



**EPA**

United States  
Environmental Protection  
Agency

Region 7

**AUTOMATIC**

**TANK**

**MONITORING**

**&**

**LINE LEAK**

**DETECTION**

**REFERENCE**

**MANUAL**

Author: Bjorn Brinkman, Environmental Engineer  
EPA, Region 7, 913-551-7761



# TLS-250

## Automatic Tank Gauging System

### VEEDER-ROOT

125 Powder Forest Dr.  
Simsbury, CT 06070  
Tel: (203) 651-2700



**Evaluator:** MRI - 05/14/93

**System Description:** *The TLS-250 is capable of sensing product loss as small as 0.2 gph. The leak detect routine is conducted while no fueling is taking place and no bulk deliveries are being made. The leak detection mode can be operated manually or set automatically for times when the facility is closed. It can be set to test a single tank or all tanks in a system. The TLS also checks itself and the fuel prior to and during a test for nine separate conditions including low inventory, recent bulk delivery and equipment problems which could cause a false test failure. The TLS system is capable of handling 8 probes. The TLS-250 Plus! uses different probes and can detect a leak of 0.1 gph. The TLS-250i uses sensors to monitor interstitial areas.*

**Certification:** 0.2 gph with PD = 99% and PFA = 0.1%  
0.1 gph with **Plus!** system

**Tank Capacity:** Max. 15,000 gal

**Test Period:** Min. 2 hrs with tank 50 - 95% full  
Min. 3 hrs with **Plus!** system

**Limitations:**

- No dispensing or delivery during test
- Not evaluated using manifold tanks
- Not capable of continuous monitoring
- Not equipped to monitor product lines

# SAMPLE REPORTS

## TLS-250

### 1. Display Inventory Information (NORMAL MODE)

- a. Depress **FUNCTION** until desired function
- b. Depress **TANK** until desired tank

### 2. Print Inventory Information (NORMAL MODE)

- a. Depress **PRINT**; information for all tanks in system.

```

Station Name
Street Name
City, State, Zip
Telephone Number

INVENTORY REPORT
FEB 6, 1987
6:30 AM

TANK 1
PREMIUM UNLEADED
1676 GALLONS FUEL
8324 GALS ULLAGE
21.75 INCHES FUEL
0.0 INCHES WATER
55.3 DEGREES F

TANK 2
REGULAR UNLEADED
3731 GALLONS FUEL
6269 GALS ULLAGE
38.37 INCHES FUEL
0.0 INCHES WATER
56.7 DEGREES F
    
```

```

LEAK MONITOR REPORT

TEST START TIME:
FEB 6, 1987
11:00 PM

TEST HOURS 1 - 6
-----
TNK1 TNK2 TNK3 TNK4

DEGREES F
60.2 56.6 55.9 55.4

GALLONS

0.0 0.0 -0.3 0.0
0.3 0.0 -2.1 0.1
0.7 0.0 -4.0 0.1
1.2 0.1 -5.6 0.0
1.5 0.0 -7.1 0.0
1.8 0.0 -9.3 0.1

DEGREES F
55.3 56.4 55.6 55.3

FINAL LEAK RATES:

                                0.20
                                GAL/HR
TANK  GAL/HR  TEST
1      0.30   PASSED
2      0.00   PASSED
3     -1.55   FAILED
4      0.01   PASSED

TANK 1
PREMIUM UNLEADED

SEG 1  TEST MIX ERR
SEG 2  TEST MIX ERR

SEG 1  DLVY MIX ERR
SEG 2  DLVY MIX ERR

TEMP CHANGE ERROR
RECENT DELIVERY

TEST ENDING TIME:
FEB 7, 1987
6:00 AM
    
```

### 3. Leak or Sensor Monitor Report (NORMAL MODE)

- a. Depress **FUNCTION** until "Leak Rate (gal/hr)"
- b. Depress **PRINT**; information for all tanks in system

**SAMPLE REPORTS**  
**TLS 250**  
**(cont)**

**4. Alarm History Report (DIAGNOSTIC MODE)**

- a. Depress **FUNCTION** until diagnostic code "8"
- b. Depress **PRINT**, shows the last three occurrences of each type of alarm for this tank

**5. Inventory Increase Report (NORMAL MODE)**

- a. Depress **FUNCTION** until "Delivery Volume"
- b. Depress **PRINT**; shows last delivery

```
TANK 1
PREMIUM UNLEADED
INVENTORY INCREASE

FEB 6, 1987
3:38 PM
  709 GALLONS FUEL
  56.7 DEGREES F

FEB 6, 1987
3:59 PM
 5685 GALLONS FUEL
  60.4 DEGREES F

4976 NET INCREASE
```

```
ALARM HISTORY REPORT
-- EXT. INPUT ON ---

MAR 13, 1987
 9:09 PM

MAR 9, 1987
 4:25 PM

MAR 6, 1987
10:25 AM
-- EXT. INPUT OFF --

MAR 13, 1987
 9:09 PM

MAR 9, 1987
 4:25 PM

MAR 6, 1987
10:35 AM

TANK 5
PRODUCT 5
----- LEAK -----

MAR 13, 1987
 1:10 AM

MAR 3, 1987
 2:15 AM

MAR 1, 1987
 4:15 AM

----- HIGH WATER -----

MAR 13, 1987
 9:06 PM

----- OVERFILL -----

FEB 23, 1987
 4:07 PM

----- LOW LIMIT -----

FEB 23, 1987
 9:04 AM

----- THEFT -----

FEB 10, 1987
12:11 AM
```

# TLS-350

## Automatic Tank Gauging & Electronic Line Leak Detection System

### VEEDER-ROOT

125 Powder Forest Dr.  
Simsbury, CT 06070  
Tel: (203) 651-2700



**Evaluator:** MRI - 03/14/95 & 06/10/96 (CSLD)

**System Description:** *The **TLS-350** and the **TLS-350R** (business inventory reconciliation) are monitoring systems that can be upgraded to provide continuous statistical leak detection (**CSLD**) and line leak detection if the appropriate **options** are added to the console. The **CSLD** option provides continuous tank leak detection without operational shut down. The system can also operate on various software, depending on the UST system. The **TLS-350R** is able to automatically gather inventory information and reconcile totals at the end of each shift, day and period. Without the **CSLD option**, the **TLS-350** can detect a leak of 0.1 gph; however, the UST system must be idle during the test. With the **CSLD option**, it is certified at 0.2 gph and can be used to test manifolded systems. Three line leak detection **options** are available:*

*Volumetric Line Leak Detection (VLLD)  
Pressurized Line Leak Detection (PLLD) &  
Wireless Pressurized Line Leak Detection (WPLLD);*

*all can detect 3, 0.2 and 0.1 gph. The **TLS-350** is also capable of monitoring groundwater and vapor sensors. The console features a built-in beeper and warning lights for alarm conditions and can be programmed to shut down pumps. **You can verify which options are included in the system by scrolling thru the functions listed on the console display.***

# TLS-350

(CONT)



**Certification:** *TANK GAUGING*

0.1 gph with PD = 99% and PFA = 1%

*With CSLD*

0.2 gph with PD = 100% and PFA = 0%

*LINE TEST*

3, 0.2 & 0.1 gph with PD = 100% and PFA = 0%

**Tank Capacity:** Max. 15,000 gal  
Max. 38,170 gal for all manifolded tanks with CSLD

**Test Period:** *TANK GAUGING*

Min. 3 hrs with tank 95% full for 0.1 gph test

Min. 2 hrs with tank 50 - 95% full for 0.2 gph test

*With CSLD*

No down time

*LINE TEST* (Depends on probe series)

3.0 gph - 14 sec to 1 min

0.2 gph - 6 to 45 min

0.1 gph - 14 to 45 min

**Limitations:** *W/O CSLD option*

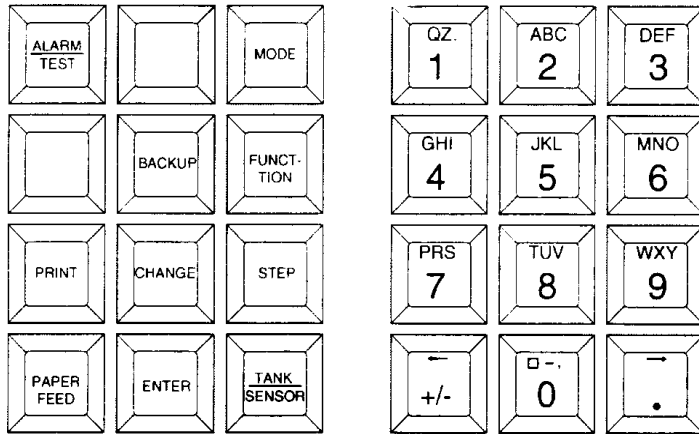
- No dispensing or delivery during test
- Not evaluated using manifolded tanks

*W/O LLD option*

- Not equipped to monitor product lines

# SAMPLE REPORTS

## TLS-350



### Console Keypad

#### 1. View Inventory Information

- a. Press **FUNCTION** until "In-Tank Inventory"
- b. Press **STEP** to view inventory in first tank
- c. Continue to press **STEP** for all other inventory information
- d. Press **TANK** for inventory in next tank

#### 2. Print Inventory Information

- a. Find "All Functions Normal" on display
- b. Press **PRINT**; information for all tanks in system.

#### 3. Delivery Increase Amount

- a. Press **FUNCTION** until "In-Tank Inventory"
- b. Press **STEP** until "Delivery ="
- c. Press **TANK** for inventory in next tank
- d. Press **PRINT** for delivery in tank

MMM DD, YYYY HH:MM XM

#### INVENTORY REPORT

T 1: UNLEADED GASOLINE  
 VOLUME = 8518 GALS  
 ULLAGE = 1482 GALS  
 90% ULLAGE = 482 GALS  
 TC VOLUME = 8492 GALS  
 HEIGHT = 76.26 INCHES  
 WATER VOL = 0 GALS  
 WATER = 0.00 INCHES  
 TEMP = 64.6 DEG F

T 2: SUPER UNLEADED  
 VOLUME = 7545 GALS  
 ULLAGE = 2455 GALS  
 90% ULLAGE = 1455 GALS  
 TC VOLUME = 7569 GALS  
 HEIGHT = 67.76 INCHES  
 WATER VOL = 0 GALS  
 WATER = 0.00 INCHES

MMM DD, YYYY HH:MM XM

#### T 1: REGULAR UNLEADED INVENTORY INCREASE

INCREASE START  
 MMM DD, YYYY HH:MM XM

VOLUME = 5146 GALS  
 HEIGHT = 44 INCHES  
 WATER = 0.00 INCHES  
 TEMP = 46.8 DEG F

INCREASE END  
 MMM DD, YYYY HH:MM XM

VOLUME = 8104 GALS  
 HEIGHT = 84 INCHES  
 WATER = 0.00 INCHES  
 TEMP = 47.2 DEG F

GROSS INCREASE = 2958  
 TC NET INCREASE = 2983

# SAMPLE REPORTS

## TLS-350

(cont)

### 4. Tank Leak Test Results

- Press **FUNCTION** until "In-Tank Test Results"
- Press **PRINT** for all tank leak tests

```
MMM DD, YYYY HH:MM XM
LEAK TEST REPORT
T 1:REGULAR UNLEADED
PROBE SERIAL NUM 105792

TEST STARTING TIME:
MMM DD, YYYY HH:MM XM

TEST LENGTH = 4.3 HRS
STRT VOLUME = 3725 GALS

LEAK TEST RESULTS
0.2 GAL/HR TEST PASS
```

### 5. CSLD Test Results

- Press **FUNCTION** until "CSLD Test Results"
- Press **PRINT** for CSLD results in all tanks

```
CSLD TEST RESULTS
-----
DD-MM-YY HH:MM XM

T 2: SUPER UNLEADED
PROBE SERIAL NUM 123002
0.2 GAL/HR TEST
PER: DD-MM-YY PASS
```

### 6. Pressurized Line Leak Detection Tests (PLLD)

- Press **FUNCTION** until "Pressure Line Results"
- Press **PRINT** for results in all lines

```
MMM DD, YYYY HH:MM XM
PRESSURE LINE LEAK TEST
RESULTS

Q 1: UNLEADED REG LINE
3.0 GAL/HR RESULTS:

LAST TEST:
MMM DD, YYYY HH:MM XM PASS

NUMBER OF TESTS PASSED
PREV 24 HOURS : 123
SINCE MIDNIGHT : 81

0.20 GAL/HR RESULTS:

MMM DD, YYYY HH:MM XM PASS
MMM DD, YYYY HH:MM XM PASS

0.10 GAL/HR RESULTS:

MMM DD, YYYY HH:MM XM PASS
MMM DD, YYYY HH:MM XM PASS
```



# SAMPLE REPORTS

## TLS-350

(Cont)

### 7. PLLD History Reports

- Press **FUNCTION** until "Pressure Line Results"
- Press **STEP** until "Press Print for History"
- Press **PRINT** for history; last 3 gph, first 0.2 gph & first 0.1 gph results for each month

```
MMM DD, YYYY HH:MM XM
PRESSURE LINE LEAK TEST
HISTORY
Q 1: UNLEADED REG LINE
LAST 3.0 GAL/HR PASS:
MMM DD, YYYY HH:MM XM
FIRST 0.20 GAL/HR PASS
EACH MONTH:
```

### 8. Wireless Pressurized Line Leak Detection Tests (WPLLD)

- Press **FUNCTION** until "WPLLD Line Results"
- Press **PRINT** for results of all lines

```
MMM DD, YYYY HH:MM XM
MMM DD, YYYY HH:MM XM
MMM DD, YYYY HH:MM XM
MMM DD, YYYY HH:MM XM
FIRST 0.10 GAL/HR PASS
EACH MONTH:
MMM DD, YYYY HH:MM XM
MMM DD, YYYY HH:MM XM
MMM DD, YYYY HH:MM XM
MMM DD, YYYY HH:MM XM
```

```
MMM DD, YYYY HH:MM XM
WPLLD LINE LEAK TEST
RESULTS
W 1:UNLEADED REG LINE
3.0 GAL/HR RESULTS:
LAST TEST:
MMM DD, YYYY HH:MM XM PASS
NUMBER OF TESTS PASSED
PREV 24 HOURS : 123
SINCE MIDNIGHT : 81
0.20 GAL/HR RESULTS:
MMM DD, YYYY HH:MM XM PASS
MMM DD, YYYY HH:MM XM PASS
0.10 GAL/HR RESULTS:
MMM DD, YYYY HH:MM XM PASS
MMM DD, YYYY HH:MM XM PASS
```

```
MMM DD, YYYY HH:MM XM
WPLLD LINE LEAK TEST
HISTORY
W 1: UNLEADED REG LINE
LAST 3.0 GAL/HR PASS:
MMM DD, YYYY HH:MM XM
FIRST 0.20 GAL/HR PASS
EACH MONTH:
MMM DD, YYYY HH:MM XM
MMM DD, YYYY HH:MM XM
MMM DD, YYYY HH:MM XM
MMM DD, YYYY HH:MM XM
FIRST 0.10 GAL/HR PASS
EACH MONTH:
```

### 9. WPLLD History Reports

- Press **FUNCTION** until "WPLLD Line Results"
- Press **STEP** until "Press Print for History Report"
- Press **PRINT** for history; last 3 gph, first 0.2 gph & first 0.1 gph results for each month

```
MMM DD, YYYY HH:MM XM
MMM DD, YYYY HH:MM XM
MMM DD, YYYY HH:MM XM
MMM DD, YYYY HH:MM XM
```

# SAMPLE REPORTS

## TLS-350

(Cont)

### 10. Volumetric Line Leak Detection Tests (VLLD)

*(TLS-350R Only)*

- Press **FUNCTION** until "Line Leak Detect Results"
- Press **PRINT** for history results of all lines

```
LIQUID STATUS
-----
MMM DD,YYYY HH:MM XM
```

### 11. Liquid Status Reports

- Press **FUNCTION** until "Liquid Status"
- Press **PRINT** for report for up to 64 sensors
- Press **TANK/SENSOR** for other sensors in system
- Press **PRINT** for report of sensor status

```
L 1 : UNLEADED ANNULAR
      SENSOR NORMAL
L 2 : SUPER ANNULAR
      SENSOR NORMAL
```

```
VAPOR STATUS
-----
MMM DD,YYYY HH:MM XM
```

```
V 1 : NORTHWEST WELL
      SENSOR NORMAL
V 2 : MAIN STREET WELL
      SENSOR NORMAL
```

### 12. Vapor Status Reports

- Press **FUNCTION** until "Vapor Status"
- Press **PRINT** for report for up to 40 sensors
- Press **TANK/SENSOR** for other sensors in system
- Press **PRINT** for report of sensor status.

