



Secondary Containment Monitoring Overview

Why Secondary Containment?

Leak Sources

Spill buckets	43%
Piping	16%
Dispensers	12%
Tanks	12%
Line Leak Detectors	3%
STPs	3%
Delivery Vehicles	3%
Flex Connectors	2%
Other	6%

*Occurrence rates are FL Report data quoted
in Oil Express, Oct 9, 2006*



UST Monitoring

- Secondary containment on UST's designed to capture releases from primary containment
- Sensors are designed for notification of releases via TLS console

Double Walled
Underground
Storage Tanks
(USTs)



Fiberglass UST Interstitial Sensor - Brine

- **794380-303** Dual Point
- **794380-301** Single Point

Single Point Version

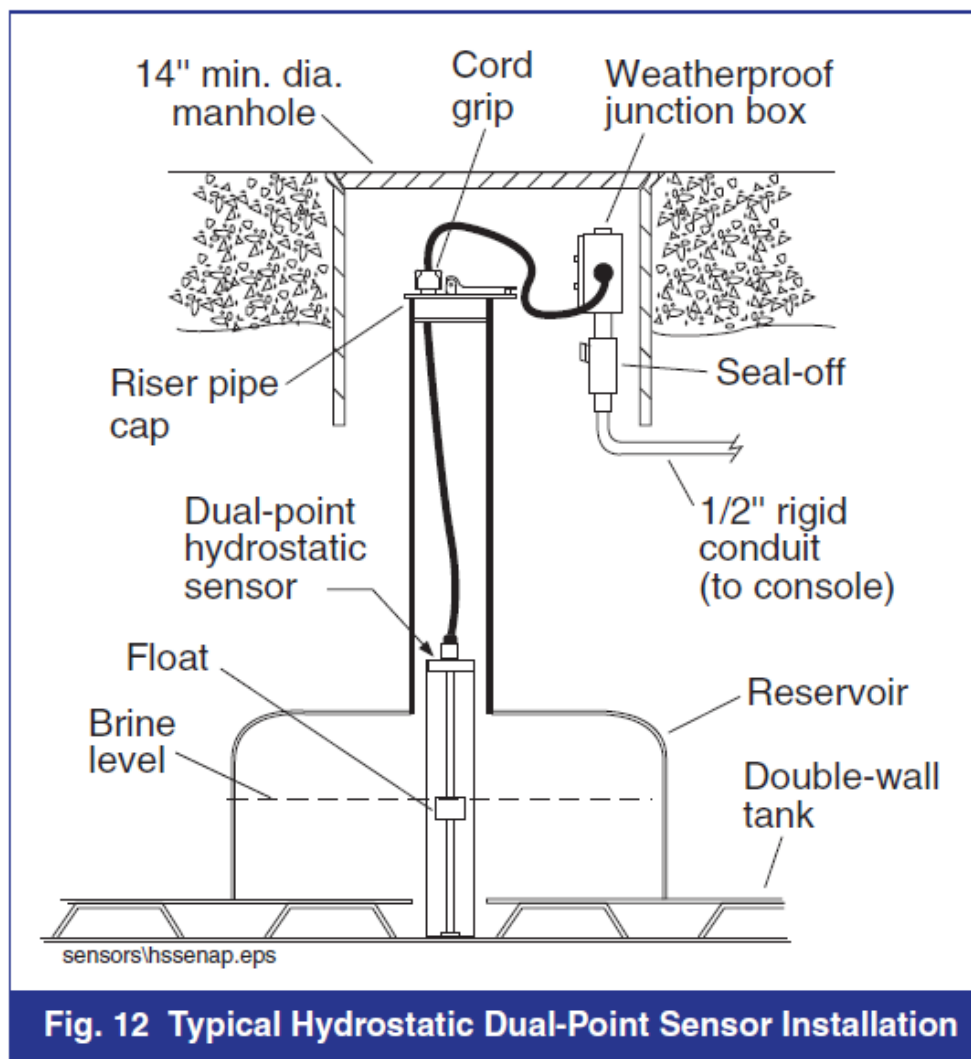
- ✓ Leak in inner or outer wall – “Fuel Alarm”

Dual Point Version

- ✓ Leak in inner wall – “Low Level” alarm
- ✓ Leak in outer wall with high groundwater – “High Level” alarm



Fiberglass UST Interstitial Sensor - Brine



Fiberglass UST Interstitial Sensor - Dry

- **794390-401, 404, 407, 409**
- ✓ Detects any liquid in interstitial space of double walled fiberglass tanks
- ✓ Available in different lengths to accommodate UST radius
- ✓ “Fuel Alarm” if liquid is detected



Fiberglass UST Interstitial Sensor - Dry

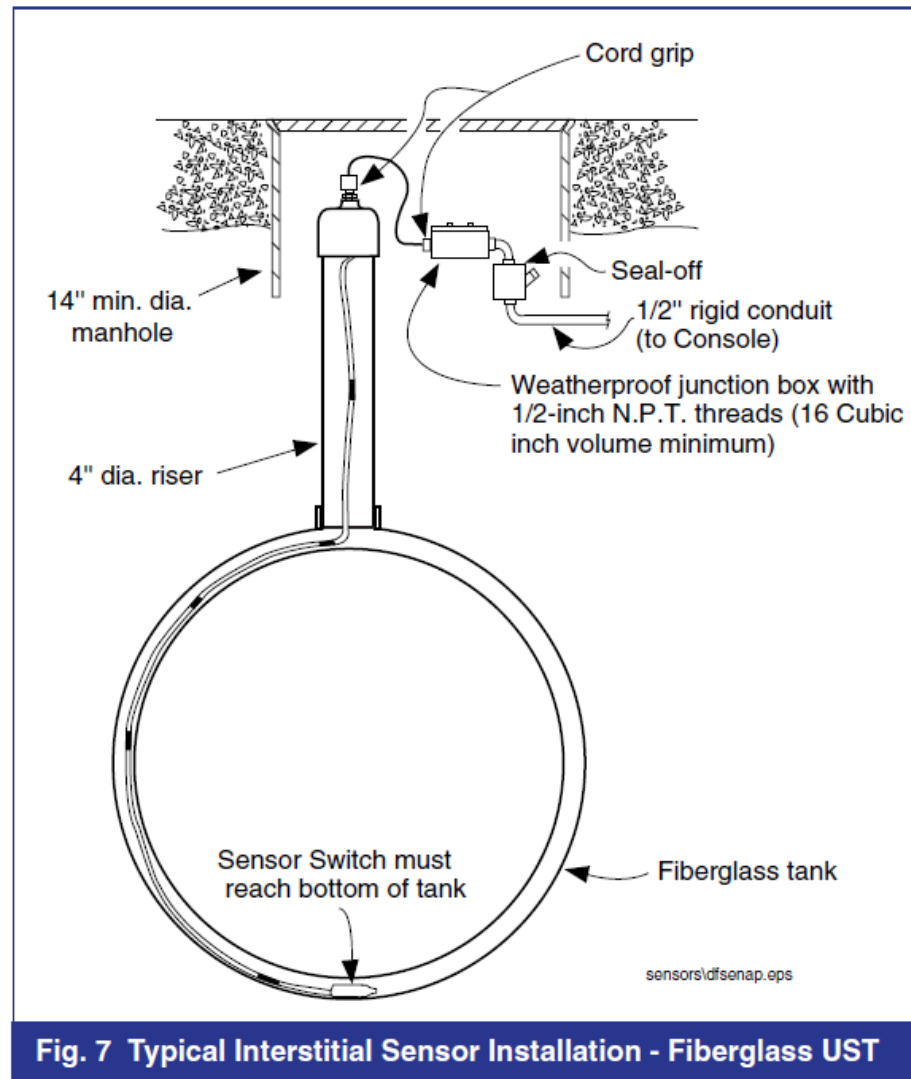


Fig. 7 Typical Interstitial Sensor Installation - Fiberglass UST

Steel UST Interstitial Sensors

- **794390-420** 16' Cable
- **794390-460** 30' Cable
- ✓ Used in interstitial of double walled steel tank to detect presence of liquids
- ✓ Float switch technology
- ✓ “Fuel Alarm” with detection of liquid
- ✓ Non-discriminating



