



Automatic Tank Monitoring and Electronic LLD Systems

Equipment Maintenance Guide

Introduction

Franklin Fueling Systems (FFS) manufactures automatic tank monitoring systems and electronic line leak detection systems for the petroleum industry. These systems are third party certified and are capable of performing self-diagnostic tests. Due to the self-diagnostic features of the automatic tank monitoring systems and electronic line leak detection systems, there are no annual physical tests required by third party testers or the EPA.

Even with these self-diagnostic features though, alarms or equipment damage can sometimes go unnoticed by service station personnel. Following the steps in this document will assist you in verifying that your equipment is functioning correctly.

Though not required, we recommend that the equipment be inspected occasionally for proper operation, especially if the tank monitoring system is located in a remote area or somewhere isolated from service station personnel. Inspecting these systems will confirm that they are operating correctly, and, in the case of electronic line leak detection systems, that it is passing its monthly line leak tests.

The inspection steps in this manual include recommendations for service station personnel, as well as steps recommended exclusively for certified service technicians. In addition, these steps can be used in conjunction with a service station's individual equipment maintenance program to help ensure the proper operation of these systems.

In the event of an alarm condition in either an automatic tank monitoring system or electronic line leak detection system (TS-LLD ,TS-LS300 or TS-LS500), a certified technician should be called to the site to diagnose the problem. Alarm conditions may be an indication of a potentially hazardous condition. Telephone numbers of certified service companies should be displayed near the equipment, and attendants should be instructed on what actions to take should an alarm trip.

Service station personnel, as well as service technicians, should always refer to the *Installation and Owner's Manual* for product and safety information. If you have any questions though, please call FFS Technical Support at 800-984-6266.

Notice

Franklin Fueling Systems reserves the right to change this document and specifications at any time without notice. Franklin Fueling Systems makes no expressed or implied warranty with regard to the contents of this manual. Franklin Fueling Systems assumes no liability for errors or omissions, or for any damages, direct or consequential, that result from the use of this document or the equipment that it describes.

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Important Safety Messages


Franklin Fueling Systems equipment is designed to be installed in association with volatile hydrocarbon liquids such as gasoline and diesel fuel. Installing or working on this equipment means working in an environment in which these highly flammable liquids may be present. Working in such a hazardous environment presents a risk of severe injury or death if these instructions and standard industry practices are not followed. Read and follow all instructions thoroughly before installing or working on this, or any other related equipment.


As you read this guide, please be aware of the following symbols and their meanings.

Warning  This symbol identifies a warning. A warning sign will appear in the text of this document when a potentially hazardous situation may arise if the instructions that follow are not adhered to closely. A potentially hazardous situation may involve the possibility of severe bodily harm or even death.


Caution  This is a caution symbol. A caution sign will appear in the text of this document when a potentially hazardous environmental situation may arise if the instructions that follow are not adhered to closely. A potentially hazardous environmental situation may involve the leakage of fuel from equipment that could severely harm the environment.

Warning  **Follow all applicable codes governing the installation and servicing of this product and the entire system. Always lock out and tag electrical circuit breakers while installing or servicing this equipment and related equipment. A potentially lethal electrical shock hazard and the possibility of an explosion or fire from a spark can result if the electrical circuit breakers are accidentally turned on during installation or servicing. Please refer to the *Installation and Owner's Manual* for this equipment and the appropriate documentation for any other related equipment, for complete installation and safety information.**

Warning  **Follow all federal, state, and local laws governing the installation of this product and its associated systems. When no other regulations apply, follow NFPA codes 30, 30A, and 70 from the National Fire Protection Association. Failure to follow these codes could result in severe injury, death, serious property damage, and/or environmental contamination.**

Warning  **Always secure the work area from moving vehicles. The equipment in this manual is usually mounted underground, so reduced visibility puts service personnel working on this equipment in danger from moving vehicles entering the work area. To help eliminate these unsafe conditions, secure the area by using a service truck to block access to the work environment, or by using any other reasonable means available to ensure the safety of service personnel.**

