

# Fuel Management System

## Programming Guide

*TS-550 evo*



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## **Open Source Notice**

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## **Inspection of Materials**

Visually inspect all components for defects or damage prior to installation. If any defect or damage is found, do not use the product and contact FFS for further assistance.

## **Warranty Information**

Please refer to the *FFS Fuel Management Systems & Product Warranty Policy* for all warranty information.

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# Important Safety Messages

FFS 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.


**Danger**  This symbol identifies an electrical danger. An electrical danger sign will appear in the text of this document when a potentially hazardous situation involving large amounts of electricity may arise if the instructions that follow are not adhered to closely. A potentially hazardous situation may involve the possibility of electrocution, severe bodily harm, or even death.





Alarms and warnings are designed to alert you with specific details when a problem occurs so you can take appropriate corrective action. System hardware failure warnings, tank related alarms, leak detection sensor alarms, and line leak alarms can be custom programmed to do many things. The events that require programming are denoted by a (p) below:

- cause the red Alarm light or yellow Warning light to flash (standard)
- activate / sound the console annunciator alarm horn (p)
- activate internal output relays for external alarm devices (p)
- print alarm reports automatically, either locally (internal printer), or remotely (USB - HP compatible printer) (p)
- send alarm and test reports to a specified e-mail address (p)
- send reports to remote location(s), via internal data/fax modem (p)

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**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 any 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**  **When the Fuel Management System is used to monitor tanks containing gasoline or other flammable substances, you may create an explosion hazard if you do not follow the requirements in this manual carefully.**

**Warning**  **All wiring must enter the console's enclosure through the designated knockouts. An explosion hazard may result if other openings are used.**

**Warning**  **You must run wiring from probes or sensors to the Fuel Management System console in conduits which are separate from all other wiring. Failure to do so will create an explosion hazard.**

**Warning**  **Substituting components could impair intrinsic safety. TS-550evo consoles are intrinsically safe for sensors installed in – Class I, Division 1, Group D – hazardous locations. Substitution of components could make the energy limiting circuitry in the system ineffective and could cause an explosion hazard. Repairs to a TS-550 evo console or attached components should only be performed by a qualified, factory-trained technician.**

**Certified Programmer/Service Person:** Only an FFS certified programmer or service person is allowed to access both the user interface keypad and areas internal to the Fuel Management System console.

**Station Owner/Operator:** The station owner or operator of the Fuel Management System console is only allowed to access the user interface keypad. Access to areas internal to the console is strictly prohibited.

## **Approvals**

**All Fuel Management System models are UL and cUL listed 6L79 as Liquid Level Gauge / Leak Detection Systems. Third party approved leak detection — Pd (probability of detection) = 99.2 % for 0.1 or 0.2 gph leak tests (0.1 = annual precision test, 0.2 is the monthly regulatory compliance test).**

\*The static tank test does not support Manifolded tanks.

\*\*SCALD is 3rd party approved for up to three Manifolded tanks.

# **Introduction**

The purpose of this manual is to guide installers, operators and technicians through programming and troubleshooting the TS-550 evo console, so that it's configured based on a site's specific needs. The Fuel Management Systems (FMS) application within the TS-550 evo console tie together the monitoring and alarm capabilities of the automatic tank gauge with advanced technologies to supply tank and level data more accurately and efficiently. This manual is also designed to introduce technicians to the LCD Graphical User Interface, which is used as an input device to program system configuration and maintain all applications from the front panel of the console as well as through a web interface. Overall safety issues, troubleshooting information, warranty, service and return policies, as defined in this manual, must be followed.

## **FMS Functions**

The main function of the Fuel Management System is to represent levels for inventory and tank leak testing by monitoring probe inputs and performing calculations based on those inputs. Line leak transducers provide line pressure data to perform line leak detection. Results from these calculations may be used for system monitoring and/or regulatory compliance. The console, in conjunction with external fuel system equipment, may provide positive system shutdown, based on programmed rules.

Sites that use Fuel Management Systems have the ability to monitor and perform:

- Tank Inventory Information
- Tank Leak Detection
- Sensor Configuration and Monitoring
- Line Leak Detection
- Sump Leak Detection
- Compliance Line and Leak Testing
- Secondary Containment Monitoring

FMS also allows sites to generate and print the following reports:

- Inventory Reports
- Delivery Reports
- Tank Test Results
- SCALD Testing Reports
- Regulatory Reports
- Sensor Reports
- Line Leak Reports
- Reconciliation Reports

## Definitions and Acronyms

Module – A module is a plug-in card within the T5 series console that is used to perform various console functions. The modules are used for field wiring of the input and/or output of electrical signals between different equipment.

RS-232 – An IEEE standard for serial communication using a 9-pin connector.

RS-485 – An IEEE standard for serial communication using Shielded Twisted Pair or Unshielded Twisted Pair wiring.

RJ-45 – An IEEE standard connector for use in communications with Shielded Twisted Pair wiring. Usually data.

RJ-11 – An IEEE standard connector for use in communications using Shielded Twisted Pair wiring. Usually voice and fax.

2SM – 2-Wire Sensor Module (Intrinsically Safe)

ACIM – AC Input Module

AIM – 4-20mA Analog Input Module (Intrinsically Safe)

AST – Aboveground Storage Tank

ATG – Automatic Tank Gauge

CARB – California Air Resources Board

CM – Controller Module

DCE – Data Communication Equipment

DIM – Dispenser Interface Module

DTE – Data Terminal Equipment

DTU – Data Transfer Unit

DW/DWT – Double Wall/Double Wall Tank

EVR – Enhanced Vapor Recovery

FAST – Franklin Auto Setup Tool

FMS – Fuel Management Systems

IS – Intrinsically Safe

ISD – In-Station Diagnostic

LCD – Liquid Crystal Display

LIM – LonWork Interface Module

LLD – Line Leak Detection

NC – Normally Closed

NO – Normally Open

OTB – One Touch Button

PC – Personal Computer

PM – Probe Module (Intrinsically Safe)

PSM – Power Supply Module

QJM – Quick-Jump Menu

RTD – Resistance Temperature Detectors

RM – Relay Module

SCM – Secondary Containment Monitoring

SLLD – Statistical Line Leak Detection

STP – Submersible Turbine Pump

TPI – Turbine Pump Interface

TS-EMS – Environmental Monitoring System

TS-EXPC – Expansion Console

URL – Uniform Resource Locator for the internet

USB – Universal Serial Bus

UST – Underground Storage Tank

VFM – Vapor Flow Meter

V/L – Vapor to Liquid ratio

VRM – Vapor Recovery Monitoring

XML – eXtensible Markup Language

## Related Documentation

The system installation and operation instructions, troubleshooting guide and console maintenance manual are provided for your use in separate documents. Detailed installation and testing instructions for each type of leak detection sensor are present in the relevant manual, and, likewise, the installation, testing, and programming of various upgrade kits and optional accessories are also contained in separate manuals, addenda or in one of this document's appendices.

*TS-550 evo Series Fuel Management Systems Installation Guide (000-2170)*

*TS-550 evo Series Fuel Management Systems Operators Guide (000-2171)*



## **General**

After the Fuel Management System has been installed, typically your interaction with the system will be from the LCD display, on-board printer; or using a Web Browser to program and monitor the console. Remote operation can be performed from a PC, either attached directly or through a network connection to the console. All of the features of the console are available through these input/output devices. Also, the console may be set up to generate and send automated reports to e-mail accounts or print reports at a programmed time.

Occasionally you may need console information, such as model and serial numbers. The model number is located on the face of the console. The serial number is located on a small plaque placed on the bottom of the left panel. This label also shows the model number, voltage, manufacturer's address, a warning symbol and the unit's voltage specifications.

## **User Interfaces (UI)**

### **LCD Touch Screen Interface**

A color LCD touch screen is included with the TS-550 evo console. This bright display allows easy viewing in any lighting condition. Console functions are easily accessed through the LCD screen.

### **Web Browser Interface**

The TS-550 evo console includes an Ethernet port and programming options to allow the system to be installed on a network. The advantages to using an Ethernet connection are: faster connection speeds, quicker data transfer rates, less data errors or quicker recovery of data when errors occur, and it does not require extra software or drivers to be loaded. This means that console parameters can be modified and that status/ alarm reports can be printed from virtually anywhere.

### **Access Control**

There are three access levels programmed into the console's operating system: Guest, User, and Administrator. Each level will allow an operator to access different features or change specific settings on the console. This security feature prevents unauthorized tampering of console configurations. The system will prompt the user for a password when required.

Default passwords are as follows:

**Guest:** (none required)

**User:** user

**Administrator:** admin

## Connecting a PC or Laptop Computer

To access the console using the Web Browser interface, connect a PC to the console through either the Ethernet port or the COM1 serial port. If the console is connected to a local network, you can perform this setup from any PC on that network by using a web browser, such as Microsoft's Internet Explorer or Mozilla's FireFox, or Safari for a Mac.

**Note:** The PC or laptop will recognize this serial connection as a network connection and will not allow the use of a Local Area Connection simultaneously. While it is not necessary to disconnect the Local Area Connection to connect using the Serial port, it will be necessary to disconnect the Serial Connection through the computers operating system in order to use the Local Area Connection again.

The following instructions are written specifically for Microsoft's Windows 7 operating system. For assistance with other operating systems, please contact Franklin Fueling Systems Technical Services.

### Connecting a PC to the TS-550 evo Ethernet Port

1. Using an Ethernet Crossover, 10 Base-T cable, plug the RJ-45 connector on one end of the cable into the Ethernet port of the console.
2. Plug the RJ-45 connector on the opposite end of the cable to the Network Interface Card of the computer.
3. Power up and log onto your PC.

**Note:** You may need to re-configure your TCP/IP settings to allow the computer to communicate with the console.

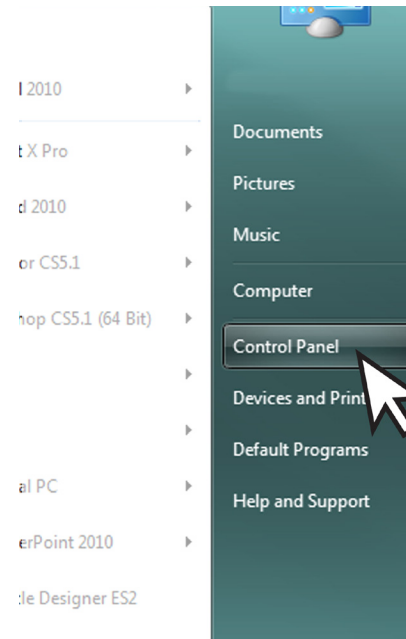
**Note:** Some modern laptops have automatically switching Network Interface Cards and as such, will require the use of a standard cat 6 cable instead of a crossover.

## Configuring IP Settings for Communication

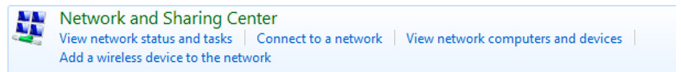
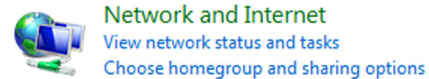
Before attempting to modify any computer settings, contact the Information Technologies department of your business, if available. Some computer accounts may have restricted permissions to overcome before any changes are allowed to be made to TCP/IP settings.

At the PC:

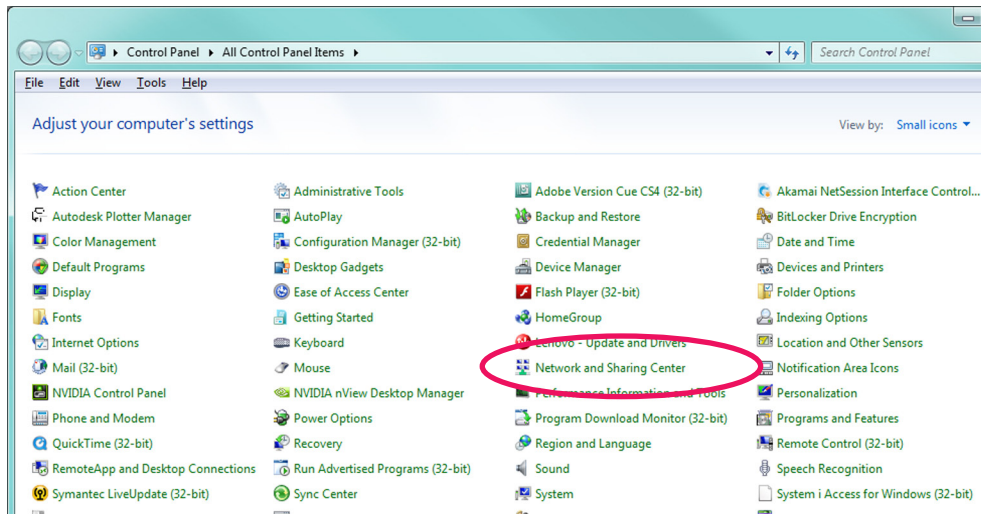
1. Power up the PC and log into your Windows operating system.
2. Click on **Start**, then select **Control Panel**.



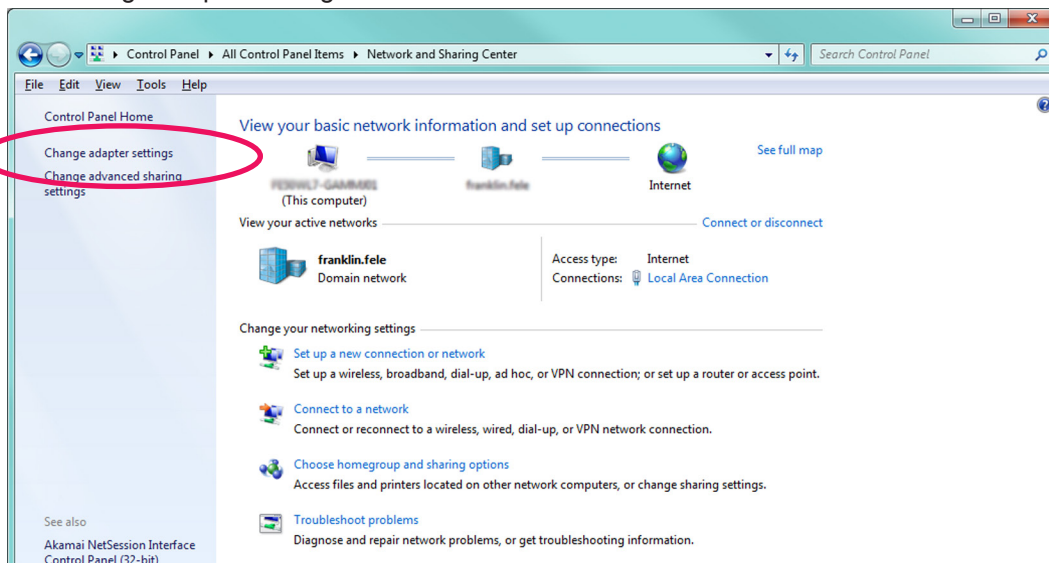
3. There are (2) two views settings possible when using Windows 7:
  - In **Category View**, click on **Network and Internet**, then click **View Network Status and tasks under Network and Sharing Center**.