Steel UST Interstitial Sensors

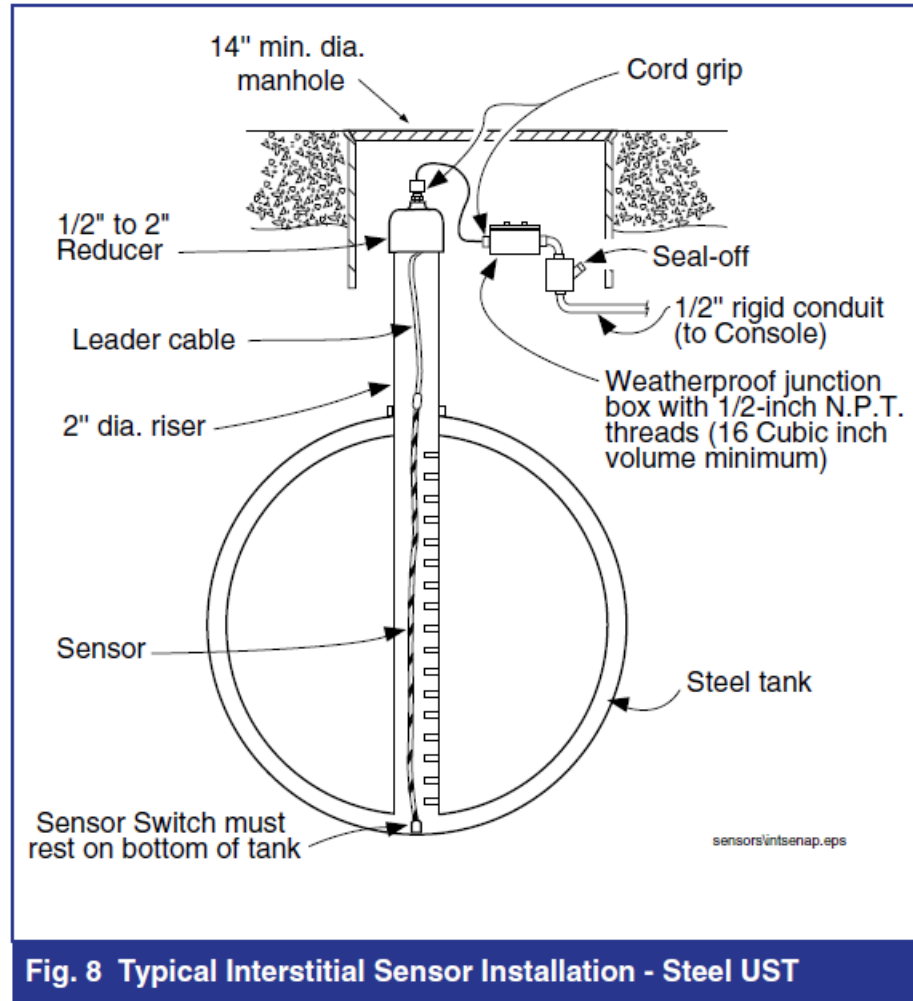
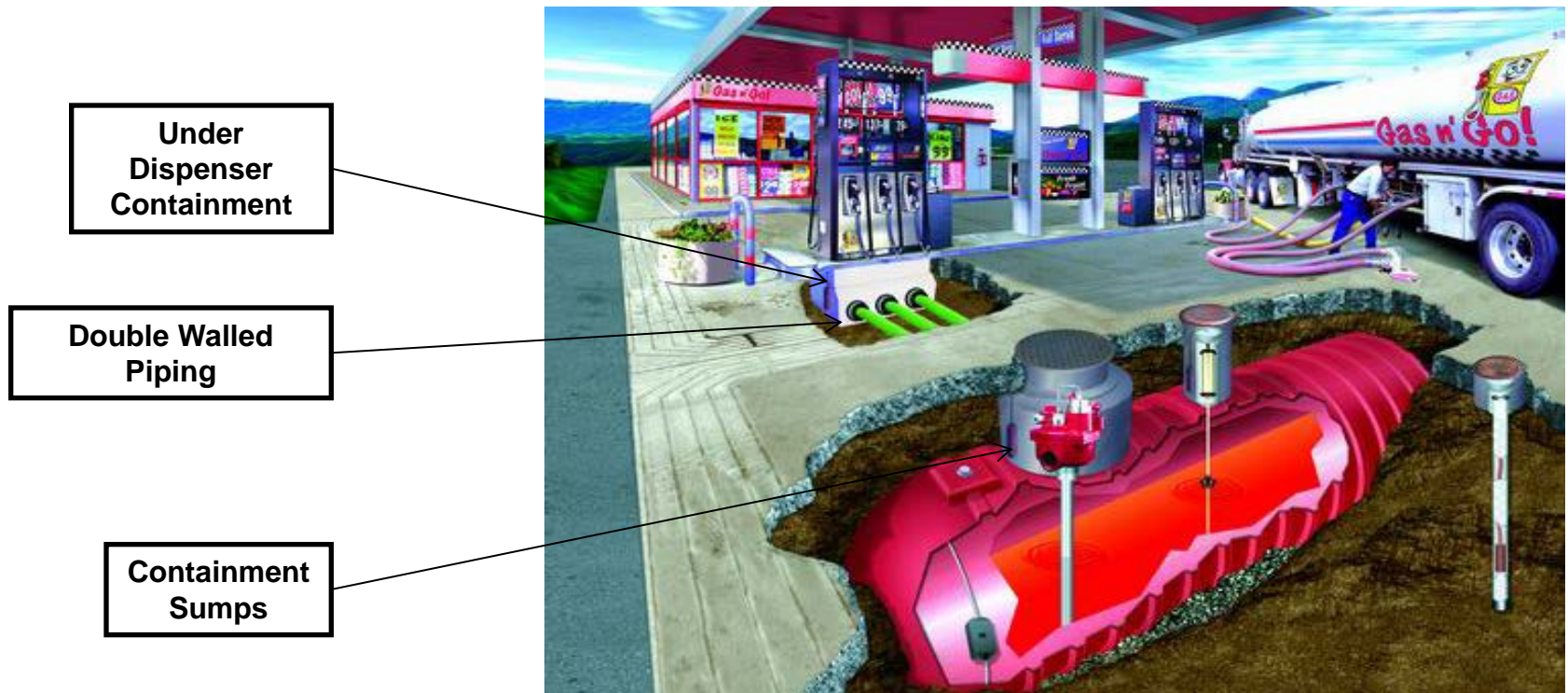


Fig. 8 Typical Interstitial Sensor Installation - Steel UST

Containment Sump Monitoring

- Containment sumps designed to capture component or piping releases
- Sensors are designed for notification of releases via TLS console



Sump Sensors (non-discriminating)

- **794380-208** (12 ft. cable)
 - **794380-209** (30 ft. cable)
-
- ✓ Used in bottom of tank sumps and UDC's
 - ✓ Float/magnetic reed switch technology
 - ✓ "Fuel Alarm" if liquid is detected
 - ✓ Compatible with all fuels



Sump Sensors (non-discriminating)

