



EECO System[®]

2000 Series Console *Operation Manual*

OPW Fuel Management Systems - System and Replacement Parts Warranty Statement

Effective September 1, 2002

System and Replacement Parts Warranty

OPW Fuel Management Systems warrants that all OPW Tank Gauge and Petro Vend Fuel Control systems supplied by OPW Fuel Management Systems to the Original Purchaser will be free from defects in material and/or workmanship under normal use and service for a period of 12 months from the date of installation or 15 months from the date of shipment. Additionally, OPW Fuel Management Systems warrants that all upgrades and replacement parts (new and remanufactured) supplied by OPW Fuel Management Systems will be free from defects in material and workmanship under normal use and service for a period of 90 days from the date of installation or for the remainder of the system's original warranty, whichever is greater, as set forth in the first sentence of this statement. The foregoing warranties will not extend to goods subjected to misuse, neglect, accident, or improper installation or maintenance or which have been altered or repaired by anyone other than OPW Fuel Management Systems or its authorized representative.

The buyer's acceptance of delivery of the goods constitutes acceptance of the foregoing warranties and remedies, and all conditions and limitations thereof.

If a claim is made within the warranted time period that any equipment and/or remanufactured part is defective in material or workmanship under normal use and service, such equipment and/or remanufactured part shall be returned to OPW Fuel Management Systems, freight prepaid. If such equipment or remanufactured part is found by OPW Fuel Management Systems in its sole judgment, to be defective in material or workmanship under normal use and service, OPW Fuel Management Systems, shall, at its sole option, repair or replace such equipment and/or remanufactured part (excluding, in all instances, fuses, ink cartridges, batteries, other consumable items, etc.)

The warranties, as set forth above, are made expressly in lieu of all other warranties, either expressed or implied, including, without limitation, warranties of merchantability and fitness for any particular purpose and of all other obligations or liabilities on OPW Fuel Management Systems part. Further, OPW Fuel Management Systems neither assumes, nor authorizes any other person to assume for it, any other liability in connection with the sale of the systems, or any new/replacement part that has been subject to any damage from any act of nature or any *force majeure*.

The term "Original Purchaser" as used in these warranties shall be deemed to mean the authorized OPW Fuel Management Systems distributor to which the system or any new/replacement part was originally sold. These warranties may be assigned by the original purchaser to any of its customers who purchase any OPW Fuel Management Systems systems or new/replacement parts.

The sole liability of OPW Fuel Management Systems, for any breach of warranty, shall be as set forth above. OPW Fuel Management Systems does not warrant against damage caused by accident, abuse, faulty or improper installation or operation. In no event shall manufacturer's liability on any claim for damages arising out of the manufacture, sale, delivery or use of the goods exceed the original purchase price of the goods. In no event shall OPW Fuel Management Systems be liable for any direct, indirect, incidental or consequential damage or loss of product.

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Introduction

The EECO SYSTEM[®] 2000 from OPW Fuel Management Systems monitors up to eight tanks (using magnetostrictive probes), 24 EECO Choice[®] sensors (installed in dispenser pans, STP sumps, wet or dry interstitial spaces of double wall tanks and/or monitoring wells), and eight pressurized lines.

Options include dispenser power control, internal 2400 baud modems, internal modems with 9600 baud fax capability, RS-232 serial communication boards and multi relay boards for external control.

Help Instructions

The EECO 2000 EECO GUIDE[®] prints instructions for the operator to follow when an alarm or system trouble occurs. These instructions list each step required to acknowledge the condition, silence alarms, and verify the alarm condition.

You can customize environmental and technical messages with a contact name and phone number specific to the alarm type.

The Help Instructions can be turned off or on in the general site setup.

Tank Level Monitor

The EECO 2000 Tank Level Monitor (TLM) monitors underground storage tanks. The leak test uses level and temperature measurements to assess tank volume in temperature compensated volume.

The test starts after a product delivery when the product has stabilized (temperature and surface area). Product dispensing may continue during the stabilization period (at least one hour between last product dispensation and manual leak test start).

Before testing, product level must be between 14% and 95% of tank capacity. Actual test time depends on product level and tank capacity.

You can manually select the test to start and run one time. Or, you can program the system to run the test daily, weekly, or monthly, or run in continuous mode (start automatically after dispensing product). See *page 45* for manual leak test.

See *page 15* for information about Tank Level Monitor reports.

Leak Sensor

The EECO 2000 Leak Sensor feature detects fuel and water in secondary containment vessels at fuel storage sites. The system provides accurate, automatic fuel sensing capabilities while continuously monitoring each sensor channel for abnormal conditions.

The leak sensor monitors up to 24 EECO Choice sensors. These sensors detect water and/or product in sumps, dispenser pans, interstitial spaces, and monitoring wells. EECO Standard sensors are also available for other applications.

Program the Leak Sensor through the main console to indicate alarm and trouble conditions, like leaks in interstitial walls or double-walled piping runs. See *page 65* for the difference between “Trouble” and “Alarm”.

When alarms or troubles occur, the main console sounds an alarm, displays the alarm or trouble name, lights a red or yellow LED and writes the event to the history log.

Line Leak Detector

The **Line Leak Detector** option monitors pressurized underground pipes for leaks. It includes a driver board, an interface assembly in the main console and sensors in each pressurized pipe. Each LLD option monitors four lines. You can install two LLD options to monitor up to eight pipes.

When problems occur, the system displays trouble codes (*page 65*). Detectable leaks (below Pump Shutoff threshold) cause a **Leaking Alarm** indication -- the event is recorded in the History Log.

Press the [SILENT] key to silence the alarm.

A leak exceeding the Pump Shutoff threshold disables the submersible pump, and sounds an alarm. Do a **Pump Shutoff Retest** to clear the alarm and enable the pump.

Start the LLD Precision Leak Test manually, or schedule it to start at a selected time daily, weekly, or monthly for automatic testing. Or, run it in continuous mode.

Manual precision line tests disable the pump and prevent product dispensation during the test.

Continuous precision line test attempts occur each time the pump shuts off after dispensing product. The system terminates the test if someone actuates a dispenser to pump product.

The LLD controller operates the pumps occasionally during the precision leak test. LLD testing can be suspended for non 24 hour stations if it is necessary to remove power to the submersible pumps. If testing is not sus-

pended and the LLD tries to energize the pumps when there is no AC power available, a 'Pump Fail' will be indicated.

Important

*The submersible pump AC circuit breaker must ALWAYS be ON for the LLD to control the submersible pumps during leak testing (unless **Suspend LLD Testing** is enabled).*

System Operation

System operation is menu driven for easy operation. Only active system features appear on the menus. For example, if the Multi Relay option is not installed, Multi Relay information does not appear in any menu or report.

Select operation mode (display, print, or change) with the [DISPLAY], [PRINT] or [CHANGE] keys.

Then, select sub-options with the [STATUS], [HISTORY], [LEAK TEST], or [SETUP] key. Use the UP or DOWN keys to move to (or display) the available selections and the [ENTER] key to make the selection.

The [CANCEL] key returns you to the previous operation.

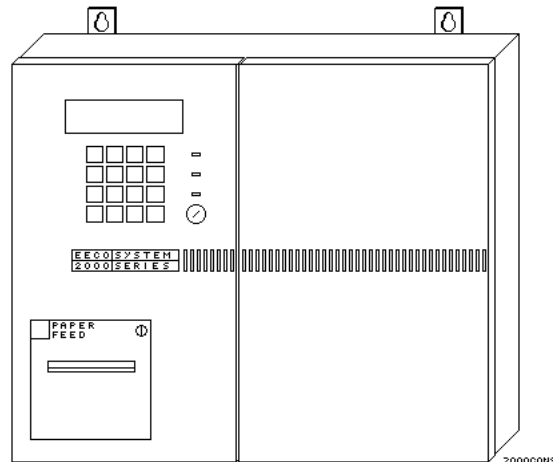


Figure 1: EECO 2000 Console

System Features

Display - The display is a 2 line by 20 character back-lit LCD module.

Printer - 35 column impact printer.

Keypad - 16 keys for complete control of the system.

LED Indicators - Three front-panel LEDs indicate System Status.

- *Green* - Normal Operation
- *Yellow* - Hardware Trouble
- *Red* - Alarm Condition

Note

It is possible for a red and a yellow LED to be ON at the same time if a trouble is detected in one section of the system and an alarm is active for another section not affected by the trouble.

Reset Key - Clears alarm and trouble condition indicators. Indications return until the alarm/trouble problem has been corrected. *SYSTEM MANAGERS* -- Remove and secure the reset key to prevent unauthorized people from resetting the system.

System Relay - The relay responds to all alarm and trouble conditions.

Relay Board - You can install and program one or two optional multi relay boards to respond to any alarm or combination of alarms. Each contact is rated for a maximum of 10 Amps, 277 VAC.

Dispenser Power Control - Interrupts dispenser power if product (or high water) is detected in the dispenser pan.

RS-232 Serial Communication - This option includes three ports: LOCAL -- for local devices like POS terminals and computers. PASSTHRU -- A pass through port provides connection for a second serial device. MODEM -- for a Hayes compatible modem (the MODEM port cannot function as a second local port).

Internal Modem - Performs the function of both the RS-232 Serial board and the external modem, and is available with FAX capabilities.

Autodial Alarm Reporting - Calls a remote monitoring computer or fax machine when alarms or troubles occur. The report is sent immediately over a dedicated phone line. With a shared phone line, the report is sent when the line is clear.

Custom Labels - You can label each input with up to 10 characters to identify sensor or probe location. Examples: TANK #1, UNLEAD REG, WELL #1, PUMP #3. The station owner enters these at start-up.

History - For troubleshooting, the history event queue stores up to 250 events. When the queue is full, the next event overwrites the oldest.

Auto Reports - Send up to four daily reports to the system printer, modem port, local port, or internal fax/modem. If modem or fax (port) is selected, the report will be sent at the programmed time, regardless of the auto answer setting.

Alarm Condition Abbreviations

Abbreviations listed below are used to display alarm conditions.

HI PRO= TLM High Product Alarm

LO PRO = TLM Low Product Alarm

HI WAT = TLM High Water Alarm

LEAK=TLM Failed Leak Test

THEFT=TLM Fuel Removed From Tank

ALARM = Leak Sensor Alarm

FUEL= Leak Sensor Fuel Detected

WATER=Leak Sensor Water Detected

HI WAT=LS High Water Float Detected

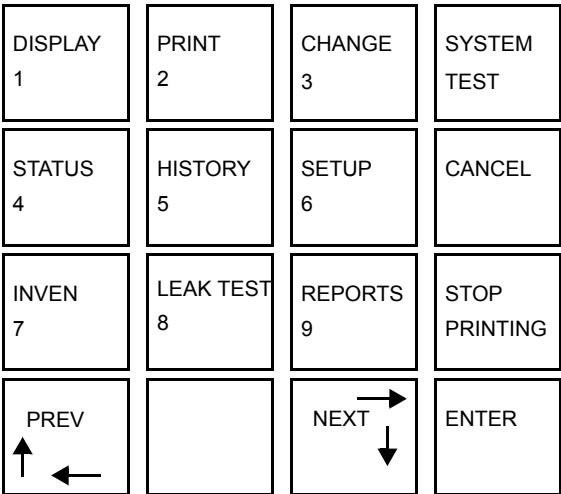
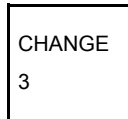


Figure 2: EECO 2000 Keypad

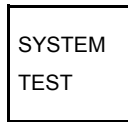
Operation Mode Keys

Each key activates a series of menus and sub-menus to select the desired system function.

<div>DISPLAY 1</div>	Press to activate the Display mode and allow selection of the Status, History, Leak Test, or Setup menus.
<div>PRINT 2</div>	Press to activate the Print mode and allow selection of the Status, History, Leak Test, or Setup menus.

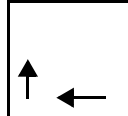


Press to activate the Change mode and allow selection of the Leak Test or Setup menus.

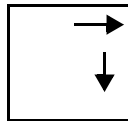


Press [SYSTEM TEST] [ENTER] for System Test. Press [SYSTEM TEST] [0] for Field Service Tests. Press [SYSTEM TEST] [1] to change language version.

Cursor Control Keys

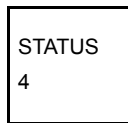


Press to move right or down while changing the information in setup.

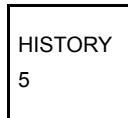


Press to move left or up when changing information in setup.

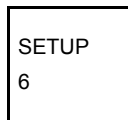
Menu Keys



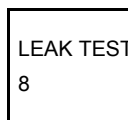
Press to show the status selections that are available in the first menu level of the Display, Print, or Change mode.



Press to show the history selections that are available in the first menu level of the Display or Print mode.



Press to show the setup selections that are available in the first menu level of the Display, Print, or Change mode.



Press to show the leak test selections that are available in the first menu level of the Display, Print, or Change mode.

Special Control Keys

SILENT	Press to silence the local audible alarm. Pressing this key does not clear the display. New alarms will activate the audible alarm again.
CANCEL	Press to exit from the selected menu level. When changing parameters, pressing this key before the [ENTER] key will leave memory unchanged.
ENTER	Press to select the displayed item. Use to select sub menu, start printing, or store new parameters into memory.DISPLAY Function

The display function is initiated by pressing the [DISPLAY] key. The four options (Status, History, Leak Test or Setup) are shown on the display and correspond to the [STATUS] [HISTORY] [LEAK TEST] and [SETUP] keys. The [CANCEL] key is used to return to the previous level.

If information is displayed in the alternate language, press [SYSTEM TEST] [1] to change to the desired language.

Display Status (Menu)

Press [] to move from TANK LEVEL MONITOR to LEAK SENSORS to LINE LEAK DETECTOR to AUTO DISPLAY (ALL). Press [ENTER] to select the desired (displayed) menu selection.

DISPLAY STATUS MENU	
TANK LEVEL MONITOR	
INVENTORY STATUS	
PRODUCT LEVEL	
GROSS VOLUME	
NET VOLUME	
PRODUCT TEMPERATURE	
ULLAGE	
WATER LEVEL	
↓ WATER VOLUME	
AUTO DISPLAY (ALL)	
DELIVERY STATUS	
WATER REMOVAL STATUS	
↓ ALARM STATUS	
AUTO DISPLAY (ALL)	
LEAK SENSORS	
LINE LEAK DETECTOR	
AUTO DISPLAY (ALL)	

- If TANK LEVEL MONITOR is selected, press [] to move from INVENTORY STATUS to DELIVERY STATUS to WATER REMOVAL STATUS to ALARM STATUS to AUTO DISPLAY (ALL). Press [ENTER] to select the desired (displayed) menu item.

A third menu level is available under INVENTORY STATUS.

Display History (Menu)

Press [] to move from ALL EVENTS to TLM EVENTS ONLY to LS EVENTS ONLY to LLD EVENTS ONLY to SYSTEM EVENTS ONLY. Press [ENTER] to select the desired (displayed) menu item.

DISPLAY HISTORY MENU

ALL EVENTS
TLM EVENTS ONLY
LS EVENTS ONLY
LLD EVENTS ONLY
SYSTEM EVENTS ONLY

Display Leak Test (Menu)

Press [] to move from TANK LEVEL MONITOR to LINE LEAK DETECTOR to AUTO DISPLAY (ALL). Press [ENTER] to select the desired (displayed) menu item.

DISPLAY LEAK TEST MENU

TANK LEVEL MONITOR
LINE LEAK DETECTOR
AUTO DISPLAY (ALL)

Display Setup (Menu)

Press [] to move from GENERAL SITE SETUP to TANK LEVEL MONITOR to LEAK SENSOR to LINE LEAK DETECTOR to MULTI RELAY to AUTO-DIAL ALARM REPORTS to AUTO REPORTS to AUTO DISPLAY (ALL). Press [ENTER] to select the desired (displayed) menu item.

DISPLAY SETUP MENU OPTIONS

GENERAL SITE SETUP
TANK LEVEL MONITOR
LEAK SENSOR
LINE LEAK DETECTOR
MULTI RELAY
AUTO-DIAL ALARM REPORTS
AUTO REPORTS
AUTO DISPLAY (ALL)

PRINT Function

The print function is initiated by pressing the [PRINT] key. The four options (Status, History, Leak Test or Setup) are shown on the display and correspond to the [STATUS] [HISTORY] [LEAK TEST] and [SETUP] keys. The [CANCEL] key is used to return to the previous level.

Print Status (Menu)

Press [] to move from TANK LEVEL MONITOR to LEAK SENSOR to LINE LEAK DETECTOR to PRINT ALL to ABORT PRINTING. Press [ENTER] to select the desired (displayed) menu item.

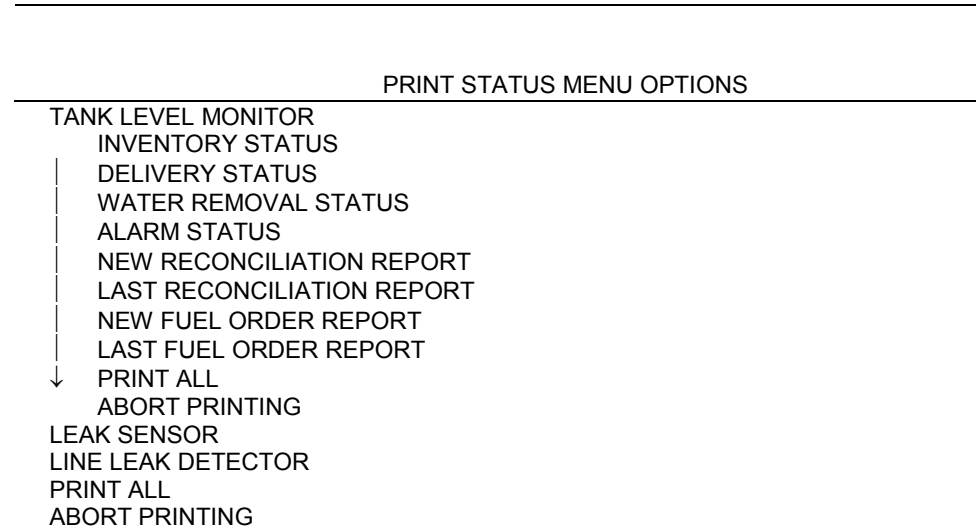


Figure 3: Print Status menu

If TANK LEVEL MONITOR is selected, press [] to move from INVENTORY STATUS to DELIVERY STATUS to WATER REMOVAL STATUS to ALARM STATUS to NEW RECONCILIATION REPORT to LAST RECONCILIATION REPORT to NEW FUEL ORDER REPORT to LAST FUEL ORDER REPORT to PRINT ALL to ABORT PRINTING. Press [ENTER] to select the desired (displayed) menu item.