### 13. Groundwater Sensor Status

- Press **FUNCTION** until "Groundwater Status"
- Press **PRINT** for report for up to 40 sensors
- Press **TANK/SENSOR** for other sensors in system
- Press **PRINT** for report of sensor status

```
GROUNDWATER STATUS
-----
MMM DD,YYYY HH:MM XM
```

```
G 1 : GROUND WATER #1
      SENSOR NORMAL
G 2 : GROUND WATER #2
      SENSOR NORMAL
```

```
LINE LEAK ALARM
SENSOR NUMBER 1
LINE LEAK TEST FAIL
P2:UNLEADED REGULAR
MMM DD, YYYY HH:MM XM
```

```
LINE LEAK ALARM
SENSOR NUMBER 1
LINE LEAK SHUTDOWN
P1:UNLEADED REGULAR
MMM DD, YYYY HH:MM XM
```

```
SUBMERSIBLE PUMP 1
DISABLED
MMM DD, YYYY HH:MM XM
```

### 14. Alarm History Report

- Press **MODE** until "Diagnostic"
- Press **FUNCTION** until "Alarm History Report"
- Press **STEP** until desired report
- Press **PRINT** for tank/sensor displayed
- Press **TANK/SENSOR** to access other tanks/sensors

# SAMPLE REPORTS

## TLS-350

(Cont)

### 15. Leak History Report

- Press **MODE** until "Diagnostic"
- Press **FUNCTION** until "In-Tank Leak Result"
- Press **STEP** until "Print Leak History"
- Press **PRINT**

#### TANK LEAK TEST HISTORY

T 1:Unleaded

LAST GROSS TEST PASSED:  
NOV 4. 1996 12:01 AM  
STARTING VOLUME= 17559  
PERCENT VOLUME = 89.1  
TEST TYPE = STANDARD

LAST ANNUAL TEST PASSED:

NO TEST PASSED

FULLEST ANNUAL TEST PASS

NO TEST PASSED

LAST PERIODIC TEST PASS:  
SEP 29. 1998 2:54 AM  
TEST LENGTH 17 HOURS  
STARTING VOLUME= 11434  
PERCENT VOLUME = 58.0  
TEST TYPE = CSLD

FULLEST PERIODIC TEST  
PASSED EACH MONTH:

JAN 31. 1998 3:19 AM  
TEST LENGTH 18 HOURS  
STARTING VOLUME= 12276  
PERCENT VOLUME = 52.3  
TEST TYPE = CSLD

FEB 28. 1998 4:29 AM  
TEST LENGTH 19 HOURS  
STARTING VOLUME= 14183  
PERCENT VOLUME = 72.0  
TEST TYPE = CSLD

MAR 31. 1998 3:37 AM  
TEST LENGTH 19 HOURS  
STARTING VOLUME= 14377  
PERCENT VOLUME = 73.0  
TEST TYPE = CSLD

APR 30. 1998 4:05 AM  
TEST LENGTH 19 HOURS  
STARTING VOLUME= 13792  
PERCENT VOLUME = 70.0  
TEST TYPE = CSLD

MAY 31. 1998 4:00 AM  
TEST LENGTH 20 HOURS  
STARTING VOLUME= 11188  
PERCENT VOLUME = 56.8  
TEST TYPE = CSLD

JUN 29. 1998 4:10 AM  
TEST LENGTH 21 HOURS  
STARTING VOLUME= 10282  
PERCENT VOLUME = 52.2  
TEST TYPE = CSLD

JUL 31. 1998 4:50 AM  
TEST LENGTH 19 HOURS  
STARTING VOLUME= 16397  
PERCENT VOLUME = 83.2  
TEST TYPE = CSLD

AUG 30. 1998 4:42 AM  
TEST LENGTH 21 HOURS  
STARTING VOLUME= 11794  
PERCENT VOLUME = 59.9  
TEST TYPE = CSLD

SEP 29. 1998 2:54 AM  
TEST LENGTH 17 HOURS  
STARTING VOLUME= 11434  
PERCENT VOLUME = 58.0  
TEST TYPE = CSLD

OCT 31. 1997 4:39 AM  
TEST LENGTH 18 HOURS  
STARTING VOLUME= 11434  
PERCENT VOLUME = 58.0  
TEST TYPE = CSLD

NOV 4. 1996 12:01 AM  
TEST LENGTH 2 HOURS  
STARTING VOLUME= 17559  
PERCENT VOLUME = 89.1  
TEST TYPE = STANDARD

DEC 1. 1996 11:56 AM  
TEST LENGTH 128 HOURS  
STARTING VOLUME= 17543  
PERCENT VOLUME = 89.0  
TEST TYPE = CSLD

# EMC ENVIRONMENTAL MANAGEMENT CONSOLE

## Automatic Tank Gauging & Electronic Line Leak Detection System

### GILBARCO

7300 West Friendly  
Greensboro, NC 27420  
Tel: (910) 547-5000



**Evaluator:** MRI - 05/14/93

**System Description:** *The EMC is manufactured by the same company that manufactures the TLS-350. It operates and looks similar to the TLS-350. Refer to the TLS-350 information sheets for system description and instructions for obtaining reports.*

**Certification:** **TANK GAUGING**

0.1 gph with PD = 99% and PFA = 1%

**With CSLD**

0.2 gph with PD = 100% and PFA = 0%

**LINE TEST**

3, 0.2 & 0.1 gph with PD = 100% and PFA = 0%

**Tank Capacity:** Max. 15,000 gal  
Max. 38,170 gal for all manifolded tanks with CSLD

**Test Period:** **TANK GAUGING**

Min. 3 hrs with tank 95% full for 0.1 gph test

Min. 2 hrs with tank 50 - 95% full for 0.2 gph test

**With CSLD**

No down time

# WILCO

## Fuel Management and

### Compliance Service

Receiver

### SIMMONS

106 East Main Street  
Richardson, TX 75081  
Tel: (800) 848-8378



Keypad/Display Unit



Evaluator: S.S.G.

Associates - 10/28/95

ATG Probe/Transmitter

**System Description:** *The Wilco system employs radio and modem communications technology to connect on-site monitoring equipment to the Simmons Central Monitoring Center. Technicians collect and process data, monitor and respond to alarms and generate compliance reports. The Wilco ATG probe uses micro-impulse radar technology to measure tank levels and then transmits data via radio signal to a remote receiver linked to the Wilco Control Panel. The Wilco control panel with user keypad and display unit then sends data between the business and Simmons central monitoring center via existing telephone lines. Inventory, sales and delivery data are then used to produce SIR results. Sales and deliveries must be entered manually thru the keypad. Options include leak detection sensor and overflow alarms.*

**Certification:** SIR 5.7 L.M. version; 0.2 & 0.1 GPH  
with PD = 99% & PFA = 1%

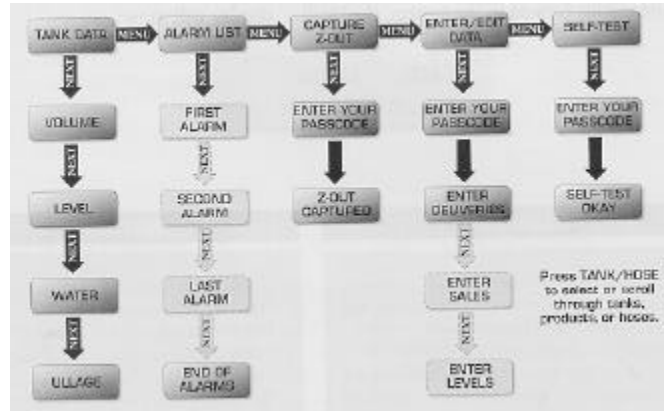
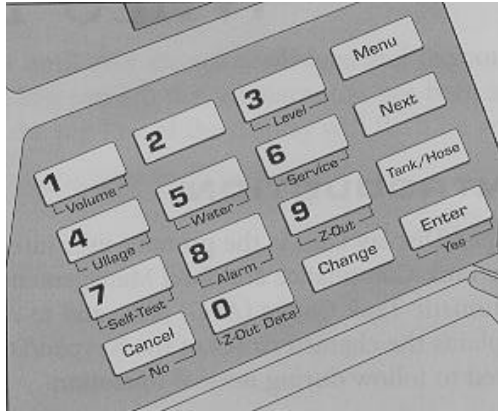
**Tank Capacity:** 45,000 gal.; 2, 3 or 4 tank manifolded systems

**Test Period:** Min. 26 days

**Limitations:** Data collection **only**

# WILCO

## Keypad Operation



**Keypad/Display Unit**

**Flowchart of Wilco Menu**

### 1. Tank Inventory

- a. Press **“Menu”** until Tank Data
- b. Press **“Next”** for Volume, Level, Water or Ullage
- c. Press **“Tank/Hose”** for different tanks in system

### 2. Alarm List

- a. Press **“Menu”** until Alarm List
- b. Press **“Next”** for each alarm
  - i. alarm description will flash on and off to indicate alarm has not been acknowledged
  - ii. if alarm status is still present, second line will indicate **“ACTIVE”**
  - iii. if alarm status is not present, second line will indicate **“CLEARED”**

### 3. Self-Test (system functioning properly)

- a. Press **“Menu”** until **Self-Test**
- b. Press **“Next”**; enter passcode (1234)
  - i. Display will show **SELFTEST OK** if functioning properly
  - ii. Display will show **SELFTEST FAIL** or **PRESS SERVICE** if not functioning properly

### 4. Overfill Alarm Check

- a. Initiate **Self-Test**, alarm should sound; **if not**, no overfill alarm
- b. Press **“Cancel”** to silence alarm

# TS-1000 & 2000

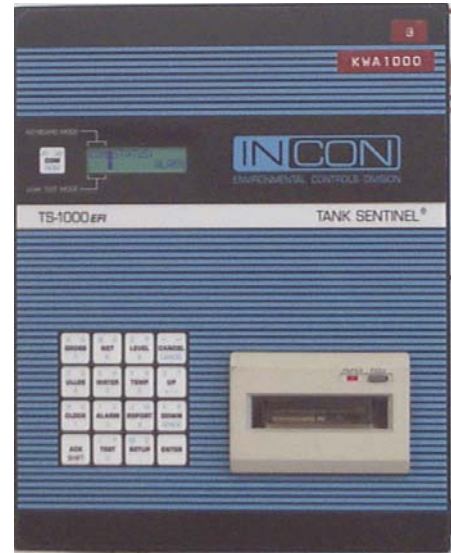
## Automatic Tank Gauging & Electronic Line Leak Detection System

### INCON

P.O.Box 638

Saco, ME 04072

Tel: (207) 283-0156



**Evaluator:** Ken Wilcox Associates - 08/05/92

**System Description:** *The TS-1000/2000 is a monitoring system that can test and gauge 2 or 4 tank systems. In addition, the TS-1000/2000 can be **optionally** equipped with up to 8 leak detection sensors to support interstitial, sump, vapor and groundwater monitoring. Alarms can be setup to sound audibly or control relay contacts for high product levels, high water levels and tank leaks. An **optional** relay output **BriteBox** accessory unit may be configured to shut-off product dispenser pumps or to turn on/off other devices. The system can also be equipped with **optional** TS-LLD line leak detection software. Reports are obtained in the same manner as the **RLM 5000**.*

**Certification:** **TANK GAUGING**

0.2 gph with PD = 99.9% and PFA = 0.1%

**LINE TEST**

3, 0.2 & 0.1 gph with PD = 100% and PFA = 0%

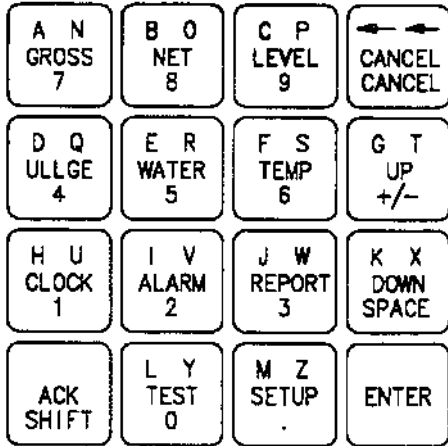
**Tank Capacity:** Max. 15,000 gal

**Test Period:** Min. 5 hrs with tank 50 - 95% full (**TS-1000**)  
Min. 3 hrs with tank 50 - 95% full (**TS-2000**)

**Limitations:**

- No dispensing or delivery during test
- Not evaluated using manifolded tanks

## SAMPLE REPORTS TS-1000



### Console Keypad

#### 1. To Print Desired Report

- a. Press **REPORT** key
- b. Press **UP** or **DOWN** until desired report
- c. Press **ENTER**
- d. If prompted, enter tank number or **0** for all tanks
- e. Press **ENTER** to print report

```

JOHNS GAS STOP
111 OAK ST.
BIDDEFORD, ME 04005
SITE # 001

7/25/1990      02:09 PM
INVENTORY REPORT

TANK NO. 1      8000 GAL
UNLEADED REG

GROSS          5051.7 GAL
NET            5024.7 GAL
PROD LEVEL     57.918 IN
ULLAGE         2963.4 GAL
TEMPERATURE    67.606 F
WATER LEVEL    0.584 IN
WATER VOL      6.4 GAL
    
```

#### Inventory Report

#### Reports Available

- |                                    |                       |
|------------------------------------|-----------------------|
| 1. Inventory                       | 2. Reconciliation     |
| 3. Delivery                        | 4. Delivery History   |
| 5. Leak Test                       | 6. Leak Time Estimate |
| 7. Alarm                           | 8. Alarm History      |
| 9. Line Test                       | 10. Line Test History |
| 11. Alarm Status and Configuration |                       |
| 12. System Configuration           |                       |
| 13. Tank Configuration             |                       |

```

JOHNS GAS STOP
111 OAK ST.
BIDDEFORD, ME 04005
SITE # 001

7/25/1990      02:11 PM
LEAK TEST REPORT

TANK NO. 1      8000 GAL
UNLEADED REG

THRESHOLD      0.20 GAL/HR
CONFIDENCE LEVEL 95.0%
TEST STARTED   12:00 AM
TEST STARTED   07/25/1990
LAST DELIVERY  6:15 AM
LAST DELIVERY  07/24/1990
% GROSS CAPACITY 73.60
BEGIN GROSS    5903.4 GAL
BEGIN NET      5069.2 GAL
BEGIN LEVEL    66.311 IN
BEGIN TEMP     68.334 F
BEGIN WATER    6.5 GAL
BEGIN WATER    0.584 IN
END TIME       1:59 AM
END DATE       07/25/1990
END GROSS      5903.4 GAL
END NET        5069.3 GAL
END LEVEL      66.307 IN
END TEMP       68.219 F
END WATER      6.5 GAL
END WATER      0.584 IN

HOURLY DATA

TIME           DEG F GAL
1:00 AM 68.276 5075.68
1:59 AM 68.219 5075.72

SLOPE          0.04 GAL/HR
SLOPE LOW      0.04 GAL/HR
SLOPE HIGH     0.04 GAL/HR
TEST RESULTS   PASSED
    
```

#### Leak Test Report



# SAMPLE REPORTS

## TS-1000

(cont)