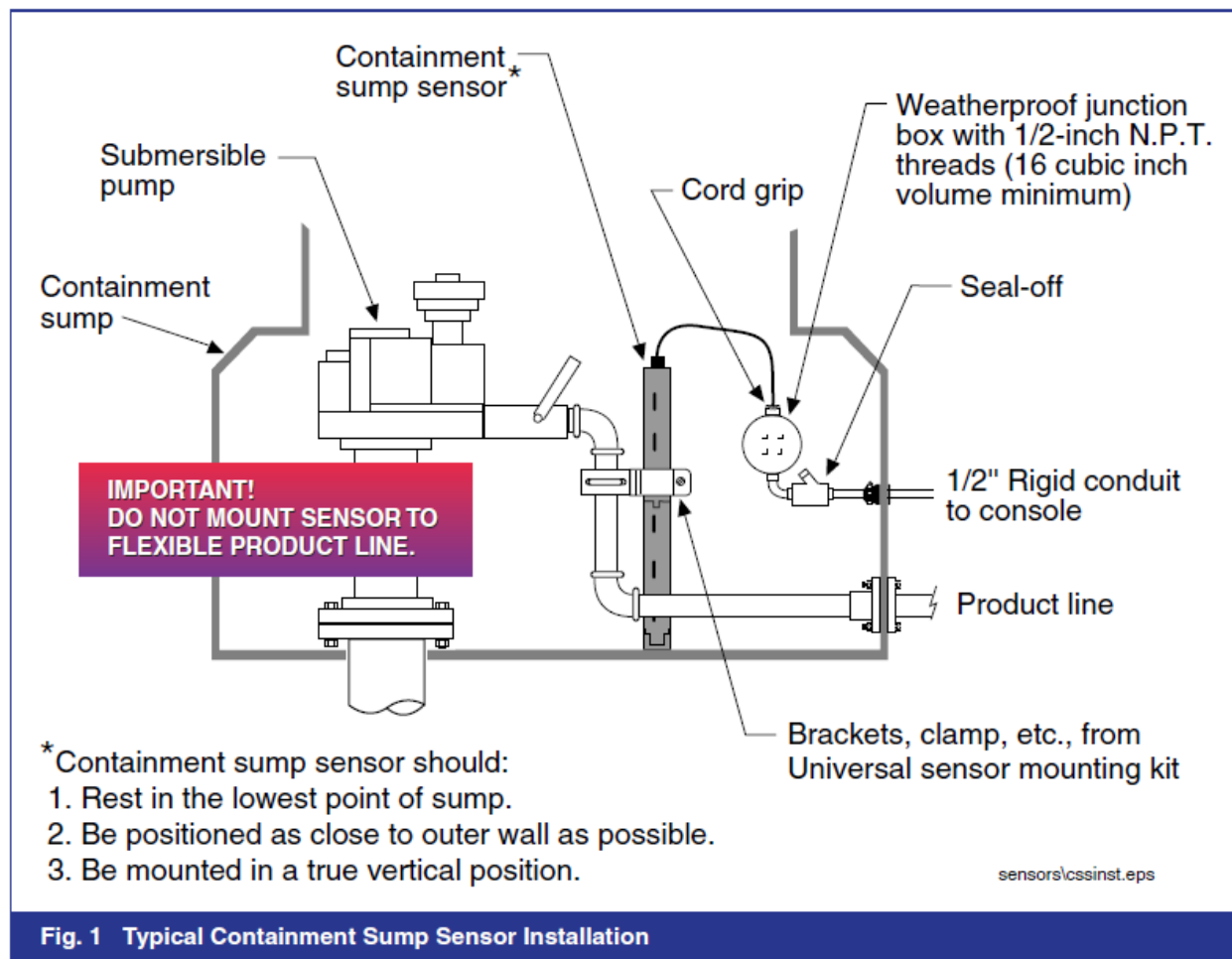
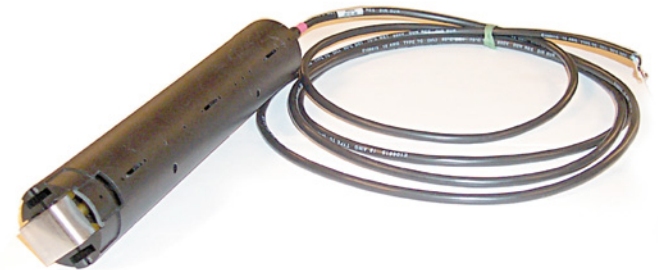


Fig. 1 Typical Containment Sump Sensor Installation

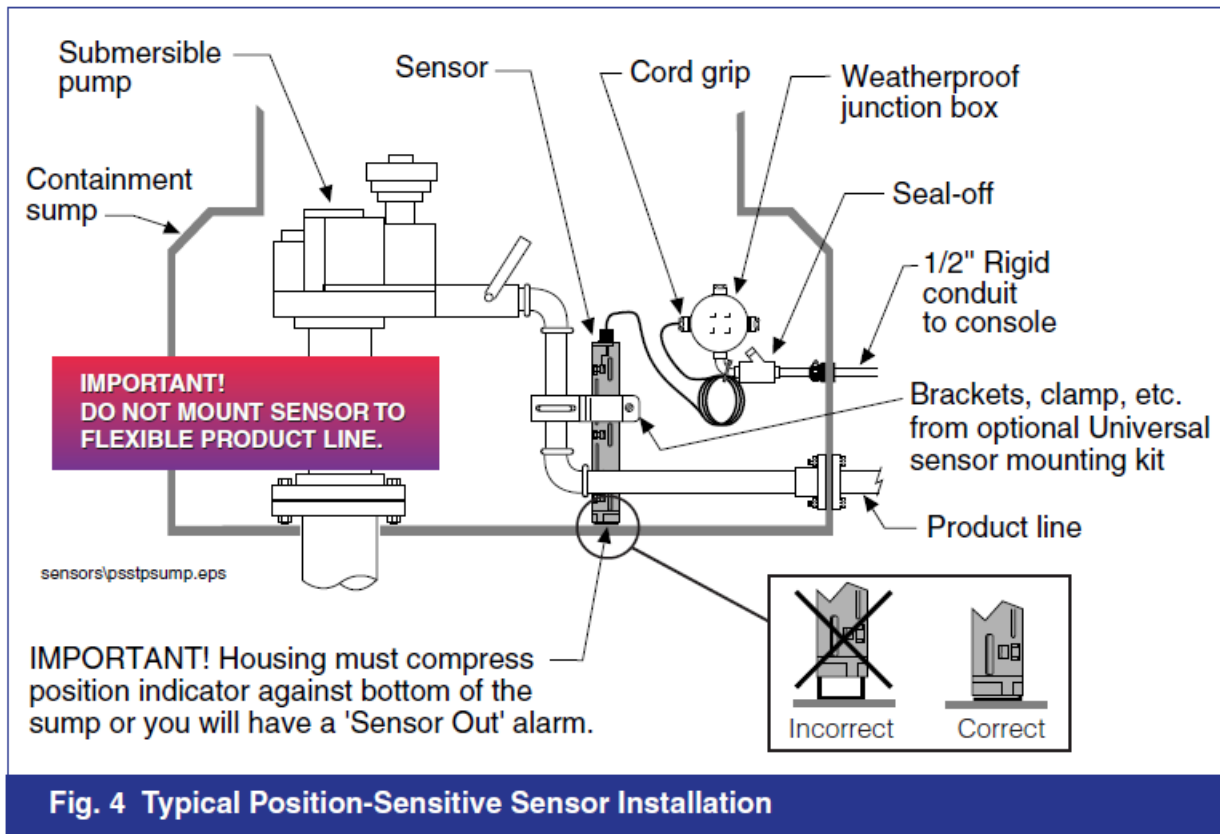
Sump Sensors (non-discriminating)

- **794380-323**

- ✓ Used in bottom of tank sumps and UDC's
- ✓ Position sensitive; "Sensor Out" alarm
- ✓ "Fuel Alarm" if liquid is detected
- ✓ Float/magnetic reed switch technology
- ✓ Compatible with all fuels



Sump Sensors (non-discriminating)

