

ST Controller Operation Manual

RE260-257 Rev. B June 99

Trademarks

The logos for Red Jacket and Marley Pump Company are property of Marley Pump Company. Trapper is a trademark of Marley Pump. The UL logo is property of Underwriters Laboratories Inc. Other trademarks that appear in this manual include Belden, Celcon, Durabar, Echelon, LonWorks, Scotch-Cast, Spiralock, Teflon, and Viton.

Copyright

Copyright 1999, Marley Pump, a United Dominion company. The Marley Pump Company reserves the right to make design improvements and pricing modifications as necessary and without notice. Marley Pump is not responsible for the operation of equipment from other manufacturers when used in conjunction with Red Jacket petroleum equipment. The information in this manual is proprietary and intended only for distributors, installers, and owners of Red Jacket equipment. Any other use of this manual in part or in whole must be authorized in writing by:

The Marley Pump Company
500 East 59th St
Davenport IA 52807

319.391.8600

Marley Pump Company reserves the right to make design improvements and pricing modifications as necessary and without notice. Please contact Marley Pump Company for information relevant to the use of Red Jacket Petroleum equipment with equipment from other manufacturers.

©1998

Printed in the USA

Table of Contents

INTRODUCTION	VI
WHAT IS THE ST CONTROLLER.....	VI
<i>Environmental Concerns</i>	<i>vi</i>
LET'S GET STARTED	1
ST CONTROLLER OVERVIEW	1
How Do I Change Printer Paper?	3
How Do I Clear a Paper Jam?	6
ST REPORTS	9
HOW DO I PRINT A REPORT?	9
<i>Understanding Printed Reports</i>	<i>11</i>
Inventory Report.....	11
Last Pass Test Report.....	14
Strapping Table Report.....	17
Leak Test Summary Report.....	18
Ullage	20
<i>How Do I Print a Chronological Report?</i>	<i>20</i>
<i>System Status Check (self diagnostic)</i>	<i>25</i>
ALARM CONDITIONS	31
HOW DO I RESPOND TO ALARMS?	31
<i>Alarm Types</i>	<i>32</i>
GLOSSARY OF TERMS	35
INDEX	39

Table of Figures

Figure 1: Front Panel of the ST Controller	1
Figure 2 Changing the Printer Paper.....	5
Figure 3 Clearing a paper jam and reloading the printer paper.....	7
Figure 4: Inventory Report.....	12
Figure 5: Last Pass Test.....	14
Figure 6: Strapping Table Report	17
Figure 7: Leak Test Summary Report.....	18
Figure 8: Ullage Report	20
Figure 9: Data History Report.....	23
Figure 10: System Status Report.....	28

Introduction



A Quick Overview

- ☆ What is the ST Controller?
 - *Environmental Concerns*

What is the ST Controller

The ST Controller is a sophisticated tank monitoring and leak detection system. It has features that allow measurement of the contents of underground storage tanks (USTs), print reports, sound alarms, communicate with remote systems (computers), and perform leak tests.

Environmental Concerns



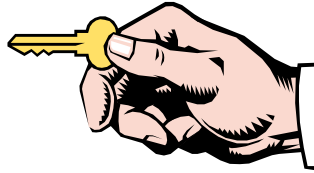
In the delicate environment in which we live, it is very important as a UST owner and operator to do all you can to avoid product contamination of the environment.

Because USTs store potentially damaging products, the Environmental

Protection Agency (EPA) has established minimum guidelines that all UST owners and operators must follow to help safeguard against dangerous leaks.



Your company has chosen Red Jacket's ST Tank Monitoring System to comply with EPA regulations. The ST Controller will minimize the possibility of accidental discharge of product from underground storage tanks.



Let's Get Started

A Quick Overview

- ☆ **ST Controller Overview**
 - *Changing Printer Paper*
 - *Clearing Paper Jams*