Warning  **Highly flammable vapors may be present in the environment in which this equipment is being installed or serviced. Do not smoke while working on, or near, this equipment. Use only non-sparking tools. Failure to follow this instructions could result in a serious fire or explosion.**

Warning  **Before entering a containment sump, check for the presence of hydrocarbon vapors. If these vapors are inhaled they could cause dizziness or unconsciousness, and, if ignited, hydrocarbon vapors could explode causing serious injury or death. Electronic and electrical petroleum monitoring equipment is often housed in containment sumps designed to trap hazardous liquid spills and prevent contamination of the environment, and, as a consequence, containment sumps can trap dangerous amounts of hydrocarbon vapors. If these vapor levels reach unsafe amounts, ventilate the sump with fresh air. While working in the sump, periodically check the atmosphere in the sump, if vapors reach unsafe levels, exit the sump and ventilate it before continuing work. Always have a second person standing by for assistance when working in, or around, a containment sump.**

<p>Models</p> <p>Tank Sentinel Consoles</p> <p>TS-1001 Consoles</p> <p>TS-504/TS-508 Consoles</p> <p>TS-750 Consoles</p>	<p>Recommended Steps</p> <p>Steps to be done by Station Owner/Attendant</p> <ol style="list-style-type: none"> 1. Verify that the display is ON and that the date and time are correct. 2. If the console has a printer, verify that it has paper. For assistance in replacing the paper roll, refer to the <i>Tank Sentinel or Auto/Stik Bulk/Stik Operator's Guide</i>, Chapter 5 - Troubleshooting and Routine Maintenance. 3. Press the Alarm Test button and verify that the WARNINGS and ALARM lights come on and that the audible alarm sounds. 4. Identify and address any WARNINGS or ALARMS. For specific information on WARNINGS and ALARMS, refer to the <i>Tank Sentinel or Auto/Stik Bulk/Stik Operator's Guide</i>, Chapter 5 - Troubleshooting and Routine Maintenance. ALARMS can be an indication of a potentially hazardous situation. If the conditions cannot be cleared, contact a service company. 5. "Stick" each tank and verify that the levels coincide with ATG levels. 6. If you can, print a Regulatory Report. Verify that the tank leak tests are passing monthly. If an electronic line leak system is installed (TS-LLD or TS-LS300/AS-LS300), verify that the line leak tests are passing monthly. 7. For information on printer lubrication, fuse replacement, and interior cleaning, see the <i>Tank Sentinel or Auto/Stik Bulk/Stik Operator's Guide</i>, Chapter 5 - Troubleshooting & Routine Maintenance section. <p>Steps to be done by Service Company</p> <ol style="list-style-type: none"> 1. To test the functionality of the battery backup system: <ol style="list-style-type: none"> a. Print a System and Tank Setup Report. b. Turn off power to the ATG using the black power switch located in the lower right hand corner of the tank gauge circuit board. After 10 seconds, turn the power on. If any programming information is lost, then the backup battery needs to be replaced. <p>Note: Information on printing different types of tank gauge reports can be found in the <i>Tank Sentinel or Auto/Stik Bulk/Stik Operator's Guide</i>, Chapter 3 - Tank Gauge Reports.</p>
<p>Fuel Management System Consoles</p> <p>TS-5</p> <p>TS-550</p> <p>TS-550evo</p> <p>TS-5000</p> <p>Colibri</p>	<p>Steps to be done by Station Owner/Attendant</p> <ol style="list-style-type: none"> 1. Verify that the POWER light is on. If the system has a display, verify that it is functional. 2. If the console has a printer, verify that it has paper. For assistance in replacing the paper roll, refer to the Fuel Management System Operators Guide FFS 000-2151, Routine Maintenance Section. 3. Identify and address any WARNINGS or ALARMS. For specific information on WARNINGS and ALARMS, refer to the Fuel Management System Operators Guide FFS 000-2151, Appendix B-Alarm Table. ALARMS can be an indication of a potentially hazardous situation. If the conditions cannot be cleared, contact a service company. 4. Stick each tank and verify that the levels coincide with ATG levels. 5. Print a Regulatory Report. Verify that the tank leak tests are passing monthly. If the system incorporates the LS500 line leak system, verify that the line leak tests are passing monthly. <p>Note: For information on printing reports, and basic printer maintenance and service, refer to the Fuel Management System Operators Guide FFS 000-2151, Printing Reports Section.</p>