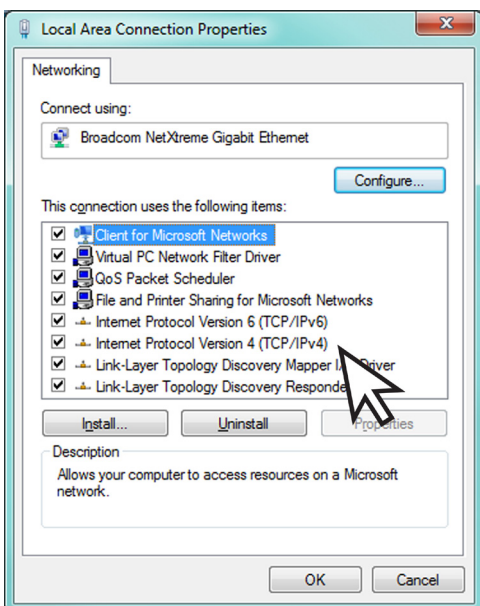
- In **Icon View**, click on **Network and Sharing Center**.



4. Click on the **Change adapter settings** in the left hand column.



5. Right-click on **Local Area Connection** and select **Properties**.
6. In the Local Area Connection Properties dialog box, under “This connection uses the following items,” select **Internet Protocol Version 4(TCP/IPv4)** and click **Properties**.



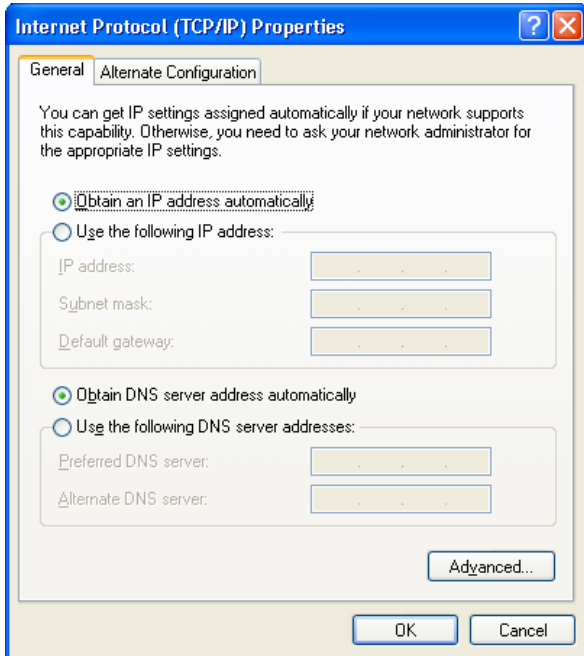
There are various ways to configure a computer to communicate with a TS-550evo console. These factors depend upon the user’s computer knowledge and how the computer is currently configured.

To determine which method is best for your site, read the instructions in the following section carefully. Make detailed notes on the current configuration of the TCP/IP settings on the PC you are using. Read both the “Obtain an IP address automatically” and the “Use the following IP address” methods before making a choice between the two.

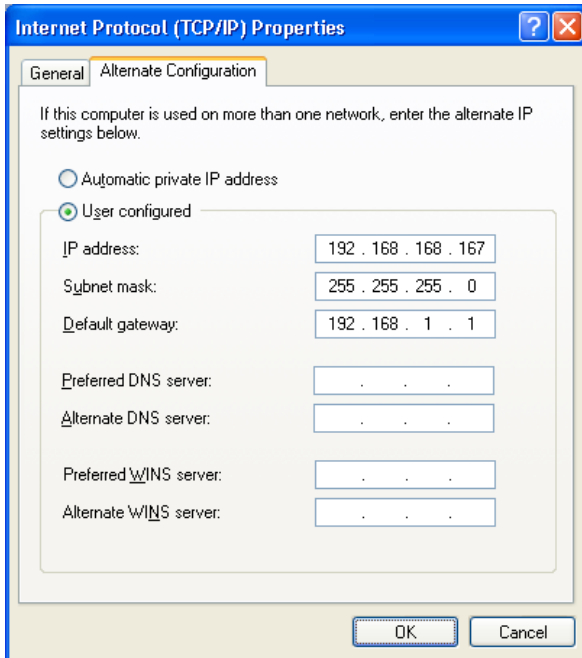
## Obtain an IP Address Automatically

Computers commonly use this setting to obtain an IP address automatically.

1. If **Obtain an IP address automatically** is selected, it may be best to click the **Alternate Configuration** tab.



2. Select **User Configured**.

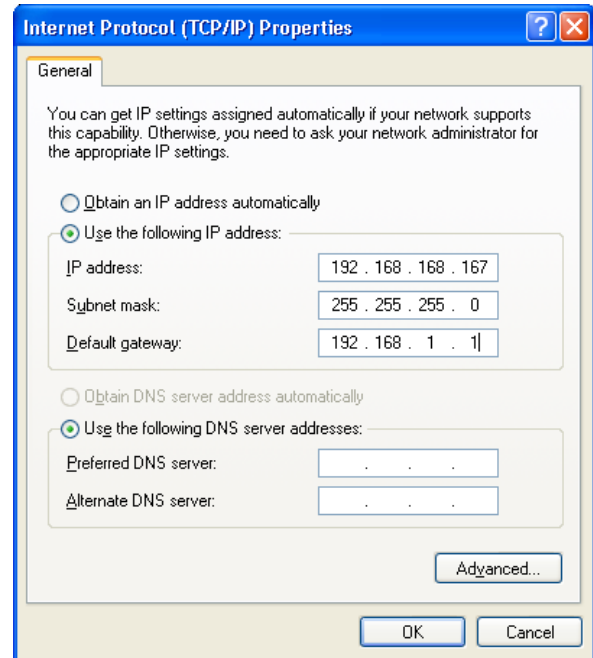


3. Enter an IP address. For simplicity, make the last segment of the IP one number different than the IP address of the console. *Upon initial setup ONLY, the numbers used in the figure may be used to configure the TCP/IP settings of your PC.* After initial startup the programmed parameters should be verified through the touchscreen
4. Leave all other information blank and click **OK**.
5. Close the Local Area network for changes to take place.

**Note:** The consoles default IP address is 192.168.168.168. If the PC is normally configured to acquire an IP address automatically, **Alternate Configuration** may be used, as mentioned above, to allow a connection to be enabled without the necessity of reconfiguring the computer each time it will be used to connect to this console.

## Use the Following IP Address

1. If **Use the following IP address** is selected and the entry boxes contain any information, record this information for use when console programming is complete.



2. Enter an IP address. For simplicity, make the last segment of the IP one number different than the IP address of the console. *Upon initial setup ONLY, the numbers used in the figure may be used to configure the TCP/IP settings of your PC.*
3. Leave the DNS information blank.

**Note:** The consoles default IP address is 192.168.168.168. If the PC is normally configured to **Use the following IP address**, make sure that all displayed information is recorded and kept prior to making any changes. It may be necessary to use this information to re-configure the console once programming is complete.

## Check Status of Connection

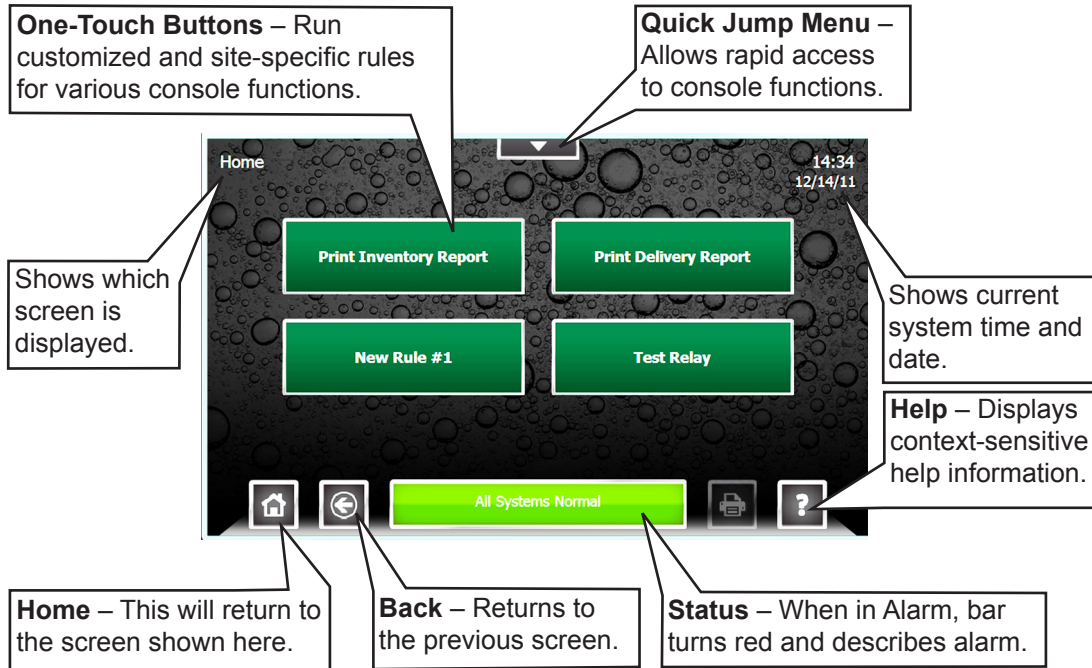
1. Check the status of your connection by going to the **Network Connections** window.
2. If the connection status is disabled, enable it by right-clicking on the **Local Area Connection** and selecting **Enable**.
3. Verify link light is lit under Ethernet on Controller module is lit and RX light is flashing. *If technical difficulties arise, please contact Franklin Fueling Systems Technical Support before proceeding.*

More information on the Web Browser Interface is located on page 31 of this manual.

# Programming and Navigation

## Console Navigation

The operating system is designed for easy navigation. Applications allow the user to modify programming options by responding to on-screen commands. The following instructions show various operating system functions, so that issues can be corrected efficiently without interrupting dispensing or sales.

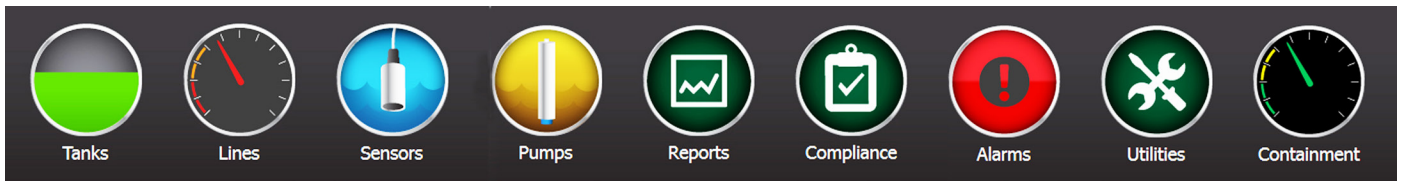


## Navigation Buttons

There are many ways to navigate the applications of the TS-550 evo console. Listed below are buttons that will help you navigate the functions of the console.

### Quick Jump Menu (QJM)

The Quick Jump Menu was developed to simplify system navigation. From the Quick Jump Menu you can access sections of the TS-550 evo with a few quick selections.

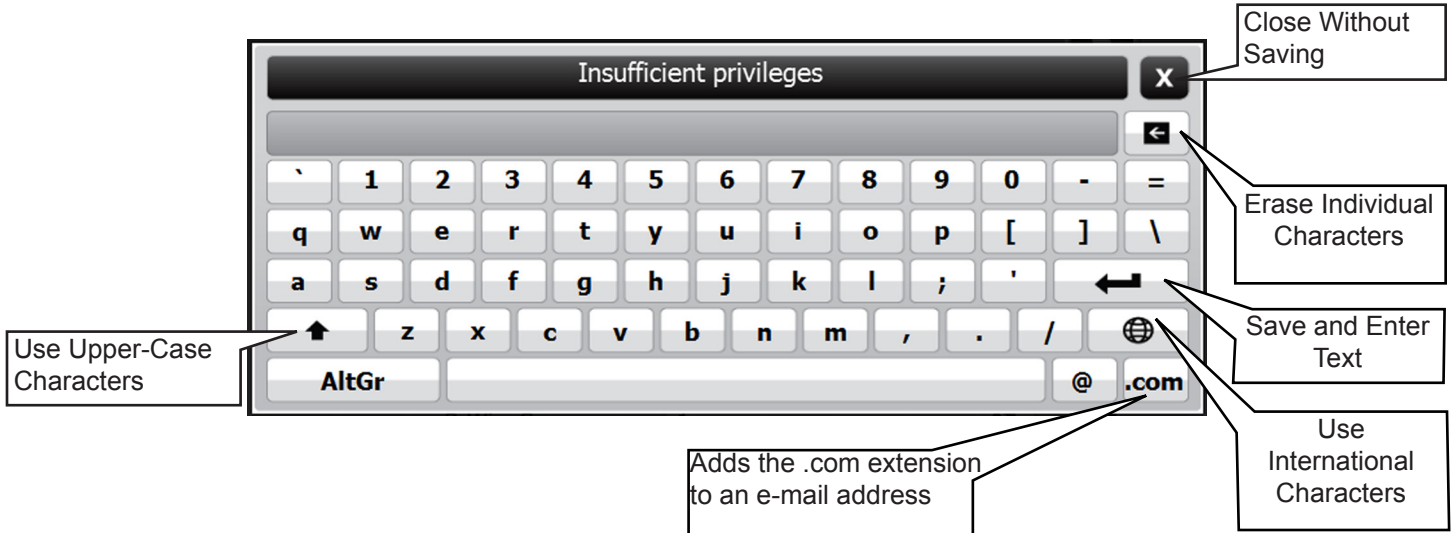


*Quick Jump Menu*

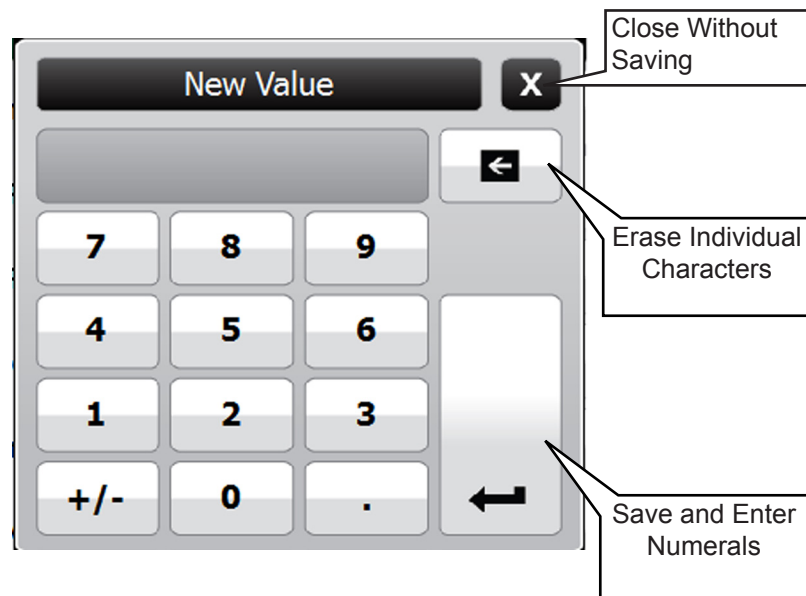
**Note:** Your console will display selections depending upon installed equipment.