ST Controller Overview

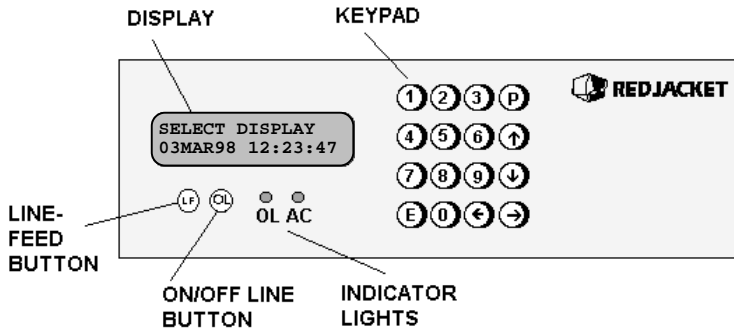





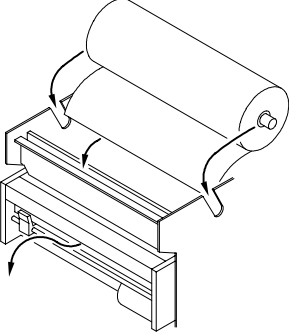


Figure 1: Front Panel of the ST Controller

Let's take a closer look at the ST Controller. Figure 1 is a drawing of the front panel of the ST Controller that shows the parts.

The following table describes each part of the ST Controller's front panel.


<p>SELECT DISPLAY 06MAR98 12:37:20</p>	<p>System activities and the alarm's status is visible on the display.</p>
	<p>The line feed key is used to advance the paper through the printer.</p>
	<p>The on-line key takes the printer on and off-line. Always check the OL light to be sure the printer is on-line before printing. If it is not on-line, the printer will not print.</p>
	<p>The AC light lets you know that the ST Controller is connected to AC power. The OL light indicates the printer is on-line and ready to print.</p>
	<p>The keypad has numbered keys, a P key, and an E key. Use the P key to print a report, and the E key to silence an alarm.</p>

	<p>Use the arrow keys to move through the menu on the display, change functions, basic programming, and locate alarms.</p>
	<p>If the ST Controller at your site has an internal printer, it will be to the left of the keypad.</p>

How Do I Change Printer Paper?

Changing the internal printer paper is easy. It is a good idea to check the paper before each shift so you won't lose any reports because you ran out of paper. The following instructions explain how to change the paper.

Notice *Not all ST Controllers have an internal printer.*

Step 1: If the OL light is on, press the  key and take the printer off-line.

Step 2: Tilt the gray top front cover of the ST Controller up and back to expose the printer assembly.

Step 3: Remove the empty paper roll from the paper spindle.

Step 4: Obtain a new roll of Red Jacket printer paper.

Step 5: Use a pair of scissors to cut a straight, clean edge across the fresh roll of paper. DO NOT *fold* the paper.

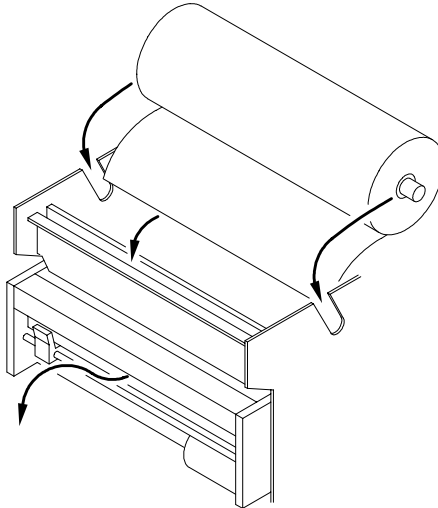


Figure 2 Changing the Printer Paper

Step 6: Feed the paper through the paper guide located at the top of the printer head. Refer to the drawing located inside the control panel of the ST Controller and to the right of the printer assembly.

Step 7: Press the Ⓞ key and the paper will feed up through the printer driver head and out the top of the printer.

Step 8: Feed paper out of the printer and up through the cover and then close the top cover.

You are now ready to print a report.

How Do I Clear a Paper Jam?

Occasionally the ST Controller's printer may jam. If the printer jams, the following steps will help you clear the paper and reset the printer.

Step 1: Open the top cover by tilting up and back.

Step 2: Clear the paper jam from the mechanism of the printer by pulling the paper gently, back through the printer assembly. Press the Reset button.

Step 3: Use a pair of scissors to cut a straight, clean edge across the paper.

Step 4: Feed the paper through the paper guide located at the top of the printer head. Refer to the drawing located inside the panel of the ST Controller and to the right of the printer assembly.

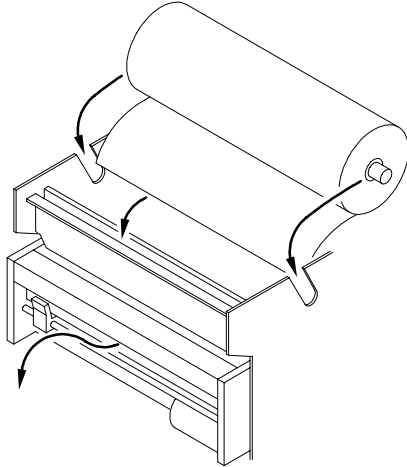


Figure 3 Clearing a paper jam and reloading the printer paper

Step 5: Feed paper out of the printer and up through the cover and then close the top cover.