Print History (Menu)

Press [] to move from ALL EVENTS to TLM EVENTS ONLY to LS EVENTS ONLY to LLD EVENTS ONLY to SYSTEM EVENTS ONLY to PRINT EVENTS BY DATE to ABORT PRINTING. Press [ENTER] to select and print the desired (displayed) menu selection.

PRINT HISTORY MENU OPTIONS
ALL EVENTS
TLM EVENTS ONLY
LS EVENTS ONLY
LLD EVENTS ONLY
SYSTEM EVENTS ONLY
PRINT EVENTS BY DATE
ABORT PRINTING

Figure 4: Print History menu

Print Leak Test (Menu)

Press [] to move from PRINT ALL to TANK LEVEL MONITOR to LINE LEAK DETECTOR to ABORT PRINTING. Press [ENTER] to select the desired (displayed) menu selection.

PRINT LEAK TEST MENU OPTIONS
PRINT ALL
TANK LEVEL MONITOR
PRINT ALL
CURRENT TEST STATUS
↓ LAST PASSED TEST
↓ LAST TEST RAN
LEAK TEST HISTORY
LINE LEAK DETECTOR
PRINT ALL
CURRENT TEST STATUS
↓ LAST PASSED TEST
LEAK TEST HISTORY
ABORT PRINTING

Figure 5: Print Leak Test menu

If Tank Level Monitor or Line Leak Detector are selected, press [] to move from PRINT ALL to CURRENT TEST STATUS to LAST PASSED TEST to LAST TEST RAN to LEAK TEST HISTORY.

Print Setup (Menu)

Press [] to move from PRINT ALL to GENERAL SITE to TANK LEVEL MONITOR to LEAK SENSOR to LINE LEAK DETECTOR to MULTI RELAY to AUTO-DIAL ALARM REPORTS to AUTO REPORTS to ABORT PRINTING. Press [ENTER] to select the desired (displayed) menu selection.

PRINT SETUP MENU OPTIONS
PRINT ALL
GENERAL SITE
TANK LEVEL MONITOR
LEAK SENSOR
LINE LEAK DETECTOR
MULTI RELAY
AUTO-DIAL ALARM REPORTS
AUTO REPORTS
ABORT PRINTING

Figure 6: Print Setup Menu

Automatic Reports

Automatic reports are printed at the conclusion of the event. These automatic reports include delivery reports, water removal reports, and leak test results (if manual leak test is selected).

Delivery Report

The delivery report is printed automatically approximately two minutes after the end of the delivery. This report includes the total gross and net

volume added to the tank plus the starting and ending inventory report but does not account for fuel dispensed during the delivery process.

STATION NAME HERE		
STREET ADDRESS		
CITY, STATE, ZIP		
PHONE NUMBER		
V22.04		
11-07-94 09:15:00		
TANK 1 REGULAR		
DELIVERY REPORT:		
GROSS VOLUME:	5201.47	US GAL
NET VOLUME:	5216.52	US GAL
START		
11-07-94 10:15:15		
PRODUCT LEVEL:	28.02	"
GROSS VOLUME:	2421.47	US GAL
NET VOLUME:	2411.24	US GAL
PRODUCT TEMP:	67.18	°F
ULLAGE (TO 95%):	6819.43	US GAL
WATER LEVEL:	0.12	"
WATER VOLUME:	1.82	US GAL
STOP:		
11-07-94 10:30:20		
PRODUCT LEVEL:	66.57	"
GROSS VOLUME:	7623.94	US GAL
NET VOLUME:	7627.76	US GAL
PRODUCT TEMP:	58.96	°F
ULLAGE (TO 95%):	1619.18	US GAL
WATER LEVEL:	0.13	"
WATER VOLUME:	1.86	US GAL

Figure 7: Automatic Delivery Report

Water Removal Report

This report will be printed approximately 2 minutes after water has been removed from the tank (following a water present alarm).

STATION NAME HERE		
STREET ADDRESS		
CITY, STATE, ZIP		
PHONE NUMBER		
V22.04		
11-07-94	09:15:00	
TANK 4 DIESEL		
WATER REMOVAL REPORT:		
VOLUME:	226.73	US GAL
START		
11-07-94	13:31:15	
PRODUCT LEVEL:	28.02	"
GROSS VOLUME:	2421.47	US GAL
NET VOLUME:	2411.24	US GAL
PRODUCT TEMP:	67.18	°F
ULLAGE (TO 95%):	6819.43	US GAL
WATER LEVEL:	5.12	"
WATER VOLUME:	231.82	US GAL
STOP:		
11-07-94	13:52:20	
PRODUCT LEVEL:	22.97	"
GROSS VOLUME:	2195.94	US GAL
NET VOLUME:	2185.76	US GAL
PRODUCT TEMP:	58.96	°F
ULLAGE (TO 95%):	9045.18	US GAL
WATER LEVEL:	0.13	"
WATER VOLUME:	1.86	US GAL

Figure 8: Water Removal Report

Leak Test Report

This report is automatically printed at the conclusion of a manually scheduled leak test or when requested as 'Last Test Ran' under 'Print Leak Test'. The report will show either passed or failed results. for other leak test reports.

```

STATION NAME HERE
STREET ADDRESS
CITY, STATE, ZIP
PHONE NUMBER
V22.04A

04-17-95      03:32:00

LEAK TEST REPORT
TANK 1 REGULAR

TEST TYPE:      MANUAL, 0.1 GPH
THRESHOLD:      0.05
CONFIDENCE LEVEL:      96/4
LAST DELIVERY:   04-15-95  18:45
TANK CAPACITY:   548      US GAL
% FULL VOLUME:   63
TEST START TIME: 10:40
TEST LENGTH:     1.45 HOUR(S)
PROD LEVEL CHANGE: 0.0300 "
PROD GROSS CHANGE: 0.050 US GAL
PROD NET CHANGE:  -0.040 US GAL
PROD TEMP CHANGE -0.20 °F
RTD 1 CHANGE     0.02 °F
RTD 2 CHANGE     0.02 °F
RTD 3 CHANGE     0.02 °F
RTD 4 CHANGE     0.02 °F
RTD 5 CHANGE     0.02 °F
WAT LEVEL CHANGE: 0.0030 "
WAT VOLUME CHANGE: 0.002 US GAL
COEFF 1:         0.3400
COEFF 2:         0.0540

TEST RESULT:  FAILED or PASSED
LEAK RATE:    0.10 GPH
(VOLUME IS DECREASING.)
  
```

Figure 9: Leak Test Report

Note

Coeff 1 and Coeff 2 are for use by factory service personnel only.

Print On Demand Reports

The operator may choose to print any of the following reports at any time by pressing the keys shown with each example.

Print Inventory Status

Press [PRINT] [STATUS] [ENTER] [ENTER] to print a new inventory status report (*Figure 10*)

```
STATION NAME HERE
STREET ADDRESS
CITY, STATE, ZIP
PHONE NUMBER
V22.04

11-07-94 09:15:00

TLM INVENTORY STATUS REPORT:

TANK 1 REGULAR
PRODUCT LEVEL:      28.02  "
GROSS VOLUME:      2421.79  US GAL
NET VOLUME:        2411.64  US GAL
PRODUCT TEMP:       67.18  °F
ULLAGE (TO 95%):    6819.21  US GAL
WATER LEVEL:        0.06  "
WATER VOLUME:       0.18  US GAL

(repeats for each tank)
```

Figure 10: On-Demand inventory Status

The information shown for tank 1 in *Figure 10* is repeated for each tank.

Print Reconciliation Report

Press [PRINT] [STATUS] [ENTER] [↓] [↓] [↓] [↓] [ENTER] to print a new reconciliation report (*Figure 11*).]

STATION NAME HERE		
STREET ADDRESS		
CITY, STATE, ZIP		
PHONE NUMBER		
V22.04		
11-07-94 09:15:00		
RECONCILIATION INFORMATION REPORT:		
TANK 1 REGULAR		
OPENING:	11-06-94	06:00:00
CLOSING:	11-07-94	06:00:00
OPENING (NET):	3625.03	US GAL
CLOSING (NET):	4685.60	US GAL
OPENING (GROSS):	3615.10	US GAL
CLOSING (GROSS):	4675.79	US GAL
NET DELIVERIES:	8500.65	US GAL
GROSS DELIVERIES:	8473.11	US GAL
NET USAGE:	7440.15	US GAL
GROSS USAGE:	7412.27	US GAL
NOTE: ESTIMATED USAGE DOES NOT		
ACCOUNT FOR PRODUCT DISPENSED		
DURING DELIVERIES.		

Figure 11: On Demand Reconciliation Report

The information shown for tank 1 in *Figure 11* will be repeated for each tank.

Note

Printing a 'new' reconciliation report will start a new time period for the next report. This action will cause the totals on a scheduled reconciliation report to be incomplete.

Pressing [↓] one additional time before pressing [ENTER] will print the last reconciliation report without starting a new time period.

Print Delivery Status Report

Press [PRINT] [STATUS] [ENTER] [↓] [ENTER] to print a delivery status report. Includes the summary of the last 10 deliveries for each tank.

STATION NAME HERE
STREET ADDRESS
CITY, STATE, ZIP
PHONE NUMBER
V22.04
11-07-94 09:15:00
TLM DELIVERY STATUS REPORT:
TANK 1 REGULAR
11-07-94 09:15:00
GROSS VOLUME: 5201.15 US GAL
NET VOLUME: 5216.86 US GAL
11-04-94 17:25:00
GROSS VOLUME: 6507.96 US GAL
NET VOLUME: 6523.79 US GAL
(up to 10 reports per tank, repeats for all tanks)

Figure 12: On Demand Delivery Status Report

Print TLM Alarm Status

This report gives the present alarm and trouble status for each tank.

Press [PRINT] [STATUS] [ENTER] [↓] [↓] [↓] [ENTER] to print a TLM alarm report.

STATION NAME HERE
STREET ADDRESS
CITY, STATE, ZIP
PHONE NUMBER
V22.04
11-06-94 09:15:00
TLM ALARM STATUS REPORT:
TANK 1 REGULAR
NORMAL
TANK 2 PLUS
NORMAL
TANK 3 SUPER
LOW PRODUCT

Figure 13: On Demand Alarm Status Report

Print Leak Sensor Status

This report gives the present alarm and trouble status for each sensor. Press [PRINT] [STATUS] [↓] [ENTER] to print a leak sensor status report (*Figure 14*).

```

STATION NAME HERE
STREET ADDRESS
CITY, STATE, ZIP
PHONE NUMBER
V22.04

11-07-94      09:15:00

LEAKSENSOR STATUS REPORT:

CHANNEL 1 IMO
REG NL SMP
WATER
11-01-94   06:08:35

CHANNEL 2 IMO
PLUS
NORMAL

CHANNEL 3 IMO
SUPER SMP
NORMAL
  
```

Figure 14: On Demand Leak Sensor Status Report

Print Fuel Order Report

This report gives the average daily product usage, total and usable inventory, remaining fuel supply in days, and the maximum order amount at the time the report is generated.

Press [PRINT] [STATUS] [ENTER] [↓][↓][↓][↓][↓] [↓] [ENTER] to print the fuel order advisory report (*Figure 15*).

```

STATION NAME HERE
STREET ADDRESS
CITY, STATE, ZIP
PHONE NUMBER
V22.04
11-07-94      06:00:00
FUEL ORDER ADVISORY
TANK 1 REGULAR

DATE AND TIME: 11-07-94 06:00:00
-----
AVG DAILY SALES:      3125.06  US GAL
% OF TOTAL SALES:      62      %
TOTAL INVENTORY:      5347.24  US GAL
USABLE INVENTORY:      4925.98  US GAL
APPRX FUEL SUPPLY:      1.57    DAYS
MAX SAFE ORDER:      4653.76  US GAL
  
```

Figure 15: On Demand Fuel Order Report

Manifold Tank Report Changes

Activating Manifold Tank Groups causes additions and changes to the standard reports.

TANK GROUP1 REGULAR GROSS VOLUME: 2421.75 US GAL NET VOLUME: 2411.42 US GAL ULLAGE (TO 95%): 6819 US GAL WATER VOLUME: 0.45 US GAL	(TLM Inventory Status)
TANK GROUP 1 REGULAR DELIVERY REPORT: GROSS VOLUME: 5201.68 US GAL NET VOLUME: 5216.45 US GAL START: 11-06-94 10:15:15 GROSS VOLUME: 2421.36 US GAL NET VOLUME: 2411.57 US GAL ULLAGE (TO 95%): 6819.34 US GAL STOP: 11-06-94 10:30:20 GROSS VOLUME: 762377 US GAL NET VOLUME: 7627.65 US GAL ULLAGE (TO 95%): 1619.90 US GAL	(Automatic Delivery Report)

Figure 16: Manifoldded Report

TLM Inventory Status Report is unchanged except for the addition of the combined inventory for the tanks in the tank group.

Automatic Delivery Report is changed to print a tank group combined report.

Print Event History

The system event history may be printed to facilitate system servicing. The history may be printed by All Events, TLM Events, Leak Sensor Events, System Events, or by Date. A sample report is shown here.

STATION NAME HERE
STREET ADDRESS
CITY, STATE, ZIP
PHONE NUMBER
22.04
11-07-94 09:15:00
EVENT HISTORY
ALL EVENTS
LOCAL SETUP CHANGED
11-07-94 20:48:19
CH 1 REG NL SMP IMO
WATER
11-07-94 20:47:57
AC POWER ON
11-07-94 13:24:14

Figure 17: Event History Report

Print TLM Leak Tests

Note

Leak tests not scheduled to run (example -- if the 0.1 precision test is not scheduled to run) do not appear on the reports.

The selections available for printing leak test information include Current Test Status, Last Passed Test, Leak Test History, and Print All. A selection of each is listed here.

```

STATION NAME HERE
STREET ADDRESS
CITY, STATE, ZIP
PHONE NUMBER
V22.04

11-07-94      09:15:00

CURRENT TLM LEAK TEST
STATUS:

TANK 1  REG. NL
        NOT RUNNING

TANK 2  DIESEL
        RUNNING

*****

LAST SUCCESSFUL TLM LEAK TEST:

TANK 1  REGULAR

0.2 GPH TEST
11-07-94  02:19:00
PRODUCT LEVEL:      34.63  "
% VOLUME:           42    %
PRODUCT TEMP:       76.97  °F
CALCULATED RATE OF CHANGE:
-0.001
(VOLUME IS INCREASING.)

*****

TLM LEAK TEST HISTORY:

TANK 1 REGULAR

PASSED 0.2 LEAK TESTS
11-07-94  15:20
11-01-94  14:33

```

Figure 18: TLM Leak Test Report

For Print All

Press [PRINT] [LEAK TEST] [↓] [ENTER] [ENTER]

For Current TLM Leak Test Status

Press [PRINT] [LEAK TEST] [↓] [ENTER] [↓] [ENTER]

For Last Passed TLM Leak Test

Press [PRINT] [LEAK TEST] [↓] [ENTER] [↓] [↓] [ENTER]

For TLM Leak Test History

Press [PRINT] [LEAK TEST] [↓] [ENTER] [↓] [↓] [↓] [ENTER]

CHANGE Function

System parameters are initially established during system startup by factory trained service technicians. The manager's access code is required to make most changes to the system. The initial manager's access code is preset at the factory to 12345. This code should be changed by the manager to prevent un-authorized changes to the system operation. Use the new code in the following procedures instead of [12345].

When entering numbers or letters in the following procedures, press [↓] or [↑] to scroll through the available characters. The character sequence is displayed in the following block:

```
! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; @ A B C
(through) X Y Z [ \ ] ^ _ space
```

Press [→] or [←] to move to the next or previous character position. Press [ENTER] to accept the changes. If "XXX" is displayed, enter numbers and decimals direct from keypad.

Change Date And Time

The time of day must be changed to accommodate daylight savings time.

1. Press [CHANGE] [SETUP] [*access code*] [ENTER]
2. Press [ENTER] [CHANGE], the first digit of the date flashes.
3. Press [→] to move to the digit that is to be changed.
4. Press [↓] or [↑] for the desired value. Press [→] to move one digit to the right. Repeat this step until the desired values are displayed.
5. Press [ENTER] to store the changes in memory or [CANCEL] to exit without storing changes to memory.

Change Manager's Code

Use the existing manager's access code to gain access to this procedure.

1. Press [CHANGE] [SETUP] [*access code*] [ENTER] [ENTER] [↓] [↓].
2. Press [CHANGE]. Enter the five numbers of the new code. **xxxxx** will be displayed, one for each digit.
3. Press [ENTER]. Enter the five numbers of the new code in a second time. **xxxxx** will be displayed.
4. Press [ENTER]. If the new code was repeated incorrectly you'll see an error. Reenter and press [ENTER] again.
5. Press [↓] to continue or [CANCEL] [CANCEL] to exit.

Change Header Line

The header lines contain site identification that goes in each printed report.

1. Press [CHANGE] [SETUP] [access code] [ENTER] [ENTER] [↓] [↓] [↓]:
2. Press [CHANGE], the first digit of the header will flash.
3. Press [↓] or [↑] to display the desired value or press [→] to move right to the digit that is to be changed.

Note that [←] key moves the flashing indication 1 digit to the left. Make all the changes to the header line.

4. Press [ENTER] to store the changes in memory or [CANCEL] to exit without storing changes to memory.
5. Press [↓] to move to the next header line or [CANCEL] twice to exit.