Selecting the icon will take you to the summary screen for that item and allow you to access more detailed information.

## Text Entry Screen



## Number Entry Screen





## Initial Console Configuration

Initial setup must be completed before the console can be used. This section will show how to set custom parameters by navigating through the programming options to set up the TS-550 evo series console for the first time.

### Touch Screen Calibration

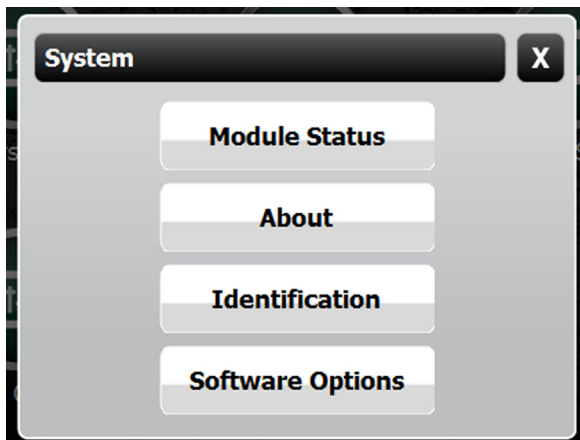
Calibrating the touch screen will enable the console to better recognize the area that you “touch,” so that you can accurately enter in information. The LCD touch screen is calibrated at the factory when a system is built but it may be necessary to re-calibrate occasionally. To calibrate the touch-screen function of the display, you must first access the calibration application.

1. From any screen, press Quick Jump Menu > Utilities > Tools > Touch Screen Calibration.
2. The console will ask if you are sure that you want to proceed, answer **Yes**.
3. Follow the on-screen instructions to complete the calibration process.

## Console Build Characteristics

Each console is custom ordered and built to each customer’s specifications. That means that all of the hardware (modules) and software options needed for your site are installed and tested. Before programming, check the status and version of each module and verify that your purchased options are present.

**Pressing QJM > Utilities > System will give you the option to view specific details about the system**



**Module Status** - Lists the modules installed and what version those modules are running. It will also indicate if the module is operational or not.

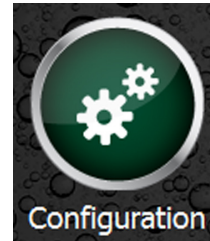
**About** - Provides contact information for Franklin Fueling Systems

**Identification** – View to locate the System Serial Number, Ethernet Address (not the same as IP address), Controller Serial number and Date/Time of manufacture.

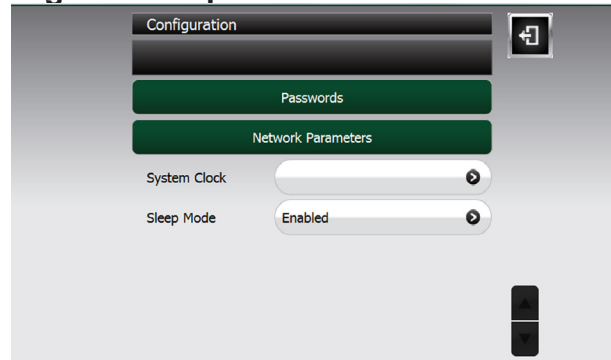
**Software Options** – Displays the current installed software options.

## Setup Menu

From any screen select QJM > Utilities > Setup > Configuration.



### Configuration Options



Using the options in this menu, you can change:

- Passwords
- Protocol Settings
- Network Parameters
- System Clock
- Current time / date and set an accurate time zone.
- Toggle Sleep Mode

### Modifying Passwords

For access control and security purposes, the console will allow you to change any password used for accessing console functions. When changing passwords, make note of the password and keep it in a secure, memorable place. The password you choose must be at least two characters long with a **maximum of 16 characters — spaces and special characters are allowed as part of your password.**

Administrator level access is required to change passwords.

To modify passwords:

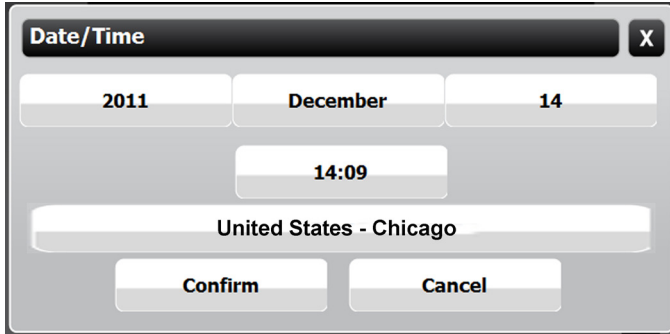
1. Press the Quick Jump Menu > Utilities > Setup > Configuration > Passwords.
2. Select the access level to be changed
3. Enter the new password and press enter to accept the change

Once the console has been powered up, navigate the console by pressing the screen on the appropriate button.

1. From any screen select QJM > Utilities > Setup > Configuration.
2. If prompted enter the administrator password.
3. Select from the options in the Network Parameters section that follows to view or change console configuration settings.

## Date/Time Set

To set the date and time, click the button that corresponds with your selection and then select the correct option from the list. If your choice does not appear on the first screen, use the up and down navigation buttons to scroll through more options. When finished, confirm your selection by pressing the confirm button. It is important to enter the date and time information correctly to ensure reports and alarms can be accurately tracked.



The screenshot shows a 'Date/Time' configuration window. At the top, there is a title bar with 'Date/Time' and a close button 'X'. Below the title bar, there are three input fields for the date: '2011', 'December', and '14'. Below these is a time input field showing '14:09'. Underneath the time field is a location dropdown menu currently set to 'United States - Chicago'. At the bottom of the window are two buttons: 'Confirm' and 'Cancel'.

## Time Zone

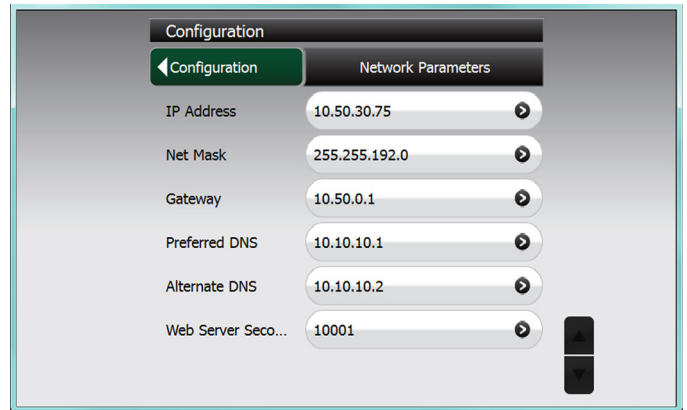
Set the Time Zone according to your geographical location. If your choice does not appear on the first screen, use the navigation up and down buttons to scroll through more options. When finished, confirm your selection by pressing the confirm button.

## Toggle Sleep Mode

Enabling sleep mode allows the display to dim after 5 minutes.

## Network Parameters

To communicate with your network equipment (i.e. router, switch, hub, etc.) you will need to modify the network parameters.



The screenshot shows a 'Configuration' window with a sub-tab for 'Network Parameters'. The window has a title bar with 'Configuration' and a back arrow. Below the title bar, there are two tabs: 'Configuration' (selected) and 'Network Parameters'. The main area contains several fields with values and navigation arrows: IP Address (10.50.30.75), Net Mask (255.255.192.0), Gateway (10.50.0.1), Preferred DNS (10.10.10.1), Alternate DNS (10.10.10.2), and Web Server Seco... (10001). A vertical scroll bar is visible on the right side of the window.

### IP Address Settings:

**IP Address** – This is a logical (electronic) address, like a street address, that the console uses to route information. This address will have to match your network, if connected to a network, in order to ‘talk’ to a remote communication device, or your PC.

**Network Mask** – Masking is a way to diversify the use of multiple subnets. The mask must match that of the network the console is connected to. Masks are used in networking to create ‘sub-networks’ within a whole, like slicing an apple. You have separate slices that may be in different locations, but they are still from the same apple. Administrators use this to make separate networks, to maximize bandwidth or capacity of medium resources (cables or fiber). Therefore, when your network uses static IP addressing (assigned by an administrator), this mask must match the Network Mask of the router port that it is attached to. If the network uses a DHCP server (automatically assigns IP addresses) then the mask should meet the specifications set by your administrator.

**Gateway** – The Gateway is the logical address to the nearest router port, commonly the one that is connected to the console. Consult your administrator for details on this and other network parameters.

### DNS Server Address:

**Preferred DNS Server/Alternate DNS Server** – The domain name system (DNS) is the way that internet domain names are located and translated into Internet Protocol addresses. A domain name is a meaningful and easy-to-remember tag for an internet address (used for e-mail functions).



## Programming System Parameters

To program the system parameters select QJM > Utilities > Setup > Parameters.



## Preferences

Use the Preference tables on the following pages to select the menu options to be changed.

### Language

#### Language Options

English  
Spanish  
Portuguese  
Italian  
Russian  
French  
Hindi  
Hebrew  
Polish  
Bulgarian  
Slovakian  
Turkish  
German  
Chinese (Simplified)  
Chinese (Traditional)

### Date/Time

Date/Time	Options
Short date format	MM/dd/yyyy M/d/yyyy M/d/yy MM/d/yy MM/dd/yy Yy/MM/dd yyyy-MM-dd dd-MMM-yy
Long date format	EEEE, MMMM dd, yyyy MMMM dd, yyyy EEEE dd MMMM, yyyy dd MMMM, yyyy
Year/month date format	MMMM, yyyy
Short time format	HH:mm H:mm hh:mm a h:mm a
Long time format	HH:mm:ss H:mm:ss hh:mm:ss a h:mm:ss a

Symbol	Representation
MM	Two-digit month with leading zero (i.e. 01 for Jan...).
M	Two-digit month, no leading zero (i.e. 1 for Jan...).
MMM	Three-letter month (i.e. JAN, FEB, AUG...).
dd	Two-digit day with leading zero (i.e. 01, 02...).
d	Two-digit day, no leading zero (i.e. 1, 2...).
yyyy	Four-digit year (i.e. 2006...).
yy	Two-digit year (i.e. 06, 07...).
HH	Two-digit hour with leading zero; 24-hour format.
hh	Two-digit hour, no leading zero; 24-hour format.
mm	Two-digit minute, with leading zero.
ss	Two-digit second, with leading zero.
a	A.M. or P.M. indicator.
EEEE	

### Numbers

Numbers	Options
Digit grouping	Group digits by 10 <sup>3</sup> using specified symbol (i.e. either "123456789" or "123,456,789").
Digit grouping symbol	Symbol used to group digits (i.e. ','; ' ' ...). User defined option.
Decimal symbol	Symbol used to separate decimal units (i.e. '.'; ','). User defined option.
Display leading zeroes	Displays decimals with leading zero (i.e. with '0.123'; without '.123').

## Units

Units	Options
Volume	Liters Gallons Imperial Gallons
Length	Millimeters Centimeters Meters Inches
Temperature	Centigrade Fahrenheit
Flow	Liters/Hour Cubic Centimeters/Second Cubic Feet/Hour Gallons/Minute Gallons/Hour
FMS - Line Pressure	Pascal Bar Pounds per square inch Inches of Water Inches of Mercury
FMS Line Pressure	Pascal Bar Pounds per square inch Inches of Water Inches of Mercury
SCM - Containment Vacuum	Pascal Bar Pounds per square inch Inches of Water Inches of Mercury
Density Units	Kilograms per Cubic Meter Grams per cubic centimeter Pounds per cubic foot
Mass Units	Kilograms Grams Pounds

## System ID

The System ID screen looks like this:

You should have the following items ready before beginning console programming:

- Site location information to setup Site ID
- Communications parameters for external equipment to match console settings
- Wiring diagrams of site if necessary; to identify sensor and/or probe location
- Manufacturers Tank Charts for “special” tank correction tables
- Probe stickers with gradient and RTD location for “special” probes

To make a modification, select the parameter that you want to change. Type the new setting in using the characters available. When finished, press enter to confirm the change. Once changes are complete select the save button. When Confirmation is displayed, press **Yes** to save and apply, or **No** to exit without saving — you may press cancel to continue making changes. Changes will not be applied until you return to the main menu.

Refer to the programming tables on the following pages for a more descriptive representation of each option including the submenus of each menu item. The console will update the menus as additional data or information is required during programming.

Please note, features appearing in this guide may not be available, unless the option is purchased with your console.