You are now ready to print a report.

ST Reports



A Quick Overview

☆ How Do I Print a Report?

Understanding Printed Reports

- *Inventory Report*
- *Last Pass Test Report*
- *Strapping Table Report*
- *Leak Test Summary Report*
- *Ullage Report*
- *How Do I Print an Event History Report?*
- *System Status Report*

How Do I Print a Report?

In this section we will go over the basic procedure for printing reports. The following list represents the reports ST Controller can generate for you.

Inventory

Last Pass Test

Diagnostics

System Program

Strapping Table

Leak Test Summary


Ullage

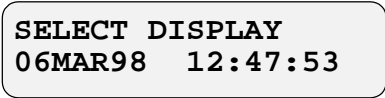
Product Temp
Water Height
Net Volume
Gross Volume
Product Height

The Diagnostics and System Program reports are for technician use only

The following instructions explain how to access the print menu, select a report, and print a report. These steps can be used to print any report you need.

On the ST Controller, perform the following steps:

Step 1: If you do not see "Select Display" press the  key until "Select Display" appears:



SELECT DISPLAY
06MAR98 12:47:53

Step 2: Press the  key and you should see the following display:



PRINT MENU
INVENTORY

Step 3: Press the ⬆ or ⬇ keys to scroll through the report choices until you see the report you want.

Step 4: Press the Ⓟ key to select the tank.

Step 5: Press the Ⓟ key and the ST Controller will begin printing the report.

Understanding Printed Reports

In the following sections we will describe various reports that are useful in running a station more smoothly. An example of each report is provided as well as a chart that describes each line of that report.



Inventory Report

The ST Controller is constantly monitoring these five things:

Product Height

Gross Volume

Ullage

Water Height Product Temperature

Each of these items can be printed individually. It's easier to print all five at once. Anytime you need a report containing all of the above items choose the **Inventory Report**.

Figure 4 is an example of the **Inventory Report** printed on the ST Controller's internal printer.

RED JACKET LEAK DETECTION SYSTEMS VERSION RJE-ST_14.1	
----- INVENTORY REPORT -----	
06MAR98	1:10:09
TANK 1 UNLEADED REG	9816 GALLONS

PRODUCT HEIGHT	39.14 INCHES
GROSS VOLUME	4036.3 GALLONS
ULLAGE (90%)	5288.8 GALLONS
NET VOLUME	4058.5 GALLONS
WATER HEIGHT	0.03 INCHES
PRODUCT TEMPERATURE	51.81 DEG. F

END OF REPORT	

Figure 4: Inventory Report

The following chart represents each part of the Inventory Report and definitions for each.

06MAR98 1:10:09	The date and time the report was printed.
-----------------	-------------------------------------------

TANK 1 UNLEADED REG 9816 GALLONS	Tank number, product type, and the total capacity of the tank.
PRODUCT HEIGHT	The current height of product in the tank.
GROSS VOLUME	The total volume of product in the tank.(Uncompensated for temperature)
ULLAGE	The amount of product that can be added to the tank, without exceeding the programmed overfill percentage.
NET VOLUME	The net volume of product in the tank.(Compensated for temperature)
WATER HEIGHT	The amount of water in the bottom of the tank.
PRODUCT TEMPERATURE	The temperature of the product in the tank.

Last Pass Test Report

```

                                RED JACKET LEAK DETECTION SYSTEMS
                                VERSION RJE-ST_14.1

                                LAST PASS TEST
-----
                                06MAR98                                10:12:13

LEAK TEST                                06MAR98                                05:13:41
*****
TANK 1 UNLEADED REG                                0.099 GAL/H PASS
-----

SHUTDOWN TEST
ALARM LEAK RATE                                0.200 GAL/H
PROBABILITY OF DETECTION 99.9%

PRODUCT HEIGHT                                43.21 INCHES
PRODUCT VOLUME                                4611.0 GALLONS
LEAK DET START TIME                            06MAR98 02:52:02
LEAK DET END TIME                              06MAR98 05:13:41
LEAK DET PERIOD                                02 HRS 21 MINS
LEAK DET START WATER                          0.04 INCHES
LEAK DET END WATER                            0.04 INCHES
LAST DELIVERY                                05MAR98 13:17:34
LEAK TEST NO                                192
-----

LINE LEAK TEST 06MAR97                                14:58:20
*****
LINE 01
-----
LINE LEAK START TIME                            06MAR98 14:40:47
LINE LEAK END TIME                              06MAR98 14:57:39
ENDING PRESSURE                                9.44 PSI
T: 0998/0008                                A01
AIR COUNTER                                    0
COMPLETE STD TEST (MONTHLY)

-----
                                END OF REPORT
    
```

Figure 5: Last Pass Test

The following table will describe each line of the sample report shown in figure 5.