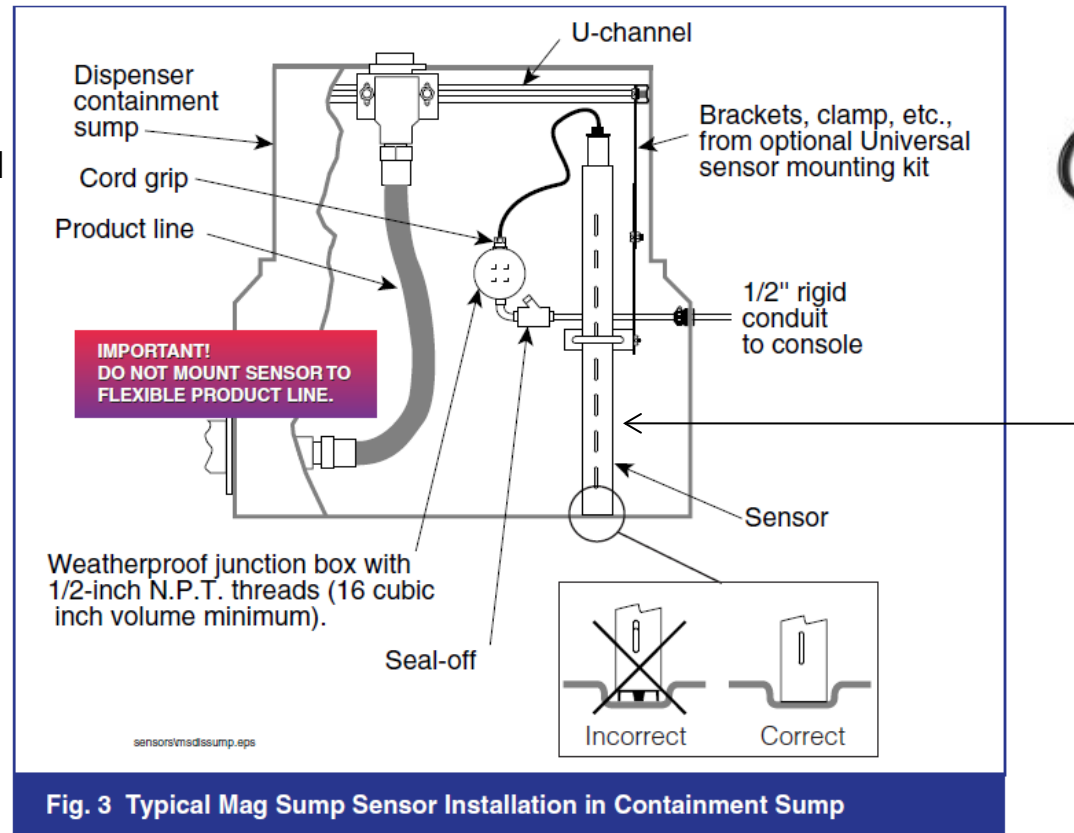




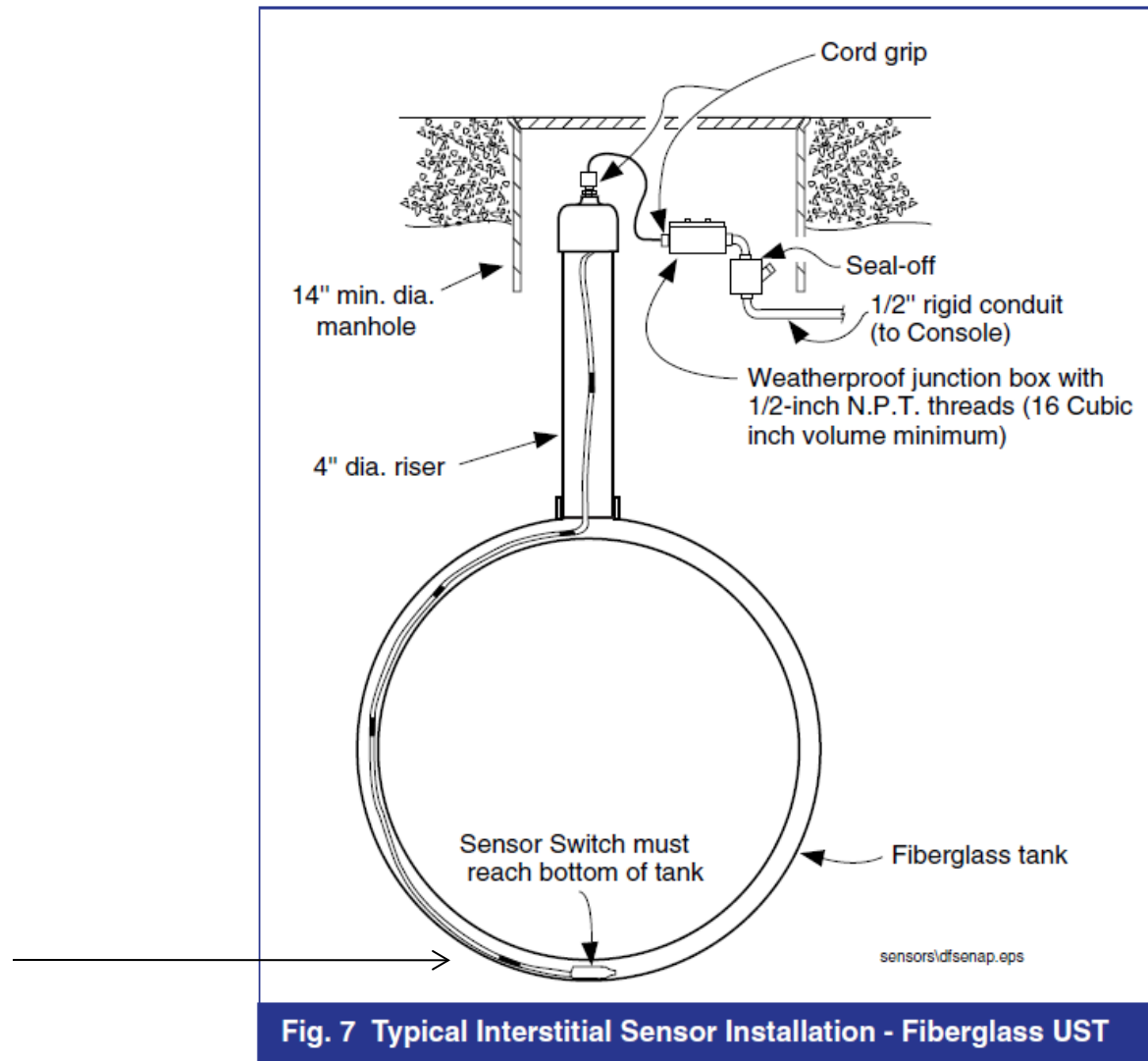
Discriminating Sensors

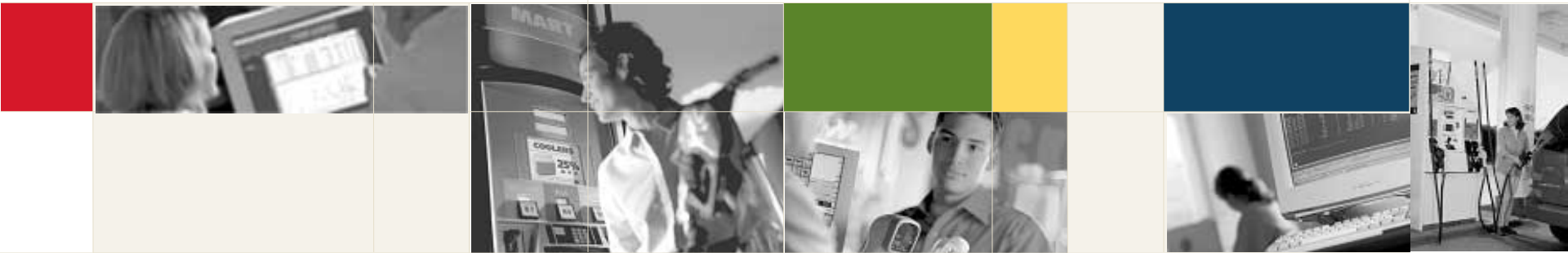
Mag Sump Sensor (Discriminating)

- Dual Float technology
- Detects water and fuel
- Programmable water warning/alarm levels
- Multiple sizes