Group Name	Parameter Name	Parameter Value	Description	Max Characters
System ID	Site Name	(Site Name)	Physical name of site.	40
	Web UI URL	(http://localhost/tsa)	URL address of site.	40
	ID Line 1	(blank)	These lines should contain the physical address of the site. This information will be used in the header of reports and to identify site properties when using web UI.	40
	ID Line 2	(blank)		40
	ID Line 3	(blank)		40
	ID Line 4	(blank)		40
	ID Line 5	(blank)		40

## System Configuration

Group Name	Parameter Name	Parameter Default	Description	Range
System Configuration	Technical Support Key	(0)	Enter the appropriate key number.	0-2
	Enable Diagnostics	(No)	Enables the logging option.	Yes/No
Modules Expected	IO	(0)	These settings are preset by ordered options. This value represents the number of each module installed. When a module is installed, the console will open more options base upon which module is installed.	0-6
	AC Input	(0)		0-6
	Relay	(0)		0-6
	Probe	(0)		0-6
	2-Wire Sensor	(0)		0-6
	3-Wire Sensor	(0)		0-6
	4-20mA Input	(0)		0-6
	Internal Printer	(0)		0-1
	LON	(0)		0-1
	DIM	(0)		0-2
Console DTU	(0)	0-1		
Diagnostics	Remote Logging Host	(None)	IP address of a remote server to log diagnostic data. (Contact Technical Support for assistance)	
External Printer	Paper Size	Letter (8.5" x 11")	Sets paper size for external printer	Letter ((8.5" x 11") A4 (210 mm x 297 mm)

## Communications

Group Name	Parameter Name	Parameter Value	Description	Parameter Inputs
Serial Ports	COMM 1	Mode	Network Connection (PPP)	Network Connection (PPP) Veeder-Root Franklin Fueling System (XML)
		Baud Rate	57600	1200-57600
		Data Bits	8	7 or 8
		Parity	None	odd even none
		Stop Bits	1	1 or 2
	COMM 2	Baud Rate	9600	1200-57600
		Data Bits	8	7 or 8
		Parity	None	odd even none
		Stop Bits	1	1 or 2
		Response Timeout	8	#
	RS-485	Baud Rate	9600	1200-57600
		Data Bits	8	7 or 8
		Parity	None	odd even none
Stop Bits		1	1 or 2	
Modem	Type	Internal	None Internal External	
	Mode	Franklin Fueling Systems (XML)	Network Connection (PPP) Veeder-Root Franklin Fueling System (XML)	
	Data Bits	8	7 or 8	
	Parity	None	odd even none	
	Stop Bits	1	1 or 2	
	Country Code	United States	(Select country)	
Protocols	Veeder-Root Port	8001	#	
	Veeder-Root Client Timeout	0	#	
	Web Server Secondary Port	10001	#	
E-Mail	"From" Address	your_from@address.com	Address of sender (console).	abc
	SMTP Host	your_smtp_host_address	IP address of SMTP Host.	#
	SMTP Port	25	Port address of SMTP.	#
	Enable Authentication	No	Data authentication (if required).	Yes/No
	Maximum Queue Size	20	Maximum size of queue in Megabytes.	
	Retry Timeout	3600	Time, in seconds, that the console will wait before attempting to resend the message.	
	Watchdog Timeout	30	Time, in seconds, that the console self-monitoring program waits when it expects and error due to software or power quality problems.	
	Enable Debugging	(No)	Select Yes if you would like more status information to be stored in the Messages file.	Yes/No
LON	IFSF Node ID	(1)	Allows the T5 Series console to communicate with an IFSF POS (Point of Sale) System	0-127

### System Sentinel Anyware

This section will be filled out automatically by System Sentinel Anyware using the Program EPS feature.

## Programming Modules

The Fuel Management System is composed of a custom set of modules. Each module has individual characteristics. Parameters must be set to match the site configuration. The programming table below will assist in this setup.

### IO Modules

The Input/Output Module is a non-intrinsically safe module that provides eight separate AC or DC voltage inputs that can range from 3 to 240 volts. In addition to the AC/DC inputs, the IO module also includes four 4-20mA signal outputs.

Group Name	Parameter Name	Parameter Default	Description	Parameter Input
IO Modules				
<b>Module #</b>				
Inputs	Channels	(0)	The number of AC or DC inputs physically wired to the gauge.	0-8
Channel #	Name	(Input 1)	Descriptive name used to identify the input.	abc#
	Enabled	(Yes)	Enables the input.	Yes/No
	Active State	(High)	High will activate channel when high voltage is present. Low will activate channel with no voltage present.	High/Low
	Action	(None)	Create an alarm or event timestamp .	None Alarm Event
Outputs	Channels	(0)	Number of 4-20mA channels in use per module.	0-4
Channel #	Name	(output 1)	Descriptive name used to identify the output	abc
	Enable	(Yes)	Yes if the channel is in use	Yes/No

### AC Input Modules

The AC Input Module is a non-intrinsically safe module that has 12 identical optically isolated AC input channels that can be used for dispenser hook isolation, vapor processor input, or as generic AC inputs.

Group Name	Parameter Default	Parameter Default	Description	Parameter Input
AC Input Modules				
<b>Module #</b>	Channels	(0)	Number of channels in use per module.	0-12
Channel #	Name	(AC Input 1)	Given name of channel.	abc#
	Enabled	(Yes)	Yes if channel is used.	Yes/No
	Active State	(High)	High will activate channel when high voltage is present. Low will activate channel with no voltage present.	High/Low
	Action Setup	None	Create an alarm or event timestamp	None, Alarm, Event

### Probe Modules

The Probe Module gather data from probes or TS-DMS sensors. This information is processed by the Controller Module for use in inventory, reconciliation, V/L Ratio calculation, TS-DMS sensor alarms and to provide information for reports.

Group Name	Parameter Name	Parameter Default	Description	Parameter Input
Probe Modules				
<b>Module #</b>	Channels	(0)	Number of channels in use per module.	0-12
Channel #	Name	(Probe 1)	Given Name of Probe.	abc#
	Type	(TS-LL2)	Type of device connected.	TS-VFM TS-LL2 TS-DMS
	Monthly Compliance	(Yes)	Select Yes if this sensor is to appear on the Compliance page and in the Regulatory report	Yes/No

## 2-Wire Sensor Modules

The 2-Wire Sensor Module is designed to accept 12 sensor inputs per module, and the system as a whole can accept a total of 36 sensors (3 modules with 12 inputs each). The module only supports standard sensors, and does not accept inputs from any 3-wire sensor including BriteSensors®.

Group Name	Parameter Name	Parameter Default	Description	Parameter Input	
<b>2-Wire Sensor Modules</b>					
Module #	Channels	(0)	Number of channels in use per module.	0-12	
	Channel #	Name	(2-Wire Sensor 1)	Given name of channel.	abc#
		Monthly Compliance	(Yes)	Select Yes if this sensor is to appear on the Compliance page and in the Regulatory report	Yes/No

## 3-Wire Sensor Modules

The 3-Wire Sensor Module is designed to accept 8 sensor inputs per module, and the system as a whole can accept a total of 24 sensors (3 modules with 8 inputs each). The 3WSNS can support standard sensors and BriteSensors®.

Group Name	Parameter Name	Parameter Default	Description	Parameter Input	
<b>3-Wire Sensor Modules</b>					
Module #	Channels	(0)	Number of channels in use per module.	0-8	
	Channel #	Name	(3-Wire Sensor 1)	Given name of channel.	abc#
		Type	(Interstitial (EIS) or 2-Wire Sensor)	The type of sensor connected to the channel. After the Channels are entered this will fill in automatically.	Unknown, Interstitial (EIS) or 2-Wire Sensor Discriminating Interstitial Sensor (DIS) Discriminating Dispenser Sump Sensor (DDS) Discriminating Turbine Sump Sensor (DTS) Monitoring Well Sensor (MWS) Hydrostatic Interstitial Brine Reservoir Sensor (HIS) Discriminating Monitoring Well Vapor Sensor (DVS)
		Monthly Compliance	(Yes)	Select Yes if this sensor is to appear on the Compliance page and in the Regulatory report	Yes/No

## 4-20 mA and 4-20 mA EXP Input Modules

The Analog Input Module has 8 identical channels for loop powered IS sensors with a 4-20 mA interface.

The 4-20 mA EXP module is programmed in the same manner. The 420 EXP module is a non-intrinsically safe board located on the hazardous side of the console, must have the wires enclosed in explosion-proof conduit, and has a red front. If a DTU is being used, there will be an option for a "virtual module" labeled Remote Module. The Remote Module gathers information from the vapor pressure sensor when a DTU is used. (see DTU Programming for further details on page 31 in this manual.)

Group Name	Parameter Name	Parameter Default	Description	Parameter Input	
<b>4-20mA Input Modules</b>					
Module #	Channels	(0)	Number of channels in use per module.	0-8	
	Channel #	Name	(4-20mA Input 1)	Given name of the channel.	abc#
		Service Type	(Analog)	Determines the input signal.	Analog Secondary Containment Monitoring Line Leak Detection Vapor Recovery Monitoring FMS Level Probe
		Low Range	-8.00	Low range of mA input	- #
		High Range	8.00	High range of mA input	+ #

## Power Supply Module

The Power Supply is a non-intrinsically safe module that provides power to the T5 series console from line voltage rated 110 - 240 VAC. This module is two inches wide, occupies two slots and is located immediately to the right of the Controller Module. The Power Supply Module has two AC/DC switching power supplies: one power supply is +5V and the other is +24V. The Power Supply also has two relay outputs for use with remote annunciators and two low voltage inputs for emergency generator applications.

Group Name	Parameter Name	Parameter Default	Description	Parameter Input
<b>Power Supply</b>				
<b>TS-TPI</b>	Enable Interface	(Yes)	Enables TS-TPI options.	Yes/No
<b>Controllers</b>	Number of Controllers	(0)	The number of controllers being monitored	1-31
<b>Controller #</b>	Name	Pump 1	Descriptive name used to identify input	abc#
	Enabled	(Yes)	Enables the output	Yes/No
	Type	(Unknown)	The type of FE Petro Smart Controller	<ul style="list-style-type: none"> <li>• Variable Frequency</li> <li>• Smart</li> <li>• Smart 1</li> <li>• 3 Phase Smart 208/380V</li> <li>• Mag/Eco</li> <li>• Unknown</li> </ul>
	Address	(0)	The slave address of the controller as configured by the DIP switches on the Smart Controller.	0-30
	Group	(0)	The Group number this pump is in. Put Pumps located in similar products into the same group for Leveling or Priority mode.	0-15
	Tank	(0)	The tank number (where this Pump is located).	0-29
	Height	(5.00)	The height of the Pump Motor Assembly off of the bottom of the tank in inches.	#
	Number of inputs	(0)	The number of inputs that will have control over activating and deactivating this Pump.	0-32
<b>Groups</b>	Number of groups	(0)	The number of Groups as assigned under controllers.	0-15
<b>Group #</b>	Name	Group 1	Descriptive name used to identify input.	abc#
	Mode	(None)	Select the mode you want. (Refer to the TPI section for more details).	Leveling Priority None
<b>Mode: None</b>				
	Master/Slave	(No)	Select yes if you want both pumps to run during periods of high demand.	Yes/No
	Alternating	(No)	Select yes if you want the pumps to alternate when hook signals drop out.	Yes/No
	Fault Shutdown	(No)	Select yes if you want both pumps to shutdown upon an alarm.	Yes/No
<b>Mode: Leveling</b>				
	Master/Slave	(No)	Select yes if you want both pumps to run during periods of high demand.	Yes/No
	Fault shutdown	(No)	Select yes if you want both pumps to shutdown upon an alarm.	Yes/No
<b>Mode: Priority</b>				
	Reserve	(20)	The percent of volume on the associated tank at which the pump will switch control to the next pump in the group.	#%
	Master/Slave	(No)	Select yes if you want all pumps to run during periods of high demand.	Yes/No
	Fault shutdown	(No)	Select yes if you want all pumps to shutdown upon an alarm.	Yes/No

Group Name	Parameter Name	Parameter Default	Description	Parameter Input
<b>Relays</b>				
<b>Channel #</b>	Name	(Relay 1)	Given name of the relay.	abc#
	Enabled	(Yes)	Whether the Relay is Enabled or not.	Yes /No
	Type	(Unknown)	Equipment connected to the relays output.	Unknown Submersible Alarm Solenoid Dispenser Other
	Polarity	(Normal)	Allow the polarity to be inverted from normally closed to normally open, changing how the relay operates with a loss of system power.	Normal, Invert
	Logic	(OR Logic)	The type of logic that the gate will use to process incoming signals. In OR, if any combination of inputs is active, the relay is active. With AND, when all inputs are active, the relay is active. In XOR, if all inputs are in the same state (on/off), the relay is inactive.	OR, AND, XOR
	Physically Wired As	(Normally Open)	How the relay is wired internally.	NO, NC
	Number of inputs	(0)	Number of devices that can control the relay.	0-32
<b>Input #</b>	Type	(Unknown Module)	Type of module that is sending the signal to control the relay.	Unknown Controller Power Supply IO AE 4-20 Probe 2-wire Sensor 3-wire Sensor
<b>Channel #</b>				
<b>Channel #</b>	Name	(LV Input 1)	Given name of input.	abc#
	Enabled	(Yes)	Whether the input is Enabled or not.	Yes/No
	Active State	(high)	High will activate channel when high voltage is present. Low will activate channel with no voltage present.	High /Low
	Action	(None)	Create an alarm or event with a timestamp	None Alarm Event



## Relay Modules

The Relay Modules come in two styles: a 10 amp module and a 2 amp module. The 2 amp module is a non-intrinsically module that has 8 identical 2 amp Form C output relays and the 10 amp module has 6 identical 10 amp Form C output relays. Each channel has a fuse and three terminals. Each channel can be configured as NO or NC with the power off by wiring to the appropriate terminals.

Group Name	Parameter Name	Parameter Default	Description	Parameter Input
<b>Relay Modules</b>				
<b>Module #</b>	10 Amp Channels	(No) (0)	Select Yes if this is the 10 Amp relay module. Number of relays used on this module.	Yes/No 0-8 (2 Amp module) 0-6 (10Amp Module)
<b>Channel #</b>	Name	(Relay 1)	Given name of the channel.	abc#
	Enabled	(Yes)	Yes if the channel is in use.	Yes/No
	Type	(Unknown)	Equipment connected to the relays output.	Unknown Submersible Alarm Solenoid Dispenser Other
	Polarity	(Normal)	Allow the polarity to be inverted from normally closed to normally open, changing how the relay operates with a loss of system power.	Normal, Invert
	Logic	(OR Logic)	The type of logic that the gate will use to process incoming signals.	OR, AND, XOR
	Physically Wired As	(Normally Open)	How the relay is wired externally.	NO, NC
	Number of inputs	(0)	Number of devices that can control the relay.	1-32
<b>Input #</b>	Type	(Unknown)	Type of module that is sending the signal to control the relay.	Unknown Controller Power Supply AC Input IO Probe 2-wire Sensor 3-wire Sensor 4-20 mA

## Dispenser Interface

The Dispenser Interface is used in the Reconciliation applications to communicate sales data from the dispensers to the console.