24MAR97 13:07:03	The date and time the report was printed.
TANK 1 UNLEADED REG 0.2 GAL/H PASS	This line describes the tank the leak test was performed on, the leak rate that is programmed, and if the test results were passing or failing.
SHUTDOWN TEST	A test that is undisturbed by pumping action for the duration of the test. This is indicated by an asterisk on the inventory report.
ALARM LEAK RATE 0.2 GAL/H	The leak rate level used to determine a pass or fail test. (The actual measured leak rate must be less than $\frac{1}{2}$ of the alarm leak rate to pass)
PROBABILITY OF DETECTION 99.9%	This factor is a set value that indicates the statistical accuracy of the test.
PRODUCT HEIGHT	The height of product in the tank at the beginning of the leak test.
PRODUCT VOLUME	The volume of product in the tank at the beginning of the leak test.
LEAK DET START TIME	The date and time the leak test started.
LEAK DET END TIME	The date and time the leak test ended.
LEAK DET PERIOD	The amount of time the leak test took.
LEAK DET START WATER	The amount of water in the bottom of the tank at the beginning of the leak test.
LEAK DET END WATER	The amount of water in the bottom of the tank at the end of the leak test.
LAST DELIVERY	The date and time of the last delivery before the leak test was performed.
LEAK TEST NO	The chronological or sequential number of the test.
LINE LEAK TEST	Indicates the line test information follows.

LINE 01	The product line number on which the leak test was performed.
LINE LEAK START TIME	The date and time the line leak test began.
LINE LEAK END TIME	The date and time the line leak test ended.
ENDING PR	The pressure at the end of the line leak test.
T: 0999/0008	A timer. Actual/Target. The actual time the test took to complete. Compared to the target time.
AIR COUNTER	Number of times air was found in the line after a customer dispense operation.
COMPLETE HOURLY TEST	<u>Hourly</u> : Indicates a 3GPH leak test has been passed successfully.
COMPLETE STD TEST (MONTHLY)	<u>STD (monthly)</u> : Indicates a monthly 0.2 GPH leak test has been passed successfully.
COMPLETE PRECISION TEST	<u>Precision</u> : Indicates a 0.1 GPH leak test has been passed successfully.

Strapping Table Report

The strapping table report represents the tank chart programmed into the ST Controller at start-up. This volume at the 16 set levels comes from the manufacturer's tank chart. The ST Controller will calculate all levels in between those listed.