JOHNS GAS STOP  
111 OAK ST.  
BIDDEFORD, ME 04005  
SITE # 001

7/24/1990      04:39 AM  
ALARM REPORT

7/24/1990      04:38 AM  
THEFT  
TANK NO. 1

### *Alarm Report*

JOHNS GAS STOP  
111 OAK ST.  
BIDDEFORD, ME 04005  
SITE # 001

7/25/1990      02:12 PM  
ALARM HISTORY REPORT

7/11/1990      05:40 PM  
POWER UP

7/11/1990      05:40 PM  
OVERFILL  
TANK NO. 1

7/23/1990      03:30 PM  
POWER UP

7/23/1990      06:17 PM  
LOW LIMIT  
TANK NO. 1

7/25/1990      05:51 AM  
THEFT  
TANK NO. 1

### *Alarm History Report*

JOHNS GAS STOP  
111 OAK ST.  
BIDDEFORD, ME 04005  
SITE # 001

7/25/1990      02:10 PM  
DELIVERY REPORT

TANK NO. 1      8000 GAL  
UNLEADED REG

BEGIN TIME      6:15 AM  
BEGIN DATE      07/24/1990  
BEGIN GROSS      799.3 GAL  
BEGIN NET        796.7 GAL  
BEGIN LEVEL      15.065 IN  
BEGIN WATER      0.571 IN  
BEGIN WATER      6.2 GAL  
BEGIN TEMP       64.601 F  
END TIME        6:37 AM  
END DATE        07/24/1990  
END GROSS       6722.8 GAL  
END NET          6676.5 GAL  
END LEVEL        75.066 IN  
END WATER        0.581 IN  
END WATER        6.4 GAL  
END TEMP        69.788 F  
GROSS DEL       5923.5 GAL  
NET DEL          5879.8 GAL

### *Delivery Report*

JOHNS GAS STOP  
111 OAK ST.  
BIDDEFORD, ME 04005  
SITE # 001

7/25/1990      02:14 PM  
DELIVERY HISTORY REPORT

TANK NO. 1      8000 GAL  
UNLEADED REG

BEGIN TIME      6:15 AM  
BEGIN DATE      07/24/1990  
BEGIN GROSS      799.3 GAL  
BEGIN NET        796.7 GAL  
BEGIN LEVEL      15.065 IN  
BEGIN WATER      0.571 IN  
BEGIN WATER      6.2 GAL  
BEGIN TEMP       64.601 F  
END TIME        6:37 AM  
END DATE        07/24/1990  
END GROSS       6722.8 GAL  
END NET          6676.5 GAL  
END LEVEL        75.066 IN  
END WATER        0.581 IN  
END WATER        6.4 GAL  
END TEMP        69.788 F  
GROSS DEL       5923.5 GAL  
NET DEL          5879.8 GAL

BEGIN TIME      6:15 AM  
BEGIN DATE      08/24/1990  
BEGIN GROSS      1657.0 GAL  
BEGIN NET        1650.0 GAL  
BEGIN LEVEL      24.952 IN  
BEGIN WATER      0.054 IN  
BEGIN WATER      0.0 GAL  
BEGIN TEMP       66.753 F  
END TIME        6:21 AM  
END DATE        08/24/1990  
END GROSS       3190.3 GAL  
END NET          3171.5 GAL  
END LEVEL        48.026 IN  
END WATER        0.058 IN  
END WATER        0.0 GAL  
END TEMP        68.417 F  
GROSS DEL       1532.4 GAL  
NET DEL          1521.5 GAL

### *Delivery History Report*

# TS-1001

## Automatic Tank Gauging & Electronic Line Leak Detection System

### INCON

P.O.Box 638

Saco, ME 04072

Tel: (207) 283-0156



**Evaluator:** Ken Wilcox Associates - 09/05/97

**System Description:** *The TS-1001 can monitor product in up to 4 tanks and also monitor up to 12 leak detection sensors internally. In addition, the TS-1001 can be **optionally** equipped with 1 or 2 external sensor expansion modules for an additional 8 or 16 sensor inputs capable of monitoring double walled tanks, containment sumps, dispenser pans, and vapor or groundwater monitoring wells. Alarms can be setup to sound audibly or control relay contacts for high product levels, high water levels and tank leaks. The console may also be configured to shut-off product dispenser pumps or to turn on/off other devices. **Optional** equipment includes overflow alarms, interface with line leak detection (TS-LLD) and SCALD (Statistical and Continuous Automatic Leak Detection; **not 3rd party certified**) software. (See TS-2001 for sample reports)*

**Certification:** TANK GAUGING

0.2 & 0.1 gph with PD = 99.9% and PFA = 0.1%

0.2 gph with (LL2 probe)

**Tank Capacity:** Max. 15,000 gal (30,000 gal with LL2 probe)

**Test Period:** Min. 5 hrs (average time to collect quality data)  
Can be tested at less than 50% capacity

**Limitations:**

- No dispensing or delivery during test
- Not evaluated using manifolded tanks

# TS-2001

## Automatic Tank Gauging & Electronic Line Leak Detection System

### INCON

P.O.Box 638

Saco, ME 04072

Tel: (207) 283-0156



**Evaluator:** Ken Wilcox Associates - 09/05/97

**System Description:** *The TS-2001 can monitor product in up to 8 tanks and also monitor up to 24 leak detection sensors internally. In addition, the TS-2001 can be **optionally** equipped with 1 or 2 external sensor expansion modules for an additional 8 or 16 sensor inputs capable of monitoring double walled tanks, containment sumps, dispenser pans, and vapor or groundwater monitoring wells. Alarms can be setup to sound audibly or control relay contacts for high product levels, high water levels and tank leaks. The console may also be configured to shut-off product dispenser pumps or to turn on/off other devices. **Optional** equipment includes overfill alarms, interface with line leak detection (TS-LLD) and SCALD (Statistical and Continuous Automatic Leak Detection; **not 3rd party certified**) software.*

**Certification:** TANK GAUGING

0.2 & 0.1 gph with PD = 99.9% and PFA = 0.1%

0.2 gph with (LL2 probe)

**Tank Capacity:** Max. 15,000 gal (30,000 gal with LL2 probe)

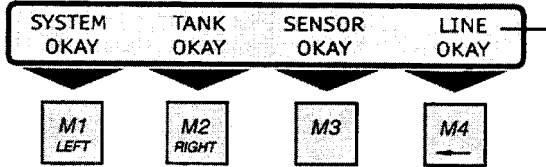
**Test Period:** Min. 5 hrs (average time to collect quality data)  
Can be tested at less than 50% capacity

**Limitations:**

- No dispensing or delivery during test
- Not evaluated using manifolded tanks

# SAMPLE REPORTS

## TS-1001/2001



A N PRODUCT 1	B O GROSS 2	C P LEVEL 3	CANCEL
D Q TANK 4	E R ULLAGE 5	F S WATER 6	G T UP +/-
H U MENU 7	I V ALARM 8	J W REPORT 9	K X DOWN SPACE
ACK SHIFT	L Y TEST 0	M Z CHECK .	ENTER

### Console Keypad

#### 2. To Print Inventory Report

- a. Press **REPORT** key
- b. Press **M 1**
- c. Press **M 4**
- d. Press enter to print

#### 3. To Print Inventory Summary Report

- a. Press **REPORT** key
- b. Press **M 1**
- c. Press **M 2**
- d. Press enter to print

#### 1. To Print Desired Report

- a. Press **REPORT** key
- b. Press **DOWN/SPACE** for more options
- c. Press menu keys (**M1 - M4**) to make selection
- d. Press enter to print

```

INCOM
INTELLIGENT CONTROLS INC
P. O. BOX 638
SACO ME 04072
1-800-984-6266

08/13/1998      9:46 AM

TANK INVENTORY DETAIL

TANK 1

TANK NO. 1      11882.3 GAL
PRODUCT        UNLD REG
GROSS          7143.7 GAL
NET            7085.2 GAL
PROD LEVEL     54.003 IN
GROSS CAPACITY 60.2%
ULLAGE         4131.7 GAL
TEMPERATURE    71.621 F
WATER LEVEL    0.686 IN
WATER VOLUME   12.8 GAL

TANK 2

TANK NO. 2      5092.7 GAL
PRODUCT        UNLD PLUS
GROSS          2037.9 GAL
NET            2020.5 GAL
PROD LEVEL     40.441 IN
GROSS CAPACITY 40.0%
ULLAGE         2800.1 GAL
TEMPERATURE    72.235 F
WATER LEVEL    0.000 IN
WATER VOLUME   0.0 GAL
    
```

```

INCOM
INTELLIGENT CONTROLS INC
P. O. BOX 638
SACO ME 04072
1-800-984-6266

08/11/1998      7:26 PM

TANK INVENTORY SUMMARY

( GROSS VOLUME )

TANK 1      11498.6 GAL
TANK 2      4097.6 GAL
TANK 3      4016.5 GAL
    
```

# SAMPLE REPORTS

## TS-1001/2001

(cont)

### 4. To Print Leak Test Report

- Press **REPORT** key
- Press **M 4**
- Press **M 2**
- Press **M 2** (**M 3** for history report)
- Press **M 1**

```
INCOM
INTELLIGENT CONTROLS INC
P. O. BOX 638
SACO ME 04072
1-800-984-6266

10/18/1997      02:42

LEAK TEST REPORT

PLUS 2          5014.3 GAL
PLUS

LEAK TEST      0.100 G/H
LEAK THRESHOLD 0.050 G/H
CONFIDENCE LEVEL 99.0%
TEST STARTED   21:45
TEST STARTED   10/17/1997
GROSS CAPACITY 56.12%
BEGIN GROSS    2814.2 GAL
BEGIN NET      2808.8 GAL
BEGIN LEVEL    52.630 IN
BEGIN TEMP     62.720 F
BEGIN WATER    0.4 GAL
BEGIN WATER    0.130 IN
END TIME       2:39
END DATE       10/18/1997
END GROSS      2814.3 GAL
END NET        2808.6 GAL
END LEVEL      52.632 IN
END TEMP       62.878 F
END WATER      0.4 GAL
END WATER      0.131 IN

HOURLY DATA

TIME    DEG F    GAL
22:44   62.721  2809.23
23:44   62.751  2808.78
0:44    62.885  2809.07
1:44    62.883  2809.09

SLOPE      -0.04 GAL/HR
SLOPE LOW  -0.04 GAL/HR
SLOPE HIGH -0.04 GAL/HR
TEST RESULTS PASSED
SLOPE EQUALS CALCULATED
LEAK RATE
```

### 5. To Print SCALD Test Report

- Press **REPORT** key
- Press **M 4**
- Press **M 3**
- Press desired **M**

```
INCOM
INTELLIGENT CONTROLS INC
P. O. BOX 638
SACO ME 04072
1-800-984-6266

08/13/1998      9:56 AM

SCALD TEST REPORT

TANK 1          11082.3 GAL
UNLD REG

LEAK TEST      0.200 GPH
LEAK THRESHOLD 0.100 GPH
EXTENT         18.0 HRS
VOL QUALIFY    0.0%
TEST STARTED   12:22 PM
TEST STARTED   08/07/1998
SALES RATE     54.731 GPH
EVAPORATED     1.781 GAL
LOST           0.327 GAL
DUTY FACTOR    0.31
UPDATED        12:40 AM
UPDATED        08/10/1998

SLOPE          -0.002 GAL/HR
TEST RESULT    PASSED
SLOPE EQUALS CALCULATED
LEAK RATE

TANK 2          5092.7 GAL
UNLD PLUS

LEAK TEST      0.200 GPH
LEAK THRESHOLD 0.100 GPH
EXTENT         18.0 HRS
VOL QUALIFY    0.0%
TEST STARTED   9:41 PM
TEST STARTED   08/09/1998
SALES RATE     8.096 GPH
EVAPORATED     0.050 GAL
LOST           -0.090 GAL
DUTY FACTOR    0.79
UPDATED        1:42 AM
UPDATED        08/11/1998

SLOPE          -0.053 GAL/HR
TEST RESULT    PASSED
SLOPE EQUALS CALCULATED
LEAK RATE
```

# SAMPLE REPORTS

## TS-1001/2001

(cont)

### 6. To Print Line Compliance Report

- a. Press **REPORT** key
- b. Press **M 3**
- c. Press **M 1** (**M 3** for history report)
- d. Press **M 1**

```

INCON
INTELLIGENT CONTROLS INC
P. O. BOX 638
SACO ME 04072
1-800-984-6266

08/12/1998      10:26 AM

LINE COMPLIANCE REPORT

LINE NO. 1      REGULAR

PASSED MONTHLY TESTS

TEST TIME      1:42 AM
TEST DATE      08/12/1998
LINE TEST      0.20 GPH
LEAK RATE      0.00 GPH

TEST TIME      11:12 PM
TEST DATE      07/14/1998
LINE TEST      0.20 GPH
LEAK RATE      0.00 GPH

LINE NO. 2      MID GRAD

PASSED MONTHLY TESTS

TEST TIME      8:15 PM
TEST DATE      08/11/1998
LINE TEST      0.20 GPH
LEAK RATE      0.00 GPH

TEST TIME      4:41 PM
TEST DATE      07/14/1998
LINE TEST      0.20 GPH
LEAK RATE      0.00 GPH

LINE NO. 3      SUPER

PASSED MONTHLY TESTS

TEST TIME      9:33 AM
TEST DATE      08/12/1998
LINE TEST      0.20 GPH
LEAK RATE      0.00 GPH

TEST TIME      12:13 AM
TEST DATE      08/05/1998
LINE TEST      0.20 GPH
LEAK RATE      0.00 GPH
    
```

### 7. To Print Alarm/Sensor Reports

- a. Press **REPORT** key
- b. Press **DOWN/SPACE** key
- c. Press **M 2** (**M1** for sensors)
- d. Press desired **M** key report

```

INCON
INTELLIGENT CONTROLS INC
P. O. BOX 638
SACO ME 04072
1-800-984-6266

08/12/1998      9:51 AM

ALARM HISTORY

08/11/1998      5:49 PM
LOW LOW PRODUCT LIMIT
TANK NO. 1

08/11/1998      2:34 PM
LOW PRODUCT LIMIT
TANK NO. 1

08/09/1998      8:46 AM
POWER UP

08/09/1998      8:46 AM
POWER DOWN

08/05/1998      10:08 AM
POWER UP

08/05/1998      10:08 AM
POWER DOWN

08/06/1998      1:48 PM
0.1GPH LINE TEST ABORTED
REGULAR
LINE NO. 1

08/06/1998      1:47 PM
0.1GPH LINE TEST ABORTED
REGULAR
LINE NO. 1

08/06/1998      1:19 PM
POWER UP

08/06/1998      1:18 PM
CONTROL UNIT COMM FAIL
SUPER
LINE NO. 3

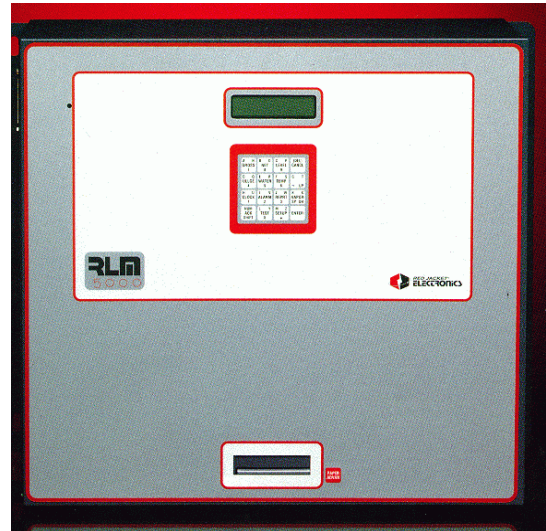
08/06/1998      1:18 PM
CONTROL UNIT COMM FAIL
MID GRAD
LINE NO. 2
    
```

# RLM 5000

## Automatic Tank Gauging System

### Red Jacket

Marley Pump Co.  
9650 Alden Rd.  
Lenexa, KS 66215  
Tel: 913 541-2985



**Evaluator:** KWA - 04/02/91

**System Description:** *The RLM 5000 operates as the central processing unit and data collection center for leak detection and inventory management. It collects level and temperature data from up to eight magnetostrictive level probes and computes various volumetric quantities, correcting all volumes for temperature. The operator may choose from among various reports as well as generate a complete set of inventory, operation and leak detection reports. These reports may be printed on demand or prescheduled. All alarms generate reports immediately and may be programmed to activate one of the two relay outputs. The RLM 5001 adds the feature of vapor and liquid detection sensors.*

**Certification:** 0.2 gph with PD = 100% and PFA = 0%

**Tank Capacity:** Max. 15,000 gal

**Test Period:** Min. 3 hrs with tank 50 - 95% full

**Limitations:**

- No dispensing or delivery during test
- Not evaluated using manifolded tanks
- Not capable of monitoring product lines
- Not capable of continuous monitoring