<p>Models Liquid Level Probes</p> <p>TSP-LL2-XX</p> <p>TSP-LL2-XX-I</p> <p>FMP-LL3-XX</p> <p>FMP-LL3-XX-I</p>	<p>Recommended Steps</p> <p>Steps to be done by Station Owner/Attendant</p> <ol style="list-style-type: none"> 1. Inspect the probe cables and connections. If the cables appear to be cracked, split, or swollen, contact a service company. <p>Steps to be done by Service Company</p> <ol style="list-style-type: none"> 1. Inspect the probe cables and connections. Cables that are cracked, split, broken or swollen should be replaced. Connections should be epoxy sealed or in weatherproof junction boxes. Connections showing corrosion, excessive moisture, or exposed bare wire should also be replaced. <ol style="list-style-type: none"> a. See the <i>Tank Sentinel</i> or <i>Auto/Stik Bulk/Stik Installation Guide</i>, Chapter 7 - System Wiring, for further information. 2. Inspect the probe and floats for residual buildup. Clean the shaft and floats with mineral spirits if necessary.
<p>Leak Detection Sensors Cable Inspection</p> <p>Includes:</p> <p>TSP-EIS</p> <p>TSP-DIS</p> <p>TSP-ULS</p> <p>TSP-UHS</p> <p>TSP-DDS</p> <p>TSP-DTS</p> <p>TSP-DVS</p> <p>TSP-HIS</p> <p>TSP-MWS</p> <p>TSP-HLS</p> <p>TSP-DMS-12/24</p>	<p>Steps to be done by Station Owner/Attendant</p> <ol style="list-style-type: none"> 1. Inspect the sensor cables for damage. If the cables show signs of cracking, splitting, or appear swollen, contact a service company. <p>Steps to be done by Service Company</p> <ol style="list-style-type: none"> 1. Inspect the sensor cables for damage. Replace cables that show signs of cracking, splitting, or swelling. 2. Inspect the sensor connections. Connections should be epoxy sealed or in weatherproof junction boxes. Connections showing corrosion, excessive moisture, or exposed bare wire should be replaced. <ol style="list-style-type: none"> a. See the <i>Tank Sentinel</i> or <i>Auto/Stik Bulk/Stik Installation Guide</i>, Chapter 7 - System Wiring for further information.
<p>Leak Detection Sensors Functional Testing</p> <p>TSP-ULS</p> <p>2 wire float switch</p>	<p>Steps to be done by Service Company</p> <ol style="list-style-type: none"> 1. Insert the sensor into a container that has at least three inches of water in it and verify that the LIQUID DETECTED alarm trips. <ol style="list-style-type: none"> a. The TSP-ULS sensor is able to sense any type of liquid, but cannot distinguish between water and hydrocarbons.
<p>TSP-UHS</p> <p>2 wire Hydrostatic Sensor</p>	<p>Steps to be done by Service Company</p> <ol style="list-style-type: none"> 1. Lift the sensor from the sensor reservoir and verify that the ATG sensor alarm trips.