If you have a non-cylindrical tank, you will have to enter the heights and corresponding volumes manually. Figure 6 is an example of the strapping table report.

```

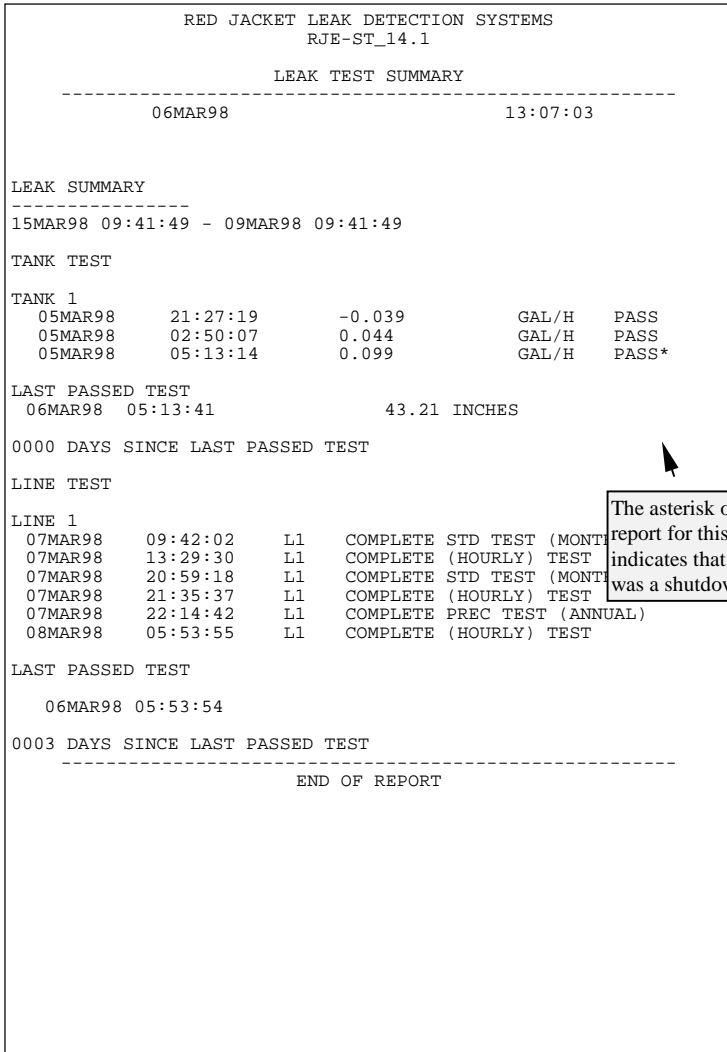
RED JACKET LEAK DETECTION SYSTEMS
VERSION RJE-ST_14.1

-----
STRAPPING TABLE
-----
          06MAR98                      13:07:03
TANK 1 UNLEADED REG          9816 GALLONS
-----
TANK CHART HGT          VOLUME
6 INCHES                265 GALLONS
12 INCHES               734 GALLONS
17 INCHES               1226 GALLONS
23 INCHES               1906 GALLONS
29 INCHES               2659 GALLONS
35 INCHES               3462 GALLONS
40 INCHES               4155 GALLONS
46 INCHES               5009 GALLONS
52 INCHES               5853 GALLONS
58 INCHES               6677 GALLONS
63 INCHES               7335 GALLONS
69 INCHES               8073 GALLONS
75 INCHES               8733 GALLONS
81 INCHES               9286 GALLONS
86 INCHES               9634 GALLONS
92 INCHES               9816 GALLONS
-----
END OF REPORT

```

Figure 6: Strapping Table Report

Leak Test Summary Report



The asterisk on the report for this test indicates that this was a shutdown test.

Figure 7: Leak Test Summary Report

The following table will describe each line of the sample report shown in figure 7.

06MAR98 13:07:03	The date and time the report printed.
06MAR98 09:41:49- 06MAR98 09:41:49	The date range for the Leak Test Report.
LAST PASSED TEST	The date and time of the last passing leak test.
0000 DAYS SINCE LAST PASSED TEST	This indicates zero days since the last test was completed.
24MAR97 09:42:02	The date and time of the test and the line on which the test was performed.
L1	The product line the test was performed on.
COMPLETE PREC TEST (ANNUAL)	The frequency of the line leak test. Hourly: Indicates 3 GPH fast pass leak test has been passed successfully. STD (monthly): Indicates a monthly 0.2 GPH leak test has been passed successfully. Precision: Indicates a 0.1 GPH leak test has been passed successfully.

Ullage

The Ullage Report is very helpful when ordering product. The ST provides this report so that you can order the right amount of product without overfilling your tank.

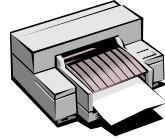
RED JACKET LEAK DETECTION SYSTEMS VERSION RJE-ST_14.1			
----- ULLAGE -----			
06MAR98		13:07:03	
T1	UNLEADED REG	(90%)	5288.8 GALLONS
T2	HARRY' PREMIUM	(90%)	5987.4 GALLONS
----- END OF REPORT			

Figure 8: Ullage Report

The following table will describe each line of the sample report shown in figure 8.

06MAR98 13:07:03	The date and time of the printed report.
T1 UNLEADED REG (90%) 5288.8 GALLONS	The amount of product that can be delivered to Tank 1 without triggering the overfill alarm.
T2 HARRY' PREMIUM (90%) 5987.4 GALLONS	The amount of product that can be delivered to Tank 2 without triggering the overfill alarm.

How Do I Print a Chronological Report?



You can print any report with a specified date range. A date range is the beginning and ending date and time for a report. The following steps explain how to print a Chronological Report.