# SAMPLE REPORTS

## RLM 5000

### 1. Inventory Report (non-temp comp)

- a. Press **RPRT** key
- b. Press **UP** or **DN** key till "Inventory"
- c. Press **ENTER** key
- d. Press **1 - 8** for desired tank or **0** for all tanks
- e. Press **ENTER** key

```

RED JACKET TECH LINE
1-800-468-7867
MISSION, KS
SITE #

1/1/1964      12:14 AM
INVENTORY REPORT
  
```

```
TANK NO. 1      GAL
```

```

GROSS      2285.3 GAL
NET        2259.9 GAL
PROD LEVEL 36.821 IN
ULLAGE     3682.6 GAL
TEMPERATURE 75.737 F
WATER LEVEL 1.963 IN
WATER VOL  45.0 GAL
  
```

### 2. Reconciliation Report (temp comp)

- a. Press **RPRT** key
- b. Press **UP** or **DN** key till "Reconci"
- c. Press **ENTER** key
- d. Press **1 - 8** for desired tank or **0** for all tanks
- e. Press **ENTER** key

```

RED JACKET TECH LINE
1-800-468-7867
MISSION, KS
SITE #
  
```

```
1/7/1964      10:50 PM
LEAK TEST REPORT
```

```
TANK NO. 1      GAL
```

```

THRESHOLD  0.20 GAL/HR
CONFIDENCE LEVEL 95.0%
TEST STARTED 3:42 AM
TEST STARTED 01/03/1964
% GROSS CAPACITY 39.90
BEGIN GROSS 2399.4 GAL
BEGIN NET 2371.2 GAL
BEGIN LEVEL 37.802 IN
BEGIN TEMP 76.640 F
BEGIN WATER 16.1 GAL
BEGIN WATER 0.738 IN
END TIME 5:22 AM
END DATE 01/03/1964
END GROSS 2399.4 GAL
END NET 2372.0 GAL
END LEVEL 37.802 IN
END TEMP 76.209 F
END WATER 16.1 GAL
END WATER 0.738 IN
  
```

### 3. Delivery Report

- a. Press **RPRT** key
- b. Press **UP** or **DN** key till "Delivery"
- c. Press **ENTER** key
- d. Press **1 - 8** for desired tank or **0** for all tanks
- e. Press **ENTER** key

### 4. Delivery History Report (if programmed)

- a. Press **RPRT** key
- b. Press **UP** or **DN** key till "Del Hist"
- c. Press **ENTER** key
- d. Press **1 - 8** for desired tank or **0** for all tanks
- e. Press **ENTER** key

#### HOURLY DATA

```

TIME      DEG F  GAL
4:42 AM  76.350  2387.88
  
```

```

SLOPE      0.54 GAL/HR
SLOPE LOW  0.54 GAL/HR
SLOPE HIGH 0.55 GAL/HR
TEST RESULTS PASSED
  
```

### 5. Leak Test Report

- a. Press **RPRT** key
- b. Press **UP** or **DN** key till "Leak"
- c. Press **ENTER** key
- d. Press **1 - 8** for desired tank or **0** for all tanks
- e. Press **ENTER** key



# SAMPLE REPORTS

## RLM 5000

(Cont)

### 6. *Leak Estimate Report (length of test)*

- a. Press **RPRT** key
- b. Press **UP** or **DN** key till "Leak Est"
- c. Press **ENTER** key
- d. Press **1 - 8** for desired tank or **0** for all tanks
- e. Press **ENTER** key

```
RED JACKET TECH LINE
1-800-468-7867
MISSION, KS
SITE #

1/1/1964      12:02 AM
LEAK ESTIMATE REPORT
```

```
TANK NO. 1      GAL
```

```
THRESHOLD      0.10 GAL/HR
CONFIDENCE LEVEL 97.5%
PERCENT CAPACITY 38.75
GROSS          2285.3 GAL
NET           2259.7 GAL
LEVEL         36.821 IN
TEMP          75.867 F
WATER VOL     45.0 GAL
WATER LEVEL   1.964 IN
EST TIME      3 HRS 20 MIN
```

### 7. *Alarm History Report*

- a. Press **RPRT** key
- b. Press **UP** or **DN** key till "Alarm Hist"
- c. Press **ENTER** key
- d. Press **1 - 8** for desired tank or **0** for all tanks
- e. Press **ENTER** key; last 50 alarms

### 8. *Alarm Status Report (current alarms)*

- a. Press **RPRT** key
- b. Press **UP** or **DN** key till "Alarm Stat"
- c. Press **ENTER** key
- d. Press **1 - 8** for desired tank or **0** for all tanks
- e. Press **ENTER** key

```
RED JACKET TECH LINE
1-800-468-7867
MISSION, KS
SITE #

1/1/1964      12:05 AM
ALARM STATUS REPORT
```

```
TANK NO. 1      GAL
```

```
HIGH LIMIT
ACTIVE
HIGH LIMIT      0.000 IN

LOW LIMIT
CLEARED
LOW LIMIT       0.0 GAL
```

### 9. *System Setup Report*

- a. Press **RPRT** key
- b. Press **UP** or **DN** key till "Setup"
- c. Press **ENTER** key
- d. Press **1 - 8** for desired tank or **0** for all tanks
- e. Press **ENTER** key

```
WATER LIMIT
ACTIVE
WATER LIMIT     0.000 IN
```

### 10. *Tank Setup Report*

- a. Press **RPRT** key
- b. Press **UP** or **DN** key till "Tank set up"
- c. Press **ENTER** key
- d. Press **1 - 8** for desired tank or **0** for all tanks
- e. Press **ENTER** key

```
LEAK
LEAK LIMIT      2.0 G/H

THEFT
THEFT LIMIT     10.0 GAL
```

# RLM 9000

## Automatic Tank Gauging & Electronic Line Leak Detection System

### Red Jacket

Marley Pump Co.  
9650 Alden Rd.  
Lenexa, KS 66215  
Tel: 913 541-2985



**Evaluator:** KWA - 04/02/91

**System Description:** *The RLM 9000 is a single console unit that incorporates the operational properties of the PPM 4000 and the RLM 5000. Refer to the individual information sheets for additional system description and sample reports.*

**Certification:** **TANK GAUGING**

0.2 gph with PD = 100% and PFA = 0%

**LINE TEST**

3, 0.2, 0.1 gph with PD = 100% and PFA = 0%

**Test Period:** **TANK GAUGING**

Min. 3 hrs with tank 50 - 95% full

**LINE TEST**

3 gph - 1 min

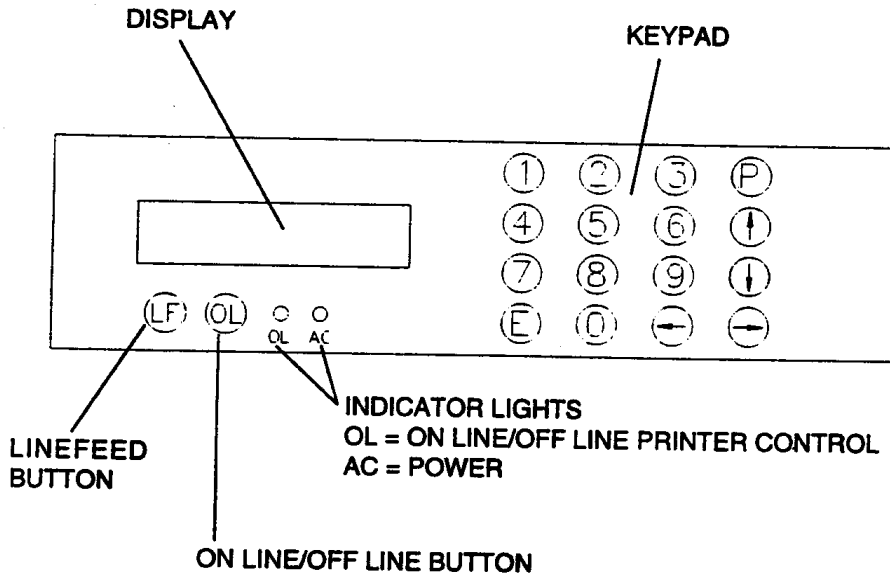
0.2 gph - 10 min

0.1 gph - 2.5 hrs

**Limitations:** *Refer to individual sheets for PPM 4000 & RLM 5000*



# SAMPLE REPORTS ST 1800



## DISPLAY OPTIONS\*

1. *Product Height*
2. *Gross Volume*
3. *Ullage*
4. *Water Height*
5. *Product Temperature*
6. *Report History*
7. *Product Dispensed*
8. *System Status*
9. *Leak Detection*

\*Press "E" to get to "SELECT DISPLAY"

## CONSOLE DISPLAY

### 1. View Display Options (at SELECT DISPLAY)

- a. Press desired **display option** keypad #
- b. Press ↑ or ↓ key to view remaining tanks

### 2. View History Reports (including leak test)

- a. Press **6**
- b. Press → to scroll to desired report
- c. Press ↑ or ↓ key to scroll to "reserved report number"
- d. Press → or ← to view info

### 3. Print Inventory Report *(green 'OL' indicator light must be on)*

- a. Press **P** key for all tanks
  - i. *For only one feature*, press desired option keypad #
  - ii. Press **P**

### 4. Print History Reports *(green 'OL' indicator light must be on)*

- a. Press **6**
- b. Press → to scroll to desired report
- c. Press **P**
- d. Press ↑ or ↓ key to enter "beginning" date
- e. Press **E**
- f. Press ↑ or ↓ key to enter "ending" date
- e. Press **E** to begin printing

LINE LEAK TEST	08AUG94 12:08:32
-----	
LINE 01	
LINE LEAK START TIME	02AUG94 10:56:01
LINE LEAK END TIME	02AUG94 12:08:22
ENDING PRESSURE	9.3 PSI
T: 3599/008	A01
AIR COUNTER	0
COMPLETE PRECISION TEST	
-----	
END OF REPORT	

RED JACKET LEAK DETECTION SYSTEMS  
VERSION RJ1-12 020CT95

SHORT STOP  
7647 LEAVENWORTH  
KANSAS CITY, KS.  
913-788-3091

-----	
LEAK TEST	
-----	
29MAY97	01:27:32
TANK 2 UNLEADED PREM: -0.038 GAL/H FAIL	
-----	
ALARM LEAK RATE	0.050 GAL/H
PROBABILITY OF DETECTION	99.9%
PRODUCT HEIGHT	39.54 INCHES
PRODUCT VOLUME	4009.7 GALLONS
LEAK DET START TIME	28MAY97 22:15:59
LEAK DET END TIME	29MAY97 01:27:32
LEAK DET PERIOD	03 HRS 11 MINS
LEAK DET START WATER	0.00 INCHES
LEAK DET END WATER	0.00 INCHES
LAST DELIVERY	26MAY97 16:34:46
LEAK TEST NO	1935
-----	

END OF REPORT

# AUTO/STIK II & JR

## Automatic Tank Gauging & Electronic Line Leak Detection System

### EBW

2814 McCracken Ave.  
Muskegon, MI 49441  
Tel: 616 755-1671

**Evaluator:** Ken Wilcox Ass. - 08/20/93



### **System Description:** *The AUTO/STIK II and JR.*

*series are electronic monitoring devices capable of tracking inventory, detecting leaks and providing alarm warnings. The systems can also be equipped with a continuous 24 hour leak detection **option**; however this option does not accumulate data during intermittent still times as most systems do, but continually starts a leak test at still times and ends the leak test only after a 30 minute still time. A leak rate for one test period is calculated by combining still period leak tests thru four consecutive days. The AUTO/STIK II can be equipped with the electronic line leak detection **option** which can monitor 1 to 8 pressurized lines. The ATUO/STIK II is capable of monitoring 1 to 16 tanks for leak detection, 1 to 64 liquid sensors and 1 to 56 relay outputs. The JR series are capable of handling the number of tanks indicated on the **model #** and are limited to the amount of sensors and relay outputs they provide.*

**Certification:** 0.1 gph with PD = 98.3% and PFA = 1.7%

**Tank Capacity:** Max. 15,000 gal

**Test Period:** Min. 4 hrs with tank 50 - 95% full

**Limitations:**

- No dispensing or delivery during test (even w/CLD)
- Not evaluated using manifolded tanks
- Not capable of monitoring product lines (JR series)

# SAMPLE REPORTS AUTOJSTIK

## 1. Printing Reports

- a. Depress **PRINT REPORTS**
- b. Depress desired report or **MORE**
- c. Continue to press **MORE** until desired report
- d. Depress desired report
- e. Depress **ALL** or enter desired tank # (**01, 02**, etc.)
- f. Depress **PRINT**

## 2. Print Inventory Information (Status Report)

- a. Depress **PRINT REPORTS**
- b. Depress **STATUS REPORT**
- c. Depress **ALL** or enter desired tank # (**01, 02**, etc.)
- e. Depress **PRINT**

## 3. Print Leak Report

- a. Depress **PRINT REPORTS**
- b. Depress **MORE**
- c. Depress **LEAK REPORT**
- d. Depress **ALL** or enter desired tank # (**01, 02**, etc.)
- e. Depress **PRINT**

### ----- LINE LEAK REPORT -----

WED MAY 22,96 5:48:19 PM

STATION NAME:  
GENES SERVICE  
SHERMAN  
MUSKEGON MI

LINE 1

CURRENT STATUS: NO ERRORS

0.2 GPH MONTHLY PASS: YES

0.2 GPH TEST HISTORY:

APR:

MAR:

FEB:

JAN:

DEC:

NOV:

LAST 0.2 GPH TEST: PASS

TUE MAY 21,96 7:01:52 PM

LAST 0.1 GPH TEST: PASS

TUE MAY 21,96 10:04:07 PM

### ----- STATUS REPORT -----

WED MAY 22,96 9:49:46 AM

STATION NAME:

TANK 1 PRODUCT: LEAD FREE

CURRENT STATUS:

[CNT] | | | | |

GROSS: 615.161 gal

NET: 608.541 gal

FUEL LEVEL: 28.9232 in

WATER LEVEL: 0.6443 in

TEMP: 76.510 °F

GROSS VTF: 355.857 gal

GROSS ULLAGE: 95%=307.307 gal

### ----- AUTO LEAK TEST -----

WED MAY 22,96 5:47:21 PM

STATION NAME:

GENES SERVICE  
SHERMAN  
MUSKEGON MI

TANK 1 PRODUCT: DIESEL

LEAK RATE: 0.009 gal/hr

PASS 0.2 GPH TEST

PERCENT OF TANK TESTED: 41.1 %

START: SUN MAY 19,96 12:00:02 AM

BEG FUEL LEVEL: 51.5870 in

BEG WATER LEVEL: 0.0357 in

850.905 gal, 53.04 °F

850.917 gal, 53.02 °F

850.928 gal, 53.00 °F

850.936 gal, 52.98 °F

END: SUN MAY 19,96 4:09:01 AM

END FUEL LEVEL: 51.5870 in

END WATER LEVEL: 0.0352 in

## 4. Print Line Leak Report

- a. Depress **PRINT REPORTS**
- b. Depress **MORE - MORE - MORE -MORE**
- c. Depress **LINE LEAK REPORT**
- d. Depress **ALL** or enter desired tank # (**01, 02**, etc.)
- e. Depress **PRINT**

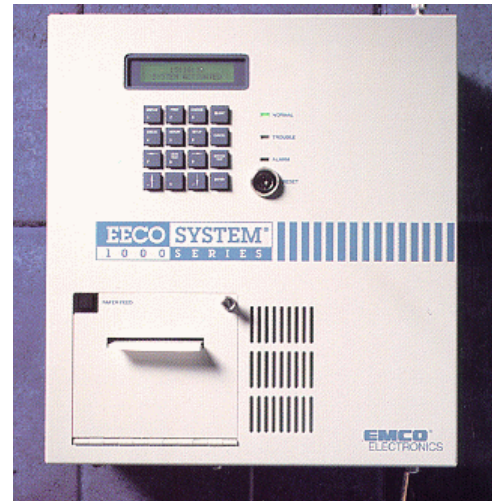
# EECO SYSTEM

## 1000 SERIES

### Automatic Tank Gauging

#### EMCO Electronics

114-300 Mackenan Dr  
Cary, NC 27511  
Ph# 919 460-6000



**Evaluator:** Midwest Research Institute - 04/29/94

**System Description:** *The EECO 1000 functions in the same manner as the EECO 2000 but does not monitor product lines or external sensors. It is strictly a tank management system designed to monitor up to eight tanks. Tank leak tests will start automatically after deliveries or can be programmed to start at a selected time daily, weekly or monthly. A segmented leak detection (SLD) **option** is available to provide continuous tank leak detection; however, it is **not** 3<sup>rd</sup> party certified.*