Group Name	Parameter Name	Parameter Default	Description	Parameter Input
<b>Dispenser Interface</b>				
<b>Precision</b>				
	Volume Precision	(3)	The number of digits to the right of the decimal point reported by the dispensers.	0-6
	Dispenser Volume	(Gross)	Select Gross if the dispenser volume is not temperature compensated.	Gross/Net
	Modify Volume Units	(No)	Allows changing the Dispenser Volume Units	Yes/No
	Dispenser Volume Units	(Gallons)	Select the units to measure dispenser volume	Liters Gallons Imp. Gallons
<b>Grades</b>				
	Number of Grades	(0)	The number of grades that are on site.	0-32
	Name	(1)	Given name of Grade	abc#
<b>Dispenser Interface Modules: DIM 1</b>				
	Type	(Wayne)	The type of communication from the dispensers.	None Gilbarco Wayne Tokheim G Site Bennett 515
	Communication	(Currant Loop)	The communication protocol of the distribution box.	None Current Loop RS422/485 Tokheim STD RS232 Duplex RS232 RxD x 1 RS232 RxD x 2
<b>Fueling Points</b>				
	Number of fueling points*	(0)	The number of possible fueling points on site	0-32
	Number of hoses	(0)	The number of grades on this dispenser.	0-8
	Hose #	(1)		
	Grade Association	(Unknown)	The grade that is associated with the first hose you dispensed from.	Select the correct grade from the Grades menu.
	Position	(0)	The number that was detected from the Query function after a dispense.	0-9

\* Q The query function is used to determine the Position number from the dispensers.

C Will copy the Position numbers and Grade associations to all fueling points with the same number of hoses. The copy and query functions are available only via the Web Browser Interface.

If using the console touch-screen, the "Auto-configure" button



will initiate the query function. ....(TBD)

## Programming FMS Parameters

Here is where specific equipment parameters will be modified to match the site setup.

### Fuel Management System

Group Name	Parameter Name	Parameter Default	Description	Parameter Input	
Fuel Management System	Ullage Percent	(95)	Percent of tank level used to calculate space left.	70-100 %	
	Delivery Delay	(15 min)	Time in minutes after delivery when increase is reported.	1 -240	
	Correction Temperature	(60.00 °F)	Product temperature correction.	5 -100 °	
	High Product Limit	(Level)	Select whether the High Product alarm will be triggered by high product Level or high product Volume.	Level / Volume	
	Static Tank Testing	Region	(United States)	The region in which the gauge is located	Other United States Spain
		Monthly Leak Test Threshold	(0.20 gph)	Static leak tolerance for testing tanks.	0 -10
		Yearly Leak Test Threshold	(0.10 gph)	Static leak tolerance for testing tanks.	0 -10
		Sentinel Mode Threshold *	(3.00 gph)	If Sentinel Mode is configured, this is the amount of volume that would trigger an alarm.	0 -10
		Confidence	(99%)	Leak testing confidence.	90, 95, 97.5, 99 %
		Minimum Leak Test Time	(2 hr)	Minimum amount of time used to test.	0-8
Maximum Leak Test Time		(8 hr)	Maximum amount of time used to test.	1-8	
Alarm On Precision Leak Test Failure *		(No)	Used to produce an alarm upon failure.	Yes/No	
Tanks	Number of Tanks	(0)	Number of tanks in fuel system.	0-48	
Tank #	Name	(Tank 1)	Given name of tank.	abc#	
	Type	(Special 1)	Type of tank.	Std./Spcl.	
	Manifolded	(No)	Used for Manifolded tanks.	Yes/No	
	Manifold #	(1)	If Manifold is selected, this option will allow you to select a manifold number. Tanks that are Manifolded should have the same manifold number.	1 -24	
	Product #	( 1)	Type of product in tank.	1-48	
	Delivery Threshold	(200.0 gal)	Amount of increase to report delivery.	0.3-9,000,000	
	Theft Threshold	(5.0 gal)	Amount of decrease to report theft.	0.3-9,000,000	
	4-20 mA Output	(None)	If an IO module is used and the outputs are configured, this option will appear. Select the correct output that correlates to this tank.	None Output 1-24	
	Monthly Compliance	(Yes)	Select Yes if this tank is to appear on the Compliance page and in the Regulatory report.	Yes/No	
	Annual Compliance	(Yes)	Select Yes if this tank is to appear on the Compliance page and in the Regulatory report for annual tank testing.	Yes/No	
	Probe	Channel	(Probe 1)	Channel used for the probe in tank.	Probe
		Type	(Standard 101)	Type of probe used in this tank.	Std./Spcl.
Ratio		(1 to 1 tip to head)	Ratio of float movement in proportion to product level. 1:7-9 for use with Moorman gauge interface.	1:1, 7:1, 9:1	
Float Type		(4 in gas)	Type of float(s) used on probe.	4, 3, or 2 in. Gas/Diesel, Stainless, Propane Gas density Diesel Density	
Water Float		(Yes)	Select Yes if water float is present.	Yes/No	
Gradient		(9.03000 µs/in)	Speed of probe wire.	7 -10	
Product Offset		(0.00 in)	Used for compensation of tank tilt. (See Appendix xx: Calculating Tank Tilt).	-1,200,000 to 1,200,000	
Water Offset		(0.00 in)		-1,200,000 to 1,200,000	
Generator Mode		Enable	(No)	If generator testing is being used, select yes.	Yes/No
SCALD		Enable	(No)	Enables SCALD tank testing.	Yes/No
	Qualify	(14 %)	Required percent full to run SCALD test.	# %	

\*These features are only available when Spain is selected for Region

**FMS Parameters Continued**

Group Name	Parameter Name	Parameter Default	Description	Parameter Input	
<b>Fuel Management System</b>					
<b>Special Tanks</b>					
Special #	Shape	(Horizontal cylinder)	Physical shape of the tank.	<ul style="list-style-type: none"> <li>Horizontal Cylinder</li> <li>Vertical Cylinder</li> <li>Rectangular</li> </ul>	
	Length	(160.00 in)	Length of tank in inches.	# in	
	Diameter	(96.00 in)	Diameter of tank in inches.	# in	
	End Type	(Cylinder)	Type of the end of the tank	Cylinder One domed end Two domed ends	
	Dome style	(Spherical)	The type of dome end	Spherical Ellipsoidal	
	Dome Radius	(0.00 in)	Radius of domed end	0-600	
	Correction table				
		Maximum number of points	(0)	The number of strapping data points that will be entered. Begin with 0 inches and 0 volume and end with maximum diameter and capacity.	0-100
	Data	#	Enter known volume for a designated level	Level/Volume	
<b>Special Probes</b>					
Special #	Length	(101 in)	The length of the special probe	#	
	RTD Table	(0.00 in)	The distance to the first RTD location. (+ adds positions, typically 5 in total)	# In	

**Manifold Tank System**

Group Name	Parameter Name	Parameter Default	Description	Parameter Input	
<b>Fuel Management System</b>					
<b>Manifolds</b>					
Manifold #	Name	(Manifold 1)	Given name of manifold.	abc#	
	Product #	(1)	Number of product in tanks.	1-48	
	Delivery Threshold	(200.0 gal)	Amount of increase to detect delivery.	# gal	
	Theft Threshold	(5.0 gal)	Amount of decrease to detect theft.	# gal	
	Monthly Compliance	(Yes)	Select Yes if this manifold is to appear on the Compliance page and in the Regulatory report	Yes/No	
	Limits	Low Product Volume Limit	(0.0)	The volume that will trigger the Low Product alarm.	# gal
		Low Low Product Volume Limit	(0.0)	The volume that will trigger the Low Low Product alarm.	\$ gal
	SCALD	Enable	(No)	Enables SCALD tank testing	Yes/No
		Qualify	(14%)	Required percent full to run SCALD test	%
	Products	Name	(Product 1)	Given name of product	abc#
Type		(Unleaded Regular)	The type of product	Unleaded regular Unleaded plus Unleaded extra Unleaded super Diesel Kerosene #2 Fuel Oil Ethanol Special Product N	
Color		(Default)	Assigns colors to grades for identification in the touch-screen interface.	White, Blue, Red, Yellow, Orange, Gold, Green, Purple, Beige, Brown, Gray, Black	

Group Name	Parameter Name	Parameter Default	Description	Parameter Input
Special Products				
Special N	Correction Type	(Table 6A)	As defined by the fuel provider	Table 6a Table 6b Table 6c
	API Gravity	(63-500)	As defined by the fuel provider	#
	Alpha	(600.000)	As defined by the fuel provider	#
	Density	(500.0)	As defined by the fuel provider	#
	Mole Weight	(130.000)	As defined by the fuel provider	#
	Vapor A	(12.101)	As defined by the fuel provider	#
	Vapor B	(8,907.000)	As defined by the fuel provider	#
Lines	Number of lines	(1)	Number of tanks in the fuel system	0-48
Line#	Name	(Line 1)	Given name of line	abc#
	Submersible Pump module	(Relay Module)	The module where the STP is connected	Relay Module Power Supply Module
	TPI	(Yes)	This option will appear if you select the Power Supply Module	Yes/No
	Submersible Pump Channel	(Relay 1)	Select the Relay Channel or pump that is associated with this line.	Relays Pumps
	Transducer	(4-20mA Input 1)	Select the correct transducer for this line	UNL Transducer Premium Transducer Diesel Transducer
	Enable SLLD	(Yes)	Select yes to enable Statistical Line Leak Detection software. This will disable the scheduling for Monthly Line Leak below	Yes/No
	Product	(None)	Select the Product associated with this line.	Product N
	Enable	(No)	Select Yes to enable line leak detection.	Yes/No
	Monthly Compliance	(Yes)	Select Yes if this Line is to appear on the Compliance page and in the Regulatory report.	Yes/No
	Annual Compliance	(Yes)	Select Yes if this Line is to appear on the Compliance page and in the Regulatory report for annual tank testing.	Yes/No
	Pressure Up Test Wait Time	(4 sec)	The amount of time to wait for Pressure to develop in the line after demand has been made	1-8 sec
	Catch Pressure Wait Time	(2 sec)	The amount of time to wait for the pressure in the line to stabilize after dispensing has finished	1-4 sec
	Dispenser Pressure Test	(Yes)	Select Yes if dispenser Pressure Test should be performed.	Yes/No
	Catch and Sudden Pressure Test	(Yes)	Select Yes if Catch and Sudden Pressure Tests should be performed.	Yes/No
Gross Test	Enable	(Yes)	Select Yes to Enable Gross leak test of 3 gph.	Yes/No
Monthly Tests	Enable	(Yes)	Select Yes to Enable monthly leak tests of 0.2 gph.	Yes/No
	Wait Period Between Passed Tests	(0 Days)	The amount of time the system will wait after a passed monthly test before starting another one.	0, 1, 7, 14
	Shutdown on Test Fail	(Yes)	Select Yes to disable dispensing upon a failed test.	Yes/No
	Fails Before Shutdown	(1)	The number of fails before the system will disable dispensing.	1-3
Annual Tests	Enable	(Yes)	Select Yes to Enable Annual leak tests of 0.1 gph.	Yes/No
	Wait Period Between Passed Tests	(0 Days)	The amount of time the system will wait after a passed annual test before starting another one.	0, 7, 30, 90
	Shutdown on Test Fail	(Yes)	Select Yes to disable dispensing upon a failed test.	Yes/No
	Fails Before Shutdown	(1)	The number of fails before the system will disable dispensing.	1-3
Grades				
Grade 1	First Tank	(Tank 1)	Select the tank that Grade 1 is associated to. Dependent on how many tanks and the tank names	abc
	Second Tank	(None)	Select a second tank if this grade is blended	abc
	Blending Ratio	(100.00%)	Select the amount of product from the first tank	##%

Group Name	Parameter Name	Parameter Default	Description	Parameter Input
Reconciliation	Over Short Limit Percent	(1.00%)	Gives the allowed amount on variance report	0-100%
	Over Short Limit Volume	(130.0 gal)	Combines with the Over Short % to give allowed volume variance	#
	Sales	(Yes)	The calculation of the variance will be based on Sales, Deliveries or Tank Volume. If all are selected, it will be based on the highest	Yes/No
	Deliveries	(Yes)		Yes/No
	Tank Volume	(Yes)		Yes/No
Autocalibration	Autostop Volume Coverage	(100%)	How much volume must be used before the Autocalibration stops.	#%
	Autostop Level Coverage	(80%)	How much level must be used before the Autocalibration stops	#%
	Autostop Number of Points Coverage	(100)	How many tank chart points must be created before Autocalibration stops.	#
Compliance Tracking	Enable Notification	(Yes)	Allows the system to notify user about compliance warnings & alarms.	Yes/No
	Assessment Time	(12:00)	Determines the time that the system will assess the compliance status.	Time

### Secondary Containment Monitoring

Group Name	Parameter Name	Parameter Default	Description	Parameter Input
Secondary Containment Monitoring	Number of Containments	(0)	Select the number of containments present.	0-48
Containment N	Name	(Containment 1)	Given name of the containment	abc#
	Enabled	(Yes)	Select Yes if this containment will be monitored.	Yes/No
	Pump Shutdown on Alarm	(No)	Do you want to disable the pump on a containment alarm?.	Yes/No
	Submersible Pump Module	(Relay module)	Select the module that has control of the STP that is associated with this containment.	Relay Module Power Supply Module
	TPI	(No)	Select Yes if TPI is controlling the STP.	Yes/No
	Submersible Pump Channel	(Relay 1)	Select the channel that has control of the STP that is associated with this containment.	Relay # Pump #
	Transducer	(4-20mA Input 1)	Select the transducer that is associated with this containment.	4-20mA #

### Rules

Group Name	Parameter Name	Parameter Default	Description	Options
<b>Rules:</b> Rules are a logic-based programming that are driven off of "If" based Events and "Then" Based actions. Essentially: "If" this event occurs "Then" the console will perform a specified action.				
Rule – New Rule #	Name	(New Rule #)	Given name of rule.	abc#
	Enabled	(No)	Yes to enable rule.	Yes/No
<b>Events:</b> Events can be both "If" logic and "Or" Logic. Therefore you can have several events trigger the same action. "If" Event 1 "Or" Event 2 occurs the console will perform a specified action.				
Event	Type	(New Alarm Occurred)	Event type that triggers action.	New Alarm Occurred; Alarm Status Changed; Application Event; Scheduled
	Category	(Any)	System that event occurs in to trigger action.	Any, System, FMS, VRM, SCM, Other
	Code	(Any)	Error/Trouble Event Code that triggers action.	(see below)
	Device	(Any)	Device that created the alarm condition.	Various
	State	(Any)	State of alarm to trigger action.	Various
<b>Action:</b> Actions are sequentially "Then"/"And" driven. Therefore, "If" an Event occurs "Then" the console will perform Action 1 and then Action 2 and then Action 3.				
Action	Type	(E-mail)	Action that will occur upon event	E-mail, Report, Relay, Tank Testing, Line Testing, Sentinel mode, Reconciliation, sound, Notify SSA, Sample input, STP Control, Generator
	Address	your.email@address.com	Where it will send e-mail	
	Contact	Generated	What e-mail format is used	Generated, Text, HTML, Other
	Template	Text	E-mail Template	HTML, Text, short text
OTB	This sets up rules that are displayed on the One Touch Buttons (OTB) on the console's Home page. The setup process is that same as Rules (above).			