Step 1: To enter chronological history, start at the "Select Display" screen, and press the **Ⓢ** key. The display will appear as follows:

```
HISTORY    0002
CHRONOLOGICAL
```

Step 2: Use the **Ⓢ** key to locate the report you would like to print.

```
HISTORY          0000
PRODUCT DEL
```


Step 3: Press the **Ⓢ** key; "Start Printing" appears on the display. Enter the day/month/year and time for the beginning range of the report. Use the **⬆** or **⬇** and **⬅** keys to move around.

START PRINTING
07MAR97 14:02:46

Step 4: Press the **Ⓢ** key to enter the "End Printing" date range screen. Use the **⬆** or **⬇** and **⬅** keys to move through the display and enter the day/month/year for the ending range of the report.

END PRINTING
26MAR97 14:02:46

Step 5: Press the **Ⓢ** key again and the ST will begin printing the requested report.



Notice

Make sure the OL light is on indicating the printer is on-line and ready to print.

Figure 9 is an example of the Data History Report showing Product Delivery.

```

                                RED JACKET LEAK DETECTION SYSTEMS
                                VERSION RJE-ST_14.1

                                DATA HISTORY
-----
                                06MAR98                                13:07:03

FROM      06MAR98      13:17:34
TO        06MAR97      13:17:34

PRODUCT DELIVERY  06MAR98      13:17:34
*****
TANK 1 HARRY'S PREMIUM      243.7 GALLONS
-----

NET DELIVERY      243.5 GALLONS
PRODUCT DISPENSED 0.0 GALLONS

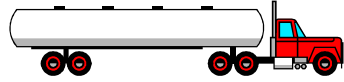
DELIVERY START TIME      05MAR97 13:00:28
BEGINNING VOLUME      2496.5 GALLONS
BEGINNING VOLUME NET   2495.4 GALLONS
BEGINNING HEIGHT      60.83 INCHES
BEGINNING TEMPERATURE  63.97 DEG F

DELIVERY END TIME      05MAR97 13:14:34
ENDING VOLUME      2740.1 GALLONS
ENDING VOLUME NET     2738.9 GALLONS
ENDING HEIGHT      65.38 INCHES
ENDING TEMPERATURE  63.86 DEG F

DELIVERY RATE      280.00 GAL/M
ESTIMATED DEL TEMP  65.82 DEG F
*****
-----
                                END OF REPORT

```

Figure 9: Data History Report



The following table will describe each line of the sample report shown in figure 9.

24MAR97 13:07:03	The date and time the report was printed.
FROM	The date and time the date range will begin.
TO	The date and time the date range will end.
PRODUCT DELIVERY	The type of report.
TANK 1 UNLEADED REG	The tank number, type of product, and the gross volume(Not temperature compensated) at the time of the report.
NET DELIVERY	The net volume(Temperature compensated) of product delivered.
PRODUCT DISPENSED	The amount of product dispensed during the delivery. This feature is only available if a T.I.M. is connected.
DELIVERY START TIME	The time the delivery began.
BEGINNING VOLUME	The gross volume(Not temperature compensated) of product in the tank before the delivery.
BEGINNING VOLUME NET	The net volume(Temperature compensated) of product in the tank before the delivery.
BEGINNING HEIGHT	The height of product in the tank before the delivery.
BEGINNING TEMPERATURE	The temperature of the product in the tank before the delivery.
DELIVERY END TIME	The date and time the delivery ended.

ENDING VOLUME	The gross volume of product in the tank at the end of the delivery.
ENDING VOLUME NET	The net volume of product in the tank at the end of the delivery.
ENDING HEIGHT	The height of the product at the end of the delivery.
ENDING TEMPERATURE	The temperature of the product in the tank at the end of the delivery.
DELIVERY RATE	The average rate of flow of product into the tank during delivery.
ESTIMATED DEL TEMP	The estimated delivery temperature of the fuel being delivered.

System Status Check (self diagnostic)

Step 1: Start from the Select Display screen. To print the system status report, press the **Ⓢ** key. The display will appear as follows during the testing process:

**CHECKING SYSTEM
PLEASE WAIT . . .**

**CHECKING ALARM
PLEASE WAIT . . .**

Step 2: To print the System Status report press the **Ⓟ** key and the report will begin printing.

Notice *If the screen appears as follows with an "ER" indicating an error, press the **Ⓢ** key to determine which probe or sensor is the problem. Check the report for further information.*



Please notify the appropriate personnel with the results.