*Refer to the EECO 2000 information sheets for additional system description and instructions to obtain reports.*

**Certification:** 3.0, 0.2 & 0.1 gph

**Tank Capacity:** Max. 15,000 gal

**Test Period:** Min. 1 hrs with tank 50 - 95% full

**Limitations:**

- Not evaluated using manifolded tanks
- No dispensing or delivery during test
- Does not monitor product lines
- Does not monitor external sensors

# EECO SYSTEM

## 1500 SERIES

### Automatic Tank Gauging & Sensor Detection System

#### EMCO Electronics

114-300 Mackenan Dr

Cary, NC 27511

Ph# 919 460-6000



**Evaluator:** Midwest Research Institute - 04/29/94

**System Description:** *The EECO 1500 functions in the same manner as the EECO 2000 but does not monitor product lines electronically. The EECO 1500 system is able to monitor product lines by the use of interstitial sensors. Monitoring sensors can also be used for dispenser pans, sumps and liquid/vapor wells. The EECO 1500 management system is designed to monitor two and four tank systems. Tank leak tests will start automatically after deliveries or can programmed to start at a selected time daily, weekly or monthly. A segmented leak detection (SLD) **option** is available to provide continuous tank leak detection; however, it is **not** 3<sup>rd</sup> party certified.*

*Refer to the EECO 2000 information sheets for additional system description and instructions to obtain reports.*

**Certification:** 3.0, 0.2 & 0.1 gph

**Tank Capacity:** Max. 15,000 gal

**Test Period:** Min. 1 hrs with tank 50 - 95% full

**Limitations:**

- Not evaluated using manifolded tanks
- No dispensing or delivery during test



# EECO SYSTEM

## 2000 SERIES

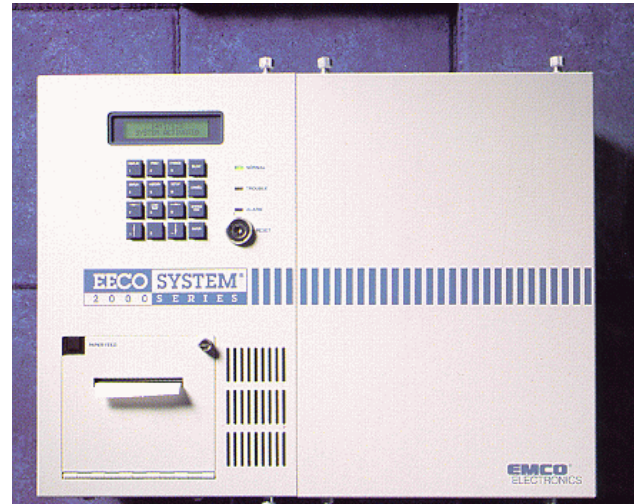
### Automatic Tank Gauging & Electronic Line Leak Detection System

#### EMCO Electronics

114-300 Mackenan Dr

Cary, NC 27511

Ph# 919 460-6000



**Evaluator:** Midwest Research Institute - 04/29/94

**System Description:** *The EECO 2000 is designed to monitor up to eight tanks, 24 EECO Choice sensors and eight pressurized lines. Tank leak tests will start automatically after deliveries or can be programmed to start at a selected time daily, weekly or monthly. A segmented leak detection (SLD) **option** is available to provide continuous tank leak detection; however, it is **not** 3<sup>rd</sup> party certified. The sensors are designed to detect fuel and water in secondary containment vessels, sumps, dispenser pans, and monitoring wells. When alarm conditions occur, audible or display lights will be activated. The event is then written into the history log. The Line Leak Detector **option** provides product line leak detection at 3, 0.2 & 0.1 gph. Leaks exceeding the 'pump shutoff' threshold will disable submersible pumps. Product line leak tests can occur automatically or manually.*

**Certification:**    **TANKS:** 0.2 & 0.1 gph    **PIPING:** 3, 0.2 & 0.1 gph

**Tank Capacity:** Max. 15,000 gal

**Test Period:**    Min. 1 hrs with tank 50 - 95% full

**Limitations:**

- Not evaluated using manifolded tanks
- No dispensing or delivery during test
- Must have LLD **option** for product line testing

# SAMPLE REPORTS

## ECCO 2000

### 1. View Display Functions

(to print reports; press PRINT prior to the following)

- a. Press **DISPLAY**
- b. Press **STATUS, HISTORY** or **LEAK TEST**
- c. Press **ENTER**
- e. Press **↓** to scroll thru menu selection
- f. Press **ENTER** when desired menu
- g. Continue to press **↓** for desired submenu
- h. Press **ENTER** when desired submenu
- i. Press **CANCEL** to exit menu level

### 2. Print Inventory Status

- a. Press **[PRINT] [STATUS][ENTER]**  
**[ENTER]**

```
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)
```

### 3. Print Event History

- a. Press **[PRINT][HISTORY]**  
**[ENTER] [↓] [ENTER]**

```
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
```

### 4. Print Tank Leak Test History

- a. Press **[PRINT] [LEAK TEST][↓]**  
**[ENTER][↓][↓][↓][ENTER]**

```
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

*****
```

# PETROSONIC III

## Automatic Tank Gauging System

### Petro Vend

6900 Santa Fe Drive  
Hodgkins, IL 60525  
Tel: (708) 485-4200



**Evaluator:** Underwriters Laboratories, Inc. - 11/04/94

**System Description:** *The Petrosonic III is a microprocessor-based system capable of monitoring up to eight probes. The controller interprets probe data, converts the product level measurements into volume measurements and produces reports. The controller records alarms, such as low product, high water, overflow and theft. The controller also functions as a leak indicator by continuously watching for extremely small changes in product level. This **is not** leak testing, but product variances. The Petrosonic III has alarm inputs you can connect to external devices such as hydrocarbon detectors or alarm bells. The system has three modes of operation; privileged, non-privileged and standby. If the system is in the privileged mode, you must have an access code. Default code is **HELLO**.*

**Certification:** 0.2 gph with PD = 99.07% and PFA = 0.93%

**Tank Capacity:** Max. 15,000 gal

**Test Period:** Min. 4 hrs with tank 50 - 95% full

**Limitations:**

- No dispensing or delivery during test
- Not evaluated using manifolded tanks
- Not capable of monitoring product lines
- Not capable of continuous monitoring

## SAMPLE REPORTS PETROSONIC III

REPORT NAME	FUNCTION #
Status	1
Inventory	2
Deliverys	3
Variation	4
Alarms	7
Tank Info	8
Tank Leak Test	53

1	2	3	PR
4	5	6	TM
7	8	9	AC
CL	0	EN	CN

### Access #'s for Reports

### Console Keypad

## ALL REPORTS ARE OBTAINED IN THE FOLLOWING MANNER:

### 1. *Printing Reports*

- a. Press **ACCESS**
- b. Press **ENTER**; console displays 'non-privileged'  
followed by 'display command > 0'
- c. Enter **Access #** for desired report (above)
- d. Press **PRINT**
- e. Press **ENTER** for report on all tanks

### 2. *Print List of Keypad Commands (Help)*

- a. Press **ACCESS**
- b. Press **ENTER**
- c. Press **PRINT**
- d. Press **ENTER**

### 3. *Abort Command*

- a. Press **CANCEL**
- b. Press **ACCESS**

# SAMPLE REPORTS PETROSONIC III

\*\* PETROSONIC III \*\*  
TANK GAUGE SYSTEMS.  
BY PETRO VEND INC.

STATUS  
12:07 PM TUE NOV 13, 1990

	----- TANK -----							
	1	2	3	4	5	6	7	8
ALARM	1	2	3	4	5	6	7	8
OVERFLOW	2	2*	.	.	.	.	.	.
LOW PRODUCT	.	.	.	.	.	.	.	.
HIGH WATER	1*	1*	1*	.	.	.	.	.
TEMPERATURE	.	.	.	.	.	.	.	.
MISSED MEAS	1*	1*	.	.	.	.	.	.
LEAK INDICATED	1	.	.	.	.	.	.	.
THEFT	.	.	6	.	.	.	.	.
DELIVERY	1	2	1	.	.	.	.	.
SALE	2	.	1	.	.	.	.	.
ACCNTG PERIOD	.	.	.	.	.	.	.	.
TIMED LEAK TEST	.	.	.	.	.	.	.	.
POWER FAILURE	5	.	.	.	.	.	.	.
PRINTER FAILURE	1	.	.	.	.	.	.	.
EXTERNAL	.	.	.	.	.	.	.	.
SAVED INVENTORY	2	.	.	.	.	.	.	.
SCHEDULE	3	.	.	.	.	.	.	.

6 ACTIVE FLAGS, 34 STORED MESSAGES,  
397 FREE BLOCKS, SYSTEM OPEN

## Status Report

\* Active Flag (alarm condition)

\*\* PETROSONIC III \*\*  
TANK GAUGE SYSTEMS.  
BY PETRO VEND INC.

INVENTORY  
12:24 PM TUE NOV 13, 1990

===== TANK 4 DIESEL  
8603.2 GL NET CORRECTED PRODUCT VOLUME.  
8605.6 GL NET CORRECTED TANK VOLUME.  
8586.9 GL GROSS MEASURED TANK VOLUME.  
1413.1 GL VOLUME LEFT IN TANK.  
76.90 IN PRODUCT LEVEL.  
56.3 F AVERAGE FUEL LEVEL.  
0.4 IN WATER LEVEL

## Inventory Report

\*\* PETROSONIC III \*\*  
TANK GAUGE SYSTEMS.  
BY PETRO VEND INC.

MESSAGES  
12:24 PM WED NOV 14, 1990

DELIVERY  
===== TANK 4 DIESEL  
DELIVERY  
DELIVERY  
START MEASUREMENT  
10:17 AM WED NOV 14, 1990  
5079.3 GL NET CORRECTED PRODUCT VOLUME.  
5093.5 GL NET CORRECTED TANK VOLUME.  
5083.6 GL GROSS MEASURED TANK VOLUME.  
4916.4 GL VOLUME LEFT IN TANK.  
48.63 IN PRODUCT LEVEL.  
56.3 F AVERAGE FUEL TEMPERATURE.  
0.9 IN WATER LEVEL.  
END MEASUREMENT  
10:43 AM WED NOV 14, 1990  
\* OVERFLOW \*  
\* HIGH WATER \*  
9965.5 GL NET CORRECTED PRODUCT VOLUME.  
9989.6 GL NET CORRECTED TANK VOLUME.  
9974.3 GL GROSS MEASURED TANK VOLUME.  
25.7 GL VOLUME LEFT IN TANK.  
94.73 IN PRODUCT LEVEL.  
57.1 F AVERAGE FUEL TEMPERATURE.  
1.2 IN WATER LEVEL.  
DELIVERY VOLUME  
4896.1 GL NET CORRECTED TANK VOLUME.  
4890.7 GL GROSS MEASURED TANK VOLUME.  
57.9 F ESTIMATED DELIVERY TEMPERATURE.

## Delivery Report

## SAMPLE REPORTS PETROSONIC III

\*\* PETROSONIC III \*\*  
TANK GAUGE SYSTEMS.  
BY PETRO VEND, INC.

MESSAGES  
12:24 PM THU NOV 15, 1990

TIMED LEAK TEST  
===== TANK 4 DIESEL  
TIMED LEAK TEST  
START MEASUREMENT  
12:00 AM THU NOV 15, 1990  
5453.1 GL NET CORRECTED VOLUME.  
5455.5 GL GROSS MEASURED VOLUME.  
5446.6 GL VOLUME LEFT IN TANK.  
51.37 IN PRODUCT LEVEL  
56.9 F AVERAGE FUEL TEMPERATURE  
0.4 IN WATER LEVEL  
END MEASUREMENT  
5453.2 GL NET CORRECTED VOLUME.  
5455.6 GL GROSS MEASURED VOLUME.  
4554.7 GL VOLUME LEFT IN TANK  
51.36 IN PRODUCT LEVEL  
56.0 F AVERAGE FUEL TEMPERATURE  
0.4 IN WATER LEVEL  
LEAK RATE  
0.016 GL/HOUR NET CORRECTED LEAK RATE.  
-0.9 F TEMPERATURE CHANGE  
FOR 4.0 HOURS  
THRESHOLD = 0.05 GL/HOUR  
TEST PASSED

### Leak Test Report

Leak Test Report is a subset of Messages Report

\*\* PETROSONIC III \*\*  
TANK GAUGE SYSTEMS.  
BY PETRO VEND INC.

MESSAGES  
1:06 PM TUE NOV 13, 1990

ALARMS  
===== TANK 4 DIESEL  
WORST CASE  
\* OVERFLOW \*  
9965.5 GL NET CORRECTED PRODUCT VOLUME.  
9989.6 GL NET CORRECTED TANK VOLUME.  
9974.3 GL GROSSED MEASURED TANK VOLUME.  
25.7 GL VOLUME LEFT IN TANK.  
94.73 IN PRODUCT LEVEL.  
57.1 F AVERAGE FUEL TEMPERATURE.  
23.5 GL GROSS WATER VOLUME.  
1.2 IN WATER LEVEL.  
HIGH WATER  
START 10:22 AM TUE NOV 13, 1990  
END 11:14 AM TUE NOV 13, 1990  
WORST CASE  
\* HIGH WATER \*  
6254.2 GL NET CORRECTED PRODUCT VOLUME.  
6284.0 GL NET CORRECTED TANK VOLUME.  
6275.1 GL GROSS MEASURED TANK VOLUME.  
25.7 GL VOLUME LEFT IN TANK.  
57.86 IN PRODUCT LEVEL.  
57.3 F AVERAGE FUEL TEMPERATURE.  
29.8 GL GROSS WATER VOLUME.  
1.4 IN WATER LEVEL.  
\* LEAK INDICATED \*  
START 1:00 AM TUE NOV 13, 1990  
END 2:00 AM TUE NOV 13, 1990  
1.00 GAL PER HOUR AVERAGE LEAK RATE  
===== TANK 5  
MISSED MEAS  
START POWER UP  
END IN PROGRESS  
MISSED 528 MEASUREMENTS  
===== SYSTEM  
POWER FAILURE  
POWER FAILURE  
START 9:22 AM THU NOV 1, 1990  
END 11:14 AM THU NOV 1, 1990  
PRINTER FAILURE  
PAPER OUT  
START 8:57 AM TUE NOV 13, 1990  
END 9:01 AM TUE NOV 13, 1990

### Alarms Report

# SiteSentinel

## Model II

### Automatic Tank Gauging System

#### PETRO VEND

6900 Santa Fe Drive  
Hodgkins, IL 60525  
Ph# 708 485-4200



**Evaluator:** Underwriters Lab., Inc. - 11/04/94

**System Description:** *The SiteSentinel is a microprocessor-based system capable of monitoring probes and sensors. Each SiteSentinel system has one controller to manage operations and can be upgraded with modules to incorporate additional probe and sensor capability. Up to eight modules can be connected for a total of 128 probes and sensors. Inventory and system reports are available anytime and can be scheduled to print automatically. Built-in sound and light alarms can signal any system event. The SiteSentinel has three modes of operation: privileged, non-privileged and restricted. If the system is in the privileged mode, you must have the password. The default password is HELLO.*

**Certification:** 0.1 & 0.2 gph

**Tank Capacity:** Max. 15,000 gal

**Test Period:** Min. 2 hrs (0.2 gph) with tank 50 - 95% full  
Min. 4 hrs (0.1 gph) with tank 90% full

**Limitations:**

- No dispensing or delivery during test
- Not evaluated using manifolded tanks
- Not capable of monitoring product lines
- Not capable of continuous monitoring

# SAMPLE REPORTS

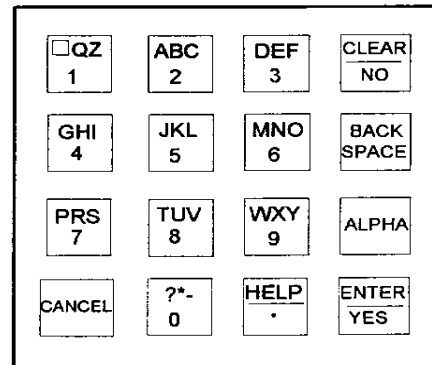
## Site Sentinel

```
SITESENTINEL  APR 29, 1996  8:36 AM
                MAIN MENU
```

```
1. ENTER PASSWORD:
2. TANK INVENTORY REPORT
3. REPORTS
4. SYSTEM COMMANDS
5. SCHEDULE COMMANDS & REPORTS
6. SYSTEM SETUP
7. I/O AND SMART MODULE DATA
8. QUICK SALE REPORT (PRINTER REQUIRED)
9. QUICK DELIVERY REPORT (PRINTER REQD)
```

### DIRECTIONS:

```
-----
AT ANY MENU YOU MAY ENTER THE FOLLOWING:
OPTION #   SELECTS OPTION
[C] OR [CANCEL]  EXITS TO PREVIOUS MENU
[P] OR [0]      PRINTS DATA FROM SCREEN
```



### Main Menu Display

### Console Keypad

#### 1. Go to Main Menu

- Press **CLEAR/NO** till Main Menu
- Press **CLEAR/NO** to scroll sub-menus

#### 2. If password is necessary

- Press **1**
- Enter password with console letter or numbers. (Try **HELLO**)
- Press **ENTER**

#### 3. Tank Inventory Report

- Press **2**
- Press **0** to print report on all tanks

#### 4. Alarms in Progress

- Press **3** then **6**
- Press **0** to print current alarms

#### 5. Alarm History

- Press **3** then **7**
- Press **0** to print alarm history

#### 6. Leak Test Report

- Press **3** then **10** then **8**
- Press **0** to print



# WILCO

## Fuel Management and

### Compliance Service

Receiver

### SIMMONS

106 East Main Street  
Richardson, TX 75081  
Tel: (800) 848-8378



Keypad/Display Unit



Evaluator: S.S.G.