# Web Browser Interface

## Navigating Applications Remotely

The Web Browser Interface offers several ways to navigate through applications:

- Easy-to-read web pages that use hyperlink text (words or characters that, when clicked, take you to another page) to move through the menus,
- Text and drop boxes and buttons allow inputs to be made efficiently,
- On-screen prompts automatically pop-up instructions to verify each step.

Not all application functions, like Network Configurations, are available at all levels. To access these options, you need to be logged in at a high enough User Role.

## Accessing the Web Browser Interface

1. To access the console using a computer, open a web browsing application.
2. Type the IP address (the default IP Address is 192.168.168.168) into the address bar of the browser window. To access the console using a remote PC, setup communications per Section 2 of this manual. When using a PC to access console applications through a direct or network connection, a T5 console incorporates a XML (eXtensible Markup Language) based access method. If the console is equipped with an optional LCD screen, the connection settings may be modified using the touch screen function of the console.

## Making Changes to System Parameters

1. To make any changes on a settings page, click **Edit**.
2. Once the preferred selections have been altered, click the confirmation option **Yes** in the yellow shaded area near the top of the window.
3. At this point, the system may prompt for a password.

## Password Prompting

After changes have been made to the consoles parameters, if the appropriate access level has not been entered, the system will prompt for a password.

If you haven't obtained the appropriate access level, you will be prompted "Error: Insufficient privileges" in a colored area, near the top of the window.



**Error:** Insufficient privileges **Password:**

1. Type the password for the access level required to save changes into the text-box and click **Apply**.
2. You will then be prompted again to save your changes; click the confirmation option **Yes** in the yellow shaded area near the top of the window.

When you've finished configuring your programming options, keep system security in mind and, to prevent unauthorized personnel from gaining access to console configurations, lower the access level to Guest. To do this from the Web Browser Interface, click **TS-550 evo System - Administrator access level**. Notice that the User Role changes back to Guest.

## Setup

The programming options for the Web Browser Interface are identical to the LCD interface; however, they are represented differently due to their respective graphical interfaces. Use the programming tables in Section 3 as a reference in programming your console with a web browser.

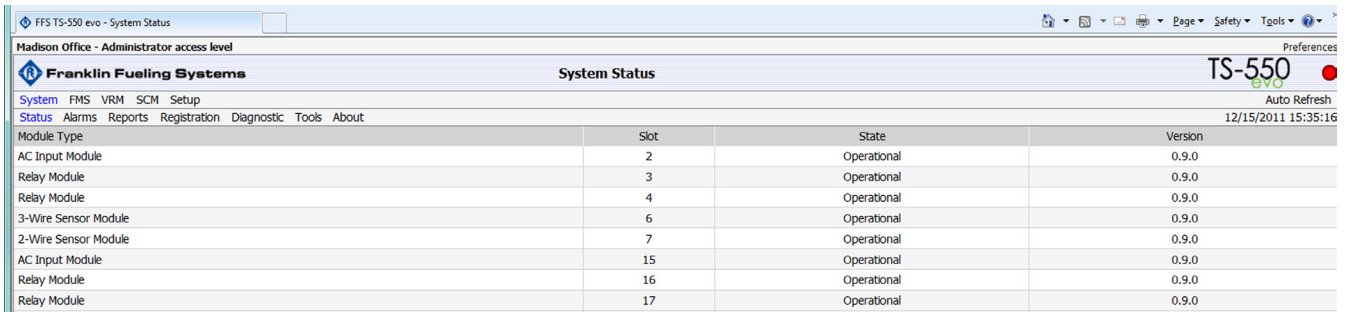


# Backup Setup Files

## Download

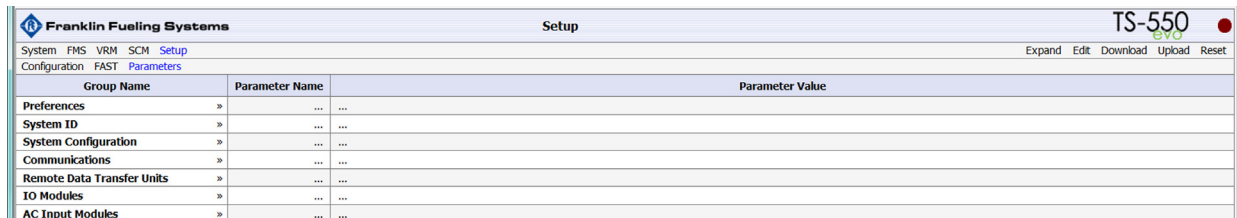
Backup allows you to download the setup file and store it on any PC connected to the console. This file can be uploaded to the console to recover lost settings or copy settings from one site to another.

1. Open a web browsing application, type the IP address (the default IP address is 192.168.168.168) into the address bar of the browser window.
2. The console will navigate to the **Home Status** page, indicated by the word **Status** displayed in the header.



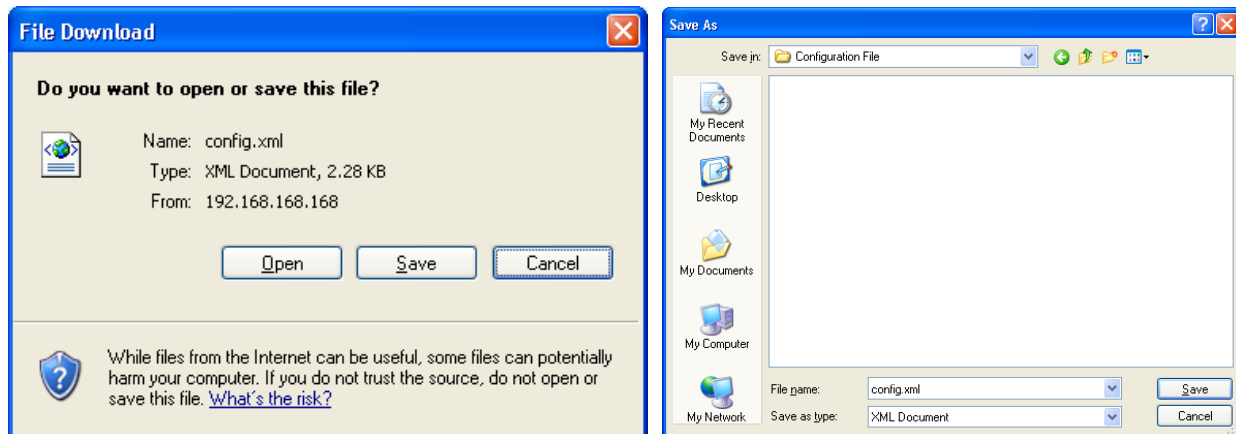
Module Type	Slot	State	Version
AC Input Module	2	Operational	0.9.0
Relay Module	3	Operational	0.9.0
Relay Module	4	Operational	0.9.0
3-Wire Sensor Module	6	Operational	0.9.0
2-Wire Sensor Module	7	Operational	0.9.0
AC Input Module	15	Operational	0.9.0
Relay Module	16	Operational	0.9.0
Relay Module	17	Operational	0.9.0

3. Left-Click once on **Setup**.



Group Name	Parameter Name	Parameter Value
Preferences	...	...
System ID	...	...
System Configuration	...	...
Communications	...	...
Remote Data Transfer Units	...	...
IO Modules	...	...
AC Input Modules	...	...

4. To download a site configuration, click **Download**. A File Download dialog box may appear, and, if it does, select **Save** to open an explorer window. (You may need to temporarily disable any pop-up blocker)



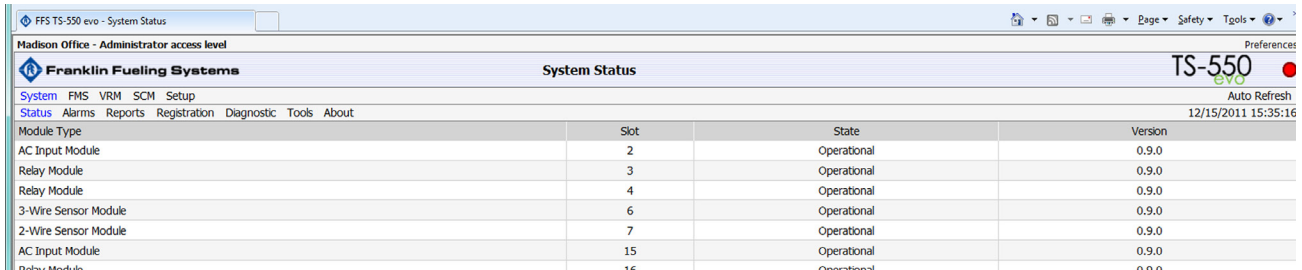
5. Select a location to save the configuration file. Then, type the File Name under where you want to save it. Use something that identifies the file with the site and represents the date saved. Click **Save**.



## Upload

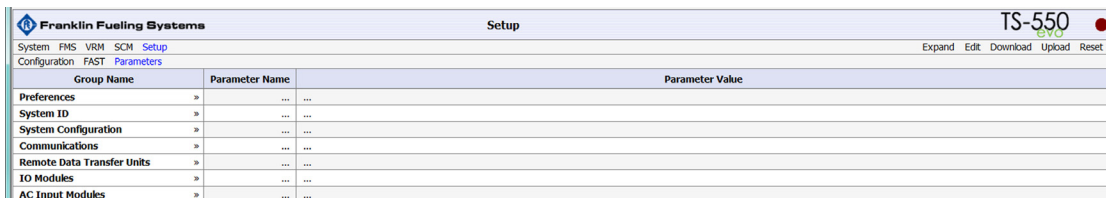
When required, the backup configuration file will need to be reloaded onto the console to restore a previous setup. *When uploading, it is important to remember that network parameters may be affected by the change, rendering it unreachable from a remote location. If the downloaded file contains an IP address different from the one currently in use, someone will need to locally reprogram the correct address into the console in order to communicate remotely.*

1. Open a web browsing application, type the IP address (the default IP Address is 192.168.168.168) into the address bar of the browser window. The console will navigate to the Home Status page, indicated by the word Status in the header.



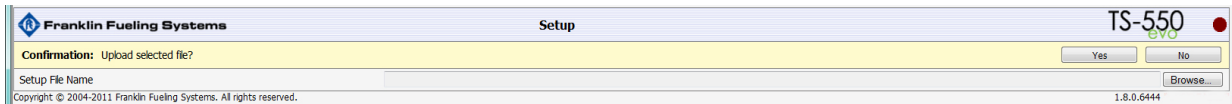
Module Type	Slot	State	Version
AC Input Module	2	Operational	0.9.0
Relay Module	3	Operational	0.9.0
Relay Module	4	Operational	0.9.0
3-Wire Sensor Module	6	Operational	0.9.0
2-Wire Sensor Module	7	Operational	0.9.0
AC Input Module	15	Operational	0.9.0

2. Left-click once on **Setup**.

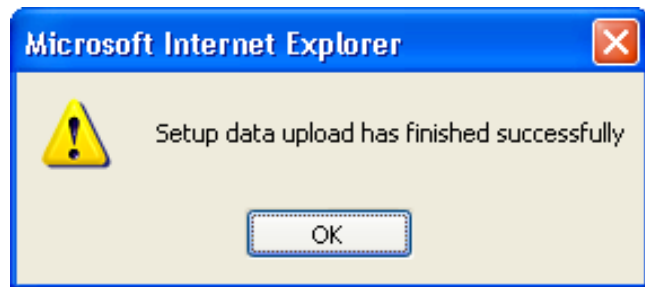
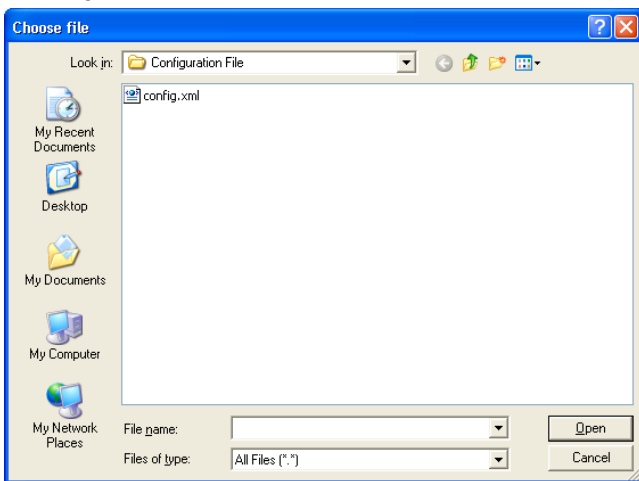


Group Name	Parameter Name	Parameter Value
Preferences	...	...
System ID	...	...
System Configuration	...	...
Communications	...	...
Remote Data Transfer Units	...	...
IO Modules	...	...
AC Input Modules	...	...

3. To upload a configuration file, click **Upload** on the Setup page. *At this point, the console may prompt for a password if the proper access level has not been obtained.*



4. An Upload Confirmation window will open. Left-Click **Browse** to locate the correct file. Click on the file name, and then click **Open**.



The file is now stored in the location of your choice and ready to upload when necessary. It is recommended that a backup copy of this file is created and stored on another medium, to ensure that the file's integrity is maintained.

This process may take a few moments for the console to apply the settings and reboot. To indicate that the update was successful, you will see this notification window.

## DIM Programming

1. For Web Browser programming capability, connect a computer to the T5 series tank gauge. (See programming section of this manual for connection information)
2. From the **Home** screen, click **Setup**
3. Click **System Configuration**, then **Modules Expected**.