Change Auto Reports

1. Press [CHANGE] [SETUP] [access code] [ENTER].
2. Press [↓] until you see **AUTO REPORTS**.
3. Press [ENTER] [CHANGE], **INACTIVE** flashes. Press [↓] to change to **ACTIVE**.
4. Press [↓] [ENTER], the first digit of the time will flash.
5. Press [↓] or [↑] to display the desired value. Press [→] to move right to the next digit. Repeat until time is correct, press [ENTER].
6. Press [↓]. To select the report destination, press [CHANGE]. Press [↓] until the desired destination (printer, local port, modem port or fax) is displayed. Press [ENTER] to select.
 - If **PRINTER** is selected, press [↓] and go to step 10.
7. Press [↓] to display modem port or local port.
8. Press [↓]. You have a choice of computer or viewable format. EECO-TALK requires the setting to be computer format. Viewable format is used for 'off the shelf' computer packages.
9. Press [CHANGE], computer format will flash. Press [↓] [ENTER] to change to viewable format. Press [↓] to set auto report number 2 through 4.
10. Press [↓]. Each available selection for the options installed in the system will be presented in the following screens. A sample screen is shown on the right and the possible options are:

Tank/Line Leak Test

The EECO 2000 tank and line leak test may be set to run automatically after each dispensing action (Continuous), started manually by the operator, or scheduled to run automatically daily, weekly, or monthly. Locate Tank Level Monitor or Line Leak Detector when changing the setup.

Change Leak Test (Menu)

If the continuous leak test mode is selected, the following 'change leak test' menu will be limited to **START AND RUN ONE TIME**.

Note: ↓ indicates pressing [↓] to move (in a vertical column) from the item above the ↓ to the item below the ↓.

Run Manual Leak Test

1. Press [CHANGE] [LEAK TEST] [ENTER]
2. Press [ENTER]
3. Press [ENTER]
4. Press [CHANGE] **NO** flashes. Press [↓] then [ENTER] to start test now or:
5. Press [↓] **AT** flashes.
6. Press [→], first digit of time flashes, set test start time.
7. Press [ENTER] to save time. Repeat for other tanks.
8. Press [CANCEL] three times to exit.

Set Daily Run Time

Note: Available only if system was set to MANUAL during startup.

1. Press [CHANGE] [LEAK TEST] [ENTER]
2. Press [ENTER]
3. Press [↓]
4. Press [ENTER] [CHANGE]. **NO** flashes.
5. Press [↓], **AT** flashes.
6. Press [→], first digit of time flashes, set test start time.
7. Press [ENTER] to save time. Repeat for other tanks.
8. Press [CANCEL] twice to exit.

Set Weekly Run Time

Note

Available only if system was set to MANUAL during startup.

1. Press [CHANGE] [LEAK TEST] [ENTER]
2. Press [ENTER]
3. Press [↓] [↓]
4. Press [ENTER] [CHANGE] **NO** flashes.
5. Press [↓], **ON** flashes.
6. Press [→], the day flashes, press [↓] to change day of the week.
7. Press [→], first digit of time flashes, set the test start time (instructions on *page 23*).
8. Press [ENTER] to save time. Repeat for other tanks.
9. Press [CANCEL] three times to exit.

Set Monthly Run Time

Note

Available only if system was set to MANUAL during startup.

1. Press [CHANGE] [LEAK TEST] [ENTER]
2. Press [ENTER]
3. Press [↓] [↓] [↓]
4. Press [ENTER] [CHANGE], **NO** flashes.
5. Press [↓] **ON** flashes.
6. Press [→], first digit of date flashes, set day of the month to test.
7. Press [→], first digit of time flashes, set test start time (instructions on *page 23*).
8. Press [ENTER] to save time. Repeat for other tanks.
9. Press [CANCEL] three times to exit.

Tank Leak Test Reports

The EECO 2000 TLM leak test uses level and temperature measurements to calculate tank volume in temperature-compensated gallons.

The test starts after product delivery and after product stabilization (temperature and surface area). Product dispensing can continue during the stabilization period; this period should be no less than one hour.

Product level must be between 14% and 95% of tank capacity before a leak test.

No alarms or troubles can be occurring in the tested tank.

Test duration varies due to product level and tank capacity. You can manually select the test to start and run one time, program the system to run the test at a selected time daily, weekly, or monthly, or run a test in continuous mode (the test starts automatically after dispensing product).

Select leak test precision (0.1 standard, 0.1 quick, 0.2 standard, or 0.2 quick) during system start-up.

If a manual leak test generates an **INCONCLUSIVE TEST** message the system restarts the leak test immediately to test again.

Successfully completed scheduled leak tests end with the report shown here. Test Results indicate **PASSED** or **FAILED** depending on the actual test. A leak test report is automatically generated and printed when a manual leak test finishes.

This report does not print for leak tests completed using the continuous test mode but is available as **Last Test Ran** under **Print Leak Test**. See *page 20*.

If the tank leak test is set to run in continuous mode (start automatically after dispensing product), the following events occur:

Leak test passes

- Record passed test in leak test history.
- Leak test pass report is not printed.

Leak test fails

- Activate audible alarm.
- Display leak test failed message.
- Print leak test failed message.
- Activate red alarm light.

- Record failed test in leak test history.

Note that the displayed alarm message and the red alarm LED will clear when the reset key is actuated

Sample Leak Test Report

```

STATION NAME HERE
STREET ADDRESS
CITY, STATE, ZIP
PHONE NUMBER
V004I

04-17-95      03:32:00

LEAK TEST REPORT
TANK 1 REGULAR

TEST TYPE:      MANUAL, 0.1 GPH
THRESHOLD:      0.05
CONFIDENCE LEVEL:      96/4
LAST DELIVERY:   04-15-95 18:45
TANK CAPACITY:   548      US GAL
% FULL VOLUME:   63
TEST START TIME: 10:40
TEST LENGTH:     1.45 HOUR(S)
PROD LEVEL CHANGE: 0.0300 "
PROD GROSS CHANGE: 0.050 US GAL
PROD NET CHANGE:  -0.040 US GAL
PROD TEMP CHANGE -0.20 °F
RTD 1 CHANGE     0.02 °F
RTD 2 CHANGE     0.02 °F
RTD 3 CHANGE     0.02 °F
RTD 4 CHANGE     0.02 °F
RTD 5 CHANGE     0.02 °F
WAT LEVEL CHANGE: 0.0030 "
WAT VOLUME CHANGE: 0.002 US GAL
COEFF 1:         0.3400
COEFF 2:         0.0540

TEST RESULT:  FAILED or PASSED
LEAK RATE:    0.10 GPH
(VOLUME IS DECREASING.)
  
```

Figure 19: Leak Test Report

Manual Leak Test Reports

Waiting To Start

If you see something like **LEAK TEST FOR TANK 2 WAITING TO START. PROJECTED START TIME: 19:45:00**, it means Run Test Now was selected but there's a wait time after a delivery and the test cannot start until that time has elapsed.

Incorrect Volume

If you see **LEAK TEST FOR TANK 2 CANNOT RUN DUE TO THE VOLUME IN THE TANK**, the test cannot run because the tank volume is above 95% or below 14%.

System Troubles

If you see **LEAK TEST FOR TANK 2 CANNOT RUN DUE TO TLM OR SYSTEM TROUBLE(S)**, it means hardware problems are preventing the system from performing a leak test. Call for service.

User-Aborted Test

If you see **LEAK TEST FOR TANK 2 ABORTED BY USER**, the test was terminated by the user either before a scheduled test could start or during a scheduled test.

Aborted Test Due To

If you see **LEAK TEST FOR TANK 1 ABORTED DUE TO PUMP ACTIVITY**, the test was terminated due to pump activity. This message may appear for other events, i.e., product delivery, etc.

Projected End Time

If you see **LEAK TEST FOR TANK 2 HAS STARTED. PROJECTED END TIME: 21:05:00**, the test has started and the test length has been calculated for the tank volume and level.

Inconclusive Data

If you see **LEAK TEST FOR TANK 2 FINISHED. INCONCLUSIVE DATA FOR 0.2 GPH LEAK TEST. (3)**, the test data did not produce either a passed or failed conclusion for the test. The cause of the inconclusive message is identified by the number in parenthesis (see *page 30*).

Leak Test Inconclusive Data

These codes are the possible cause of inconclusive leak test results, and appear in the Inconclusive Data Reports as: (1), (2), (3), (4), or (5).

CODE 1 - Excessive temperature changes during test.

- Recent delivery of hot or cold product.
- Large drop in product level pulled cold or hot air into tank.
- Drifting measurement (within normal range).
- Above ground tank (may not stabilize to do valid leak test).

CODE 2 - Data quality check failed. Data is not 'clean enough' to meet the P_d and P_{fa} requirements.

- Surface waves from the last delivery have not subsided. Allow extra stabilization time before start of test.
- Thermal currents within product may be large enough to effect the float stability.
- The probe float is at a transition point and is changing + or - 0.001".
- Excessive vibrations from overhead traffic.

CODE 3 & 4 - Calculated leak rates for test A and test B of leak test have excessively different results. This is usually caused by some external 'event' happening during the leak test. Code 3 = leak rate > .3 GPH. Code 4 = or < .3 GPH.

- Deflection of tank walls and ends have not yet stabilized.
- Recent large change in product level.
- Submersible pump activated during test.
- Product level measured externally with 'stick' during leak test.

CODE 5 - Product level increase without water level increase. Indicates the check valve in the submersible pump or the suction line is leaking.

External factors may cause the product level to change or the product temperature to be interpreted incorrectly (the probe position in the tank, or a wrong API Gravity specified). The system interprets this bad data as a failed leak test.

Note

External factors that cause a leak test to "fail" must be evaluated to determine the actual cause. If this evaluation does not eliminate the cause of the failed leak test, additional testing should be done to determine your course of action.

Other Factors Causing Leak Test Problems

- Incorrect probe setup and calibration causing errors in height to volume conversion.
- Obstructed vent lines causing changes in tank ends and walls as vacuum or pressure equalizes.
- Fill caps leaking (or missing) along with flooded manway allowing water to leak into tank.
- Heavy gusting winds across vent lines may cause a fluctuating pressure in tank.
- Rapidly changing water table affects the temperature and mechanical stability of a tank.
- Excessive tank pitch causing errors in converting level to volume (upper and lower areas of tank).

System Test

A system test (self-diagnostic) occurs at power-up, or when requested from the front panel. In either case, you will see **SYSTEM TEST PASSED** or **SYSTEM TEST FAILED** at the test's conclusion for two seconds. The display then goes to STANDBY mode.

If the test was requested from the front panel, the display will remain until the user presses the [CANCEL] key or one minute has passed. At that time, the display will revert to the standby mode.

If any items are found to fail, the diagnostic coded troubles, as well as a system test failed message are written to history and can be displayed or printed as desired. In addition, system or specific equipment troubles are logged and will be flashing in the standby screens.

No message is written to history if the test passes.

The system test will take approximately 8 seconds to complete and consists of the following items:

1. All display pixels turn ON, then OFF, repeatedly for the duration of the test.
2. All LEDs flash ON and OFF for the duration of the system test.
3. The horn sounds for two seconds, is silenced for five seconds, repeatedly.
4. The real time clock is checked for valid date and time. If an invalid date or time is found, date is set to 01-01-90 and/or time to 00:00:00. The clock is checked again to make sure seconds are updating.
5. All 82C55 control registers are checked.
6. The Serial DUART IC is checked for errors. If the test is being run at power-on, a simplified loop back test is performed.
7. Four pre-selected ram locations (two in each ram IC) are checked for read and write capabilities.
8. When the test is finished, the printer will print the date and time and either **SYSTEM TEST PASSED** or **SYSTEM TEST FAILED**.

Setup Procedure

Caution

This procedure is for use by trained service personnel to establish all EECO 2000 operating parameters. Some sub-procedures are not available to the operator.

All EECO SYSTEMs ship from the factory with operational parameters set to 'default' values for alarm levels.

Some users define default parameters for their installations that are pre programmed into the system during the manufacturing process. In these cases, all you need to do is check for correct entries.

Obtain site-specific information from the site manager to input into the system. Use the listing provided with this instruction to establish the desired information.

Multiple alarms may occur at initial system power-up -- all sensor and probe channels are set ACTIVE before shipment to eliminate the chance that the system will be installed, turned ON and not properly programmed.

Your first step is to deactivate all unused input channels to eliminate the trouble condition.

The EECO 2000 monitors all inputs and clears alarms and trouble indications when the RESET KEY is actuated.

System Programming

The following flow chart illustrates the selections that are available in the menus and sub menus and is used as a guide to locate system, tank monitor, leak sensor, and line leak detector parameters.

The elements are listed in the order they appear in the system. To enter setup mode from the Time/System Activated screen, press:

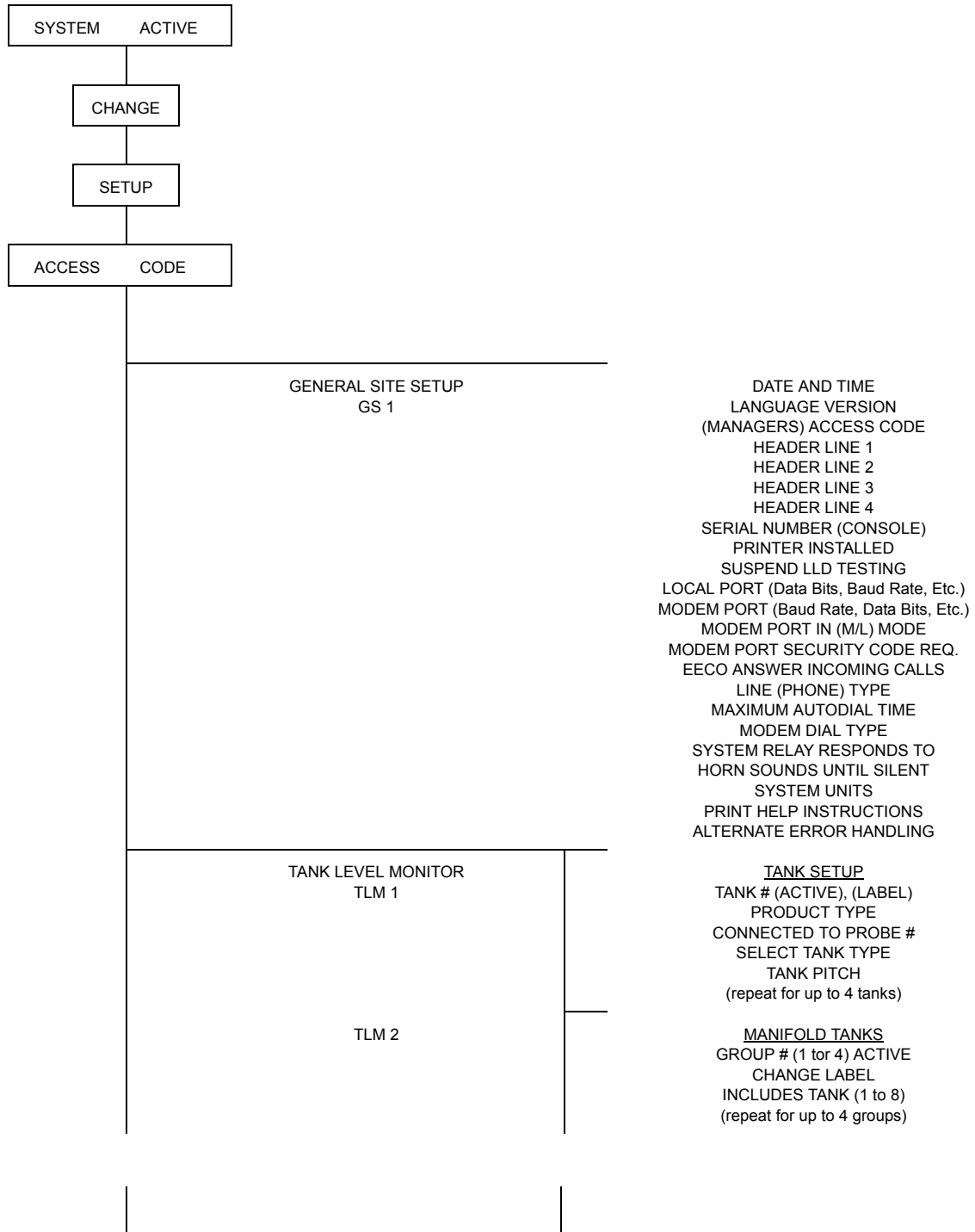
[CHANGE] [SETUP] [access code] [ENTER].

Each sub-menu section is identified in the center column with a code (GS 1, TLM 5, etc.). This code is listed in the setup instructions (starting on page 25) to provide a cross reference back to the parameter locator flowchart.

The setup procedure following the parameter flow chart is shown in the sequence that is to be followed when programming the system.

See page 23 for instructions on changing parameters.

