INCON FUEL MANAGEMENT SYSTEMS

Inspection & Testing

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Franklin Fueling Systems
Outline

1. **Consoles.** Model identification and testing.
2. **Probes.** Types, wiring, inspection, testing.
3. **Sensors.** Types, wiring, inspection, testing.
4. **Electronic Line Leak Detection (ELLD).** Model identification and testing.
5. **Accessories.** Remote alarms.
6. **Reports.** Printing reports on various systems.
7. **Resources.** Where to get help.
1 - Consoles
**Console Series Identification**

INCON systems are comprised of the following series, newest to oldest:

- **Evo Fuel Management Systems.** Extended T5 platform silver consoles with color touchscreen displays.

- **Colibri.** Compact grey console w color touchscreen but no printer, for in-tank (probe) use only.

- **T5 Fuel Management Systems.** Royal blue consoles with monochrome touchscreen display.

- **T1 Tank Sentinel Systems.** Black consoles with alphanumeric 2-line LCD display and membrane keypad. Models include TS-1001, 2001, 504/508, 750.

- **TS-1000.** First generation light blue console. No longer in production. (no photo)
T1 Series Functional Testing
TS-504 (discontinued), TS-750, & TS-1001 Consoles

- If console has a printer, verify it has paper.
- Verify display is on and the date and time are correct.
- Press Alarm Test button and verify WARNING and ALARM lights come on and audible alarm sounds.
- Identify and address any WARNINGS and ALARMS. Consult Tank Sentinel Operator’s Guide for information.
- Stick each tank and verify levels coincide with INCON tank levels.
- Print Regulatory Report to confirm tanks, lines and sensors are compliant (where applicable).
- Print System Setup Report, then remove power using power switch. Wait 10 seconds then restore power. If programming is lost the backup battery needs to be replaced.
T5 Series Functional Testing
Colibri, TS-5/550/5000, TS-550/5000evo Consoles

• If console has a printer, verify it has paper.
• Verify display is on and the date and time are correct.
• Identify and address any WARNINGS and ALARMS. Consult Tank Sentinel Operator’s Guide for information.
• Stick each tank and verify that levels coincide with INCON tank levels.
• Print Regulatory Report to confirm tanks, lines and sensors are compliant (where applicable).
• Print System Setup Report, then remove power using power switch. After 10 seconds reapply power. If programming is lost the Controller Module needs to be replaced.
2 - Probes
Liquid Level Probes
TSP-LL2-XX, TSP-LL2-XX-I Models

- Tank probes come in two models: ‘Precision’ which can perform in-tank leak detection (i.e. tank testing for single-wall USTs) or Inventory-only.
- Probes use jacketed cables for communication. Inspect probe cables and connections. Replace any cracked, split, broken or swollen cables.
- Connections should be epoxy-sealed or in weatherproof junction boxes. Repair any connections showing corrosion, excessive moisture, or exposed bare wires.
- See Tank Sentinel or Fuel Management Systems Installation Guides for more information.
3 - Sensors
General Sensor Information

• Test sensors annually, or as required per applicable codes.
• Normally-dry sensors are installed at the lowest point (bottom) of the monitored space, whether containment sump or (dry) tank interstitial.
• Normally-wet sensors (hydrostatic) are typically installed at the top of the reservoir space; check tank/sump manufacturer requirements for specific applications.
• Sensor location mapping (programmed names) should be accurate; a sensor programmed as “87 STP Sump” should activate that alarm channel when tested.
• All sensors should be maintained in clean, unobstructed condition; replace any damaged or corroded assemblies.

See Tank Sentinel or Fuel Management Systems Installation Guides for more information.
INCON Sensors & Part Numbers

INCON part numbers follow a logical/literal designation system, beginning with the prefix “TSP” for Tank Sentinel Part.