UST Interstitial Sensor (Discriminating)





Other Sensors

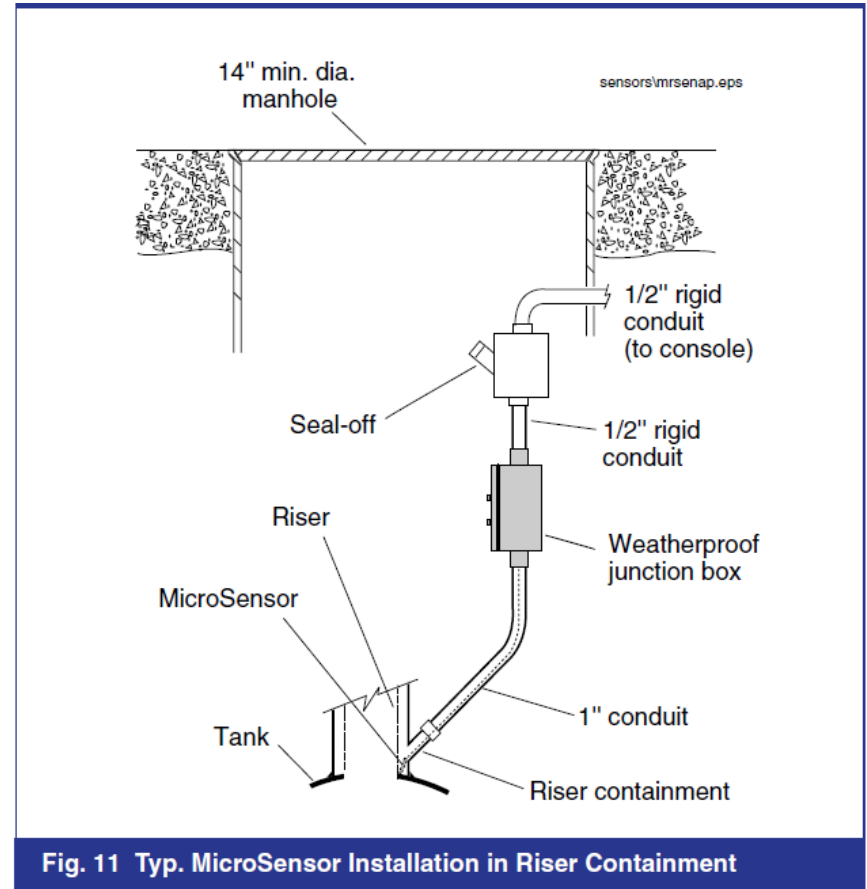
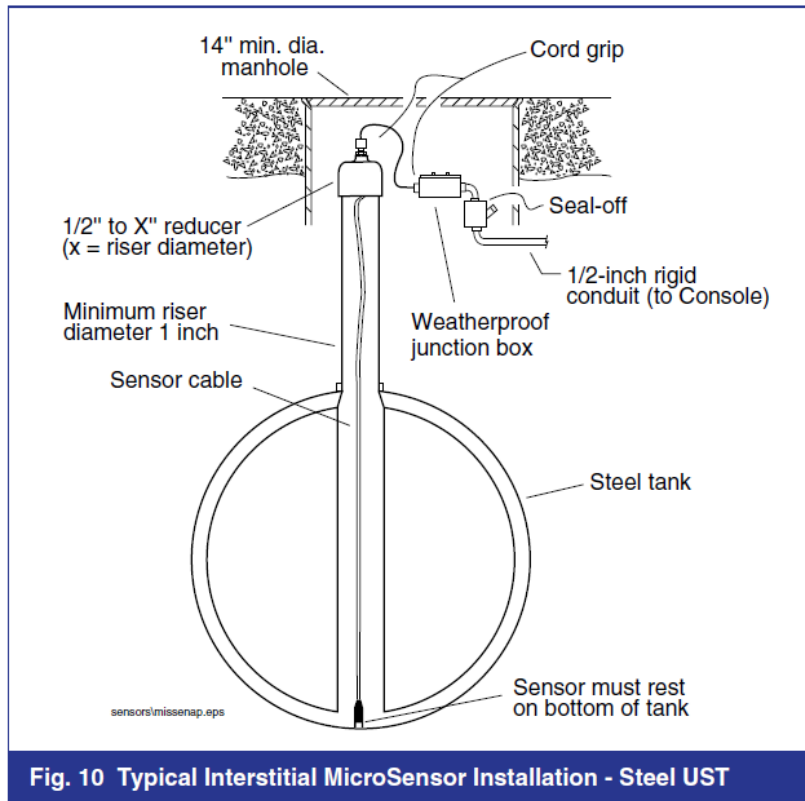
Micro Sensor

- **794380-344**

- ✓ Solid state electronic technology
- ✓ Liquid detection in any confined space
- ✓ Small (.4" x .8" x 2.2")
- ✓ Stiff, easy to push cord
- ✓ Any liquid triggers "Fuel Alarm"



Micro Sensor

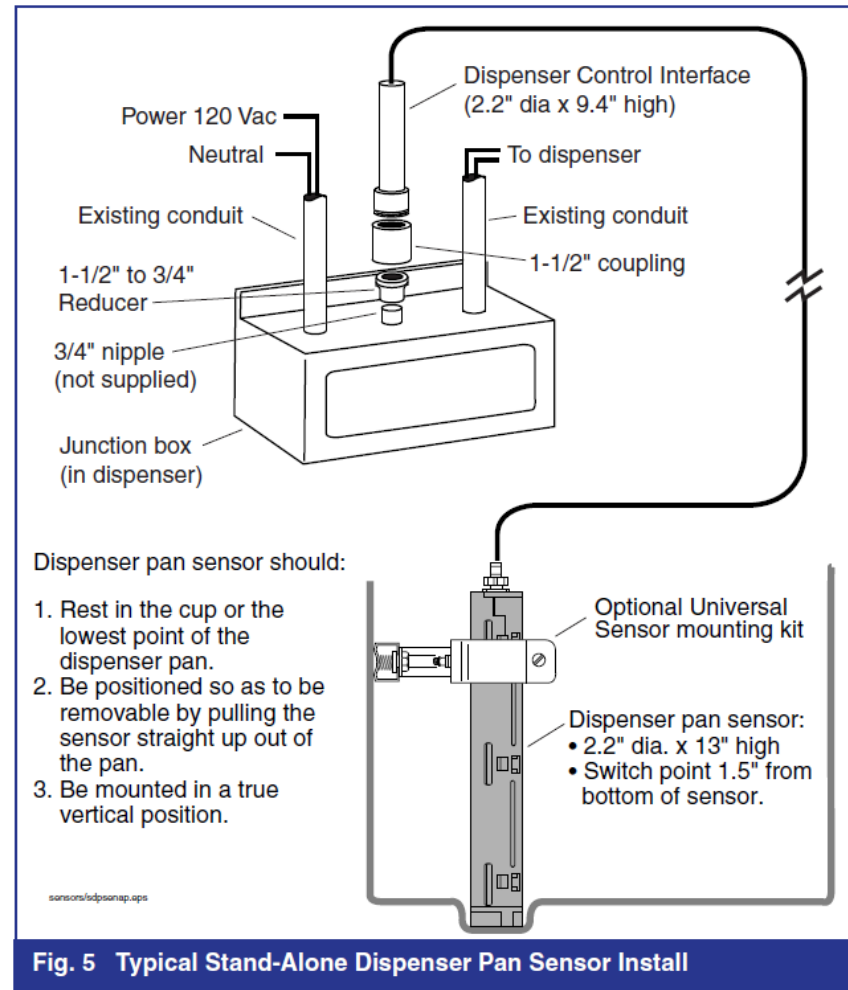


“Stand Alone” UDC Sump Sensors

• 847990-001

Feature

- Leak detection sensor option in retrofit UDC applications without wiring to TLS
- ✓ Provides dispenser shutdown only



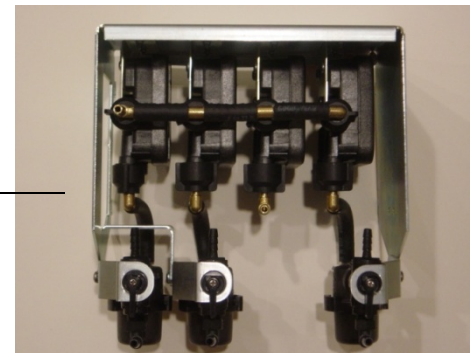


Continuous Monitoring Secondary Containment Vacuum Sensing (SCVS) System

SCVS Overview

Features

- ❑ Maintains a continuous vacuum on a secondary space
- ❑ Designed and compatible with tanks, lines and sumps
- ❑ Detect a leak before it enters into the environment
- ❑ Simple Installation
 - Uses the submersible pump as a vacuum source
 - Multiple sensors can share one vacuum source



SCVS Kit

Why Continuous Monitoring?