Parameter Flow Chart



TLM 3	<u>LEAK TEST SETUP</u> PRECISION TEST MODE LEAK TEST PRECISION GROSS LEAK TEST SHUTDOWN FOR Y/M TESTING TLM GROSS TESTING STORE 0.1 GPH TESTS STORE 0.2 GPH TESTS ONLY STORE .1 TESTS > % ONLY STORE .2 TESTS > % DO .1 TESTS AFTER REQ. MET DO .2 TESTS AFTER REQ. MET
TLM 4	<u>ALARM SETUP</u> OVERFILL LEVEL TANK # HIGH PRODUCT (%) HIGH PRODUCT RELAY ACTION (Alarm) ORDER PRODUCT (%) ORDER PRODUCT (Volume) LOW PRODUCT LEVEL (%) WATER PRESENT (%) HIGH WATER ALARM HIGH WATER LEVEL (%) HI WATER SHUTDOWN PUMP ULLAGE LEVEL (%) 0.1 LEAK TEST REQ. ALARM 0.2 LEAK TEST REQ. ALARM THEFT ALARM (Start/Stop Time, level) DELIVERY THRESHOLD (GPM) (repeat for each active tank) DISPLAY/PRINT NET VOLUMES
TLM 5	<u>PROBE SETUP</u> PRODUCT FLOAT TYPE WATER FLOAT TYPE PROBE TEMPERATURE RANGE TIMING FACTOR (Gradient) PROBE SERIAL NUMBER PROBE (LENGTH) PROBE INPUT CHANNEL NUMBER FLOAT POSITIONS (For Calibration) CALIBRATE PROBE CALIBRATION FACTORS (Repeat for each probe)
TLM 6	<u>PRODUCT SETUP</u> PRODUCT # (DEFINED), (UNDEFINED) PRODUCT LABEL CTE, API, SPECIFIC GRAVITY
TLM 7	<u>TANK TABLE SETUP</u> (Do not change except under the direction of factory personnel)
TLM 8	<u>PROBE SPECIFICATIONS</u> (Do not change except under the direction of factory personnel)
TLM 9	<u>FLOAT PARAMETERS</u> (Do not change except under the direction of factory personnel)

<p>LEAK SENSOR LS 1</p>	<p><u>EECO CHOICE SENSOR SETUP</u> CHANNEL # IMO (ACTIVE) (LABEL) SENSOR TYPE If disp. pan: TIED TO DISP. If STP sump: TIED TO PUMP SUMP SENSORS SENSITIVITY DPAN SENSORS SENSITIVITY DISPENSER RELAYS ARE (NC or NO)</p>
<p>LINE LEAK DETECTOR LLD 1</p>	<p><u>PUMP SETUP</u> PUMP # (ACTIVE), (LABEL) PUMP # SENSOR ATTACHED DISABLE PUMP # FOR 3 GPH P# CONNECTED TO TK (1 to 8) PUMP # 0.1 LK TST RQ ALARM PUMP # 0.2LK TST RQ ALARM CONTIN PUMP REQUEST ACTIVE CONTIN PUMP REQUEST TIMEOUT (repeat for up to 8 lines)</p>
<p>LLD 2</p>	<p><u>LEAK TEST SETUP</u> PRECISION LEAK RATE SHUTDOWN FOR Y/M TESTING LLD PRECISION TEST MODE NUMBER RETESTS ALLOWED STORE 0.1 GPH TESTS (Y or M) STORE 0.2GPH TESTS (M or W) DO 0.1 AFTER REQ'S MET DO 0.2 AFTER REQ'S MET</p>
<p>LLD 3</p>	<p><u>MANIFOLDED PUMPS</u> GROUP # (1 to 4) ACTIVE MAIN SENSOR # INCLUDE PUMP (1 to 8) PUMP EVENLY (repeat for up to 4 groups)</p>
<p>LLD 4</p>	<p><u>CALIBRATION</u> I'FACE BD 1 EXTENDED RANGE I'FACE BD 2 EXTENDED RANGE PUMP # WIRED TO PUMP (NO) ENTER TO CALIBRATE SENSOR CALIBRATION FACTOR (1.850) (repeat for up to 8 sensors)</p>
<p>LLD 5</p>	<p><u>PIPE SETUP</u> PIPE # LABEL PIPE TYPE # RADIUS PIPE TYPE # BULK MODULUS (repeat for up to 8 types)</p>

LLD 6	<u>PUMP CONSTANTS</u> PIPE A TYPE PIPE A LENGTH PIPE B TYPE PIPE B LENGTH FLEX LENGTH ORIFICE CONSTANT (.250) COMP. CONSTANT (0.00) PUMP PRESSURE (28 PSI) (repeat for up to 8 lines)
MULTI RELAY MR 1	<u>RELAY MATRIX</u> RELAY # ACTIVE (INACTIVE) FOR: LS: (HIGH FUEL, WATER, HIGH WATER), TLM: (LEAK, HIGH PROD, THEFT, LOW PROD, .1 LT REQ, .2 LT REQ, HIGH WATER) (repeat for 1 or 5 relays)
AUTODIAL ALARM REPS AA 1	<u>AUTODIAL ALARM REPORT</u> ALARM GROUP # (1-4) ENABLE, TIME GROUP # PHONE # (20 DIGITS) FORMAT (COMPUTER/VIEWABLE) (HIGH PRODUCT, LOW PRODUCT, THEFT, HIGH WATER, TEST FAILS, TEST REQ'D, SENSOR FUEL, SNSR HI FUEL, SENSOR WATER, SENSR HI WAT, SENSOR ALARM, AND ALL TROUBLES,)
AUTO REPORTS AR 1	<u>AUTO REPORT</u> REPORT # (1-3) ACTIVE, TIME SEND TO (PRINTER, MODEM, OR LOCAL) PHONE # (20 DIGITS) FORMAT (COMPUTER/VIEWABLE)

Enter System Setup

Start at the Time/System Activated display:

Press [CHANGE] [SETUP].

Press [XXXXXX] (access code) [ENTER]. This is the entry display to set up Tank Level Monitor (below), Line Leak Detector (*page 49*), Leak Sensor (*page 55*) General Site (*page 56*), Autodial Alarm (*page 60*), Auto Reports (*page 61*), and Multi Relay (*page 62*).

Tank Level Monitor

The Tank Level Monitor Setup is divided into nine sections.

The sections for Tank Table Setup, Float Setup, and Probe specifications are pre programmed -- DO NOT CHANGE without explicit directions by factory personnel.

Install Probe #1 (as identified on the shipping tube label) in site tank #1, and connect its cable to the TLM interface input connector #1.

Before beginning you must know the **probe serial number**, **timing factor** (listed as *gradient* on the probe label) and **probe length**.

If the site has diesel tanks, the probes in those tanks must have a diesel water float installed.

Follow the sequence listed below and complete each section for all probes before proceeding to the next section. You may deactivate the input channel while programming the Probe Setup.

From General Site Setup display press [↓] until you see Tank Level Monitor display:

PRESS ↑, ↓, OR ENTER
TANK LEVEL MONITOR

Probe Setup (TLM 5)

This section stores unique probe parameters in a memory table. For example, if your site has three tanks, you should have three sets of probe parameters programmed into memory.

Parameters include float types, temperature range, timing factor (gradient), serial number, probe length, physical input channel, and float calibration.

Although these parameters are programmed at the factory, you should still verify them.

Press [ENTER] [↓] [↓] [↓] [↓], (from Tank Level Monitor display):

1. Product Float Press [ENTER]

Use the standard 4" Nytrophyl Product float in most cases except where chemicals would damage the float. Other selections are: Nitrophyl 2", Nitro. 1.48", Stainless (Steel), and Special Product floats.

2. Water Float Press [↓]

The standard 4" Nytrophyl gas/wat or dsl/wat float should be used in most cases except where chemicals would damage the float. Other selections are: Nitrophyl 2" Gas/Wat, Nitrophyl 2" Dsl/Wat, Nitro. 1.48" Gas/Wat, Nitro. 1.48" Dsl/Wat, Stainless (Steel) Water, Not Attached and Special water floats.

3. Probe Type Press [↓].

Set to Extended Range (temperature) for all stainless steel probes.

4. Timing Factor Press [↓].

The Timing Factor is listed as 'Gradient' on the probe label and will be about 9.020 microseconds per inch. This factor is used to accurately convert time to level. Change entry to the correct value.

5. Probe Serial Number Press [\downarrow].

The Probe Serial Number is listed on the probe label. Enter the correct number for probe identification on the printed setup listing.

6. Probe Specification Press [\downarrow].

The Probe Spec is the standard length of the probe. It will be 5" less than the stroke length (listed on the probe label). An 8' probe has a stroke length = 101" ($96'' + 5'' = 101''$). The one exception is the 5' probe which has a stroke length = 69". The displayed standard lengths are from 4' to 12' in 1 foot increments. The probe must be long enough to touch the tank bottom with the probe head into the riser above the top of the tank.

7. Probe Input Channel Press [\downarrow].

The Probe Input Channel # is the probe connector number (TLM 1 to TLM 4). The desired condition is: Probe #1 is installed in tank #1, it's data cable is connected to TLM 1, and its parameters setup as Probe #1.

8. Float Position For Calibration Press [\downarrow].

Position the product and water float together with the bottom of the water float flush with the end of the probe (same as standing the probe vertically on the floor). Verify setting is 3.00 and 0.00 (0.00 and 0.00 if no water float installed). Note: values change with float types.

9. Calibrate Floats Press [\downarrow].

Float calibration is required when installing a replacement probe but not usually required when installing a new system.

WARNING

DO NOT CALIBRATE IF THE PROBE IS IN THE TANK!

Press [ENTER] to read the position of the floats (as located in the step 8). The display will change to '<ENTER> TO CONTINUE' when the calibration has been completed.

10. Verify Calibration Value Press [ENTER] [\downarrow].

Calibration factor is the measured length added to a predefined value for product and water float location. The predefined values are different for each probe length to allow all calibration values to be approximately +2.75" for every size probe (4" Nytraphyl product and water float). A value *drastically* off from 2.75" means incorrect calibration or wrong length probe.

11. Press [↓] and repeat steps 1 through 10 for each tank or press [CANCEL] [CANCEL] to return to the Tank Level Monitor display.

Product Setup (TLM 6)

Six standard product types are programmed at the factory for specifying parameters for the user.

Note

Labels used here are not the same labels used in the printed reports.

The standard products are:

#	Label	CTEAPI	Sp. Gr.
1	SUP UNLEAD	0.00058520560.75467	
2	REG UNLEAD	0.00060650590.74278	
3	REG LEAD	0.00062780620.73127	
4	DIESEL	0.00045400340.85498	
5	UNLEADED +	0.00061360600.73890	
6	WATER	0.00037157101.00000	

You can define up to eight products. Change the existing six codes or add two new ones. You must know the correct CTE (Coefficient of Thermal Expansion) and either the API or Specific Gravity of the product.

CTE and API parameters are vital for accurate leak test results. Contact the factory if additional instructions are needed.

Press [ENTER] [↓] [↓] [↓] [↓] [↓], (from Tank Level Monitor display):

1. Product Defined Press [ENTER].

A product must be defined (active) here to appear for selection in Tank Setup. Press [CHANGE] [→] to modify the 10 digit label.

2. CTE (Coefficient of Thermal Expansion) Press [↓].

The stored value is a national average for the specified fuel type. When changing predefined product type to a different product, enter the correct CTE for the new product type.

3. API Press [↓].

The stored value is a national average for the specified fuel type. When changing predefined product type to a different product, enter the correct API for the new product. Sp. Gravity changes automatically.

4. Sp. Gravity Press [↓].

This value is used for chemicals. When changing predefined product type to a chemical product, enter the correct Specific Gravity for the new product. API value will be changed automatically.

9. Press [↓] and repeat steps 1 through 4 for each new product or press [CANCEL] [CANCEL] to return to the Tank Level Monitor display.

Tank Setup (TLM 1)

Use this section to activate monitoring of each tank. Define parameters unique to each tank and store them into a table in memory. Input a 10 character label that will appear on all reports, select product type, link to probe parameters established in section 7.3.1, define the tank size, and input a pitch value.

Press [ENTER] (from Tank Level Monitor display):

1. Tank Active and Label Press [ENTER].

‘Active’ activates monitoring of the tank. Input a 10 character label that will identify the product on all reports. Press [CHANGE] [→] to enable the label change process. Press [ENTER] to store the changes.

2. Product Type Press [↓].

Select one of the eight product numbers that was established in 7.3.2 (Product Setup) for the product in the tank.

3. Connected to Probe Press [↓].

Select the parameter group that was defined in 7.3.1 Probe Setup for the probe that is installed in the tank (this is not the interface input channel number). Example: Probe 1 is installed in Tank 1 and is connected to TLM Input 1 with parameters stored in Probe Setup 1.

4. Select Tank Chart Press [↓].

Select the tank type from the pre programmed selections for fiberglass tanks or enter tank sizes for horizontal or vertical flat ended steel tanks. Select from: Owens Corning Fiber, Xerxes Fiberglass, Corespan Fiberglass, CAE Fiberglass, ZCL Fiberglass, Other Fiberglass (Convault and Lifetime), Horiz Steel Cylinder, Vert Steel Cylinder, and Special User Defined.

Example 1: Select OC G-3 9410 Gallon 8' tank:

Press [CHANGE] & [↓] until you see:

Press [ENTER] [↓]. Press [ENTER] to select.

Example 2: Select a 72" X 205" Horiz. Steel tank. Locate display:

Press [CHANGE] & [↓] until you see:

Press [ENTER] [↓] to display:

Press [ENTER] to select. Input 0 0 0 0 7 2 2 0 5.

Note

Input 6 numbers (000072) for the diameter, filling the diameter field, followed by the actual length (205).

Press [ENTER]. Calculated FV (full volume), L (length), and D (diameter) are displayed.

L:205.00 D:72.00 "

5. Tank Pitch Press [↓].

Use Tank Pitch to set a product level adjustment or to change the TLM level reading to the 'stick' reading. The most accurate operation is obtained with the probe installed in the center of the tank and the pitch set to zero. Calculate the pitch change using the 'desired level' minus the TLM level and entering the result (including the sign) as the pitch.

Example: Desired level = 51.5", TLM level = 50". Pitch = 51.5" - 50" = + 1.5"

6. Repeat steps 1 through 5 for each tank in the system. Press [CANCEL] [CANCEL] to return to the Tank Level Monitor display.

Manifold Tank Groups (TLM 2)

This section is used to define manifold tank groups for reporting the total combined volume (inventory and delivery) for the group in addition to the normal tank volume. You can specify up to 4 tank groups.

Press [ENTER] [↓] (from Tank Level Monitor display):

1. Manifold Group 1 Press [ENTER]

'Active' activates monitoring of the tank. Input a 10 character label that will identify the product on all reports. Press [CHANGE] [ENTER] to enable the label change process. Press [ENTER] to store the changes.

2. Tanks Included in the Group Press [↓]

Select YES for the tanks that are linked by siphon connections. There must be at least 2 tanks selected to make a group.

Press [ENTER]. Select the second tank in the tank group.

3. Repeat steps 1 and 2 for each active tank group. Press [CANCEL] [CANCEL] to return to the Tank Level Monitor display.

Note

Isolate the tanks to perform a leak test (open siphon line to pump or shut off siphon line between the tanks).

Leak Test Setup (TLM 3)

Press [ENTER] [↓] [↓] (from Tank Level Monitor display):

1. **Precision Test Mode** Press [ENTER].

Choose from Manual, Continuous, Disabled, and Continuous-Quick.

- Manual: Schedule Daily, Weekly, Monthly, or On Demand.
- Continuous: Start standard test automatically when product is stable.
- Contin-Quick: Start quick test automatically when product is stable.

Note

Continuous Leak Test is preferred over Continuous Quick due to the increased possibility of false alarms with the 5% P_{fa} .

2. **Leak Test Precision (for Manual Leak Test)**
Press [↓].

Select 0.1, 0.2, 0.1Q (Quick), or 0.2Q (Quick) to select the manual leak test mode.

Note

Standard Leak Test is preferred over Quick Leak Test due to the increased possibility of false alarms with the 5% P_{fa} .

Repeat steps 1 and 2 for each active tank.

3. **Shutdown for Yearly/Monthly Testing** Press [↓]. (Requires LLD option)

Select YES to let the EECO SYSTEM disable the STP and test the tank automatically at the end of the month/year if test has not passed during the time period. The system will notify the operator prior to test time.

4. **TLM Gross Testing** Press [↓].

Change to ACTIVE to perform continuous 3 GPH tank test. This test is not required by the EPA.

5. Store 0.1 Tests Press [↓].

Store passed leak tests Yearly or Monthly to save either 1 test (stored yearly) or 12 tests (stored monthly) in leak test history.

6. Store 0.2 Tests Press [↓].

Store passed leak tests Monthly or Weekly to save either 12 test (stored monthly) or 52 tests (stored weekly) in leak test history.

7. Store 0.1 Test Volume Press [↓].

[Range: 14% to 95%] Store passed leak tests only if the tank volume is greater than the selected percentage. Example: California requires >50%.

8. Store 0.2 Test Volume Press [↓].

[Range: 14% to 95%] Store passed leak tests only if the tank volume is greater than the selected percentage.

9. Continue 0.1 Testing Press [↓].

Select NO to stop testing after passing the first leak test during the selected time period or YES to continue testing.

Caution

False leak test results can occur even with a Probability of False Alarm = 1%.

10. Continue 0.2 Testing Press [↓].

Select NO to stop testing after passing the first leak test during the selected time period or YES to continue testing.

Alarm Setup (TLM 4)

This section is used to establish the alarm characteristics of the system. Information must be obtained from the station owner or manager to customize the system to his requirements. The minimum and maximum values will be shown in ().

Press [ENTER] [↓] [↓] [↓] (from Tank Level Monitor display):

1. Overfill Level Press [ENTER].

(1 - 10") This alarm is used to record overfill actions that may indicate tank overfill devices are not working or improper fill procedures. The alarm indication will clear when the product level drops 5% below the alarm activation level.

2. High Product Level Press [↓].

(0% - 95%) This alarm is set to 90% when an external overfill alarm is installed at the fill area to warn the transport driver that the tank level has reached 90% full, otherwise set to 95% to reduce operator alarms.

3. High Product (alarm) Action Press [↓].

(Latch or 10 seconds and reset) This feature sets the relay action for a high product alarm. Latch keeps the relay activated until the condition clears, 10 seconds and Reset clears the alarm and deactivates the relay after 10 seconds to allow the use of one relay to activate the high product alarm for multiple tanks.

4. Order Product Level Press [↓].

(0% - 100%) Set Order Product as a percent of tank capacity or press [↓] and set as gallons. The alternate setting will adjust automatically. Use as an alarm to order product delivery.

5. Low Product Level Press [↓].

(0 - 36") Set Low Product in inches from bottom of tank. Use to disable the STP (requires LLD or multi-relay) to prevent possible pump damage from running dry. Set approximately 2" above pump intake.

6. Water Present Level Press [↓].

This alarm is used as a warning that a significant amount of water has been detected at the probe location.