- DMS  Discriminating Magnetostrictive Sensor
- EIS  Electro-optical Interstitial Sensor
- DIS  Discriminating Interstitial Sensor
- ULS  Universal Liquid Sensor
- UHS  Universal Hydrostatic Sensor
- DDS  Discriminating Dispenser (sump) Sensor
- DTS  Discriminating Turbine (sump) Sensor
- DVS  Discriminating Vapor Sensor
- HIS  Hydrostatic Interstitial Sensor
- MWS  Monitoring Well Sensor
- HLS  High Level Sensor
Sensor Wiring
TSP- DMS-12/24, EIS, DIS, ULS, UHS, DDS, DTS
DVS, HIS, MWS, HLS Models

- Other than the Discriminating Mag Sensors (DMS), all sensors may be connected with stranded wire; DMS are probe-type devices therefore needing jacketed cable.
- Inspect sensor wiring and connections. Replace any cracked, split, broken or swollen wires.
- Connections should be epoxy-sealed or in weatherproof junction boxes. Repair any connections showing corrosion, excessive moisture, or exposed bare wires.
- Discriminating aka “Brite” sensors communicate using 3 wires; non-discriminating sensors use 2 wires.
Float Switch Sensors (non-discriminating)

- **TSP-ULS** Universal Liquid Sensor
  - Used to monitor sumps, wells, and dry tank interstitial spaces.
  - To test, insert into container with at least three inches of water (or the appropriate fuel when required) and verify LIQUID DETECTED ALARM trips.

- **TSP-UHS** Universal Hydrostatic Sensor
  - Similar to ULS but with inverted float for monitoring normally-wet (liquid-filled) double-wall sump interstitial spaces.
  - To test, lift the sensor from the reservoir and verify that SENSOR ALARM trips.

*Float switch sensors are intended for vertical/upright orientation for proper operation*
Optical Sensors

- Light-sensitive devices used in dark/enclosed spaces. Test in darkened/covered containers; light exposure may prevent activation.

- Include pull string eyelet for wrap-around applications (i.e. dry DW fiberglass tank interstitial), and function in vertical or horizontal position.

- **TSP-EIS** Electro-optical Interstitial Sensor (non-discriminating)
  To test, insert sensor into darkened container with at least three inches of water (or the appropriate fuel when required) and verify that the **LIQUID DETECTED** alarm trips.

- **TSP-DIS** Discriminating Interstitial Sensor
  Insert sensor into darkened container with at least three inches of water (or the appropriate fuel when required) and verify that the **WATER DETECTED** or **PRODUCT DETECTED** alarm trips, as appropriate.

Wipe with clean, dry cloth before reinstallation.
Discriminating Sump Sensors

- Combined use of magnetic float switches to detect liquid at two levels, and polymer strip to detect hydrocarbons.
- **TSP-DDS** Discriminating Dispenser Sump Sensor (12”)
- **TSP-DTS** Discriminating Turbine Sump Sensor (24”)
- Identical operation; DTS taller for deeper monitored spaces such as any tank sump (turbine, fill, piping, etc).
- To test, insert sensor into container with at least three inches of water (or the appropriate fuel when required) and verify **WATER DETECTED** or **PRODUCT DETECTED** alarm trips, as appropriate.
- Next, turn upside down or insert in several inches of water and verify that the **SUMP FULL** alarm trips.

Cleanse and dry after hydrocarbon exposure to return to service (recover)
Hydrostatic Interstitial Sensors

- Two internal float switches detect changes above or below full/normal tank interstitial reservoir level.
- **TSP-DIS** Discriminating Interstitial Sensor (12”)
- **TSP-DIS-XL** Discriminating Interstitial Sensor (24”)

To test, first verify brine level is filled to approximate middle of sensor body; adjust liquid or sensor positions as necessary.

- Remove from interstitial brine solution and verify LOW BRINE alarm trips.
- Next, fully submerge in interstitial brine solution and verify HIGH BRINE alarm trips.
TSP-MWS Monitoring Well Sensor

- Discriminating, normally-wet, groundwater monitoring well sensor which detects hydrocarbons anywhere along its length.
- Hangs suspended from top well cap/plug; available in 10’, 15’, 20’ and 25’ lengths.
- To test, remove sensor and verify DRY WELL alarm trips.
- Where required, insert into appropriate fuel and verify PRODUCT DETECTED alarm trips.
TSP-DVS Discriminating Vapor Sensor

- Discriminating, normally-dry sensor which detects hydrocarbon vapors in monitoring well or other containment space.

- To test, first place in high-vapor environment such as a mostly empty gasoline container and confirm VAPOR DETECTED alarm trips.

- Next, remove to open air; vapor reading will drop.

- Finally, insert into container with at least three inches of water and confirm WATER DETECTED alarm trips.