- ❑ Inherent assumption that both walls of a double walled system are competent for the life of the system
- ❑ “Active” monitored components of an UST system are continuously monitored
- ❑ “Passive” monitored components of an UST system are periodically monitored for the presence of liquids
- ❑ California studies showed hazardous liquids still entering the environment via passively monitored UST systems
- ❑ No releases into environment since CA adopted continuous monitoring requirements in 2004
- ❑ Continuous monitoring required for all tanks, piping and sumps in CA

Mini Hydrostatic Sensor

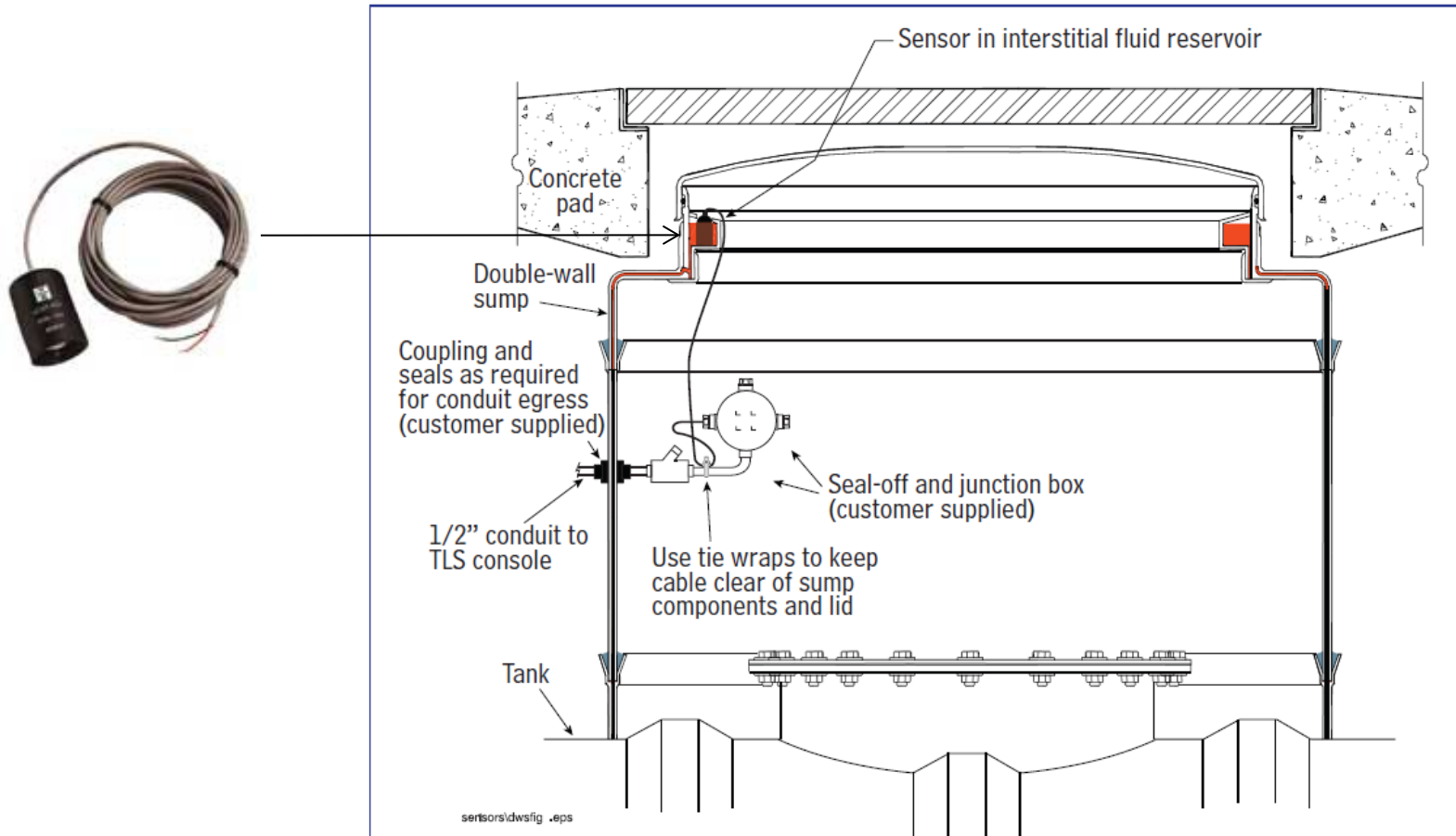


Fig. 13 Typical Single-Point Mini-Hydrostatic Sensor Installation



Sensor Operability Testing

Testing Procedures

Veeder-Root manual # 577013-814

Manual No: **577013-814** • Revision: **E**

Line Leak Detection Systems, UST Leak Detection
Equipment, Mag Sump Sensor, and Other Sensors

Operability Testing Guide



Testing Procedures

Part No.	Sensor	Test Procedure
794380-320	Solid State Discriminating Pan Sensor	Ref Procedure A
794380-350	Solid State Discriminating Sump Sensor	Ref Procedure A
794380-322	Discriminating Pan Sensor	Ref Procedure A
794380-352	Discriminating Sump Sensor	Ref Procedure A
794380-36x series	Fiber Trench Sensor	Ref Procedure A
794380-341, -343	Discriminating Interstitial Sensor	Ref Procedure B or D
794380-208, -209	Piping Sump Sensor	Ref. Procedure C
794380-321	Solid State Pan Sensor	Ref. Procedure C
794380-351	Solid State Sump Sensor	Ref. Procedure C
794390-420, -460	Interstitial Liquid Sensor for Steel Tanks	Ref. Procedure C
794380-341, -343	Discriminating Interstitial Sensor (Used in the non-discriminating mode)	Ref. Procedure D
794380-345	Interstitial Sensor for High-Alcohol	Ref. Procedure D
794380-340, -344	MicroSensor	Ref. Procedure D
794390-40x series	Interstitial Sensor for Fiberglass Tanks	Ref. Procedure E
794380-301, -302, -303, -304	Hydrostatic Sensor	Ref. Procedure F
794380-62x	Groundwater Sensor	Ref. Procedure G
794390-700	Vapor Sensor	Ref. Procedure H
847990-001, -002	Standalone Dispenser Pan Sensor with Dispenser Control Interface	Ref. Procedure I
794380-323	Position Sensitive Sensor	Ref. Procedure J
857280-100, -200, -30x	Vacuum Sensor (TLS-350 only)	Ref. Procedure K

Testing Procedures

Testing Procedure C:

Piping Sump Sensors 794380-208, 794380-209, Interstitial Sensors 794390-420, 794380-430, 794390-460, Solid-State Pan Sensor 794380-321, and Solid State Sump Sensor 794380-351

1. Fill one of the test containers with a minimum of 2 inches of water.
2. Remove sensor carefully from tank or containment area. Visually inspect the sensor for any damage as defined by sensor category in the Periodic Maintenance Checklist in the console's Operators manual, such as damage to the cable or to the sensor housing.
3. While holding the sensor vertically, place the sensor into the container until it is submerged. Test only one sensor per test container (multiple test containers may be used). Test times may run as long as 5 minutes depending upon console type and configuration. If the sensor does not issue a "Fuel" alarm after 5 minutes, the sensor has failed the test.
4. Remove the sensor from the test vessel after observing a response. Allow the sensor to completely dry off in order to clear the alarm. Document the alarm and proceed to the next step.
5. Press the Alarm/Test key on TLS-350 consoles, or touch the Alarm button twice on TLS-450 consoles to clear the alarm before moving on to the next sensor.
6. Reinstall the sensor(s) upon verification of proper operation.
7. Print the test history and console status for your records. This completes the test procedure. Report any performance concerns to Veeder-Root while on site.