7. High Water Alarm Press [↓].

Set to ACTIVE to enable the features (pump shut off) of the system (requires LLD or multi-relay) when high water is detected.

8. High Water Level Press [↓].

(0 to Tank Height) Set to desired level (at least 2" below pump intake) for water alarm. Water level measured at the probe location will be different from level measured at another opening in a tank that is not level.

9. High Water Shutdown Pump Press [↓].

Select YES if the system should disable the pump at high water level (requires LLD).

10. Ullage Press [↓].

(0 - 95%) Ullage is the safe volume required to fill the tank. This entry is the value used in calculating safe ullage on inventory reports.

11. 0.1 Leak Test Required Alarm Press [↓].

(inactive or active) When set to Active, the system will alarm at 355\25 days before going 'out of compliance' if the 0.1 leak test has not passed during the selected yearly/monthly time.

12. 0.2 Leak Test Required Alarm Press [↓].

(inactive or active) When set to Active, the system will alarm on 25\5 days before going 'out of compliance' if the 0.2 leak test has not passed during the selected monthly\weekly time.

13 Theft Alarm Press [↓].

(inactive or active) This feature is used on non 24-hour stations that want an alarm indication if product is removed from the tanks when the station is closed. If set to Active, select the Start and Stop time for the detection period, and the volume (number of gallons) for the alarm level.

14. Delivery Threshold Press [↓].

Increasing volume in the tank is monitored for a rate of increase that exceeds the value selected here. 50 GPM is selected for gravity drop from a tank truck. This setting may be too great to detect filling using a small transfer pump. (Repeat steps 1 through 14 for each active tank. Press [CANCEL] [CANCEL] to return to the Tank Level Monitor display.)

15. Display and print net volumes

Select NO to omit net volume from all printed reports and display.

Tank Table Setup (TLM 7)

This section requires data developed from tank strapping information provided by the customer to the factory. Tank table setup should be changed only under the direction of factory service personnel.

Press [ENTER] [↓] [↓] [↓][↓] [↓] [↓]. (from Tank Level Monitor display):

1. Special Table Label Press [ENTER].

Identify the table with a unique name up to 10 characters long.

2. Order of Polynomial Press [↓].

This is the order of polynomial that describes the tank.

3. Tank Height (diameter) Press [↓] (in inches)

This value specifies the tank diameter

4. Calculated Maximum Height Press [↓] (in inches) .

This value may be slightly different from the actual tank diameter.

Full Volume is the actual tank capacity in gallons.

6. Table Coefficients Press [↓] .

Enter the actual coefficients listed starting with C1 through last.

7. Repeat steps 1 through 8 for each active tank .

Press [CANCEL] [CANCEL] to return to the Tank Level Monitor display.

Probe Specifications (TLM 8)

This should be changed only under the direction of factory service personnel.

Float Setup (TLM 9)

This should be changed only under the direction of factory service personnel.

Line Leak Detector

The LLD detects leaks in pressurized lines (minimum pump pressure allowed is 24 PSI).

For temperature stability, all lines must be below ground due to temperature stability and the dispenser must be equipped with a time delay device to allow time for the LLD option to terminate any leak test that may be in process. The pump must also be equipped with a control relay where the relay is actuated through the LLD interface.

The line monitor setup is divided into 6 sections. Perform the setup in the following sequence.

FIRST....From General Site Setup (*page 56*), press [↓] until you see Line Leak Detector display:

Pump Constants (LLD 6)

The site may include 2 types/sizes of underground piping. Each type and flexible couplings must be identified with the correct total length.

Press [ENTER] [↓] [↓] [↓] [↓] [↓] (from Line Leak Detector display):

1. Pipe Type A Press [ENTER]

Select from the pipe type specified in Pipe Setup. It is important that the correct type is specified because diameters and expandability are different for each type. Contact the factory if a different type is used.

2. Pipe A Length Press [↓]

Enter the total pipe length (including parallel runs) for this line. Be as accurate as possible. This length will be used to calculate total gallons of fuel in the line.

3. Pipe Type B Press [↓]

(Only if two different pipe types are in the line) Select the pipe type from the pipes specified in Pipe Setup. It is important that the correct type is specified because diameters and expandability are different for each type. Contact the factory if you have a problem or a different type is used.

4. Pipe B Length Press [↓].

Enter the total pipe length (including parallel runs) for this line. Be as accurate as possible. This length will be used to calculate total gallons of fuel in the line.

Note

This is zero if only one pipe type is used.

5. Flex Length Press [↓]

Enter the total combined length. Note that flex lengths are commonly used at each STP and at each dispenser.

6. Orifice Constant Press [↓]

Set the orifice constant to .250 for gasoline or .230 for diesel.

7. Comp. Constant Press [↓]

The compressibility constant is always zero.

8. Pump Pressure Press [↓]

Measure the “dead head” pump pressure (pump running without dispensing product) and enter the value.

9. Repeat steps 1 through 8 for each installed pump. Press [CANCEL] [CANCEL] to return to the Line Leak Detector display.

Calibration (LLD 4)

The LLD channel should be deactivated during this calibration process.

Caution

This operation interrupts product dispensing!

The calibration plug must be installed in the end of the LLD sensor to position the piston in the center of the cylinder.

Press [ENTER] [↓] [↓] [↓] (from Line Leak Detector display):

1. Interface Board 1 Extended Range Press [ENTER] .

Set to No (not required).

2. LLD on Pump #is Not Wired to the Pump Press [↓] .

Dedicated cable must be used between the LLD sensor and the LLD Interface module. Select: 'Is Not Wired to Pump'.

3. Calibrate Sensor Press [↓] .

Initiate sensor calibration. The pump will be turned on for approximately 4 seconds to move the internal piston against the end of the calibration plug. The sensor voltage is then recorded as the calibration factor.

4. Calibration Factor Press [↓] .

(1.850 before calibration) The calibration factor must be between 2.3 and 2.6 VDC. If the calibration factor is not within this range, check that pump activates for the LLD sensor being calibrated. Contact the factory if additional help is required.

Remove the calibration plug (after removing line pressure) and re-install the copper tube between the LLD sensor and the pump tank port. Run Field Service Test 81x (where x = pump number) to test the piston travel between zero (full position) and piston stabilization. Field Service tests begin on *page 81*.

Repeat steps 1 through 5 for each LLD sensor (pump). Press [CANCEL] [CANCEL] to return to the Line Leak Detector display.

Pump Setup (LLD 1)

This section is used to activate monitoring of the pressurized line. Activation may interrupt product dispensing.

Press [ENTER] (from Line Leak Detector display):

1. Pump # Press [ENTER].

Activate the LLD sensor connected to pump 1

Input a 10 character label to identify the fuel type in the reports, Regular, Super, etc. The product name is used here.

2. Pump 1 Sensor Attached Press [↓]. (SET TO 'YES' FOR ALL LLDs)

Use with manifolded lines (one LLD sensor and one in-line check valve) to identify which pump has the LLD sensor attached.

3. Disable Pump for 3.0 GPH Leak Press [↓].

Select the pump shut down leak rate. Select from 3, 2, 1, or 0.5 GPH leak rates (3 GPH is normally used)

4. Connected to (Tank 1 to 8) Press [↓].

Identify which tank (TLM) the pump is installed in to allow the system to coordinate TLM and LLD leak test. This display is repeated for 8 tanks.

5. .1 Leak Test Required Alarm Press [↓].

This is Inactive or Active. When **Active**, the system will sound an alarm at 355\25 days before going 'out of compliance' if the 0.1 leak test has not passed during the selected yearly/monthly time.

6. .2 Leak Test Required Alarm Press [↓].

This is Inactive or Active. When **Active**, the system will sound an alarm on 25\5 days before going 'out of compliance' if the 0.2 leak test has not passed during the selected monthly\weekly time.

7. Continuous Pump Request Press [↓].

The system will monitor for a continuous pump request from the dispenser which would indicate a possible problem with a dispenser control board. Regular NL product may require more than one hour during peak business hours. Press [↓] and select 1, 2, 3, or 4 hours.

Repeat steps 1 through 7 for each LLD sensor (pump).

Press [CANCEL] [CANCEL] to return to the Line Leak Detector display.

Manifold Pumps (LLD 3)

This section is used to identify the manifold pumps and lines. Manifold lines will have an LLD sensor on one pump (Main Sensor) and inline check

valve (or approved pump check valve) on the other pumps. The control for each pump in the manifold group will be connected into a separate LLD channel. The channel input wiring for a pump without LLD sensor will not have sensor wires on connector inputs 4 & 5.

Press [ENTER] [↓] [↓] (from Line Leak Detector display):

1. **Manifolded (line) Group 1 Press [ENTER].**

Set the Manifolded (line) Group to Active [CHANGE] [↓].

Press [→]. Input a 10 character label to identify the Manifolded Group in the reports, Regular, Super, etc. The product name is used here.

2. **Main Sensor Press [↓].**

Identify the pump (LLD interface input) that has the LLD sensor attached.

3. **Include Pump 1 Press [↓].**

Identify the secondary pumps (LLD interface input) in the manifolded group that do not have sensors attached (repeat for up to eight inputs).

4. **Pump Evenly Press [↓].**

Select 'YES' to bring the tank levels down evenly or 'NO' to pump one tank down to the Low Product level then switch to the next tank in the group.

5. Repeat steps 1 through 4 for each manifolded line group.

Press [CANCEL] [CANCEL] to return to the Line Leak Detector display.

Pipe Setup (LLD 5)

Pipe Types are pre programmed at the factory to include radius and bulk modulus for the most common materials used today.

Caution

Do not change these settings unless instructed to do so by factory personnel.

Press [ENTER] [↓] [↓] [↓] [↓] (from Line Leak Detector display):

1. **Pipe Label Press [ENTER].**

Press [CHANGE]. Input a descriptive label for the pipe, then press [ENTER].

2. **Pipe Radius Press [↓].**

Press [CHANGE]. Input the pipe radius. When the value is correct, press [ENTER].

3. Bulk Modulus Press [↓].

Press [CHANGE]. Input the bulk modulus. When the value is correct, press [ENTER].

Repeat steps 1 through 3 for each new pipe type. Press [CANCEL] [CANCEL] to return to the Line Leak Detector display.

Leak Test Setup (LLD 2)

The EECO SYSTEM performs the standard leak tests with a probability of false alarm = 0%.

Press [ENTER] [↓], (from Line Leak Detector display):

1. Precision Test Rate Press [ENTER].

Select 0.2 or 0.1 GPH leak rate for the precision test mode.

2. Shutdown for Yearly / Monthly Testing Press [↓].

Select 'YES' to disable the STP and test the line automatically to prevent the station from going out of compliance because the required test has not been run.

3. Precision Test Mode Press [↓].

(Manual - Continuous) When set to continuous, the system will attempt to run a precision test each time the STP is turned off. If a dispenser handle is actuated, the test will be terminated and the STP will be turned on with no interruption to the customer. In the manual mode, the operator must schedule the test and ensure no dispenser on that line is actuated.

4. Number of Retest Allowed Press [↓].

(1 - 10) If the system disables the STP due to a detected leak or other site problem, the attendant may perform a retest the allowed number of times before calling maintenance.

5. Store 0.1 GPH Tests Press [↓].

(Yearly or Monthly). This selection will record either 1 test (stored yearly) or 12 tests (stored monthly) in leak test history.

6. Store 0.2 GPH Tests Press [↓].

(Monthly or Weekly). This selection will record either 12 tests (stored monthly) or 52 tests (stored weekly) in leak test history.

7. Keep Running .1 Test Press [↓] .

Select 'YES' to keep running .1 tests after first one for the time period has been successfully completed.

8. Keep Running .2 Test Press [↓] .

Select 'YES' to keep running .2 tests after first one for the time period has been successfully completed.

9. Press [CANCEL] [CANCEL] to return to the Line Leak Detector display.

Leak Sensor Setup (LS 1)

The Leak Sensor option provides continuous monitoring of dispenser pans, sumps, interstitial tank spaces, and monitoring wells. Each sensor must be activated, must have a label up to 10 characters long and, for EECO Choice Sensor Family, you must define the sensor type from *Figure 1*..

Table 1: Leak Sensors

Abbreviation	Sensor Name	Sensor Number
ANNULAR-NONDIS	Annular Non discriminating	Q0003-006
N OPEN SWITCH	Hydrostatic Space Flood	(Q0003-005)
N CLOSED SWITCH	Normally closed Float Switch	Q0003-009
ANNULAR-DISCRM	Annular discriminating	(Q0003-003
DISPENSER PAN	Dispenser pan	Q0003-001
STP SUMP	STP sump sensor	Q0003-002
WATER MONITOR	Ground water monitor	Q0003-xx4

From General Site Setup display (*page 56*) press [↓] [↓] until you see Leak Sensor display:

1. Activate Sensor Press [ENTER] .

Set sensor channel to Active when there is a sensor attached, otherwise select Inactive. Enter a 10 character label for sensor location.

2. Sensor Type Press [↓] .

Select the sensor type from the table above to match the installed sensor.

- **If STP SUMP sensor is selected** change 'NONE' to the pump (LLD channel) number where the sensor is located. If no LLD, select 'NONE'.
 - **If DISPENSER PAN sensor is selected** change 'NONE' to the dispenser power control relay number that controls the power for the dispenser where the sensor is located. If no dispenser power control option installed, select 'NONE'.
3. Repeat steps 1 and 2 for all sensors.

4. SUMP SENSOR SENSITIVITY Press [↓].

Select HIGH to enable normal fuel detection, or LOW to enable pump shut off when the sensor's bottom float detects any liquid in the sump.

5. DISPENSER PAN SENSOR SENSITIVITY Press [↓].

Select HIGH to enable normal fuel detection, or LOW to enable dispenser shut off when the sensor's bottom float detects any liquid in the sump.

6. DISPENSER RELAY SELECTION Press [↓].

Select NORMALLY OPEN for 'fail safe' mode (loss of power to the EECO console will disable all dispensers), or NORMALLY CLOSED for 'passive' mode. (Dispenser Power Control option required)

General Site Setup (GS 1)

General Site Setup enters site parameters for console features. See Change Date and Time (*page 23*) Change Manager's Code (*page 23*) and Change Header Lines (*page 24*) for more information.

1. Change Date and Time

From General Site Setup display (Sect. to 7.2), press [ENTER] [↓]

2. Language Version

Select between English and Spanish or English and French. This selection can also be changed by pressing [SYS TEST] [1].

3. Change Manager's Access Code

4. Change Header Line 1

5. Change Header Line 2

6. Change Header Line 3

7. Change Header Line 4**8. Console Serial Number**

Enter the console serial number from the console label.

9. Printer Installed

Select YES when the console includes a local printer or there is a printer connected to the external printer port.

10. Suspend LLD Testing

Choose YES if the submersible pump's AC power will be turned off during hours the station will be closed. If 'YES' is selected enter the station open and close time for each day of the week.

11. Local Port

- **Data Bits & Baud** Press [↓], select 7 or 8 Data Bits and 300, 1200, 2400, 4800, or 9600 Baud (select same settings as the communicating device).
- **Stop Bits & Parity** Press [↓], select 1 or 2 Stop Bits and None, Even, or Odd Parity (select the same settings as the communicating device).
- **Security** Press [↓], if Yes, input a 6 digit code that must precede every command that comes from the communicating device.

12. Modem Port

- **Data Bits and Baud Rate** Press [↓], select 7 or 8 Data Bits and 300, 1200, 2400, 4800, or 9600 Baud (select the same settings as the communicating device).
- **Stop Bits and Parity** Press [↓]. Select 1 or 2 Stop Bits and None, Even, or Odd Parity. (select the same settings as the communicating device).
- **Modem Mode.** Press [↓]. Select Modem Mode if an external 'Hayes compatible' modem is attached. Trouble 21 will be displayed if no modem is attached. Select Local Mode for all other cases.
- **Modem Port Security** Yes or No. Press [↓]. If Yes, input a 6 digit code that must precede every command that comes from the communicating device.

12a. Modem Port in Modem Mode

- **Answer Incoming Calls** Press [↓]. Select Yes to answer incoming calls or No to select outgoing calls only.

- **Line Type Dedicated** Press [↓], set line type to dedicated if there is no other device or phone on the line. This setting is used for installations equipped with a switch box.
- **Line Type Shared** Set to shared if the local phone is on the same line, then enter the beginning and ending time to answer incoming calls.
- **Maximum Auto Dial Time** Press [↓], select 1, 2, 3, or 4 hours for the maximum calling time to complete the call. The event will be recorded in history if the system is unsuccessful in completing the call.
- **Modem Dial Type** Press [↓], select pulse or tone depending on the type of local phone system at the site. Most phone systems today use tone dialing. Note that the phone line must be the same 'analog' type used by fax machines or home phones as compared to 'digital' systems found in many office systems.

13. System Relay

Press [↓], select 'YES' if the silent key will reset the system relay.

Press [↓], select 'YES' if the silent key will silence the audible alarm.

14. System Units

- **Height** Press [↓], select height in inches or CM (centimeters).
- **Volume** Press [↓], select volume in US gallons, imperial gallons, or liters.
- **Temperature** Press [↓], select temperature in °F or °C.

15. Help Instructions

Print Help Instructions Press [↓], select Yes to print help instructions for alarm and trouble condition. Select No to disable.

15a Use Default Environmental Text

Press [↓]. Select No to customize the two line message that prints when a alarm condition is detected. The default message is shown in the next two screens.

- **ET1** Press [↓]. Input the desired message (use ET1 and ET2).
Example: Acme Environmental Services (see environmental help example below)
- **ET2** Press [↓]. Input the second line of the desired message. Example: Phone: 919-555-1212 (see environmental help example below)

15b Use Default Technical Text

Press [↓]. Select No to customize the two line message that prints when a trouble condition is detected. The default message is shown in the next two screens.

- **TT1** Press [↓]. Input the desired message (use TT1 and TT2).
Example: Acme Pump & Tank Services (see technical help example below)
- **TT2** Press [↓]. Input the second line of the desired message. Example: Phone: 919-555-1234 (see technical help example below)

16. Alternate Error Handling

Two ways are provided for the communication package to respond to invalid commands. Try YES or NO to select the one that works for this installation.