A wet sensor will not detect vapors
High Level/Overfill Sensors

- Rigid shaft, adjustable position float switch sensor; available in two lengths:
  - TSP-HLS-15 High Level Sensor (15”)
  - TSP-HLS-30 High Level Sensor (30”)

- To test, manually move the float to raised/high level position and verify **LIQUID DETECTED** alarm trips.
Magnetostrictive (MAG) Sensors

- Miniaturized probe-type device which detects water and hydrocarbons, indicates water level in inches, and will alarm if removed from installed (normal) position.

- TSP-DMS-12 Discriminating Mag Sensor (12”)
- TSP-DMS-24 Discriminating Mag Sensor (24”)

- To test, raise slightly off containment base and verify MAG SENSOR INSTALLATION ERROR trips.

- Place onto bottom of container with three inches of water and verify MAG WATER warning trips.

- Place onto bottom of container with three inches of fuel and verify MAG PRODUCT Alarm trips.

- Reinstall into original location, ensuring DMS sits at bottom of containment space and verify no alarms or warnings remain.
4 - Electronic Line Leak Detection (ELL D)
TS-LLD Line Leak Detector

- Single-channel explosion-proof (retrofit) standalone ELLD using plenum gold transducers which communicate over STP power circuit.
- Confirm no active alarms; if present, check dispenser and submersible pump sumps for leaks.
- To test, introduce calibrated 3 GPH leak into product line and manually launch a Gross Test (3 GPH); verify controller completes test and indicates a flashing "3" and LINE LEAK DETECTED.
- Verify dispensing disabled while in Gross Alarm.
- Press RESET/TEST button to restore normal system operation after simulated leak is detected.

Consult TS-LLD Installation Guide for specific instructions.
TS-LS300 AutoLearn Line Leak Detector

- 4-channel standalone or sidecar ELLD using gold transducers.
- To test, print Regulatory Report on INCON to confirm Monthly Line Tests (.2 GPH) are passing each month (when integrated with T1 Series).
- Confirm no active line alarms; if present, check dispenser and submersible pump sumps for leaks.
- Introduce calibrated 3 GPH leak into product line and manually launch a Gross Test (3 GPH); verify system completes test and indicates Gross Alarm.
- Verify dispensing disabled while in Gross Alarm.

TS-LS500 AutoLearn Line Leak Detector

- T5 series integrated ELLD using blue transducers.
- To test, print Regulatory Report to confirm Monthly Line Tests (.2 GPH) are passing each month.
- Confirm no active line alarms; if present, check dispenser and submersible pump sumps for leaks.
- Introduce calibrated 3 GPH leak into product line and manually launch a Gross Test (3 GPH); verify system completes test and indicates Gross Alarm.
- Verify dispensing disabled while in Gross Alarm.

5 - Accessories
Remote/Overfill Alarms

- Enclosed external alarm stations for remote notification of overfill threat. Can also be used for other alarms if desired, dependent upon system configuration.

- **TS-RA1** Remote Alarm (indoor or outdoor)
- **TS-RA2** High-Intensity Remote Alarm (outdoor)
- **TS-RK** Remote Acknowledgement Button

To test, remove tank probe then slide product float to a HIGH HIGH level position, based on system setup. Confirm HIGH HIGH alarm on console, and audible and visual alarm on remote unit(s).

- Press acknowledgement button to clear remote unit.
6 - Report Printing
Printing Reports (T1 Series)

- Press the **REPORT** key.
- Press the **DOWN** key to view report types.
- Press M1-M4 menu softkeys to make report choice.
Printing Reports (T5/Colibri Series)

- Press to access the Report Menu.
- Select the Report Type and Date Range desired.
Printing Reports (Evo Series)

• Press the down arrow at the top of the screen to open the Quick Jump Menu.

• Press to access the Report Menu.

• Select the Report Type and Date Range desired.

• Select the output method (print, email, fax).
Resources

- **Website.**  [www.franklinfueling.com](http://www.franklinfueling.com) Product info, catalogs, datasheets, manuals.

- **TECHLAB.**  [http://techlab.franklinfueling.com](http://techlab.franklinfueling.com) Technical extranet site. Check contractor certifications, register for online or classroom training, download manuals, CAD drawings, watch videos, etc.

- **Helpdesk.**  Mon – Fri 8A to 5P all CONUS time zones.  **800-984-6266.**

- **Regional Field Service Engineers.**  Instruction, technical field support, and on-site assistance when needed.
  - Northeast  Steve Nelson  [stevenelson@franklinfueling.com](mailto:stevenelson@franklinfueling.com)  734-854-2026
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