Step 3: This report should be printed and stored on site at least once a year.

```
RED JACKET LEAK DETECTION SYSTEMS
VERSION RJE-ST_14.1

SYSTEM STATUS
-----
06MAR98          13:07:03

SYSTEM INFORMATION
RJE-ST_14.1
PROM SIG COCC
RAM CHECK 131072
BATTERY   OK
LEAK MODE A

PROBE INFORMATION
TANK PROBE 1 OK

WATER FLOAT ACTIVE
LAST LEAK DETECTION 05MAR98 14:50:57
TRANSCIEIVER HEIGHT 3.75 INCHES
INITIAL HEIGHT      23.65 INCHES

SENSOR INFORMATION
SIB: 01L_04.1
SIB SIG 0237

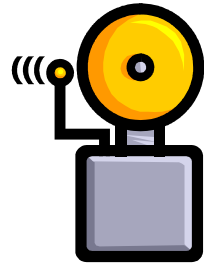
SENSOR 01 OK
SENSOR 02 OK
-----
END OF REPORT
```

Figure 10: System Status Report

The following list describes and defines the information in the **System Status** report shown in figure 10

06MAR98 13:07:03	The date and time of the printed report.
RJE-ST_14.1 06MAR98	The version of software installed on the ST Controller.
PROM SIG C0CC	The electronic signature of the PROM.
RAM CHECK 131072	Memory test and size.
BATTERY OK	The status of the battery.
LEAK MODE A	Leak detection mode selected in programming. A= Automatic P= Programmed M= Manual
TANK PROBE 1 OK	The status of the probe.
WATER FLOAT ACTIVE	The status of the water float.
LAST LEAK DETECTION	The date and time of the last tank leak detection test.
TRANSCIEVER HEIGHT	This is the \pm setting for matching stick readings.
INTIAL HEIGHT	Initial product height.
SIB: 01L_04.1	Version of the software of the Sensor Interface Board (SIB).
SIB SIG 0237	SIB signature.
SENSOR 01 OK SENSOR 02 OK	The status of the sensors.

Alarm Conditions



Quick Overview

- ☆ How Do I to Respond to Alarms?
 - *Alarm Types*

How Do I Respond to Alarms?

One of the most important things to understand about the ST Controller is how to react in an alarm condition. Depending on how your ST is programmed, there are several alarm conditions that can be reported by the ST Controller.

It is important that your site has a set of guidelines to follow in the event of an alarm condition. If these guidelines have not been explained, consult your supervisor. It is extremely important that you are familiar with the alarm procedures.

Respond to alarm conditions as follows:

Step 1: Stay calm.

Step 2: Wait until the printer finishes printing the alarm report.

Step 3: Press the Ⓜ key to silence the alarm.

Step 4: Follow your company's guidelines.

Alarm Types

Some possible alarm conditions include:

- **Overfill**

This alarm will be triggered if the product level in the tank rises higher than 90%.

- **High Water**

This alarm will be triggered if the level of water in the tank rises higher than the set limit.

- **Low Product**

This alarm will be triggered when the product level in the tank falls below the set limit.

- **System Error**

- **Delivery Report**

This alarm will be triggered when a delivery report is printed.

- **Sensor Alarm**

This alarm will be triggered if a sensor does not respond to the ST Controller.

- **Failed Catastrophic or Hourly 3 GPH Test**

This alarm will be triggered if the ST Controller detects a leak rate of greater than 3GPH.

- **Failed Standard Test**

This alarm will be triggered if the ST Controller detects a leak rate of greater than 0.2 GPH.



- **Failed Precision or Standard 0.2 GPH Line or Annual 0.1 GPH Line Test**

- **Liquid Alarm**

- **Product Alarm**

Glossary of Terms

Alarm History Report	Reports the alarms that have occurred.
Delivery	The product delivered into the tank.
Catastrophic or Hourly Test	A test for a leak of 3 gallons per hour or greater. To pass this test the actual leak rate must be $\frac{1}{2}$ of this amount or less.
Standard or Monthly Line Test	A test for a leak of 0.2 gallons per hour or greater. To pass this test the actual leak rate must be $\frac{1}{2}$ of this amount or less.
Precision Line Test	A test for a leak of 0.1 gallons per hour or greater. To pass this test the actual leak rate must be $\frac{1}{2}$ of this amount or less.
Gross Volume	The physical volume of product in the tank. This is <i>not</i> adjusted for temperature. It does <i>not</i> include any water that may be at the bottom of the tank.
High water	Indicates that the water level in the tank is at or above the limit set in the ST programming.
Inconclusive Tank Test	The Tank Leak Test ran, but the results were inconclusive due to test interruptions.
Inventory	The amount of product in the tank.
Leak Detection	During leak detection, the ST Controller notes any changes in product height and converts the height to a volume measurement. The ST then revises this data in order to compensate for variables that influence leak tests (temperature changes, tank geometry, etc.). The ST Controller