Associates - 10/28/95

ATG Probe/Transmitter

**System Description:** *The Wilco system employs radio and modem communications technology to connect on-site monitoring equipment to the Simmons Central Monitoring Center. Technicians collect and process data, monitor and respond to alarms and generate compliance reports. The Wilco ATG probe uses micro-impulse radar technology to measure tank levels and then transmits data via radio signal to a remote receiver linked to the Wilco Control Panel. The Wilco control panel with user keypad and display unit then sends data between the business and Simmons central monitoring center via existing telephone lines. Inventory, sales and delivery data are then used to produce SIR results. Sales and deliveries must be entered manually thru the keypad. Options include leak detection sensor and overflow alarms.*

**Certification:** SIR 5.7 L.M. version; 0.2 & 0.1 GPH  
with PD = 99% & PFA = 1%

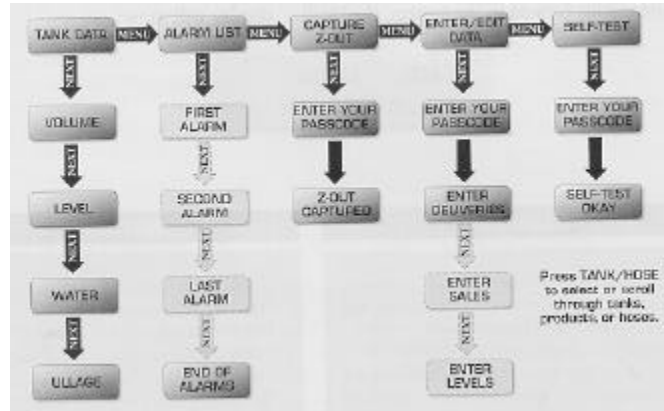
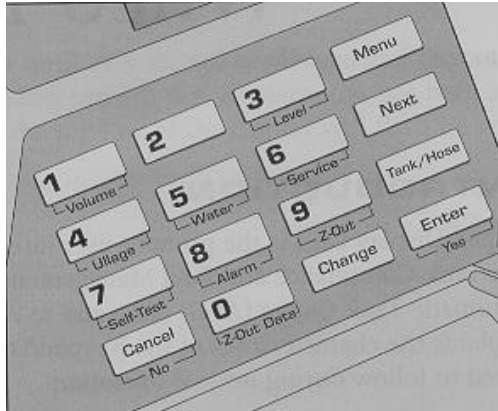
**Tank Capacity:** 45,000 gal.; 2, 3 or 4 tank manifolded systems

**Test Period:** Min. 26 days

**Limitations:** Data collection **only**

# WILCO

## Keypad Operation



**Keypad/Display Unit**

**Flowchart of Wilco Menu**

### 1. Tank Inventory

- a. Press **“Menu”** until Tank Data
- b. Press **“Next”** for Volume, Level, Water or Ullage
- c. Press **“Tank/Hose”** for different tanks in system

### 2. Alarm List

- a. Press **“Menu”** until Alarm List
- b. Press **“Next”** for each alarm
  - i. alarm description will flash on and off to indicate alarm has not been acknowledged
  - ii. if alarm status is still present, second line will indicate **“ACTIVE”**
  - iii. if alarm status is not present, second line will indicate **“CLEARED”**

### 3. Self-Test (system functioning properly)

- a. Press **“Menu”** until **Self-Test**
- b. Press **“Next”**; enter passcode (1234)
  - i. Display will show **SELFTEST OK** if functioning properly
  - ii. Display will show **SELFTEST FAIL** or **PRESS SERVICE** if not functioning properly

### 4. Overfill Alarm Check

- a. Initiate **Self-Test**, alarm should sound; **if not**, no overfill alarm
- b. Press **“Cancel”** to silence alarm

# Soil Sentry Liquid 330

## Double-Walled UST Monitoring System

### Arizona Instrument - A Z I

4114 E. Wood St.  
Phoenix, AZ 85040  
Tel: 602 731-3434



**Evaluator:** Ken Wilcox Ass. - 01/08/93

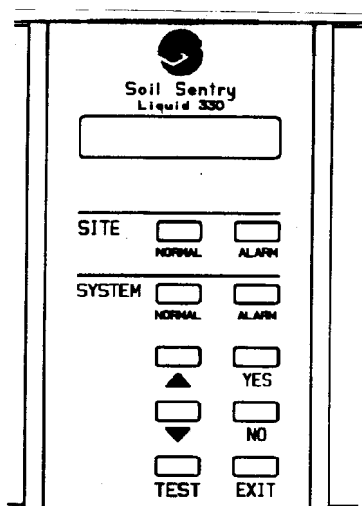
**System Description:** *The Soil Sentry Liquid 330 uses optical sensing technology to monitor double-contained storage tanks and piping. The system utilizes up to 10 optical sensing probes which continuously monitor annular spaces in tanks and piping. Probes can also be installed in the tanks to provide high and low level alarms. The Liquid 330 uses a WET/DRY probe to distinguish between normally DRY or WET conditions. A discriminating probe can be used to determine whether the liquid is water or product. All event conditions (alarms) are stored and can later be recalled. The system is capable of storing 350 lines of information.*

<b>Detector:</b>	<b>Output type:</b>	qualitative
	<b>Sampling frequency:</b>	continuous
	<b>Operating principle:</b>	refraction

**Applicability:** Unleaded and synthetic gas, diesel fuel, n-hexane, jet-A fuel, toluene, xylene(s) and water

# SAMPLE REPORTS

## Liquid 330



### Display Options

1. View Menu Options?
2. View Current Status?
3. View Print Options?
4. Make Setup Changes?
5. Diagnostics Options?

### Console

#### 1. View or Print Current Status

- a. Press **YES** or **NO** until "View Current Status?"
- b. Press **↑** or **↓** until desired information
- c. Press **YES** to download information
- d. Press **EXIT** to leave routine

```
LIQUID 330 CURRENT STATUS
05-MAR-91 12:33
```

```
Site Name
Site Address
City, State, Zip
Site Comments
```

```
Controller: OK
Calibration: 2.54 Volts, OK
```

```
Probe 1: 2.64 Volts, Normal
Probe 2: Inactive
Probe 3: 2.64 Volts, Normal
Probe 4: Inactive
Probe 5: Inactive
Probe 6: 2.64 Volts, Normal
Probe 7: Inactive
Probe 8: Inactive
Probe 9: 2.64 Volts, Normal
Probe 10: Inactive
```

#### 2. View or Print History

- a. Press **YES** or **NO** until "View Print Options?"
- b. Press **↑** or **↓** until "Print History?"
- c. Press **YES** to download information
- d. Press **EXIT** to leave routine

```
LIQUID 330 PAST SIGNIFICANT EVENTS
16-APR-91 13:53
```

```
16-04-91 13:37 Event: Operate/Setup
Power: ON
16-04-91 13:37 Event: Site Alarm
Probe 10 ALARM
16-04-91 13:38 Event: Operate/Setup
Site Alarm Cleared
16-04-91 13:50 Event: Operate/Setup
Setup Menu Entered
16-04-91 13:52 Event: Operate/Setup
Setup Menu Entered
16-04-91 13:52 Event: System Alarm
EVENT MEMORY
16-04-91 13:52 Event: Operate/Setup
System Alarm Cleared
End of Significant Events
```

# Soil Sentry Twelve - X

## Vapor Monitoring System

### Arizona Instrument - AZI

4114 E. Wood St.  
Phoenix, AZ 85040  
Tel: 602 731-3434



**Evaluator:** Ken Wilcox Ass. - 04/17/91

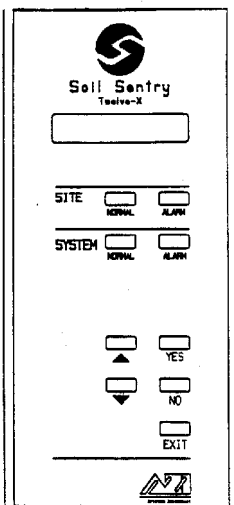
**System Description:** *The Soil Sentry Twelve-X is an “aspirated vapor” monitoring system. It’s designed to analyze the vapor concentration of Total Organic Hydrocarbons (TOH) found in the soil and backfill around motor fuel tanks. The system searches for leaks by drawing air samples from up to 12 underground locations and electronically analyzing those samples for the vapor of leaking hydrocarbon materials . The system sequentially draws air samples from each active vapor sampling point three times a day. If a vapor level above the adjustable alarm level is identified over three successive sampling cycles, or if a dangerously high vapor level is identified during any one cycle, the site alarm is triggered and a record is made of the day, cycle period, identification of the high vapor sampling point and the measured vapor level.*

<b>Detector:</b>	<b>Output type:</b>	quantitative
	<b>Sampling frequency:</b>	continuous
	<b>Operating principle:</b>	metal oxide semiconductor

**Applicability:** Unleaded and synthetic gas, diesel fuel, n-hexane, JP 4 & 5 jet fuel, toluene, xylene(s)

# SAMPLE REPORTS

## Twelve - X



### Console

### Display Options

1. View Menu Options?
2. System Status
3. View Site Levels?
4. View Print Options?
5. Operate/Setup Options?
6. Diagnostics Options?

### 3. View or Print Past Vapor Levels

- a. Press **YES** or **NO** until "View Print Options?"
- b. Press **↑** or **↓** until "Past Vapor/Pressure?"
- c. Press **YES** to download information
- d. Press **EXIT** to leave routine

### 1. View Site Levels

- a. Press **YES** or **NO** until "View Site Levels?"
- b. Press **↑** or **↓** until desired information
- c. Press **EXIT** to leave routine

Arizona Instrument Corp.  
1100 E. University  
Tempe, Arizona 85281

```
14-MAR-90 09:00
Well Vapor(ppm) Press(In.H2O) Alarm
00      1200      -052      3500 PPM
01       0010      -050      3500 PPM
02       0010      -050      3500 PPM
03       0010      -050      3500 PPM
04       0010      -050      3500 PPM
05       0010      -050      3500 PPM
06       0010      -050      3500 PPM
07       0010      -050      3500 PPM
08       0010      -050      3500 PPM
09       0010      -050      3500 PPM
10       0010      -050      3500 PPM
11       0010      -050      3500 PPM
12       0010      -050      3500 PPM
```

### 2. View or Print Alarm History

- a. Press **YES** or **NO** until "View Print Options?"
- b. Press **↑** or **↓** until "Past Signif(ificant) Events?"
- c. Press **YES** to download information
- d. Press **EXIT** to leave routine

Arizona Instrument Corp.  
1100 E. University  
Tempe, Arizona 85281

```
09-MAR-90 00:00
Well Vapor(ppm) Press(In.H2O)
00       0010      -049
00       0010      -049
00       0010      -049
```

```
09-MAR-90 08:00
Well Vapor(ppm) Press(In.H2O)
00       0010      -050
01       0010      -050
02       0010      -049
03       0010      -049
04       0010      -049
05       0010      -049
06       0010      -049
07       0010      -049
08       0010      -049
09       0010      -049
10       0010      -049
11       0010      -049
12       0010      -049
```

```
09-MAR-90 16:00
Well Vapor(ppm) Press(In.H2O)
00       0010      -050
01       0010      -050
02       0010      -049
03       0010      -049
04       0010      -049
05       0010      -049
06       0010      -049
07       0010      -049
08       0010      -049
09       0010      -049
10       0010      -049
11       0010      -049
12       0010      -049
```

# PPM 4000

## Automatic Electronic Line Leak Detector

### Red Jacket

Marley Pump Co.  
9650 Alden Rd.  
Lenexa, KS 66215  
Tel: 913 541-2985



**Evaluator:** KWA - 04/94

**System Description:** *The PPM 4000 is a programmable line pressure and probe monitoring system utilizing eight independent channel control functions for use in detecting product discharges from UST's and supply lines. The line pressure monitoring system is capable of automatically testing at catastrophic (3gph), standard (0.2 gph) and precision (0.1 gph) levels. Tests begin after each operation of the submersible pump and every time the line pressure falls to 10 PSI or upon demand. Alarm and pump shutdown will occur if the system detects a leak of 3 or 0.2 gph. The PPM 4000 is also capable of performing liquid and vapor monitoring. Eight additional channels can be monitored with the installation of the PPM 4100. To check most current information, continue to depress the SCAN key. Date and results of most recent line tests will appear.*

**Certification:** 3, 0.2, 0.1 gph with PD = 100% and PFA = 0%

**Pipeline Capacity:** Max. 55.1 gal

**Test Period:**  
3.0 gph - 1 min  
0.2 gph - 10 min  
0.1 gph - 2.5 hrs

# TS-LLD

## Electronic Line Leak Detection System

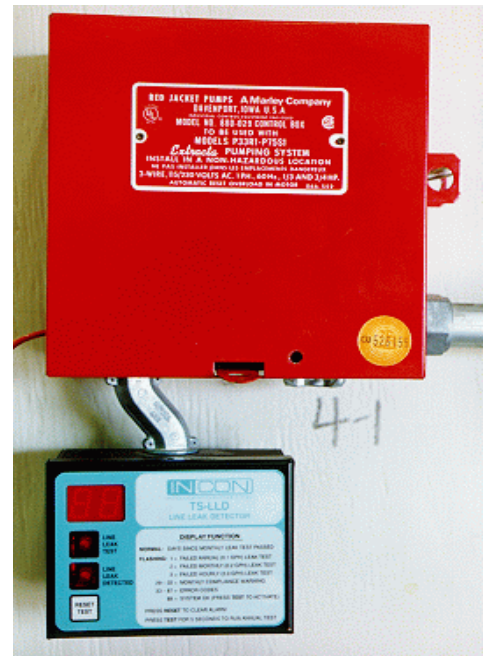
### INCON

P.O. Box 638

Saco, ME 04072

Tel: 207 283-0156

**Evaluator:** KWA - 07/06/95



**System Description:** *The INCON TS-LLD line leak detector has two major “system” components. The Leak Sensing Unit or LSU is installed into the line leak detector port at the submersible pump housing. The Control Unit or CU is installed above or to the side of the submersible pump relay box or motor starter enclosure. The TS-LLD system will automatically turn on the submersible pump during quiet periods to run pressurized line leak tests. A quiet period is required to complete all line leak tests. A 3.0 gph test will automatically run after every product dispense and takes 3 minutes to complete. The 0.2 gph test also runs automatically after product dispense and takes a minimum of 55 minutes to complete. The 0.1 gph test must be started manually. To conduct a 3.0 gph test, press the control unit reset/test button momentarily. The display should indicate an 88 while the button is held down. **Do not** hold the button for longer than four seconds or a 0.1 gph test will be started. Turn the dispenser lever on and then off to start 3 gph test. At the control unit, the Line Leak Test indicator will light. The attached page describes alarm and error codes.*

**Test Period:** 3.0 gph - 3 minutes  
0.2 gph - min. 55 minutes to max. 8 hrs  
0.1 gph - 8 hrs quiet time; 40 minute test

**Max. Pipeline Cap: Rigid** - 163 gal

**Flex** - 49.6 gal



# ALARM & ERROR CODES

## TS-LLD

<b>Display Code</b>	<b>Description</b>
<b>00 to 28</b>	<b>Not Flashing (No Alarm or Error)</b> this is a <b>normal display</b> of the number of days since the last monthly line leak test passed.
<b>88</b>	<b>Not Flashing (System OK)</b> the control unit electronics and display is working correctly.