Example: Environmental Help

```

STATION NAME HERE
STREET ADDRESS
CITY, STATE ZIP
PHONE NUMBER
V22.05

05-01-95

LEAK SENSOR 01 DISPNSR 01
FUEL

PRESS THE SILENT KEY TO SILENCE THE
AUDIBLE ALARM.

AN ALARM HAS OCCURRED FOR SENSOR
01. TO CONFIRM THIS ALARM, RESET
THE ALARM WITH THE KEY & CONTINUE
TO MONITOR THE SYSTEM. IF THE
ALARM REAPPEARS, NOTIFY
ACME ENVIRONMENTAL SERVICES
PHONE: 919-555-1212
IMMEDIATELY. FAILURE TO TAKE
PROPER CORRECTIVE ACTION COULD
RESULT IN SERIOUS PROPERTY AND
ENVIRONMENTAL DAMAGE

```

Example: Technical Help

(7 line header here)

LEAK SENSOR 02 DISPNSR 02
TROUBLE 30

PRESS THE SILENT KEY TO SILENCE THE
AUDIBLE ALARM.

YOUR SYSTEM IS EXPERIENCING TROUBLE
30 ON SENSOR 02, A POSSIBLE SENSOR
MALFUNCTION.

IF THIS IS THE FIRST TIME THIS
TROUBLE HAS HAPPENED, RESET THE
SYSTEM WITH THE KEY & CONTINUE TO
MONITOR THE SYSTEM.

IF THE TROUBLE REAPPEARS, DO NOT
RESET THE TROUBLE. PRESS THE
KEY & CALL

ACME PUMP & TANK SERVICES
PHONE: 919-555-1234

FAILURE TO TAKE PROPER CORRECTIVE ACTION
COULD RESULT IN SERIOUS PROPERTY AND
ENVIRONMENTAL DAMAGE.

Auto Dial Alarm Setup (AA 1)

Auto dial Alarm Setup is used (when communication options are installed) to define up to 4 alarm groups with a phone number and destination type for each group. (Group examples: Fuel Order Alarm & Low Product Alarm go to the Fuel manager, System trouble codes go to the Service Manager, Leak alarms go the Environmental Manager, etc.)

When the groups have been established with phone numbers (up to 20 digits) and format, a matrix will be displayed with the possible alarm or trouble and each of the 4 groups. Set YES under a group to include the report or NO to omit the report. Each condition may be selected for any or all of the 4 groups or may be omitted.

From General Site Setup display...

1. Press [↓] until you see Autodial Alarm Reports display:

2. Alarm Group 1 [ENTER]

Set to Enabled to activate the report group.

- Press [↓], record the desired phone number (computer modem or fax). Valid characters are 1-9, 0, and comma (.). The comma is used to insert a 'wait period' in the dialing string to allow local switching to outside line.
- Press [↓], Select computer format (packed data string) or viewable (similar to printed report). EECOTALK™ requires the setting to be

computer format. Viewable format is used for ‘off the shelf’ computer packages.

3. Repeat settings for Alarm Groups 2, 3, and 4.

The (alarm condition) will be displayed in the following order. Numbers 1, 2, 3, and 4 correspond to Auto Dial Alarm Groups 1, 2, 3, and 4.

Set to YES to activate auto dial for the displayed alarm condition, NO to ignore. Repeat for all alarm conditions. Note that the matrix will vary depending on configuration of the system.

Alarm	Condition	Group 1	Group 2	Group 3	Group 4
1	TLM Overfill	YES	NO	NO	NO
2	TLM High Product	NO	NO	NO	NO
3	TLM Order Product	NO	NO	YES	NO
4	TLM Low Product	NO	NO	YES	NO
5	TLM Theft	NO	NO	NO	NO
6	TLM High Water	NO	YES	NO	NO
7	TLM Water Present	NO	YES	NO	NO
8	TLM Test Fails	YES	NO	NO	NO
9	TLM Test Req'd	YES	NO	NO	NO
10	Leak sensor Fuel	YES	NO	NO	NO
11	Leak sensor Hi Fuel	YES	NO	NO	NO
12	Leak sensor Water	NO	YES	NO	NO
13	Leak sensor Hi Water	YES	NO	NO	NO
14	Leak sensor Alarms	YES	NO	NO	NO
15	LLD Shutoff Alarms	YES	NO	NO	NO
16	LLD Leak Alarms	YES	NO	NO	NO
17	LLD Precision Leaks	YES	NO	NO	NO
18	LLD Leak Test Req'd	YES	NO	NO	NO
19	LLD Pump Fail Alarms	NO	YES	NO	NO
20	LLD Contin. Pump Req	NO	YES	NO	NO
21	LLD Out of Fuel Alarms	NO	NO	YES	NO
22	LLD Air in Lines	NO	YES	NO	NO
23	All Troubles	NO	YES	NO	NO

Auto Reports Setup (AR 1)

Auto Reports Setup provides up to 4 selections during each 24 hour day. You select the destination (printer, modem port, local port, or fax). Example: Schedule Auto Report #1 for 6:00 AM, send it to the printer.

From General Site Setup display (*page 56*), press [↓] until you see Auto Reports display

2. Report 1 [ENTER]

Change from INACTIVE to ACTIVE to activate the report. Select the report time.

- Press [↓], Select the report destination (PRINTER, MODEM PORT, LOCAL PORT, or FAX). Note: displayed destination will depend on installed options.
- Press [↓]. If modem port or fax was selected, enter the destination phone number.
- Press [↓]. If modem port or fax was selected, enter the data format to be used. Select computer format (packed data string) or viewable (similar to printed report). EECOTALK™ requires the setting to be computer format. Viewable format is used for ‘off the shelf’ computer packages.

All possible reports will be displayed (report/status). Change NOT INCLUDED to INCLUDED to add the various reports to the Auto Report

4. Repeat settings for Auto Reports 2, 3, and 4.

Auto Report #:	1	2	3	4
Report Time:06:00	12:00	18:00	00:00	
LEAKSENSOR STATUS	Include			
LLD STATUS			Include	
LLD LEAK TEST			Include	
TLM INVENTORY REPORT	Include	Include	Include	Include
TLM DELIVERY REPORT				Include
TLM WATER REMOVAL				
TLM ALARM STATUS				Include
TLM LEAK TEST	Include			Include
LAST RECONCILIATION				
NEW RECONCILIATION	Include	Include	Include	
LAST FUEL ORDER REP				
NEW FUEL ORDER REP	Include			Include
Destination	Printer	Printer	Printer	Modem
Phone #				2134587
Format				Computer

Multi Relay Setup (MR 1)

One system relay (preset to respond to all alarms) is standard on all EECO 2000 consoles. The system may be equipped with two optional multi relay boards for a maximum of 8 programmable relays. The wiring and intended function of each relay contact will determine which alarm conditions will be used to activate each relay.

Note

Do not perform this setup until all sensors and probes are activated.

Print the Multi Relay setup to see the available matrix of alarms, troubles, and relays. Use the listing to identify the alarm/trouble conditions that will be used to activate each relay. Proceed with the multi relay setup.

Caution

Multi relays are for alarm enunciators only. **DO NOT** use them for controlling pumps or valves associated with product transfer.

From General Site Setup display...

1. Press [↓] until you see Multi Relay display
2. Press [ENTER] **Relay 1 Active For**

Set to Active or Inactive for the alarm condition. The alarm condition repeats for each installed option (sensor channel, LLD pump, TLM, etc).

Alarm Conditions List

Varies depending on system configuration.

- LS CH n FUEL ALARMS
- LS CH n HIGH FUEL ALARMS
- LS CH n WATER/DRY ALARMS
- LS CH n HIGH WATER ALARMS
- LLD PUMP n SHUTOFF ALARMS
- LLD PUMP n LEAK ALARMS
- LLD PUMP n PREC. TEST FAIL ALARMS
- LLD PUMP n FAIL ALARMS
- LLD PUMP n 0.1 LEAK TEST REQUIRED
- LLD PUMP n 0.2 LEAK TEST REQUIRED
- LLD PUMP n OUT OF FUEL ALARM
- LLD PUMP n CONTINUOUS PUMP REQ ALARM
- TLM TANK n LEAK
- TLM TANK n HIGH PROD

- TLM TANK n ORDER PRODUCT
- TLM TANK n WATER PRESENT
- TLM TANK n THEFT
- TLM TANK n OVERFILL
- TLM TANK n LOW PROD
- TLM TANK n .1 LEAK TEST REQUIRED
- TLM TANK n .2 LEAK TEST REQUIRED
- TLM TANK n HIGH WATER

Repeat for all relays that are connected for use.

POSSIBLE MULTI RELAY ACTIONS - LEAK SENSING

Sensor	Cond. 1	Cond. 2	Cond. 3	Cond. 4
STP Sump	Fuel	High Fuel	Water	High Water
Dispenser Pan	Fuel	High Fuel	Water	High Water
Ground Water	Fuel	Dry		
Annular Discrm.	Fuel	Water		
Annular Nondis	Alarm			
Switch (n.o./n.c.)	Alarm			

Print Setup Parameters

The System Setup may be printed to record the parameter settings that have been programmed into the system during startup. The complete report can be printed by selecting PRINT ALL or by sections that include GENERAL SITE, TANK LEVEL MONITOR, LEAK SENSOR, RELAY, AUTO-DIAL ALARM REPORTS, and AUTO REPORTS.

Print two listings of the setup parameters (press [PRINT] [SETUP] [ENTER]) after system programming has been completed. Place one copy inside the console for future reference and return one copy with the startup documentation. The default setup parameter listing illustrates the system parameters before programming.

Alarms and Trouble Codes

Glossary

Alarms identify a release of product or levels in the tank or line that are outside preset limits. The red LED is ON when an alarm condition has occurred.

Troubles identify malfunctions in the monitoring system hardware. Two digit codes (TRxx) are displayed to assist in identifying the cause of the condition. The yellow LED is on when a trouble condition has occurred.

System Troubles -- several system troubles can become active. Note that some of these troubles also affect individual TLM or LS operations.

Tank Level Monitor gauges have several alarms and troubles that can become active. Once an alarm or trouble becomes active, the indication is latched into the system display and stored in memory. The displayed indication is cleared with the reset key.

Leak Sensors have four alarms and several trouble conditions which can be active. Once an alarm or trouble becomes active, the indication is latched into the system display and stored in memory. The displayed indication is cleared with the reset key.

Summary of Trouble Codes

System Trouble Codes

- 00 - #1 LS/LLD driver board, A/D converter problem
- 01 - #2 LS/LLD driver board, A/D converter problem
- 02 - #1 LS/LLD driver board, LS 8255 problem
- 03 - #2 LS/LLD driver board, LS 8255 problem
- 04 - #1 LS/LLD driver board, LLD 8255 problem
- 05 - #2 LS/LLD driver board, LLD 8255 problem
- 06 - TLM self test failed
- 07 - TLM power supply failure
- 08 - TLM 8255 parallel I/O IC problem
- 09 - TLM communications problem
- 10 - TLM 8051 does not respond
- 11 - TLM can't send out command
- 12 - Auxiliary board 8255 (display) problem
- 13 - Auxiliary board 8255 (keypad) problem
- 14 - Printer problem
- 15 - Real time clock invalid
- 16 - Real time clock not advancing
- 17 - RAM problem (MPU)

- 18 - EEPROM problem
- 19 - Local port general problem
- 20 - Modem port general problem
- 21 - General external communications problem
- 22 - General external communications problem
- 23 - #1 LLD interface board problem
- 24 - #2 LLD interface board problem
- 25 - #1 Pollulert interface board problem
- 26 - #2 Pollulert interface board problem
- 30 - Sensor open circuit
- 31 - Sensor shorted circuit
- 32 - LS Interface board problem
- 40 - No LLD sensor present or bad connection
- 41 - Excessive air in the lines
- 42 - LLD piston movement problem
- 43 - Trouble obtaining A/D data
- 44 - AC Power to LLD is not on
- 45 - Piston is unstable (after 10 re-pumps)
- 46 - Software error
- 50 - Failed to sync to probe
- 51 - Probe missing sync pulse
- 52 - Missing float pulse
- 53 - Missing interrogate pulse
- 54 - No product float detected, there should be one
- 55 - No water float detected, there should be one
- 56 - Water float detected, there should not be one
- 57 - Product float position exceeds probe length
- 58 - Product float is positioned above maximum height of tank
- 59 - Water float position greater than the probe length
- 60 - Water height above max height of tank
- 61 - Bad values (high ref is the same as low ref)
- 62 - 8051 math errors
- 63 - General gauge error
- 64 - Data incorrect for the gauge
- 65 - General errors

Detailed Trouble Codes

The EECO SYSTEM internal diagnostics continually check the total system for correct operation. The following codes represent the possible system troubles and information to assist in isolating the cause of the problem.

00 #1 LS/LLD driver board, A/D (analog to digital) converter problem

- The #1 LS/LLD driver board A/D self tests fails.
 - *Re-seat the #1 LS/LLD driver board and ribbon cable. Retest.*
 - *Replace the #1 LS/LLD driver board. Retest.*

01 #2 LS/LLD driver board, A-to-D converter problem

The #2 LS/LLD driver board A/D self tests fails.

- 1 - Re-seat the #2 LS/LLD driver board and ribbon cable. Retest.
- 2 - Replace the #2 LS/LLD driver board. Retest.

02 #1 LS/LLD driver board, 8255 problem

The Leak Sensor 8255 IC mode register does not program correctly.

- 1 - Re-seat the #1 LS/LLD driver board and MPU board. Retest.
- 2 - Replace the #1 LS/LLD driver board. Retest.

03 #2 LS/LLD driver board, LS 8255 problem

The Leak Sensor 8255 IC mode register does not program correctly.

- 1 - Re-seat the #2 LS/LLD driver board and MPU board. Retest.
- 2 - Replace the #2 LS/LLD driver board. Retest.

04 #1 LS/LLD driver board, LLD 8255 problem

The LLD 8255 IC mode register does not program correctly.

- 1 - Re-seat the #1 LS/LLD driver board and MPU board. Retest.
- 2 - Replace the #1 LS/LLD driver board. Retest.

05 #2 LS/LLD driver board, LLD 8255 problem

The LLD 8255 IC mode register does not program correctly.

- 1 - Re-seat the #2 LS/LLD driver board and MPU board. Retest.
- 2 - Replace the #2 LS/LLD driver board. Retest.

06 Tank Level Monitor Self Test failed

TLM receiver failed. Incorrect values detected when internal test signal applied.

- 1 - Re-seat the TLM driver board and ribbon connector.
- 2 - Replace TLM driver board. Retest.
- 3 - Replace the TLM Interface board. Retest.

07 TLM power supply failure

The TLM power supply voltage (TLM interface board) is out of range or zero.

- 1 - Measure voltage at probe connector. (20 VDC at probe connector or 26 VDC at unused connector)
- 2 - If not zero, adjust power supply to 26 VDC (at unused connector).
(Remove module, adjust, replace).
- 3 - If zero volts, check fuse on interface and AC connection at backplane.
- 4 - Replace the TLM Interface Module. Retest.

08 TLM 8255 parallel I/O IC problem

The TLM 8255 IC mode register does not program correctly.

- 1 - Re-seat the TLM driver board and ribbon connector. Retest.
- 3 - Replace the TLM driver board. Retest.

Note

Errors 09 through 11 must occur three passes in succession to result in an error code.

09 TLM communications problem

The 8751 IC TLM data is incorrect.

- 1 - Re-seat the TLM driver board. Retest.
- 2 - Check that the 8751 IC is seated in it's socket.
- 3 - Replace the TLM driver board. Retest.

10 TLM 8751 does not respond

No data exchange between the TLM 8751 IC and the main MPU.

- 1 - Re-seat the TLM driver board. Retest.
- 2 - Check for compatible TLM/Tank Table/MPU software
- 3 - Replace the TLM driver board. Retest.

11 TLM can't send out command

No data flow between the TLM 8751 IC and the main MPU input buffer.

- 1 - Re-seat the TLM driver board. Retest.
- 2 - Replace the TLM driver board. Retest.

12 Auxiliary board 8255 (display) problem

The Display 8255 IC mode register does not program correctly.

- 1 - Re-seat the auxiliary board. Retest.
- 2 - Replace the auxiliary board. Retest.

13 Auxiliary board 8255 (keypad) problem

The Display 8255 IC mode register does not program correctly.

- 1 - Re-seat the auxiliary board. Retest.
- 2 - Replace the auxiliary board. Retest.

14 Printer problem

The auxiliary board is unable to send characters to the printer driver board

- 1 - Re-seat the auxiliary board and ribbon cable to the printer driver board. Retest.
- 2 - Re-seat power cable connections at the backplane and printer driver board. Retest.
- 3 - Set 'printer installed' to 'no' and then back to 'yes'. Retest.

4 - Replace printer driver board. Retest.

5 - Replace printer. Retest.

15 Real time clock invalid

The time and date in the real time clock are not valid.

1 - Set correct date and time, turn system off and back on. Check for correct time.

2 - If problem is only after AC power was off, check main board battery voltage (minimum 3.0 VDC).

3 - Replace the MPU board (contains RTC IC). Retest.

16 Real time clock not advancing

The real time clock is not advancing.

1 - Replace the MPU board (bad RTC IC). Retest.

17 RAM problem (MPU)

A RAM memory problem was detected during self test.

1 - Run System Test, check for failure.

2 - Replace the MPU board. Retest.

18 EEPROM problem

An EEPROM memory problem was detected during self test.

1 - Run System Test, check for failure.

2 - Replace the TLM driver board.

19 Local port, general problem

Serial communication board local port hardware problem.

1 - Replace the serial board. Retest.

20 Modem port, general problem

Modem port problem with the serial communication board hardware.

1 - Replace the serial board. Retest.

21 General external communications problem

Modem port communication problem when initializing an external modem.

1 - Check that modem power is 'on'.

2 - Check the null modem cable from the system modem port to the modem.