<p>TSP-EIS 3 wire optical sensor</p>	<p>Steps to be done by Service Company</p> <ol style="list-style-type: none"> 1. Insert the sensor into a container that has at least three inches of dark liquid in it and verify that the LIQUID DETECTED alarm trips. <ol style="list-style-type: none"> a. The TSP-EIS is a light sensitive sensor. Exposure to light may prevent the sensor from going into ALARM, so do not test it in direct light. 2. Wipe the sensor prism with a clean, dry cloth before reinstalling it.
<p>TSP-HLS 2 wire float switch</p>	<p>Steps to be done by Service Company</p> <ol style="list-style-type: none"> 1. Manually move the float to a high level position and verify that the LIQUID DETECTED alarm trips. 2. Testing this device is a matter of rotating the sensor 180 degrees with the bottom up, to cause an alarm at the ATG console. Test the sensor for proper operation on a yearly basis, or more frequently per local code.
<p>TSP-DIS 3 wire optical and conductivity sensor</p>	<p>Steps to be done by Service Company</p> <ol style="list-style-type: none"> 1. Insert the sensor into a container that has at least three inches of dark liquid in it and verify that the WATER DETECTED trips. <ol style="list-style-type: none"> a. The TSP-DIS is a light sensitive sensor. Exposure to light may prevent the sensor from going into ALARM, so do not test it in direct light. b. The TSP-DIS sensor can also detect liquid hydrocarbons, although we do not recommend testing the sensors using hydrocarbons. c. Wipe the sensor prism with a clean, dry cloth before reinstalling it.
<p>TSP-DDS 3 wire Discriminating Dispenser Sump Sensor</p> <p>TSP-DTS 3 wire Discriminating Turbine Sump Sensor</p>	<p>Steps to be done by Service Company</p> <ol style="list-style-type: none"> 1. Confirm that the sensor is installed upright and located at the bottom of the dispenser/turbine sump. 2. Insert the sensor into a container that has at least three inches of water in it and verify that the WATER DETECTED alarm trips. 3. Turn the sensor upside-down and verify that the SUMP FULL alarm trips. <ol style="list-style-type: none"> a. The TSP-DDS and the TSP-DTS sensors can also detect liquid hydrocarbons, although we do not recommend testing the sensors using hydrocarbons.
<p>TSP-HIS 3 wire Hydrostatic Interstitial Sensor</p>	<p>Steps to be done by Service Company</p> <ol style="list-style-type: none"> 1. Verify that the brine level is located in the approximate middle of the sensor. Move the sensor as necessary. 2. Pull the sensor out of the interstitial brine solution and verify that the LOW BRINE alarm trips. 3. Turn the sensor upside-down and verify that the HIGH BRINE alarm trips.

<p>TSP-MWS 3 wire Discriminating Ground Water Monitoring Well Sensor</p>	<p>Steps to be done by Service Company</p> <ol style="list-style-type: none"> 1. Pull the sensor out of the monitoring well and verify that the DRY WELL alarm trips. <ol style="list-style-type: none"> a. The TSP-MWS sensor is also capable of detecting hydrocarbon vapors, although we do not recommend testing the sensors using hydrocarbon vapors.
<p>TSP-DVS Discriminating Vapor Well Sensor</p>	<p>Steps to be done by Service Company</p> <ol style="list-style-type: none"> 1. Insert the sensor into a container that has at least three inches of water in it and verify that the LIQUID DETECTED alarm trips. <ol style="list-style-type: none"> a. The TSP-DVS can also detect hydrocarbon vapors in a vapor well, although we do not recommend testing the sensors using hydrocarbon vapors.
<p>TSP-DMS Discriminating Magnetostrictive Sensor</p>	<p>Steps to be done by Service Company</p> <ol style="list-style-type: none"> 1. Raise the sensor slightly and confirm that the sensor goes into an alarm, indicating that the sensor has been tampered with. 2. Insert the sensor into a container with at least 3 inches of water and verify that the sensor indicates the presence of water. If the Water Alarm programming is set to less than 3 inches, verify that the sensor indicates a water alarm. <ol style="list-style-type: none"> a. The TSP-DMS can also detect liquid hydrocarbons, although we do not recommend testing this sensor using hydrocarbons.

Electronic Line Leak

TS-LLD Line Sentinel

TS-LS300 AutoLearn

Steps to be done by Station Owner/Attendant

1. Print a **Line Compliance Report**. Verify that for each product line a .2 GPH test is being passed every month. If the report does not show line tests passing regularly, contact a service company.
 - a. Information on printing different types of tank gauge reports can be found in the *Tank Sentinel* or *Auto/Stik Bulk/Stik Operator's Guide*, Chapter 3 - Tank Gauge Reports.
2. Verify that there are no line alarms on the tank gauge.
 - a. Information on line alarms can be found in the *TS-LS300 AutoLearn User's Guide* or the *TS-LLD Installation Guide*.
 - b. Alarms that cannot be cleared promptly could be an indication of a potentially hazardous situation. Contact a service company.