**Note:** The TS-550evo can be built with the DIM module installed in the console. It is also possible to have DIM capability installed by a technician in the field. For information on installing the DIM module in the field, refer to DIM Module Installation Guide (part 000-2044)

4. If the TS-550evo was sent with DIM capability, verify that under **Modules Expected**, DIM is set to 1.
5. If the DIM module was installed in the field, you may need to set DIM to 1. Click on Edit in the upper right corner of the screen to allow the DIM setting to be changed to 1.
6. Under Setup, click on **Dispenser Interface/Precision**.

Probe Modules	»	...	...
4-20mA Input Modules	»	...	...
Power Supply	»	...	...
Relay Modules	»	...	...
<b>Dispenser Interface</b>			
Precision		Volume Precision	3
		Dispenser Volume	Gross
		Modify Volume Units	Yes
		Dispenser Volume Units	Gallons
Grades	»	...	...
Dispenser Interface Modules	»	...	...
Fuel Management System	»	...	...
Vapor Recovery Monitoring	»	...	...
Secondary Containment Monitoring	»	...	...
E-Mail	»	...	...
System Sentinel AnyWare	»	...	...
Rules	»	...	...

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7. **Volume Precision** refers to the number of digits to the right of the decimal. It will only affect how the information is displayed. Default is 3.
8. **Dispenser Volume** can be entered as Gross or Net.
  - a. Gross-not temperature compensated (typical US)
  - b. Net-temperature compensated (typical Canada)
9. Under **Dispenser Interface**, click **Dispenser Interface Modules**

Power Supply	»	...	...
Relay Modules	»	...	...
<b>Dispenser Interface</b>			
Precision		Development Mode	No
		Volume Precision	3
		Dispenser Volume	Gross
		Modify Volume Units	Yes
		Dispenser Volume Units	Gallons
Grades	»	...	...
<b>Dispenser Interface Modules</b>			
DIM 1		Type	None Gilbarco Wayne Tokheim GSite
		Communication	Current loop
Fueling Points	»	...	...
Fuel Management System	»	...	...
Vapor Recovery Monitoring	»	...	...
Secondary Containment Monitoring	»	...	...
E-Mail	»	...	...
System Sentinel AnyWare	»	...	...
Rules	»	...	...

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10. **Type** refers to the manufacturer of the Dispenser Distribution box. Select the type from the drop down list.

Some typical examples:

- **Gilbarco**-Universal D-Box (PA0261 Series)
- **Wayne**-Wayne/Dresser D-Box
- **GSite**-Gilbarco MOC G-Site and Passport Systems
- **Tokheim**-M98, M94 Power Center, 67 DBoxes

Power Supply	»	...	...
Relay Modules	»	...	...
<b>Dispenser Interface</b>			
Precision		Volume Precision	3
		Dispenser Volume	Gross
		Modify Volume Units	Yes
		Dispenser Volume Units	Gallons
Grades	»	...	...
<b>Dispenser Interface Modules</b>			
DIM 1		Type	Wayne
		Communication	<div style="border: 1px solid black; padding: 2px;">           Current loop            RS422/485            Tokheim STD            RS232 Duplex            RS232 Rx/D x 1         </div>
Fueling Points	»	...	...
Rel Management System	»	...	...
Recovery Monitoring	»	...	...

11. **Communication** refers to the method of communication used by the corresponding distribution box.

Some typical examples:

- Current loop-Gilbarco PA0261x000011-PA0261x00020, Wayne/Dresser D-Box
- RS422/485-Gilbarco PA0261x000011-PA0261x000021
- RS232 Duplex-Gilbarco MOC G-Site Systems

12. Under **Dispenser Interface**, select **Grades**.

Power Supply	»	...	...	
Relay Modules	»	...	...	
<b>Dispenser Interface</b>				
Precision	»	...	...	
Dispenser Interface Modules	»	...	...	
Grades		Number of Grades	4	
	Grade 1	Name	Unlead Regular	
	Grade 2	Name	Unlead Midgrade	
	Grade 3	Name	Unlead Premium	
	Grade 4	Name	Diesel	
Fueling Points		Number of Fueling Points	12	
	Fueling Point 1	Q C	Number of Hoses	3
		Hose 1	Grade Association	Unlead Regular
			Position	6
	Hose 2	Grade Association	Unlead Midgrade	
		Position	4	
	Hose 3	Grade Association	Unlead Premium	
Position		2		

13. **Number of Grades** refers to the number of grades used at the site. Select the appropriate number from the drop down list.

14. Enter a Name for each grade entered in Number of Grades. This text box will allow entries of specific names per customer request.

15. Under **Dispenser Interface**, select **Fueling Points**.

<b>Power Supply</b>	»	...	...
<b>Relay Modules</b>	»	...	...
<b>Dispenser Interface</b>			
<b>Precision</b>	»	...	...
<b>Dispenser Interface Modules</b>	»	...	...
<b>Grades</b>		Number of Grades	4
<b>Grade 1</b>		Name	Unlead Regular
<b>Grade 2</b>		Name	Unlead Midgrade
<b>Grade 3</b>		Name	Unlead Premium
<b>Grade 4</b>		Name	Diesel
<b>Fueling Points</b>		Number of Fueling Points	12
<b>Fueling Point 1</b>	»	...	...
<b>Fueling Point 2</b>	»	...	...
<b>Fueling Point 3</b>	»	...	...
<b>Fueling Point 4</b>	»	...	...

**Note:** A Fueling Point is anywhere a vehicle can stop and dispense fuel. Most dispensers have two fueling points. (front and back).

16. Select the Number of Fueling points from the drop down list.

<b>Power Supply</b>	»	...	...
<b>Relay Modules</b>	»	...	...
<b>Dispenser Interface</b>			
<b>Precision</b>	»	...	...
<b>Dispenser Interface Modules</b>	»	...	...
<b>Grades</b>		Number of Grades	4
<b>Grade 1</b>		Name	Unlead Regular
<b>Grade 2</b>		Name	Unlead Midgrade
<b>Grade 3</b>		Name	Unlead Premium
<b>Grade 4</b>		Name	Diesel
<b>Fueling Points</b>		Number of Fueling Points	12
<b>Fueling Point 1</b>	Q C	Number of Hoses	3
<b>Hose 1</b>		Grade Association	Unlead Regular
		Position	6
<b>Hose 2</b>		Grade Association	Unlead Midgrade
		Position	4
<b>Hose 3</b>		Grade Association	Unlead Premium
		Position	2

17. Under **Fueling Points**, select **Fueling Point 1**.

18. Select the Number of Hoses from the drop down list.

**Note:** Hose is defined as “each type of product that can be dispensed from a fueling point” A fueling point with only one physical hose, but three available grades, would be entered as **Number of Hoses = 3**.

19. Under Fueling Point 1, select Hose 1, then Grade Association.

20. Select from the drop down menu the grade associated with Hose 1. Click OK.

21. Select **Position**.

There are two ways to program the Hose Position:

- Manually-If you know the D-Box grade position you can manually select the Position number from the drop down list.

3-Wire Sensor Modules	»	...	...
4-20mA Input Modules	»	...	...
Power Supply	»	...	...
Relay Modules	»	...	...
Dispenser Interface			
Precision	»	...	...
Dispenser Interface Modules	»	...	...
Grades		Number of Grades	4
Grade 1	Query Button	Name	Unlead Regular
Grade 2		Name	Unlead Midgrade
Grade 3		Name	Unlead Premium
Grade 4		Name	Diesel
Fueling Points		Number of Fueling Points	12
Fueling Point 1	Q C	Number of Hoses	3
Hose 1		Grade Association	Unlead Regular
Hose 2		Grade Association	Unlead Midgrade
Hose 3		Grade Association	Unlead Premium
Fueling Point 2	Q C	Number of Hoses	3
Hose 4		Grade Association	Unlead Regular

- By selecting **Q** next to the Fueling Point, the gauge will automatically Query the D-Box and fill in the information. For the Query function to work, all equipment must be installed and connected, and all positions must be set to 0.

After hitting the Query button, you will be prompted that programming for that fueling point will be overwritten. Select OK. You will then be prompted to dispense a small amount of product (approximately 0.03 gal.) Follow the on-screen instructions. The positions will then be automatically entered into the programming. If other fueling points are identical, simply hit the Copy button © and the positions will fill in. There is no need to re-query and dispense fuel if fueling points are identical.

## Rules

Rules can be used to generate the DIM reports.

The following is an example of generating a daily reconciliation report:

Rule - Over-Fill Alarm	»	...	...
Rule - Reconciliation Report	-	Name	Reconciliation Report
		Enabled	Yes
Events	+		
Event	-	Type	Schedule
		Schedule Type	Daily
		Time	05:00
Actions	+		
Action	-	Type	Reconciliation
		Reconciliation Action	Open Period
Action	-	Type	Reconciliation
		Reconciliation Action	Generate Summation Report
Rule - Print Reconciliation Report	-	Name	Print Reconciliation Report
		Enabled	Yes
Events	+		
Event	-	Type	Schedule
		Schedule Type	Daily
		Time	06:00
Actions	+		
Action	-	Type	Report
		Report Name	DIM Reconciliation Report
		Reconciliation Report Type	Daily
		Report Action	Print
		Print Device	Internal

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In the example above, two rules are used. The first rule Rule-Reconciliation Report is used to define the start time of the reconciliation period. In this case, 5:00 a.m. The two actions are used to 1) Open a new period, which closes the last one, and 2) Generate a Summation Report. When a summation report is generated, it is stored, but not printed.

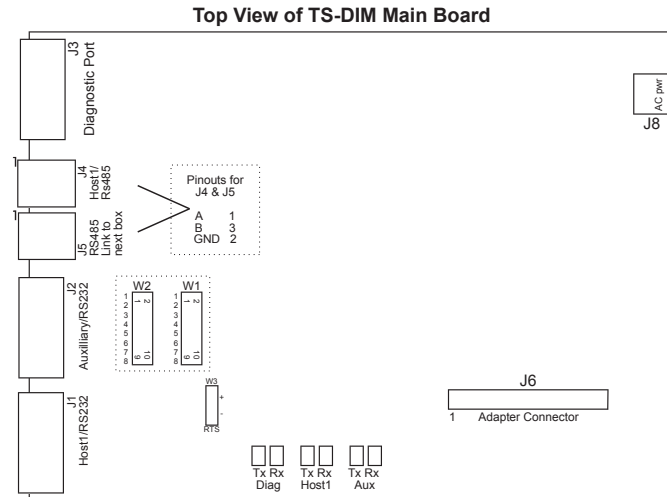
To print the report, a second rule is established. In the example, this is the Print Reconciliation Report rule. A DIM reconciliation report can be printed without using the last action from this rule, by selecting reports and then DIM Reconciliation per the customer's request.

## Dual DIM Installation

Some sites and dispenser configurations may require the use of a second DIM module that would be installed externally to perform reconciliation. This section outlines the special installation steps required to install a second TS-DIM on a T5 series console.

## Hardware Configuration

In order for the external TS-DIM module to communicate properly with the T5 series console a few jumpers will need to be adjusted. To make these adjustments the cover of the TS-DIM will need to be removed to access the jumpers.

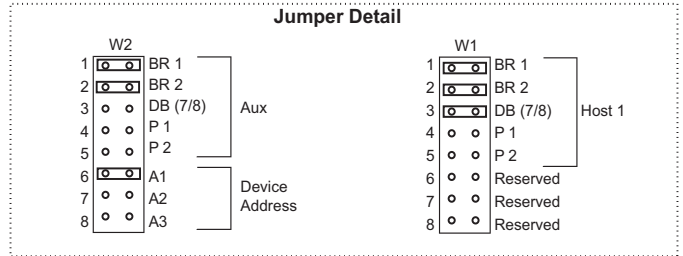


## Device Address

The internal DIM module in the T5 series console will always be addressed as zero. By default an external TS-DIM will come shipped with an address of zero also. For these two devices to exist on the same system the external TS-DIM will need to have its address changed to one. Set the external TS-DIM's address to one by placing a jumper on row 6 of W2.

## Communication Settings

Once the external DIM has been addressed properly the communications for the Host 1 port will need to be changed to match the internal DIM communication settings. The internal DIM's communication settings are: 9600 Baud Rate, 8 Data Bits, No Parity. To properly configure the communication setting on the external DIM you will need to place jumpers on the following rows 1, 2, and 3 of W1.



## Wiring the TS-DIM to a T5 Series Console

**Warning** Turn off the main power source / all power sources that terminate in the console before working on or servicing this equipment. Failure to do so will create a lethal electrical shock hazard.

1. Make sure all power to the T5 Series console is turned off at the power source.
2. Locate the Communication Ports on the T5 series console.
3. Terminate the wires as follows:
  - a. Wire 485A to Terminal 485A
  - b. Wire 485B to Terminal 485B
  - c. Wire S.RTN to Terminal GND

**Note:** There may be RS-485 interface wires already connected to the terminals. In this case, remove the wire(s) and splice them with the appropriate TS-DIM wire. Reinsert these into the correct terminal and tighten the screw. Connect the other end (RJ-45 connector) to the Host in the External DIM, not to the RS485



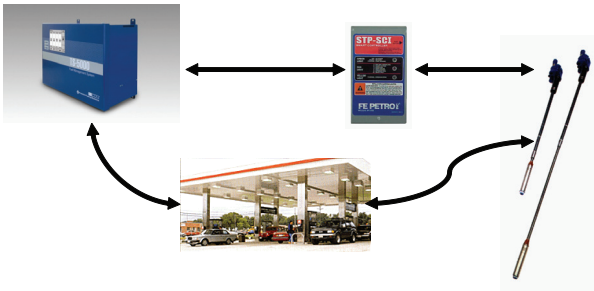
## TS-TPI Overview and Functionality

Tank fuel management can be achieved using a Franklin Fueling Systems TS-550 evo Series Fuel Management Systems and an FE Petro Turbine Pump Controller (STP-SCI, SCIII, EcoVFC or MagVFC) through Turbine Pump Interface (TPI). Refer to Bulletin TB1010-04 for connecting to an STP-SCIII controller.

Tank Fuel Management looks at percent (%) full volume of individual tanks and gives priority to the submersible pump needed to control tank inventories. Additional features and benefits of the Tank Fuel Management system include:

- Tank Overfill Protection
- Dry Tank Indication
- Automatic pump controller reset
- Clogged Intake Indication
- Pump in Water Indication.
- Use of additional pumps in the same group when demand increases

Tank Fuel Management can be used to keep tank levels similar, eliminating the need for a syphon system. Tank Fuel Management can also be used to pump down one tank to a user defined level, and then switch over to the other tank for fuel dispensing. In either case, there must be at least one submersible pump in each tank.