3 - If no modem is attached, check that modem port is set to 'local mode'.

3 - Verify modem setup is correct and complete.

22 General external communications problem

There is a problem in dialing, connections, or hang-up.

1 - Verify the correct phone numbers are programmed for the reports.

- 2 - Verify modem is connected to an operational phone line and is not in use.
- 3 - Verify phone numbers being called are not busy.
- 4 - Verify that 'DTR' is not forced 'on' by dip switch setting in modem.
- 5 - Verify that 'CD' is not forced 'on' by dip switch setting in modem.

23 #1 LLD interface board problem

#1 LLD interface board fails self test.

Re-seat ribbon cable at #1 LS/LLD driver board. Retest.

Re-place LLD interface module. Retest.

24 #2 LLD Interface board problem

#2 LLD interface board fails self test.

Re-seat ribbon cable at #2 LS/LLD driver board. Retest.

Re-place LLD interface module. Retest.

Leak Sensor Trouble Codes

25 #1 Pollulert interface board problem

#1 Pollulert interface board fails self test.

Re-place #1 Pollulert interface module. Retest.

26 #2 Pollulert interface board problem

#2 Pollulert interface board fails self test.

Re-place #2 Pollulert interface module. Retest.

30 Open sensor circuit on active leak sensor channel

- 1- If no sensor connected to active channel, change channel setting to 'INACTIVE'.
- 2- Check wire connections at sensor input and at sensor junction box for open circuit.
- 3 - Run FS test #200 (+ sensor #) to test sensor values above normal operating range.
- 4 - Possible defective sensor . Connect sensor direct to interface input connection.

Retest.

31 Sensor short circuit on active leak sensor channel

- 1 - Check wire connections at sensor input and junction box for 'shorted circuit'.
- 2 - Run FS test #220 (+ sensor #) for sensor values below normal operating range.
- 3 - Defective sensor . Connect sensor direct to interface input connection. Retest.

32 Leak sensor interface module fails self test

The indicated channel fails self test.

- 1 - Re seat the indicated interface module. Retest.
- 2 - Replace the indicated interface module. Retest

Line Leak Detector Trouble Codes

40 No LLD sensor present or bad connection

- 1 - Check wire and connections at the LLD interface and sensor.
- 2 - Check LLD interface input fuse for the indicated channel.

41 Excessive air in the Lines

- 1 - Insufficient product pumped through line to purge air.
- 2 - Improper parameter settings.

42 LLD piston movement problem

The piston does not travel past 0.4 position prior to starting test.

- 1 - Test pump pressure for minimum 24 PSI.
- 2 - Verify LLD sensor calibration and orifice constant.
- 3 - Check for crimped or clogged vent line between LLD and tank.
- 4 - Disassemble LLD piston/sleeve, check for foreign matter or damaged piston.

43 Trouble obtaining A/D data

- 1 - Re seat the LLD driver board, LLD I/F board, and ribbon cable. Retest.
- 2 - Replace the LLD interface module. Retest.
- 3 - Replace the LLD driver board. Retest.

44 AC Power to LLD is not on (cannot perform during precision leak test)

- 1 - Check for AC power at bottom LLD interface connector.
- 2 - If no AC power, Check that circuit breaker in power panel is 'on'.
- 3 - If AC power at connector, check AC fuse inside LLD interface module. Retest.
- 4 - Replace LLD interface module. Retest.

45 Piston is unstable (after 10 re-pumps)

- 1 - Check for difference between ground temperature and product temperature.
- 2 - Disassemble LLD piston/sleeve, check for foreign matter or damaged piston.

46 Software error - call Technical Support Services Department

Tank Level Monitor Trouble Codes

50 Failed to sync to probe

The 8751 IC is not able to sync to a specific probe. There is a sync pulse, but the timing is wrong or erratic, particularly the low to high temperature transition. If problem occurs

on one probe of a multi-probe installation, connect and test the probe on an unused input. If the problem is not corrected, replace the probe.

- 2 - If problem occurs on all active probe channels, replace the TLM interface module.

51 Probe is missing sync pulse

The TLM interface 8751 IC does not receive the probe sync pulse.

- 1 - Check that probe is connected to correct channel and interface voltage is 20 VDC.
- 2 - Check that TLM interface and probe junction box connections are OK.
- 3 - Check that correct data cable was used.
- 4 - Connect the probe directly to the channel indicated. Replace if defective.

52 Missing float pulse

The interrogate pulse is detected, but there are no float pulses.

- 1 - Check that floats (and magnets) are installed on the probe.
- 2 - Check that probe is installed and touching the tank bottom.
- 3 - Check for correct data cable (with probe connected directly to console).
- 4 - Replace the TLM probe.

53 Missing interrogate pulse

There is no interrogate pulse detected from the probe.

- 1 - If problem occurs on one probe of a multi-probe installation, connect and test the probe on an unused input. If the problem is not corrected, replace the probe.
- 2 - If problem occurs on all active probe channels, replace the TLM interface module.

54 No product float detected

Similar to 52 above. The 8751 IC is not sending back product float information to the MPU board.

- 1 - Check that floats (and magnets) are installed on the probe.
- 2 - Check that probe is installed and touching the tank bottom.
- 3 - Check for correct data cable (with probe connected directly to console).
- 4 - Replace the TLM probe.

55 No water float detected when there should be one

No water float has been detected when the system has been set up for one.

- 1 - Check for correct water float set-up and calibration.
- 2 - Check that probe is correctly installed and touching tank bottom.
- 3 - Check that water float (and magnet) is installed on probe.

56 Water float detected when there should not be one

A water float has been detected when the system has been set up for none.

- 1 - Check that water float is not installed on the probe.
- 2 - Replace probe (probe sending extra pulses). Retest.

57 Product float displacement is greater than probe length

Product float is past the probe end (position is less than zero).

- 1 - Check that correct probe length has been selected in tank setup.
- 2 - Check product float calibration.

58 Product height is above max height of tank per tank table

The product float height is greater than the tank diameter.

- 1 - Check that tank has not been overfilled causing float to be in riser pipe.
- 2 - On installation or tank overfill, and that product float is not stuck in the riser pipe.
- 3 - Check that correct tank table has been selected.

59 Water displacement is greater than the probe length

The water float position is less than zero (but not into the probe 'dead zone'), indicating the float bottom is past the end of the probe.

- 1 - Check that probe is correctly installed and touching tank bottom.
- 2 - Check that water float calibration is correct.
- 3 - Check that correct probe length has been selected in tank set-up.

60 Water height is above max height of tank per tank table

The water float height is greater than the tank diameter.

- 1 - Check that correct tank table (diameter) has been selected.
- 2 - Check the probe calibration factor.
- 3 - Check that floats are not stuck in riser pipe.

61 Bad values (high and low reference values are the same)

The temperature information from the probe is bad or out of range.

- 1 - Product temperature may be out of measurement range.
- 2 - Check temperature data returned from probe using Field Service test.
- 3 - Replace the probe (bad temperature data). Retest.

62 8751 IC math errors

The 8751 IC had problems in its calculations of the pulse widths.

- 1 - Replace the TLM driver board. Retest.

63 General probe error

Intermittent errors occurring pertaining to a particular probe.

This group includes errors 57 through 61 (listed above). The problem is most likely in the probe.

64 Data incorrect for the probe

Intermittent errors occurring pertaining to a particular probe.

This group includes errors 57 through 61 (listed above). The problem is most likely in the probe.

65 General errors

1. Intermittent errors occurring pertaining to the TLM circuit.
2. This group includes errors 08 through 11 (listed above).
3. The problem is most likely in the TLM driver board.

Additional troubleshooting guidelines are shown on the following pages to assist in specific Line Leak Detector error codes:

Perform each operation in sequence, when asked a question, locate the destination paragraph letter under YES or NO and proceed to that paragraph for the next procedure or conclusion to the problem.

LLD TROUBLE CODE 40

A trouble code 40 is an indication that the EECO SYSTEM does not recognize an LLD sensor that is currently active. The following tables help determine the origin of this indication.

The following is a guide to troubleshooting a Trouble Code 40. This guide should be followed precisely. Omitting any step will cause inconclusive results.

LLD TROUBLE CODE 40	YES	NO
A. Is an LLD channel active where no LLD sensor is present?	B	C
B. Deactivate appropriate LLD channel and go to step K.		
C. Check for continuity of (2) fuses for the corresponding channel with failure. Does continuity exist?	G	D
D. Replace with 125ma/250v fuse and go to step E.		
E. Cycle dispenser request on and off 10 times and recheck fuses. Does continuity exist?	K	F
F. Replace defective LLD interface and go to step K.		
G. Does open or short exist between pin 4 and LLD sensor connection?	I	H
H. Does open or short exist between pin 5 and LLD sensor connection?	I	J
I. Replace defective wire between LLD interface and LLD sensor and go to step K		
J. Defective LLD sensor and go to step K.		
K 1. Ensure system is functioning normally. 2. Secure all panels and connections to console. 3. Record console serial number. 4. Print site history. 5. Call 800-342-6125 for Returned Goods Authorization.		

LLD TROUBLE CODE 44

A Trouble Code 44 is an indication that Line Leak Detector test power is missing. The following table will help to determine the reason for this indication.

LLD TROUBLE CODE 44	YES	NO
A. Does 95 to 120 volts AC exist on connector X on Line Leak Detector Interface?	B	C
B. Run 36X system test (X = line being tested). Does 120 VAC exist on terminal 1 of Line Leak Detector interface respective LLD channel?	J	D
C. Locate the reason for missing power (i.e. circuit breaker, broken wire, etc.)		
D. Are all dispenser request voltages in phase with connector X on LLD interface?	F	E
E. Wire all dispenser request voltages and connector X in phase and proceed to F.		
F. Turn off console and all appropriate power. Remove LLD Interface and check for continuity of 9 fuses. Does continuity exist?	J	G
G. Replace blown fuse with 125ma/250v fuse. Return console to full operation and proceed to H.		
H. Perform the following in order. 1. Reinstall LLD Interface. 2. Turn on power. 3. Reset existing all existing trouble codes. 4. Cycle each dispenser request a of minimum of 3 times. 5. Does trouble code 44 exist?	J	I
I. Record console serial no. and return console to full operation.		
J. Call 800-342-6125 for technical assistance		

LLD TROUBLE CODE 41

A trouble code 41 is an indication that LLD piston displacement between 0.0 and 0.4 is too slow. Excessive air in the product line is the usual cause of this problem. The following table will help determine the origin of this indication.

The following table must be followed in exact order to prevent inconclusive results.

LLD TROUBLE CODE 41	YES	NO
A. Are the following pump constants set properly? 1. Bulk Modulus 2. Pipe Radius 3. Pipe Length	C	B
B. Set proper parameters and go to step C.		
C. Is it flexible piping?	K	D
D. Run system test 81X (X = line number being tested) Go to step E.		
E. Is length of pipe less than 100 feet?	H	F
F. Is length of pipe 100 to 200 feet?	I	G
G. Is length of pipe greater than 200 feet?	J	E
H. Does piston displacement reach 0.4 by 8 seconds?	L	K
I. Does piston displacement reach 0.4 by 12 seconds?	L	K
J. Does piston displacement reach 0.4 by 15 seconds?	L	K
K. Close ball valve to isolate LLD from product line. Does displacement reach 0.4 by 4.0 secs?	L	P
L. Is Out of Fuel Alarm active?	N	M
M. Activate Out of Fuel Alarm and go to step N.		
N. Is Out of Fuel Alarm set to shutdown at TLM Low Product Level?	S	O
O. Set Out of Fuel Alarm to Active. Go to step S.		
P. Perform the following. 1. Remove copper LLD drain tube from submersible pump. 2. Insert tube into an approved product container. 3. Turn on submersible pump for 60 seconds. 4. Measure amount of product released in container. 5. Does amount exceed 12 ounces?	R	Q
R. Reopen ball valve and go to step C.		
Q. Clean clogged orifice in LLD.		
S. Cycle pump. Does system alarm a Trouble Code 41 at end of leak test?	T	V

T. Purge air from product lines and repeat step S. Does system alarm Trouble Code 41?	U	V
U. Perform the following. 1. Record serial no. 2. Print set up of LLD. 3. Print site history. 4. Run 81X test. 5. Call 800-342-6125 for technical assistance.		
V. Return console to full operation.		

LLD TROUBLE CODE 42

A trouble code 42 is an indication of a stuck piston. The following table will help determine the origin of this indication.

The following table must be followed in exact order to prevent inconclusive results. If this table does not give the answer to this problem call 800-342-6125 for technical assistance.

WARNING

Make sure all removed parts or connections replaced during maintenance are restored to prevent mishap.

TROUBLE CODE 42	YES	NO
A. Is wiring type dedicated Belden 89740 or 9409?	B	R
B. Is wiring length from console to LLD sensor less than 200 feet?	C	X
C. Are the following parameters set up properly? 1. Pipe length 2. Line pressure 3. Bulk modulus 4. Dedicated or shared wire set up	D	E
D. Run 81x test. (X = line no. being tested) Is the displacement at the beginning of the test less than .25 inches? (see note #1 below)	H	F
E. Set parameters and go to step D.		
F. Close ball valve and run 81X test. Is the displacement at the beginning of the test less than .25 inches?	G	I
G. Purge air from product line and repeat D.		
H. Does piston reach 0.5 displacement by 60 seconds with ball valve open?	K	T

I. Is submersible pump pressure greater than 23 psi?	K	J
J. Pump pressure is insufficient to provide for proper LLD operation.		
K. Recalibrate LLD. Is calibration voltage within the following ranges? Dedicated wire = 2.3 - 2.6 Shared wire = 1.8 - 2.2	D	L
L. Move LLD connection to a different interface channel and recalibrate. Is calibration voltage within the following ranges? Dedicated wire = 2.3 - 2.6 Shared wire = 1.8 - 2.2	M	N
M. Bad channel on LLD Interface. Proceed to step X.		
N. Reconnect sensor to previous channel and proceed to step O.		
O. Run Belden 9409 wire above ground straight to sensor from corresponding Interface channel and recalibrate. Is calibration voltage 2.3 to 2.6?	P	Q
P. Bad wire in conduit.		
Q. Bad LLD. Proceed to X.		
R. Is LLD sharing submersible pump power wires?	B	S
S. Wrong wire type used. Consult factory for correct installation parameters.		
T. Close ball valve and run 81X test. Does piston displacement reach 0.5 by 10 seconds?	G	U
U. Perform the following procedure. 1. Remove copper LLD drain tube from submersible pump. 2. Insert tube into and approved petroleum container. 3. Turn on submersible pump and measure amount of product released in 60 seconds. Does amount exceed 12 ounces?	V	W
V. Stuck piston in LLD.		
W. Obstructed drain tube or clogged orifice exists.		
X. Call 800-342-6125 for technical assistance.		

Note #1 - .25 changes to .4 in software versions 30.07/22.04/20.08

LLD CATASTROPHIC SHUTOFF CHECKLIST

LLD CATASTROPHIC SHUTOFF	YES	NO
A. Run 81x test (x=line being tested) Does piston displacement reach 1.6 within 18 seconds?	B	D
B. Close product line ball valve. Does piston displacement reach 1.6 within 18 seconds?	C	U
C. Is sensor calibration between 2.3 to 2.6?	P	Q
D. Does shutoff occur during deliveries only?	E	F
E. Rotate product drop tube with slant facing away from the submersible pump intake. Proceed to N.		
F. Is wire length greater than 200 ft. from console to LLD?	V	G
G. Perform the following in order on each dispenser: 1. Manually hold open product nozzle. 2. Hold nozzle in an approved container. 3. Activate dispenser request. 4. Does a small amount of product release from nozzle then product begins to flow normally?	H	I
H. Time delay problem. Call 800-342-6125 if MPU software version is earlier than 20.04.		
I. Does catastrophic alarm occur after Low Product Alarms?	J	R
J. Is Out of Fuel Alarm set to active?	K	N
K. Is Out of Fuel Alarm set to shutdown at TLM Low Product level?	L	O
L. Is TLM Low product level setting higher than distance from tank bottom to submersible pump intake + 3 inches?	V	M
M. Set TLM Low product level to correct height.		
N. Set Out of Fuel Alarm to active. Proceed to O.		
O. Set Out of Fuel Alarm to shutdown at TLM Low product level. Go to step M.		
P. Possible bad LLD. Call 800-342-6125 for technical assistance.		
Q. Recalibrate LLD Sensor then go to Step A.		
R. Check each dispenser individually. Is request voltage on pin 2 of corresponding LLD channel above 95 VAC?	S	T
S. Possible bad LLD interface. Call 800-342-6125 for technical assistance.		
T. Faulty dispenser.		
U. Locate reason for line pressure decrease.		
V. Call 800-342-6125 for technical assistance..		

Field Service Tests

TO ENTER FIELD SERVICE TEST:

PRESS	DISPLAY SHOWS COMMENTS
[SYSTEM TEST]	PRESS <ENTER> TO DO SYSTEM TEST
[0]	ENTER ACCESS CODE - Mgr's code is not valid
here [access code]	
[ENTER]	WARNING! NORMAL OPERATION WILL STOP!
[ENTER]	ENTER TEST NUMBER TO PERFORM:(Test Number)
[ENTER]	(Test Is Performed)
[ENTER]	(Optional Step) (Test Is Performed Again)
Or:	
[CANCEL]	ENTER TEST NUMBER TO PERFORM:(Select New Test)
Or:	
[CANCEL]	(Exit Field Service Test)

If no keys are pressed for 3 minutes, the system will return to normal operation.