Steps to be done by Service Company

1. Print a **Line Compliance Report**. Verify that for each product line a .2 GPH test is being passed every month. Verify that there are no line alarms on the tank gauge. If the report does not show line tests passing regularly or if line alarms are present, then:
 - a. Check for leaks.
 - b. Make sure that the pumps are not constantly running.
 - c. Make sure that there is enough quiet time to run tests.
 - Information on printing different types of tank gauge reports can be found in the *Tank Sentinel* or *Auto/Stik Bulk/Stik Operator's Guide*, Chapter 3 - Tank Gauge Reports.
 - Information on line alarms can be found in the *TS-LS300 AutoLearn User's Guide* or the *TS-LLD Installation Guide*.
3. Inspect the transducer cables. Cables showing signs of cracking, splitting, or swelling should be replaced. Confirm that connections are either in a dry, weatherproof J-Box or sealed in an epoxy pack. Redo connections that are wet or corroded.
 - a. Information on transducer cable installation can be found in the *TS-LS300 AutoLearn User's Guide*.

Note: Local codes may require annual line testing to verify that the installed leak detection system will catch an actual 3 GPH leak.

- For information on conducting a manual 3 GPH leak test, see Chapter 5 of the *TS-LS300 AutoLearn User's Guide* or Chapter 3 of the *TS-LLD Installation Guide*.
- For instructions on how to introduce a calibrated 3 GPH leak into a petroleum pipeline, refer to page 6 of FE Petro's *STP-MLD Installation and Owner's Manual*.

Steps to be done by Station Owner/Attendant

1. Print or Generate a Monthly Line Leak Report for the last 30 days. Verify that for each product a Monthly (.2 GPH) line test is being passed each month. If the report does not show line tests passing regularly, contact a service company.
 - NOTE: For information on printing reports refer to the Fuel Management System Operators Guide FFS 000-2151, Printing Reports Section.
2. Verify that there are no line alarms on the tank gauge
 - a. Information on line alarms can be found in the LS500 Auto Learn Line Leak Detection Installation and User's Guide FFS 000-02145
 - b. Alarms that cannot be cleared promptly could be an indication of a potentially hazardous situation. Contact a service company

Steps to be done by a Service Company

1. Print or Generate a Monthly Line Leak Report for the last 30 days. Verify that for each product a Monthly (.2 GPH) line test is being passed each month. Verify that there are no line alarms on the tank gauge. If the report does not show line tests passing regularly or if line alarms are present, then;
 - a. Check for leaks
 - b. Make sure that the pumps are not constantly running.
 - c. Make sure that there is enough quiet time to run tests
- Information on printing different types of tank gauge reports can be found in the Fuel Management System Operators Guide FFS 000-2151, Routine Maintenance Section.
- Information on line alarms can be found in the LS500 Auto Learn Line Leak Detection Installation and User's Guide FFS 000-02145
2. Inspect the transducer cables. Cables showing signs of cracking, splitting, or swelling should be replaced. Confirm that connections are either in a dry, weatherproof J-Box or sealed in an epoxy pack. Redo connections that are wet or corroded.
 - a. Information on transducer cable installation can be found in the LS500 Auto Learn Line Leak Detection Installation and User's Guide FFS 000-02145

- Note:** Local codes may require annual line testing to verify that the installed leak detection system will catch an actual 3 GPH leak.
- a. Information on conducting a manual 3GPH leak can be found in the LS500 Auto Learn Line Leak Detection Installation and User's Guide FFS 000-02145
 - b. For instructions on how to introduce a calibrated 3 GPH leak into a petroleum pipeline, refer to page 6 of FE Petro's STP-MLD Installation Owner's Manual.



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