Pretesting and Periodic Testing

- Pretesting procedures insure component integrity before use:
 - ✓ Tanks utilize pressure or vacuum
 - ✓ Sumps filled with water and observed for leaks
 - ✓ Piping pressurized and observed for loss of pressure
 - Inert gases (helium) also used for pretesting of UST components
- Periodic testing insures component integrity during use:
 - ✓ Operability testing of all leak detection equipment
 - ✓ Sump integrity testing
 - ✓ Typically every 36 months



Alarm History Reports

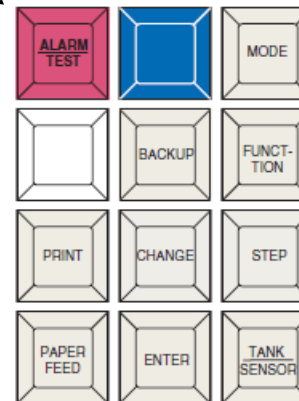
Alarm History Reports

- Alarm History Reports are available via TLS console printer
- They provide a record of the last three (3) occurrences of each type of alarm or warning condition
- Liquid Sensor Alarm History Reports record alarms for the liquid sensor that is selected

Alarm History Reports

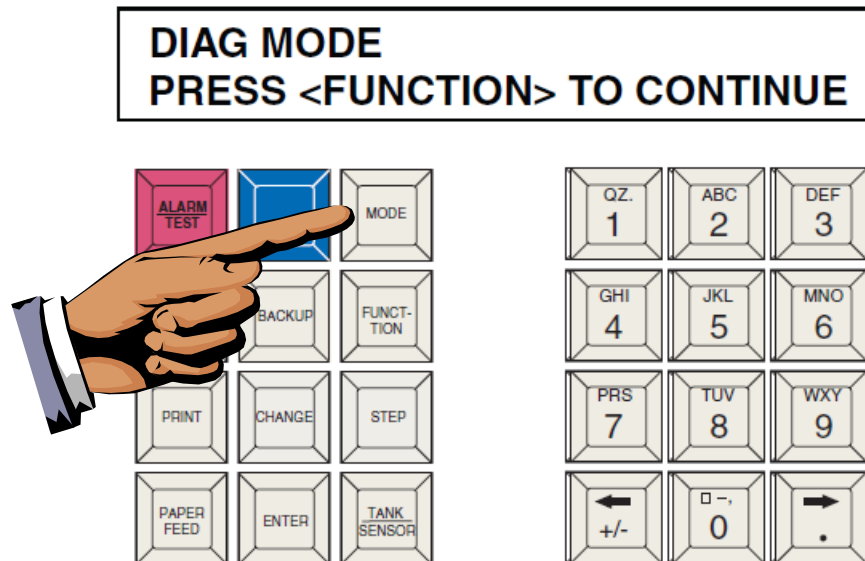


**MMM DD, YYYY HH:MM XM
ALL FUNCTIONS NORMAL**



Alarm History Reports

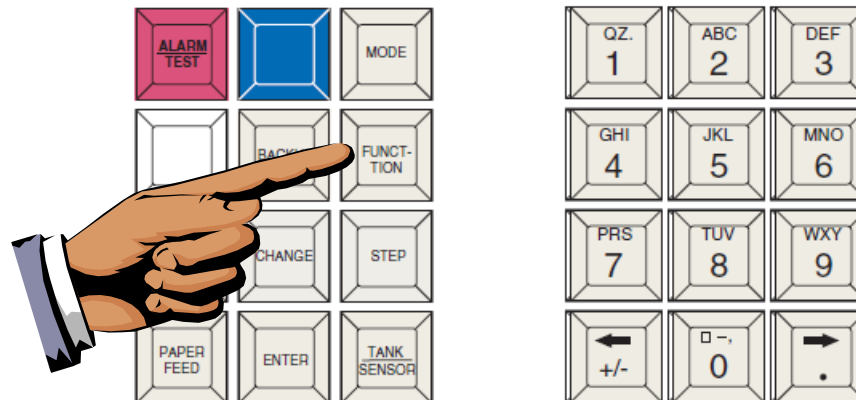
- Alarm History Reports are accessible via TLS DIAGNOSTIC MODE
- Press MODE until the following message:



Alarm History Reports

- Press FUNCTION until the following message:

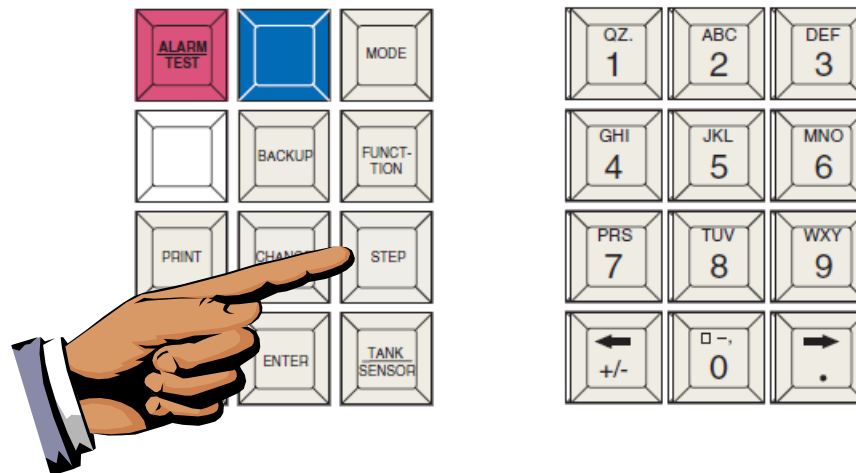
**ALARM HISTORY REPORT
PRESS <STEP> TO CONTINUE**



Alarm History Reports

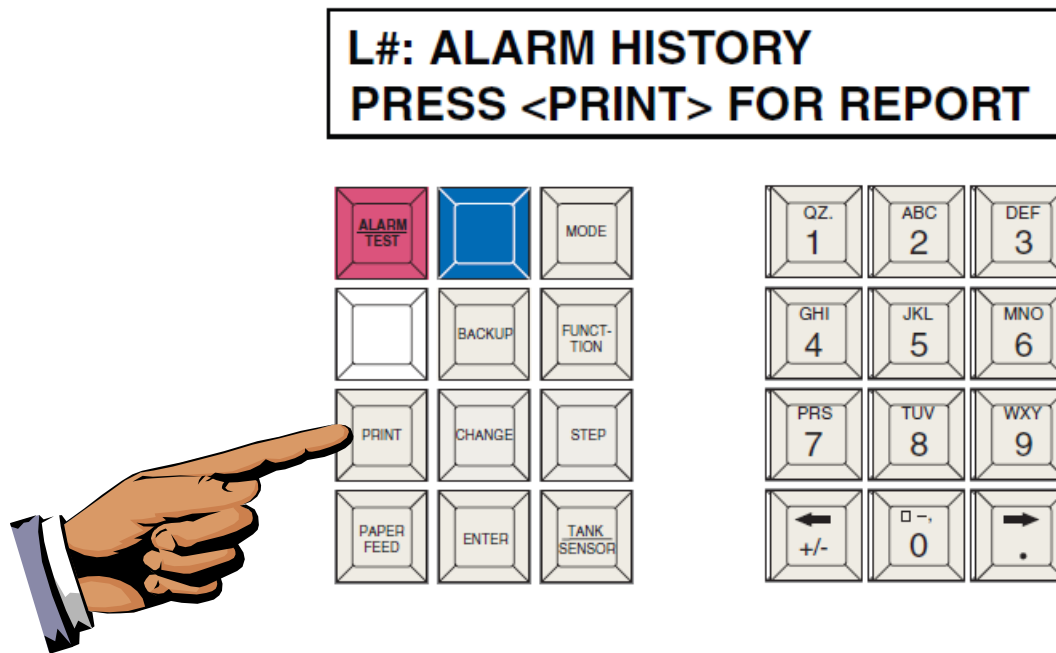
- Press STEP until the following message:

**L#: ALARM HISTORY
PRESS <PRINT> FOR REPORT**



Alarm History Reports

- Press PRINT to print report for specified Liquid Sensor:



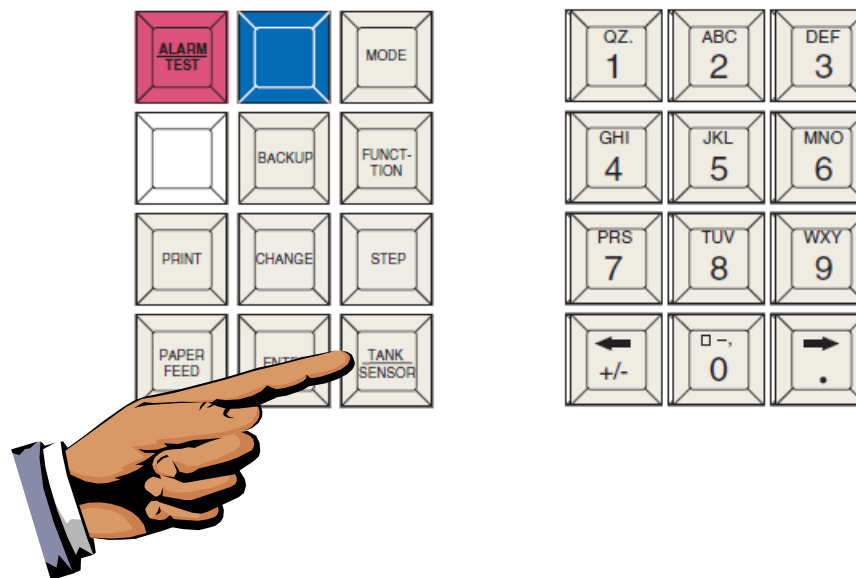
Alarm History Reports

```
ALARM HISTORY REPORT  
  
----- SENSOR ALARM -----  
L 1:SIMULATOR SENSOR  
OTHER SENSORS  
SENSOR OUT ALARM  
NOV 29, 2010 11:18 AM  
  
FUEL ALARM  
NOV 29, 2010 11:18 AM  
  
FUEL ALARM  
NOV 29, 2010 11:17 AM
```

Alarm History Reports

- Press TANK/SENSOR to access other Liquid Sensors:

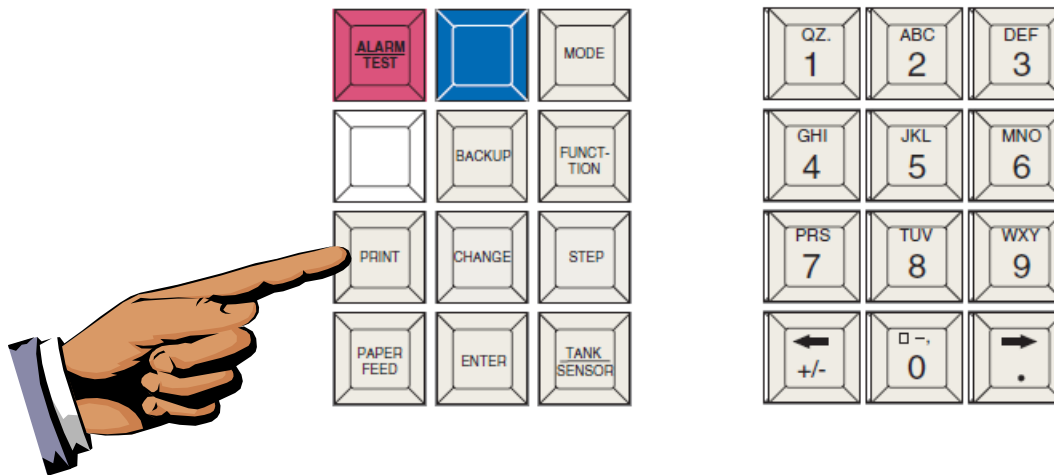
L#: ALARM HISTORY
PRESS <PRINT> FOR REPORT



Alarm History Reports

- Press PRINT to print additional sensor reports:

L#: ALARM HISTORY
PRESS <PRINT> FOR REPORT



Alarm Definition

Table 29-5.- Liquid Sensor Status Indicators - Piping Sump, Steel or Fiberglass Tank Interstitial Sensors

Display Message	Front Panel Indicator	Cause	Action
FUEL ALARM	Alarm	An interstitial or piping sump liquid sensor detects liquid in a tank's interstitial space or piping sump.	Call for service following the procedures established for your site.



Alarm Definition

Table 29-5.- Liquid Sensor Status Indicators - Piping Sump, Steel or Fiberglass Tank Interstitial Sensors

Display Message	Front Panel Indicator	Cause	Action
SENSOR OUT ALARM	Alarm	A sensor is disconnected or is not functioning properly.	Call for service following the procedures established for your site.
		Liquid sensor setup was performed incorrectly.	Reenter this liquid sensor's setup values.



Alarm Definition

Table 29-6.- Liquid Sensor Status Indicators - Normally Closed Sensors

Display Message	Front Panel Indicator	Cause	Action
FUEL ALARM	Alarm	An interstitial or piping sump liquid sensor detects liquid in a tank's interstitial space or piping sump.	Call for service following the procedures established for your site.



Alarm Definition

Table 29-7.- Liquid Sensor Status Indicators - Dual Float Differentiating (Hydrostatic) Sensors

Display Message	Front Panel Indicator	Cause	Action
HIGH LIQUID ALARM	Alarm	A sensor in a brine-filled interstice detects an increase in the brine level increase. Liquid is entering the riser pipe, or in a high groundwater area, an outer wall rupture has occurred.	Call for service following the procedures established for your site.
LOW LIQUID ALARM	Warning	A sensor in a brine-filled interstice detects a decrease in the brine level. A hole is in the tank's inner wall, or in low groundwater areas, a hole is in the outer wall.	Call for service following the procedures established for your site.
SENSOR OUT ALARM	Alarm	A sensor is disconnected or is not functioning properly.	Call for service following the procedures established for your site.



Alarm Definition

Table 29-8.- Liquid Sensor Status Indicators

Display Message	Front Panel Indicator	Cause	Action
Dual Float Discriminating Dispenser Pan and Containment Sump Sensors			
SHORT ALARM	Alarm	An internal short has occurred in the sensor.	Call for service following the procedures established for your site.
HIGH LIQUID ALARM	Alarm	Liquid reached 8" on the dispenser pan sensor or 10" on the containment sump sensor.	Immediately follow the alarm reporting procedures established for your site.
FUEL ALARM	Alarm	Fuel is present in the area being monitored by the sensor.	Immediately follow the alarm reporting procedures established for your site. Refer to the System Setup Manual for more information on recovering from an alarm due to leak or spill in the containment area.
LIQUID WARNING	Warning	Liquid reached 1 inch (25.4 mm) on the dispenser pan or containment sump sensors.	Immediately follow the alarm reporting procedures established for your site.
SENSOR OUT ALARM	Alarm	The sensor is disconnected or is not functioning properly.	Sensor problem must be corrected or sensor replaced. Call for service by following the procedures established for your site.
		Liquid sensor setup was performed incorrectly.	Reenter this liquid sensor's setup values.

Thank You!

David Emmington
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