Test Summary

001	Display MPU main software revision
002	Display tank table software revision
003	Display TLM driver software revision
005	Calculate and verify checksums for MPU main software
006	Calculate and verify checksums for tank table
010	Verify RAM
011	Verify EEPROM
060	Generate known test pattern to display
061	Light all pixels and LEDs
062	Turn on horn
063	Turn on system relay
070	Display keys pressed
080	Printer test
100-188	Display TLM data
200-276	Display leak sensor readings
290	Display the hexadecimal count value for LS/LLD driver card #1
291	Display the hexadecimal count value for LS/LLD driver card #2
298	Display the LS/LLD driver card #1 test voltage
299	Display the LS/LLD driver card #2 test voltage
300-308	Display voltage & displacement readings for LLD
350-368	Set LLD relays to given state
380	LLD relays sequence automatically
398	Display pump control lines for LLD 1-4

399	Display pump control lines for LLD 5-8
400	Multi-relays installed
401-655	Multi-relay tests
660	Multi-relays sequence automatically
700	Internal loop back test
701	Modem to local port test
705	Modem startup test
706	Modem dial and connect test
810	LLD piston movement test
900	Clear RAM
901	Clear EEPROM

Memory Tests

Test Number 1 - Display MPU main software revision

MPU MAIN SOFTWARE REVISION: XXXXXXXX

Test Number 2 - Display tank table software revision

TANK TABLE SOFTWARE REVISION: XXXXXXXX

Test Number 3 - Display TLM driver software revision

TEST IN PROGRESS, PLEASE WAITTLM DRIVER SOFTWARE REVI-
SION: XXXXXXXX

(or)TLM DRIVER SOFTWARE REVISION: ERROR

Test Number 5 - Calculate and verify checksums for MPU main software.

TEST IN PROGRESS, PLEASE WAITMAIN MPU SOFTWARE CHECK
SUMS: (PASS or FAIL)

Test Number 6 - Calculate and verify checksums for tank table software

TEST IN PROGRESS, PLEASE WAITTANK TABLE SOFTWARE CHECK
SUMS: (PASS or FAIL)

Test Number 10 - Verify RAM

WARNING! POWER LOSS WILL CORRUPT RAM. [Press ENTER
to continue]

PLEASE WAIT, VERIFYING RAM.LOW: (PASS or FAIL) HIGH:
(PASS or FAIL)

Test Number 11 - Verify EEPROM

WARNING! POWER LOSS WILL CORRUPT EEPROM. [Press ENTER to continue].:

PLEASE WAIT, VERIFYING EEPROM.EEPROM TEST: (PASS or FAIL)

Display Tests

Test Number 60 - Generate known test pattern to display

ABCDEFGHIJKLMNOPQRSTUVWXYZ.0123456789(!)

Test Number 61 - Light all pixels and LEDs

All three LEDs will light and the display will turn on all pixels.

Test Number 62 - Turn on Horn

(horn will sound)TEST 62, HORN IS ON

Test Number 63 - Turn on System Relay

WARNING! TEST TURNS ON SYSTEM RELAY! [press ENTER to continue].

TEST 63, SYSTEM RELAY IS ON.

Keypad Tests

Test Number 70 - Display keys pressed. - Press the CANCEL key one time to exit test

PRESS KEY	DISPLAY	PRESS KEY	DISPLAY
1 Display	- 1	7 ←	-7
2 Print	- 2	8 Leak Test	-8
3 Change	- 3	9 →	-9
Silent	- S	System Test	-T
4 Status	- 4	↑	-U
5 History	- 5	0	-0
6 Setup	- 6	↓	-D
Cancel	- Cancels Test	Enter	-E
Reset Switch	- R		

Printer Tests

Test Number 80 - Printer Test

PRINTER TEST BEING PERFORMED. TEST STRING SENT TO PRINTER
SUCCESSFULLY

(or) COULD NOT SEND TEST STRING TO PRINTER.

PRINTER TEST:

ABCDEFGHIJKLMNOPQRSTUVWXYZ 0123456789 . , () ! & *

Test Number 900 Clear RAM

When this test is chosen, the following appears:

WARNING! THIS TEST CLEARS SYSTEM RAM. (Press the ENTER
key to continue)

PLEASE WAIT, CLEARING RAM.

*When the all ram is cleared, the system will reset. As all ram was cleared,
the system setup must now be reprogrammed.*

Test Number 901 Clear EEPROM

When this test is chosen, the following screen appears:

WARNING! THIS TEST CLEARS THE EEPROM. (Press the ENTER
key to continue)

PLEASE WAIT, CLEARING EEPROM.

EEPROM CLEARED SUCCESSFULLY (or) NOT ABLE TO CLEAR
EEPROM.

Tank Level Monitor Tests

Test Number 100-188 - Display TLM data

This test is used to display low & high reference count, count and temperature values, water & product counts.

1	X	X Description	Y	Y Description
(always "1")	0	all inputs	0	Low & High Reference
	1	probe input channel #1	1	RTD # 1
	2	probe input channel #2	2	RTD # 2
	3	probe input channel #3	3	RTD # 3
	4	probe input channel #4	4	RTD # 4
	5	probe input channel #5	5	RTD # 5
	6	probe input channel #6	6	RTD # 6
	7	probe input channel #7	7	Water & Product Floats
	8	probe input channel #8	8	Collect all, display sequence.

Example, to display information for RTD# 5 for the probe connected to probe input # 2, the test number is 125.

COLLECTING DATA PLEASE WAIT

- (if for floats) PROBE #, FLOATS W:nnnnnn P:nnnnnn
- (if for RTDs) PROBE #, Y nnnnnn tt.tt
- (if for reference) PROBE #, HI & LO REF H:nnnnnn L:nnnnnn
- (if trouble with probe) PROBE #, TROUBLE YY

Wherennnn = count in hexadecimal (Base 16)

tt = calculated temperature (in degrees F)

yy = diagnostic code for the trouble found with the TLM or probe.

Line Leak Detector Tests

Test Number 290 - Display the LS/LLD driver card A/D hexadecimal reading. (driver card 1)

Test Number 291 - Display the LS/LLD driver card A/D hexadecimal reading. (driver card 2)

AD #Y COUNT VALUE: XXX

(or) CANNOT READ ANY DATA FROM LS/LLD DRIVER #

LS/LLD A/D TEST

Test Number 298 - Display the LS/LLD driver card test voltage

(driver 1).

Test Number 299 - Display the LS/LLD driver card test voltage (driver 2)

COLLECTING DATA, PLEASE WAITLS/LLD DRIVER 1 A/D
VOLTAGE: X.XX

(OR) CANNOT READ ANY DATA FROM LS/LLD DRIVER #

Test Number 300-308 Read LLD data

These tests are a group of tests which can display voltage and displacement for line leak detectors. To correctly identify the test number desired, the following equation must be used:

Test number = 300 + X, (Where: X=the LLD number, (1-8) or 0 for do all sensors in sequential order.)

WARNING! INTERRUPTS ABILITY TO PUMP! (Press ENTER to continue)

COLLECTING DATA, PLEASE WAITLLD X, UNABLE TO READ THE
SENSOR. (or) LLD X, V: AA.AA D: AA.AA

The **unable to read sensor** message will appear when there is a problem with the A/D circuit such that we cannot read any data.

Test Number 350-378 Set LLD relays

This group of tests set the relays for various line leak detectors. Select the test number below:

Test number = 35n = Disable pump, (relay A on, relays B & C off).

36n = Repump, (relays A & B on, relay C off).

37n = Read sensor, (relays A & C on, relay B off).

Where n=the LLD number, (1-8) or 0 for do all sensors in sequential order.

WARNING! INTERRUPTS ABILITY TO PUMP! Press ENTER to continue.

SETTING LLD RELAYS

When the relays have been put into their test state, one of the following types of displays will appear:

RELAY A ON, B&C OFF ALL PUMPS or RELAY A&B ON, C OFF PUMP
n or RELAY A&C ON, B OFF PUMP n

The relays will stay in the test state and the information will remain displayed until the CANCEL key is pressed, or one minute of no key activity, at which time the screen will revert to the ENTER TEST NUMBER screen and all relays are put back into their normal state (Relays A, B & C off).

Test Number 380 LLD Relays sequence automatically.

WARNING! INTERRUPTS ABILITY TO PUMP! Press ENTER to continue.

This test sets the relays automatically in one second intervals in the sequence described below. Note that only LLDs on installed interface cards will be included in the sequence. As each piece of the test is run, the display will be updated to inform the user of what is currently on, such as

**RELAY A ON, B&C OFF PUMP 3 (or) RELAY A&B ON, C OFF
(etc) ALL PUMPS.**

Test Number 380 (Continued)

The test will start with all pumps in the 'Normal State' (all relays off). Each pump will go individually through 'Disable Pump' (Relay A on, Relays B & C off) and then back to 'Normal State'.

All pumps will then go to 'Disable Pump' and then to 'Normal State'. Each pump will then go individually through 'Repump' (Relays A & B on, Relay C off) and then back to 'Normal State'.

All pumps will then go to 'Repump' and then back to 'Normal State'. Each pump will then go individually through 'Read Sensor' (Relays A & C on, Relay B off) and then back to 'Normal State'.

All pumps will then go to 'Repump' and then back to 'Normal State'. At this point the screen will revert to the ENTER TEST NUMBER screen.

Test Number 398-399 Display LLD Pump Controller signals

This group of tests displays the pump control lines for either LLD 1-4 (test 398) or for LLD 5-8 (test 399). Once a test has been requested, the following screen will appear:

BD #1 AC:OFF 1:OFF 2:OFF 3:OFF 4:OFF

Where OFF can be replaced by ON and BD #1 will be replaced with BD #2 for test 399. The information will remain displayed until the CANCEL key is pressed, or one minute of no key activity, at which time the screen will revert to the ENTER TEST NUMBER screen.

Test Number 81n Display LLD Piston Position and Voltage (Where n = input number)

WARNING! INTERRUPTS ABILITY TO PUMP!

This test turns the pump on then off the prints elapsed time, piston position, and LLD voltage for one minute. Use this test to evaluate the LLD sensor for piston movement and pipe action during the 60 second test. Repeat the test with the ball valve closed to test the check valve.

Multi Relay Tests

Test Number 400 Multi-Relays Installed.

The following screen appears:

OF MULTI-RELAYS INSTALLED: (0,4,8)

Test Number 401-655 Multi-Relay Tests.

WARNING!

THIS TEST TURNS ON MULTI-RELAYS!

Press ENTER to continue. and display the following screen:

MULTI-RELAYS ON: A,B,C,D,E,F,G,H

Where A-B is a list of the relays that are currently being turned on or ALL. To determine the test number that corresponds to the desired relays, the following equation must be used:

Test Number=400+(sum of X values as defined below)

Relay #	X Value	Relay #	X Value	Relay #	X Value
1	1	4	8	764	
2	2	5	16	8128	
3	4	6	32	(All)255	

For example, to turn on relays 1,3, and 8, Test # = 400 + (1+4+128)=533.
To turn on all relays, Test # =400+255=655.

Test Number 660 Multi-Relays sequence automatically.

The following warning screen is displayed:

WARNING! TEST TURNS ON MULTI RELAYS!

The user must press ENTER to continue. If CANCEL is pressed, the screen reverts back to the original Enter test number screen. Once ENTER has been pressed, the test will be carried out.

This test will turn on and then off each relay in consecutive order and finally all relays. The time interval between each step is approximately one second. When each relay is on, the following screen will appear:

MULTI-RELAYS ON: 3 (or) MULTI-RELAYS ON: ALL
(etc) .

Maintenance

Recommended yearly maintenance consists of the following:

Printer

The printer ribbon (Epson ERC-23; OPW P/N Q439500) must be replaced when the printed characters become too faint to read. Systems not equipped with the internal printer are supplied with a 25-pin, female connector for connection of a local printer with Centronics parallel interface (PC compatible parallel printer). Follow the instructions below to change either the paper or ribbon in the printer.

Changing Printer Ribbon

1. Loosen the two captive screws below the front panel on the main console and open the printer door to access the printer.
2. Locate the lift tab on the printer ribbon cartridge and gently pull towards you to remove the ribbon.
3. Press a new ribbon into place, making absolutely sure that the ribbon is under the paper. Properly positioning the ribbon under the paper is necessary to insure that the characters are printed correctly.
4. Turn the ribbon tension adjustment knob (located on the right side of the ribbon cartridge) to remove all slack in the ribbon. Close the printer door.
5. Tighten the printer door captive screw and bottom captive screws. Depress the paper feed switch to be sure the new paper is correctly installed.

Changing Printer Paper

1. Loosen the two captive screws on the bottom of the main console.
2. Loosen the two captive screws on the lower front panel on the main console and open the panel to access the printer.
3. Grasp the printer on the right side of the carriage frame and tilt it forward.
4. Lift up the paper roll spindle until it clears the printer carriage.
5. Remove the empty paper spool from the spindle and slide on a new roll of paper. Be sure the paper roll turns freely on the spindle so the paper

will feed properly. NOTE: The paper should feed off the bottom side of the paper roll.

6. Place the spindle and new paper roll back in the printer carriage and lower it all the way down.
7. Bring the leading edge of the new paper over the top roller on the printer, then down into the feed through slot (keep paper straight).
8. While exerting a slight downward pressure on the paper, depress the paper feed switch (located to the left of the printer) to advance the paper through the printer.
9. Feed approximately 1/2" to 1" of paper out through the front of the printer. NOTE: Make sure that the paper is on top of the ribbon. Push the printer carriage back into the main console.
10. While closing the paper door, feed and align the end of the paper through the paper feed slot.
11. Tighten the door panel captive screws and bottom captive screws. Depress the paper feed switch to be sure the new paper is correctly installed.

Battery Backup

Check the Memory Backup Battery Voltage for a minimum of 3.0 VDC checked at battery leads (3.6 VDC Lithium Battery) .

Battery current is provided only when system AC power is off.

Tank Level Monitor

Periodic maintenance of the TLM probe may be required to remove the buildup of contamination from the probe surface and the floats. Frequency of maintenance will vary from product to product.

Occasional failed leak tests are a sign the probes need cleaning. Contamination of the probe surface can restrict the travel of the floats during a leak test. This will rarely be more than .002" to .003" so it will not affect inventory accuracy, but can be enough to affect the leak test results.

1. Remove the probes from the tank.
2. Remove the floats and clean any debris that may have collected on the surface and around the magnet at the top of the floats.
3. Inspect the hole in the top of the float. A toothed spacer is mounted inside the hole. The teeth should be long enough to keep the magnet or float body from touching the shaft of the probe when it is assembled. If the teeth are worn, replace the float.

4. Clean the shaft with an abrasive pad, like Scotchbrite. STEEL WOOL IS NOT RECOMMENDED.
5. Stand the probe on the ground vertically.
6. Polish the probe using long straight in-line strokes along the length of the shaft. Polishing should not be required within 10" to 12" of the end of the probe since no leak tests are performed in this range. *Do not use a twisting motion.* Stainless steel probes will require heavy pressure. Periodically inspect the surface for a smooth finish.
7. Reinstall the floats and 'E clip' on the probe and perform the probe calibration procedure (see setup TLM5 in Section 7). Carefully reinstall the probe.
8. Check activation of all sensor and probe inputs to verify that no input channel has been de-activated. The internal diagnostics continuously check each input for proper operation

Quick Configuration Guide

Note To System Owner

Select and mark the features to be activated during system start-up that will help you manage your station and get the most from your new EECO SYSTEM 2000 automatically. Select automatic report print times and the desired data to be included in the report and the information will be available at the times you have selected.

EECO GUIDETM printed Help Instructions tell your station operator what to do when an alarm occurs.

Print EECO GUIDE Help Instructions when an alarm occurs? ♦ Yes ♦ No

Audible console alarm sounds for 30 seconds then silences. ♦ Yes ♦ No

Reports can be selected to print automatically up to 4 times daily. Information to be included in each of the reports can be selected for each report.

Refer to Sample Reports when selecting the following:

Include Inventory Data in Report:	♦ #1	♦ #2	♦ #3	♦ #4
Include Delivery Status in Report:	♦ #1	♦ #2	♦ #3	♦ #4
Include Fuel Order Advisory in Report:	♦ #1	♦ #2	♦ #3	♦ #4
Include Reconciliation Information (Shift) in Report:	♦ #1	♦ #2	♦ #3	♦ #4
Include Water Removal Status in Report:	♦ #1	♦ #2	♦ #3	♦ #4
Include Status in Report:	♦ #1	♦ #2	♦ #3	♦ #4
Include Leak Test Status in Report:	♦ #1	♦ #2	♦ #3	♦ #4

Report Schedule Times#1 _____ #2 _____ #3 _____ #4 _____

The Fuel Order Advisory Report contains information calculated on your 14 day rolling average fuel through-put. This report includes the number of days fuel supply in each tank at the time the new report is generated and the amount of fuel that can be safely added at the time of the report. This available tankage is calculated on a selectable percentage of actual tank capacity

Set Fuel Order Advisory % of tank capacity to : ♦ 90% ♦ 95% ♦ Other _____ %

If optional Multi Relay boards have been installed in the system and wired into the pump control circuit, their outputs can be used to prevent damage to the submersible pumps in the event of low fuel level (near pump intake) or pumping water into the filters. A submersible pump uses the fuel from the pump to cool the motor. A dry pump may burn out or overheat.

Shut off submersible pump on Low Product Level ♦ Yes ♦ No

Shut off submersible pump on High Water Level ♦ Yes ♦ No

The system can notify you when it is time to run the monthly or yearly leak test in the event it has not been completed in the allotted time.

Notify operator when Monthly Leak Test is due? ♦ Yes ♦ No

Notify operator when Yearly Leak Test is due? ♦ Yes ♦ No

A factory trained technician is required to check the system installation and perform the system start-up and include the selections listed above. The start-up technician is required to train the owner / operator in the system use. Your signature (attesting that this training has been completed) is required on the forms that are returned to OPW Fuel Management Systems to activate the system warranty.

Appendix EPA Test Reports

TLM Test	P(D)	P(FA)	Page
0.1 gph Precision Test	99%	1.0%	LT-3
0.1 gph Quick Test	96%	4.0%	LT-5
0.2 gph Precision Test	99.1	0.9%	LT-9
0.2 gph Quick Test	95.4%	4.6%	LT-11

LLD Test	P(D)	P(FA)	Page
3.0 gph Hourly Monitoring Test	100%	0%	LT-15
0.2 gph Monthly Monitoring Test	100%	0%	LT-21
0.1 gph Line Tightness Test	100%	0%	LT-27

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