### **Flashing Display - Alarm and Error Codes**

<b>1</b>	<b>Failed Annual (0.1) GPH line leak test</b>
<b>2</b>	<b>Failed Monthly (0.2) GPH line leak test</b>
<b>3</b>	<b>Failed Hourly (3.0) GPH line leak test</b>
<b>29 - 32</b>	<b>Alarm - Over 28 days since the last Monthly line leak test passed.</b> The number that is flashing is the number of days since the last monthly line leak test passed.
<b>80</b>	<b>Annual leak test aborted.</b>
<b>81</b>	<b>Leak Sensing Unit is out of operating range.</b>
<b>82</b>	<b>Leak test aborted -- thermal instability</b>
<b>83</b>	<b>Leak Sensing Unit is not communicating.</b>
<b>84</b>	<b>Pressurized line is out of compliance.</b>
<b>85</b>	<b>Leak Sensing Unit requires cleaning.</b>

# Auto-Learn

## LS300-120 PLUS A/L, A/S & LSI

### Electronic Line Leak Detection System

#### EBW

2814 McCracken Ave.  
Muskegon, MI 49441  
Tel: 616 755-1671



**Evaluator:** Jetronix Engr. Lab. - 06/01/91

**System Description:** *The EBW Automatic Line Leak Detection system consists of a main logic control unit which is interfaced with the Auto Stik ATG console and the model LS-300 pressure transducer located in the pipeline. The system uses a microprocessor with an algorithm based on time and line pressure to determine if a leak is present. Three gph leak tests are conducted every 45 minutes. In the event that a leak is detected by the system, the pump is activated and the line is repressurized. After 3 successive fails, the alarm is activated and the pump is shut down. Leak tests for 0.2 gph are automatically initiated after the pump has been still for 3 hours; 0.1 gph leak tests are initiated after a still time of 6 hours. If the system detects a leak, the same process occurs as in the 3.0 gph tests. Models that do not include the A/L series are only certified at 3 gph. This EBW system was previously owned by Compo Miller. You may still see this brand name.*

**Certification:** 3, 0.2, & 0.1 gph

**Pipe Capacity:** 163 gal

**Test Period:** 3.0 gph - 10 minutes  
0.2 gph - 25 minutes  
0.1 gph - 34 minutes

LEAK DETECTION MODE

	HI	LO	TEST	ALARM	HORN	CONDITIONS
A	●	⊗	●	●		3 GPH TEST IN PROGRESS PRESSURE WITHIN LIMITS
B	●	⊗	☀	●		PRECISION TEST IN PROG PRESSURE WITHIN LIMITS
C	●	●	●	☀	🔊	LEAK ALARM FAILED 3 GPH TEST
D	☀	●	●	☀	🔊	LEAK ALARM PRESSURE WITHIN LIMITS INSUFFICIENT PRESSURE TO CONDUCT TEST
E	●	☀	●	☀	🔊	LEAK ALARM PIPELINE FAILED TO CATCH PRESSURE
F	⊗	⊗	☀	⊗		0.2 GPH PRECISION TEST PASSED (0.1 GPH TEST PASSED <u>2 FLASHES</u> )
G	⊗	⊗	⊗	☀		0.2 GPH PRECISION TEST FAILED (0.1 GPH TEST FAILED <u>2 FLASHES</u> )
H	☀	●	⊗	⊗		WAITING TO TEST AGAIN LAST TEST FAILED
I	☀	●	⊗	⊗		WAITING TO TEST AGAIN LAST TEST PASSED
J						
K	☀	☀	●	☀	🔊	POSSIBLE TRANSDUCER/SENDER FAILURE SENDER NOT ANSWERING / TRANSDUCER READINGS ARE OFF SCALE (EITHER MAYBE DISCONNECTED)
L	⊗	●	⊗	⊗		PIPELINE PRESSURE IS BELOW 7.5 PSI
M	●	⊗	⊗	⊗		PUMP ON
N	☀	☀	☀	☀		AUTO LEARN NOT COMPLETED <u>UNIT CAN NOT DETECT LEAKS</u>

● OFF

● ON CONTINUOUSLY

⊗ MAY INDICATE OTHER CONDITIONS

☀ BLINK



(EQUAL ON & OFF 1 SEC)



FLASH  
(QUICK)



FLASH EVERY 4 SECONDS)

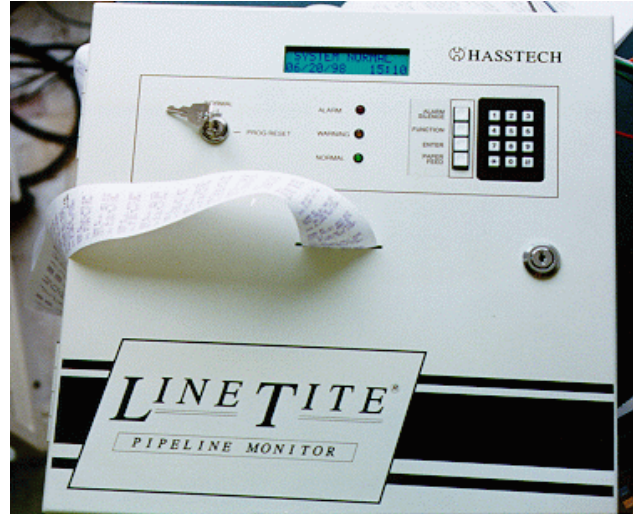
# LINE TITE

## PIPELINE MONITOR

### Electronic Line Leak Detection System

#### Hasstech

6985 Flanders Dr.  
San Diego, CA 92121  
Tel: 619 457-5880



**Evaluator:** Ken Wilcox Ass. - 04/15/97

**System Description:** The *LineTite CPLD* (continuous pressure leak detector) system consists of a single control panel and a remote sensor for each product pipeline. The functions of four remote line monitor sensors can be upgraded with the addition of two *LineTine CPLD* expansion modules (4 sensors per module) allowing control of up to twelve lines per system. The control panel provides indicators to continuously show the current operating status of the system. The indicators will show a *NORMAL*, *WARNING* or *ALARM* condition. An LCD Display will also continuously indicate the status of the system as well as the exact cause of any system *WARNING* or *ALARM* conditions. In the event of a system error or failed test, an internal or optional external buzzer will sound to alert the station operator. System is also capable of dispenser shutdown.

**Certification:** 3 & 0.1 gph w/ PD = 100% & PFA = 0%

**Test Period:** 3.0 gph - 1 to 26 minutes (depending on sensor)  
0.1 gph - 1.2 to 12.9 hrs

**Pipe Capacity:** 0.1 gph - 49.6 gal

# SAMPLE REPORTS

## Line Tite

### 1. *Print Daily Report*

- a. Press **FUNCTION** then 06

FUNCTION #06

---

DAILY REPORT  
07/24/97 14:11  
HASSTECH INC.  
6985 FLANDERS DR  
SAN DIEGO  
CA 92121  
619-457-5880

CHAN #1      PRODUCT #1  
3GPH TESTS PASSED:    0003  
3GPH TESTS FAILED:    0002  
3GPH TESTS ERRORED:  0001  
0.1 GPH TEST NOT RUN

CHAN #2      PRODUCT #2  
3GPH TESTS PASSED:    0003  
3GPH TESTS FAILED:    0002  
3GPH TESTS ERRORED:  0001  
0.1 GPH TEST NOT RUN

CHAN #3      PRODUCT #3  
3GPH TESTS PASSED:    0000  
3GPH TESTS FAILED:    0002  
3GPH TESTS ERRORED:  0001  
0.1 GPH TEST NOT RUN

CHAN #4      PRODUCT #4  
3GPH TESTS PASSED:    0000  
3GPH TESTS FAILED:    0000  
3GPH TESTS ERRORED:  0000  
0.1 GPH TEST NOT RUN

---

### 2. *Print History Report*

- a. Press **FUNCTION** then 16

FUNCTION #16

---

HISTORY REPORT  
07/24/97 14:11

LAST 0.1 GPH TEST PASSED:  
07/23/97 CH 1  
07/23/97 CH 2  
07/23/97 CH 3  
07/23/97 CH 4

LAST 3 GPH TEST PASSED:  
07/23/97 CH 1  
07/23/97 CH 2  
07/23/97 CH 3  
07/23/97 CH 4  
SYSTEM SETUP CHANGED:  
07/24/97

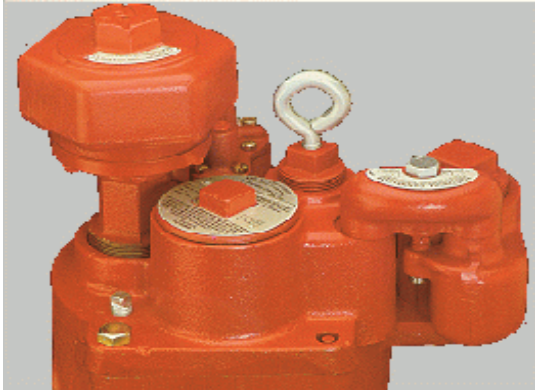
---

### 3. *Audible Alarm Test*

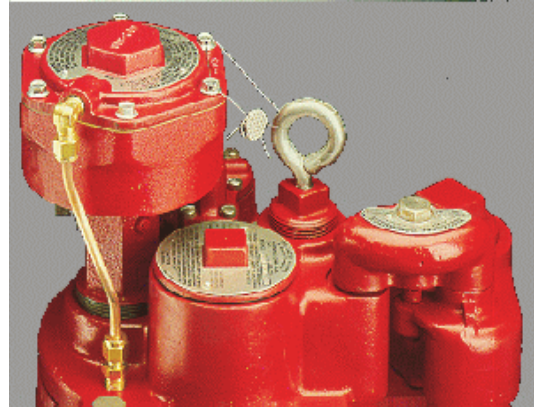
- a. Press **FUNCTION** then 15

# RED JACKET

## Mechanical Line Leak Detectors



Diaphragm Leak Detector (**DLD**)



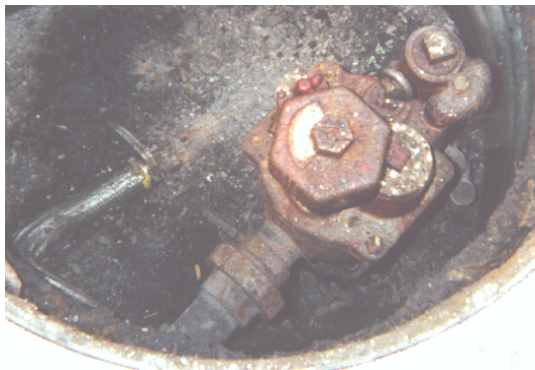
Piston Leak Detector (**PLD**)  
(Not 3<sup>rd</sup> party certified)



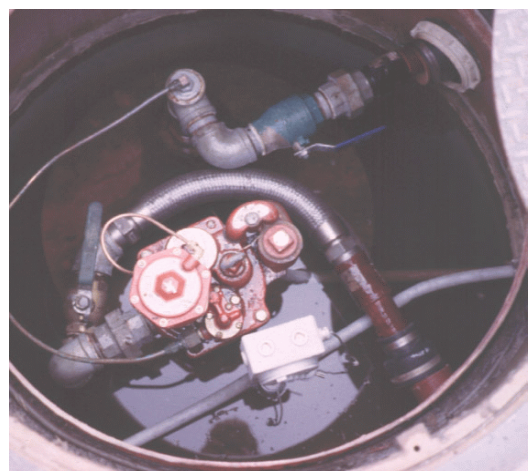
Extended Life Diaphragm (**XLD**)



Extended Life Piston (**XLP**)