	then converts this information to a leak rate.
Line Feed Button 	The line feed key is located on the ST Controller front panel and feeds the printer paper through the printer.
Line Test	A passed Line Test indicates that product is not leaving the line. A failed test may indicate product being lost from the line.
Liquid Alarm	Indicates a liquid has entered the containment sump. This alarm does not identify what the liquid is.
Low Product	An alarm generated by the ST Controller to indicate product is at 10% of the tank's capacity and a delivery of product may be needed.
On-line button 	Located on the ST Controller's front panel. Press the on-line key to place the printer on-line and ready for printing.
Overfill	Indicates the tank has been overfilled <i>above</i> the 90% limit.
Product Alarm	Indicates product has possibly entered the containment area.
Product Dispensed	The amount of fuel dispensed through all nozzles. This may be entered manually or automatically collected for the ST Controller by the T.I.M.
Product Temperature	Due to temperature stratification (layers) in most tanks, product is rarely uniform in temperature. To account for this the ST Controller displays a weighted average temperature (a temperature that is weighted to a higher degree where it represents greater volume change, the middle of the tank).
Reconciliation	Reports throughput information based on the amount of product dispensed and deliveries

	received.
Report History	<p>Data history in the ST Controller's memory area. When "display option" information is called up by the user or an automatic display (event driven display) is initiated by the ST Controller, data is transferred to this memory area where it is listed chronologically.</p> <p>This feature prevents the accidental loss of system status and alarm information and provides a location where this information can be stored before the oldest information is overwritten by new alarm reports or other data.</p>
Select Display	The normally displayed screen on the ST Controller's front panel.
Sensor Alarm	The sensor alarm indicates water or product may be entering one of the ST Controller's monitored locations.
System Error	In case of a system error, call a qualified technician for repair.

System Status	<p>When the (B) key is pressed, the display will appear as follows:</p> <div style="border: 1px solid black; border-radius: 10px; padding: 10px; text-align: center; margin: 10px 0;"> <p>CHECKING SYSTEM PLEASE WAIT...</p> </div> <p>Programming will run a system test on all areas of hardware. An alarm will be sounded for (2) seconds during this test.</p> <p>If the system test finds an error, the display will appear as follows:</p> <div style="border: 1px solid black; border-radius: 10px; padding: 10px; text-align: center; margin: 10px 0;"> <p>SYSTEM STATUS ER</p> </div> <p>To print a report press the (P) key on the front of the ST Controller. Be sure the (AL) key has been pressed.</p>
Tank Sticking	Measuring the product level in the tank using a tank stick and a tank chart to calculate the amount of product stored in the tank.
Transaction Interface Module (TIM)	Collects product dispensed information from each dispenser automatically.
Ullage	The amount of product that can be added to the tank, without exceeding the programmed overfill percentage.
Ullage Report	The amount of product that can be delivered to the tank without overflowing the tank.
Water Height	The amount of water on the bottom of the tank.

Index

A

AC light	2
Alarm History Report	29
Alarms	25
arrow keys	3

C

Change Printer Paper	3
Clear a Paper Jam	5

D

Delivery	29
display	2

E

Event History Report	17
----------------------------	----

F

Failed Catastrophic Test	29
Failed Precision Test (California software)	29
Failed Standard Test	29
front panel	1

G

Gross Volume	29
--------------------	----

H

High water	29
------------------	----

I

internal	3
Inventory	29
Inventory Report	9

K

keypad	2
--------------	---

L

Last Pass Test Report	11
Leak Detection	29
Leak Test Summary Report	15
line feed	2
Line Test	30
Liquid Alarm	30
Low Product	30

O

OL light	2
on-line	2
Overfill	30

P

Print a Report	7
Product Alarm	30
Product Dispensed	30
Product Temperature	30

R

Reconciliation	30
Report History	31

S

Select Display	8, 31
Sensor Alarm	31
Strapping Table Report	14
System activities	2
System Error	31
System Status	32

T

Tank Sticking	32
Transaction Interface Module	32

U

Ullage	32
--------------	----

Ullage Report 32

W

Water Height..... 32