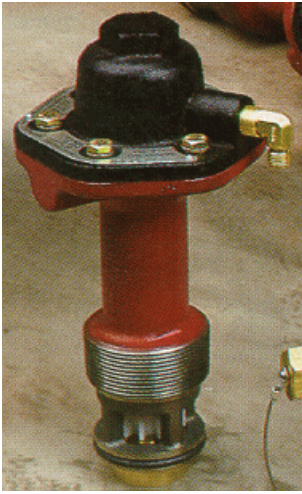
**DLD**



**XLP**

# RED JACKET

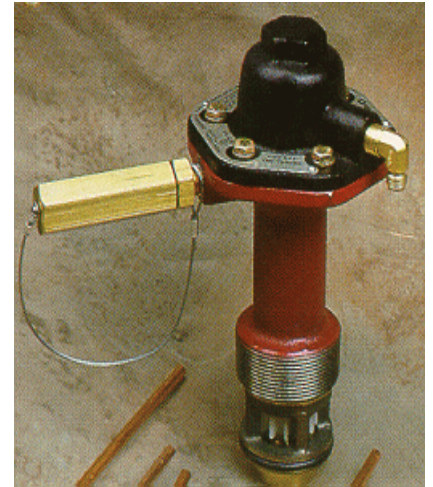
## Mechanical Line Leak Detectors



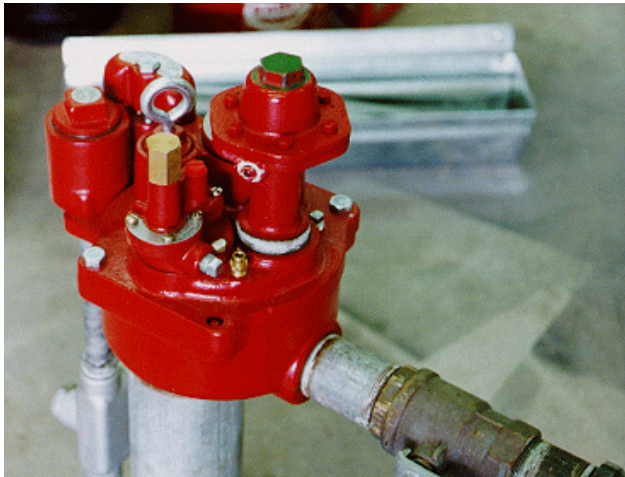
**FX1V**



**FXV Series**



**FX2V**



**FX Model**

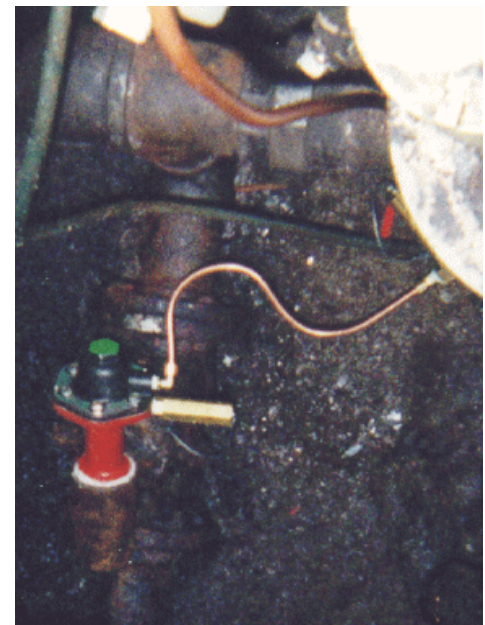


**FX Model**



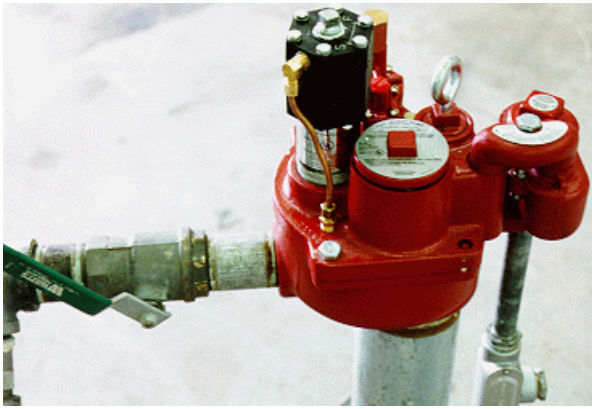
**FX1V**

**FX2V**

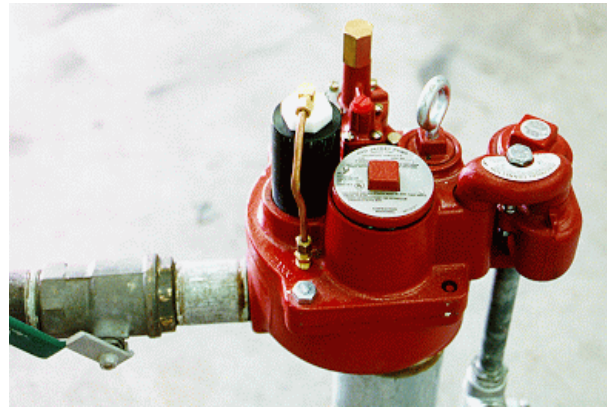


# VAPORLESS

## Mechanical Line Leak Detectors



**LD-2000**



**LD-2200/SCOUT**



**LD-2000-E**  
(for Enviroflex  
piping)



**LD-2000-S** (electronically  
assisted pump shut down)



**LD-2000-T**  
(for Tokheim  
pumps)

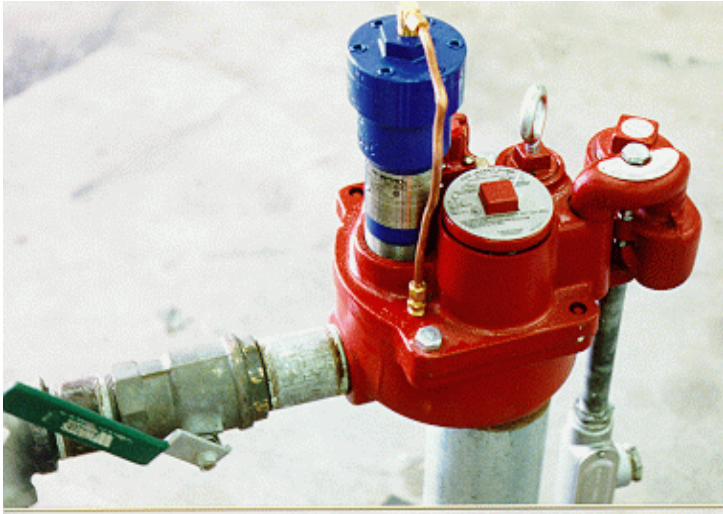


**LD Accumulator**

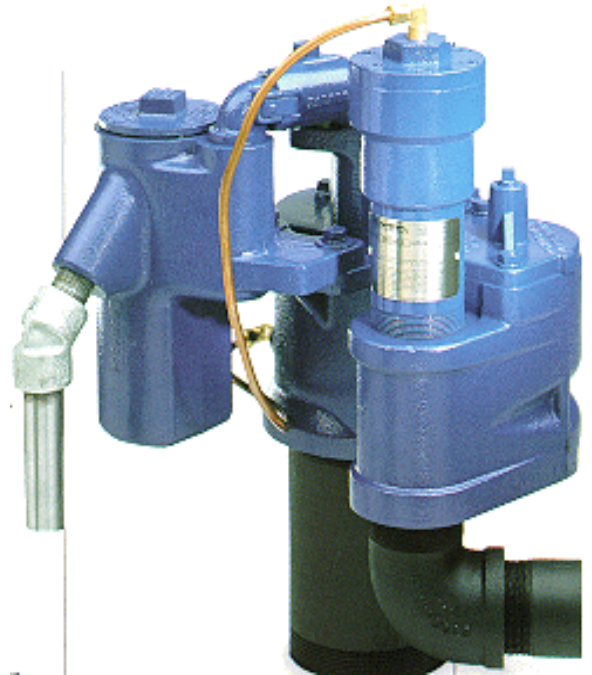


# FE PETRO

## Mechanical Line Leak Detector



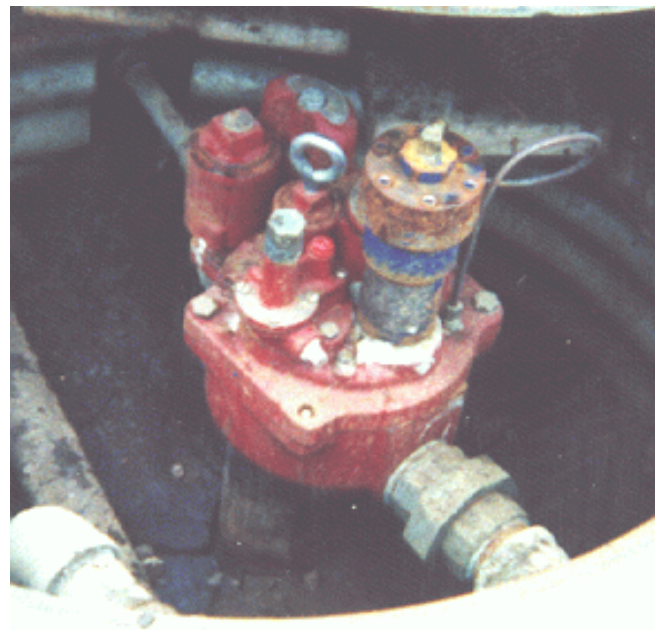
**RJ PUMP w/ FE PETRO MLLD**



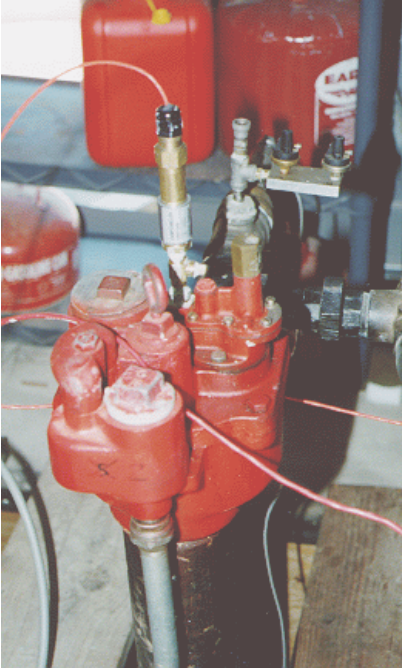
**FE PETRO PUMP & MLLD**



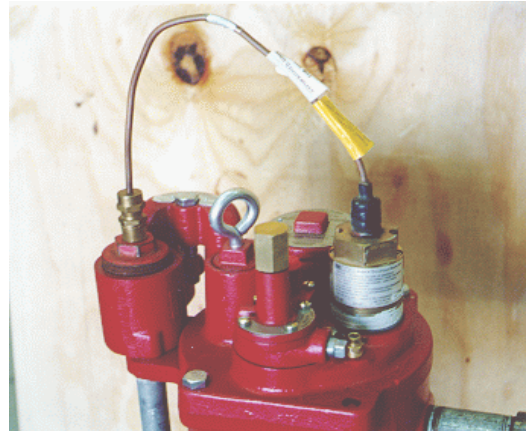
**RJ PUMP w/ FE PETRO MLLD**



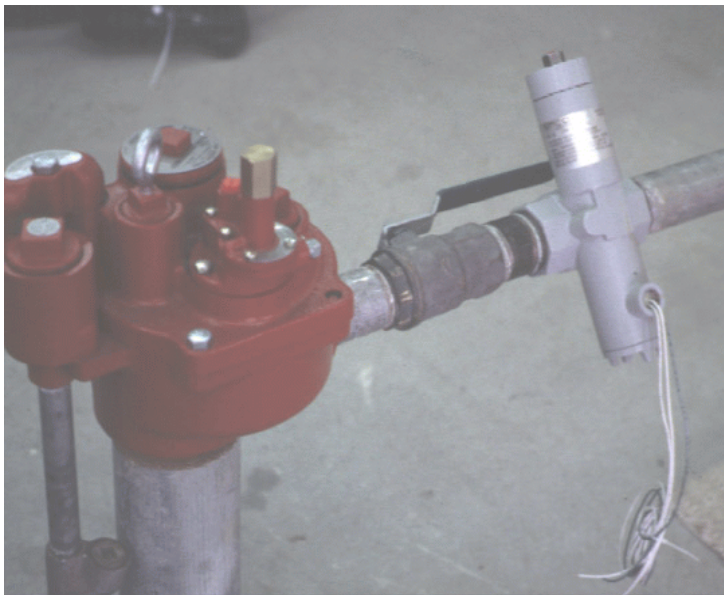
# ELECTRONIC Line Leak Detectors



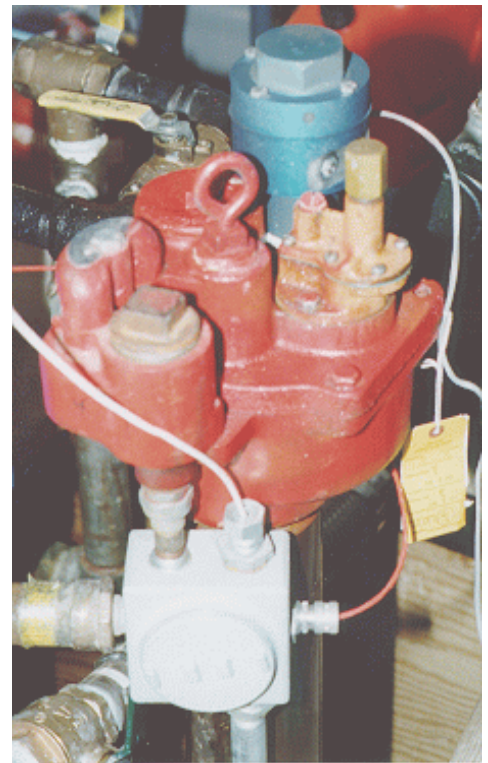
**EBW (Compo Miller)**



**INCON TS-LLD  
(wireless)**



**EECO-LLD**

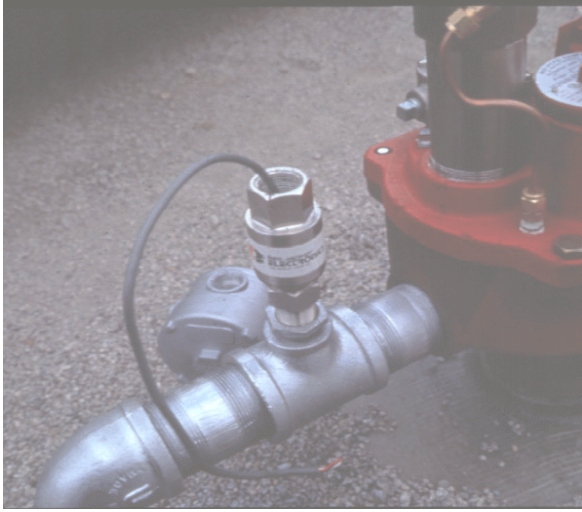


**Hasstech w/RJ Pump**

# RED JACKET ELECTRONIC

## Line Leak Detectors

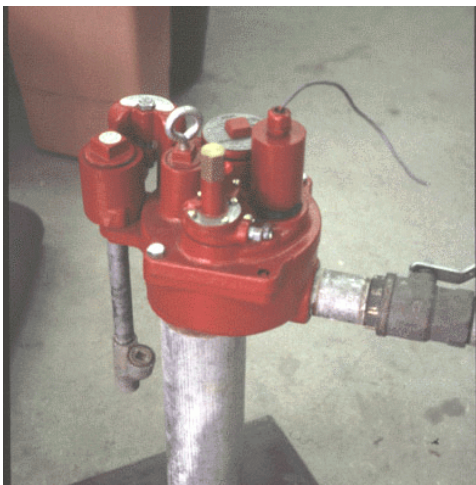
for PPM4000, RLM9000 & ST1400/1800



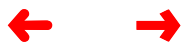
(older model)



(plumbed)



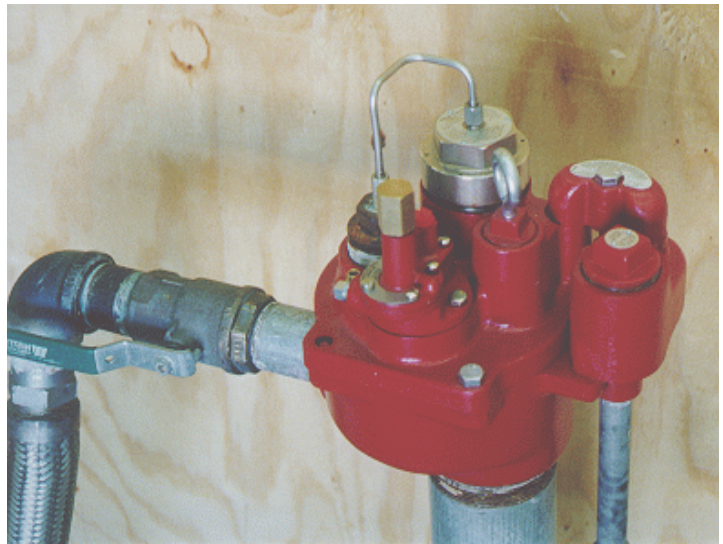
new model



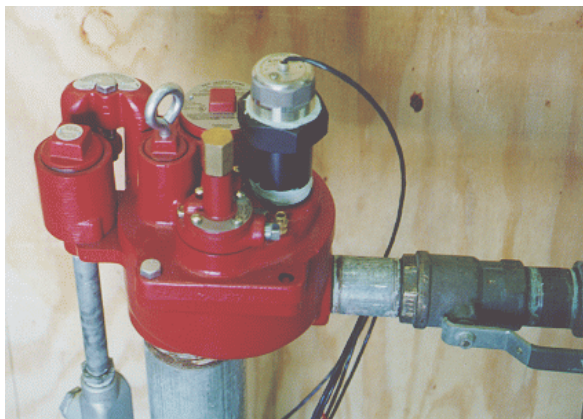
# Veeder Root Electronic Line Leak Detectors



**Wireless LLD**



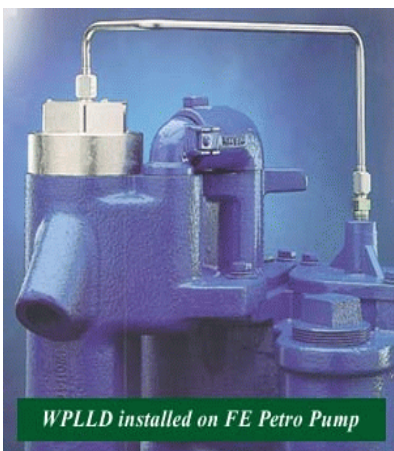
**Wireless LLD w/Red Jacket pump**



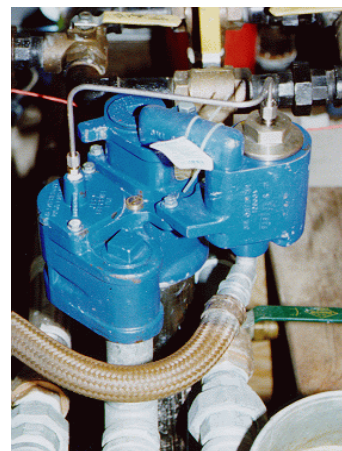
**Pressure LLD (wire)**



**Pressure LLD (field)**



**Wireless LLD w/FE Petro pump**



**Wireless LLD**