*TS-TPI Overview*

The TS-TPI programming function allows the controllers to be “grouped” together, and be programmed for specific fuel management options. These options are NONE, LEVELING, and PRIORITY

- NONE means NO level management for the selected pump group. (Default setting.)
- LEVELING mode seeks to maintain an equal level of fuel in each tank by placing pump controllers associated with the tank containing the most amount of fuel to priority. This will force the pump installed in the tank with the highest level of fuel to activate with the next activation of a dispenser switch.

**Note:** Leveling is achieved using level as percentage volume full. The tank gauge will look at levels in a tank as % full, and will attempt to keep that number equal between all tanks in LEVELING mode. If tanks are different sizes, the levels in tanks may not be equal, but the % full for each tank will be similar.

- PRIORITY mode tries to pump down one tank before switching to other tank(s). After choosing PRIORITY mode, the technician will program the RESERVE

setting. The reserve level is input as a percent full in the tank. When the RESERVE level is reached for that tank, priority will switch to the pump in the other tank. If both tanks are below RESERVE level the ATG will automatically use Leveling until tanks receive a delivery of fuel or reach Dry Tank Indication Levels.

**Note:** In both Leveling and Priority modes, the ATG chooses which pump will take priority. Because of this, the pump controllers should be set to **Master-Slave**, not **Master-Slave/Alternating Circuit**. If the pump controllers are configured for Master-Slave/Alternating Circuit, the pumps will not turn on in a predictable manner. Tanks that are in Leveling or Priority mode are monitored and tested as separate tanks and should NOT be siphoned.

**Other TS-TPI functions include;**

**Overfill Protection:** when the LEVELING and PRIORITY modes are chosen, if a tank level rises above its high level limit, that tank will become the priority tank, regardless of what leveling mode is active. If the level in that tank continues to rise and reaches the high-high limit, all pumps in the group will be shutdown, except for the pump in the tank with the high-high alarm. In-line check valves used to prevent overfill conditions in manifolded tanks, such as those used with Red Jacket submersible pumps, are not required or recommended.

**Note:** The Overfill Protection feature will work correctly ONLY when the high and high-high level alarms are programmed correctly. Failure to set high and high-high level alarms will result in a loss of overfill protection.

**Dry Tank Indication:** TS-TPI programming enables the user to enter a PUMP HEIGHT measurement (default is 5”). This is the distance between the bottom of the pump motor to the bottom of the tank. When the pump controller indicates an Under-Load condition and the product level is within 3” of the programmed PUMP HEIGHT measurement, an alarm on the tank gauge will indicate DRY TANK. When a delivery is made, the pump controller will automatically be reset.

**Note:** Because the TS-TPI resets the pump controller after a delivery is made, the Auto Restart feature on the pump controller must be disabled.

**Clogged Intake Indication:** The combination of a pump controller Under-load condition and a tank level that is at least 3” greater than the programmed PUMP HEIGHT measurement will cause a CLOGGED INTAKE indication. Because the tank gauge is able to confirm that there is fuel in the tank, this alarm indicates a motor intake that is being blocked by a foreign object. Hence the pump stops and start for 3 times to try to remove the foreign object.

**Pump in Water Indication:** If the tank gauge records a water level that is within 2” of the programmed PUMP HEIGHT measurement, the pump will become disabled. The tank gauge will indicate a PUMP IN WATER alarm.



## TPI Setup

Group Name	Parameter Name	Parameter Default	Description	Max Value	
<b>Power Supply</b>					
<b>RS-485</b>					
<b>TS-TPI</b>					
<b>Controllers A*</b>					
<b>Controller 1</b>		Name	Unlead Pump 1	Given Name of the pump controller	abc#
		Enabled	(Yes)	Enables the controller.	Yes/No
		Type	(Mag/ECO)	Type of controller used	Variable Frequency Smart 3 phase smart Smart I Mag/Eco unknown
		Address	(1)	Unique address of the controller	30
		Group	(0)	Controller group number (if a member of a group)	15
		Tank	(1)	Tank associated with controller	48
		Height	(5.00 in)	Approximate distance of pump motor from tank bottom	#
		Number of Inputs	(1)	Number of inputs that will activate controller	32
<b>Input 1</b>		Type	AC Input Module	Select module that contains the input	Modules listed
		Channel	Disp. 1/2 Unleaded	Specific input that will activate the controller	12
<b>Controller 2</b>					
		Name	Unlead Pump 2	Given Name of the pump controller	abc#
		Enabled	(Yes)	Enables the controller.	Yes/No
		Type	(Mag/ECO)	Type of controller used	Variable Frequency Smart 3 phase smart Smart I Mag/Eco unknown
		Address	(1)	Unique address of the controller	30
		Group	(0)	Controller group number (if a member of a group)	15
		Tank	(1)	Tank associated with controller	48
		Height	(5.00 in)	Approximate distance of pump motor from tank bottom	#
		Number of Inputs	(1)	Number of inputs that will activate controller	32
<b>Input 1</b>		Type	AC Input Module	Select module that contains the input	Modules listed
		Channel	Disp. 1/2 Unleaded	Specific input that will activate the controller	12

\* When in the Edit mode of Setup, an A will appear for AutoConfigure. When the AutoConfigure Option is used, the tank gauge will locate all of the controllers that are properly wired in the system and identify them.

Note: All DIP switch settings for the FE Petro controllers should be set as stand alone controllers, with the exception of the addressing. All controllers need to have a unique address that is NOT set to 0). Note that the SCIII must be placed in slave mode for TPI to function.

# List of Alarms and Troubleshooting

For all alarms conditions, the troubleshooting steps provided in this chapter are suggested actions to take in the event of an alarm. Follow all site policy procedures set by local governing agencies in the case of a spill, leak, or malfunction. If the steps provided by this manual or the site policy are followed and the system still requires additional support, contact Franklin Fueling Systems Technical Services.

Alarms are listed in sections for System Alarms, VRM Alarms, FMS Alarms, SCM Alarms, Wire Sensor Alarms, LLD Alarms, TPI Alarms, Printer Alarms and Miscellaneous Alarms.

## System Alarms

Displayed Alarm / Warning	Device	Description	Recommended Actions
<b>2-Wire Sensor Module is Offline</b>	Slot	2-Wire Sensor Module is offline due to unknown causes.	Follow safety procedures before working inside of the console. Visually verify a steady, green "Run" light. If a red "Err" light is flashing or steady, try to reboot the system. If the condition still exists, contact Franklin Fueling Systems' Technical Services Dept. for support on this issue.
<b>2-Wire Sensor Module Setup Error</b>	None	Programming errors made during setup of the 2-Wire Sensor Module.	Verify 2-Wire Sensor Module programming parameters. If the condition still exists, contact Franklin Fueling Systems' Technical Services Dept. for support on this issue.
<b>2-Wire Sensor module number mismatch</b>	Slot	2-Wire Sensor Modules detected does not match the number programmed.	At startup check that the number of 2-Wire Sensor Modules installed matches the number programmed under System Configuration > Modules Expected. On machines that are in service: Check for a flashing green light or no light at all on the 2-Wire Sensor Module and contact FFS Technical Services for support.
<b>3-Wire Sensor Module is Offline</b>	Slot	3-Wire Sensor Module is offline due to unknown causes.	Follow safety procedures before working inside of the console. Visually verify a steady, green "Run" light. If a red "Err" light is flashing or steady, try to reboot the system. If the condition still exists, contact Franklin Fueling Systems' Technical Services Dept. for support on this issue.
<b>3-Wire Sensor Module Setup Error</b>	None	Programming errors made during setup of the 3-Wire Sensor Module.	Verify 3-Wire Sensor Module programming parameters. If the condition still exists, contact Franklin Fueling Systems' Technical Services Dept. for support on this issue.
<b>3-Wire Sensor Module Mismatch</b>	Slot	3-Wire Sensor Modules detected does not match the number programmed.	At startup check that the number of 3-Wire Sensor Modules installed matches the number programmed under System Configuration > Modules Expected. On machines that are in service: Check for a flashing green light or no light at all on the 3-Wire Sensor Module and contact FFS Technical Services for support.
<b>4-20mA Module is Offline</b>	Slot	4-20mA Module is offline due to unknown causes.	Follow safety procedures before working inside the console. Visually verify a steady green "Run" light. If a red "Err" light is flashing or steady, try to reboot system. If the condition still exists, contact Franklin Fueling Systems' Technical Services Dept. for support on this issue.
<b>4-20mA Module Number Mismatch</b>	Slot	4-20 mA Modules detected does not match the number programmed.	Check that the number of 4-20mA Modules installed matches the number programmed under System Configuration > Modules Expected. Check for a flashing green light or no light at all on the 4-20mA Module and contact FFS Technical Services for support
<b>4-20mA Module Setup Error</b>	None	Programming errors made during setup of the 4-20mA Module.	Verify 4-20mA Module programming. If the condition still exists, contact Franklin Fueling Systems' Technical Services Dept.
<b>4-20mA Input Error</b>	Channel/ANA	Errors have been detected in the an analog input channel	If the input is not being used, set the programming to reflect proper input type. If the input is being used as an analog signal, inspect the wiring and redo connections.
<b>AC Input Module is Offline</b>	Slot	AC Input Module is offline due to unknown causes.	Follow safety procedures before working inside of the console. Visually verify a steady green "Run" light. If a red "Err" light is flashing or steady, try to reboot system. If the condition still exists, contact Franklin Fueling Systems' Technical Services Dept. for support on this issue.
<b>AC Input module number mismatch</b>	Slot	AC Input Modules detected does not match the number programmed.	Check that the number of AC Input Modules installed matches the number programmed under System Configuration > Modules Expected. Check for a flashing green light or no light at all on the AC Input Module and contact FFS Technical Services for support.
<b>AC Input Module Setup Error</b>	None	Programming errors made during setup of the AC Input Module.	Verify AC Input Module programming parameters. If the condition still exists, contact Franklin Fueling Systems' Technical Services Dept. for support on this issue.
<b>AC Input Alarm</b>	None	An input on the AC input module has been configured as an alarm and is active.	Check the programming and voltage inputs for the specified Input channel on the AC Input module.

Displayed Alarm / Warning	Device	Description	Recommended Actions
<b>Controller Module is Offline</b>	Slot	Controller Module is offline due to unknown causes.	Follow safety procedures before working inside the console. Visually verify a steady green "Run" light. If red "Err" light is flashing or steady try to reboot system. If the condition still exists, contact Franklin Fueling Systems' Technical Services Dept. for support on this issue.
<b>DIM module number mismatch</b>	Slot	DIM modules detected does not match the number programmed.	Check that the number of DIM Modules installed matches the number programmed under System Configuration > Modules Expected. If problem persists, contact FFS Technical Services for support
<b>Internal Error #1</b>	System	There is an internal buffer error occurring in the gauge.	Contact FFS Technical Services for support
<b>Invalid Configuration</b>	None	The configuration that has been loaded is not valid.	Verify the file type of the configuration which is being uploaded
<b>Invalid Registration</b>	None	The registration that is loaded is not valid.	If you have upgraded the site before, use the upgrade tool to restore the former registration. If you have not upgraded the site before, contact FFS Technical Services for support.
<b>IO Input Alarm</b>	None	An input on the Input/Output module has been configured as an alarm and is active.	Check the programming and voltage inputs for the specified Input channel on the IO module.
<b>IO Module is offline</b>	Slot	The IO Module is not communicating with the Console	Inspect the IO module for error lights. If green light is flashing, recover the module. If the lights are off: Power down, remove/re-seat the module and power back up. If problem persists, contact FFS Technical Services for support
<b>IO module number mismatch</b>	Slot	IO Modules detected does not match the number programmed.	Check that the number of IO Modules installed matches the number programmed under System Configuration > Modules Expected. Check for a flashing green light or no light at all on the IO Module and contact FFS Technical Services for support.
<b>IS Barrier Violation</b>	None	Non-Intrinsically Safe module placed in IS area; or IS Barrier is removed.	Check the module configuration to ensure that a module has not been improperly placed. Power down and then remove/re-seat the IS barrier. If problem persists contact FFS Technical Services for support
<b>LON module number mismatch</b>	Slot	Lon Modules detected does not match the number of Lon Modules programmed.	Check that the number of LON Modules installed matches the number programmed under System Configuration > Modules Expected. If problem persists, contact FFS Technical Services for support. Also check that the Node ID does not conflict with another Node ID in the network
<b>Power Supply Input Alarm</b>	None	An input on the Power Supply has been configured as an alarm and is active.	Check the programming and voltage inputs for the specified Low Voltage Input channel on the Power Supply module.
<b>Power Supply Module number mismatch</b>	Slot	Power Supply Modules detected does not match the number programmed.	Check that the number of Power Supply Modules installed matches the number programmed under System Configuration > Modules Expected. Check for a flashing green light or no light at all on the Power Supply Module and contact FFS Technical Services for support
<b>Power Supply Module is Offline</b>	Slot	Power Supply Module is offline due to unknown causes.	Follow safety procedures before working inside the console. Visually verify a steady green "Run" light. If red "Err" light is flashing or steady try to reboot system. If the condition still exists, contact Franklin Fueling Systems' Technical Services Dept. for support on this issue.
<b>Power Supply Module Setup Error</b>	None	Errors in the setup of the listed module.	The console may need to be reprogrammed.
<b>Printer Module Number Mismatch</b>	Slot	Printer Modules detected does not match the number programmed.	Check that the number of Printer Modules installed matches the number programmed under System Configuration > Modules Expected. If problem persists, contact FFS Technical Support.
<b>Probe Module is Offline</b>	Slot	Probe Module is not communicating with the console.	Follow safety procedures before working inside the console. Visually verify a steady green "Run" light. If red "Err" light is flashing or steady, re-seat module and reboot system. If the condition still exists, contact Franklin Fueling Systems' Technical Support for help on this issue.
<b>Probe Module Number Mismatch</b>	Slot	Probe Modules detected does not match the number of Probe Modules programmed.	Check that the number of Probe Modules installed matches the number programmed under System Configuration > Modules Expected. Check for a flashing green light or no light at all on the Probe Module and contact FFS Technical Services for support.
<b>Probe Module Setup Error</b>	None	Programming errors made during setup of the Probe Module.	Verify Probe Module programming parameters. If the condition still exists, contact Franklin Fueling Systems' Technical Support for help on this issue.
<b>Relay Module is Offline</b>	Slot	Relay Module is offline due to unknown causes.	Follow safety procedures before working inside the console. Visually verify a steady green "Run" light. If red "Err" light is flashing or steady try to reboot system. If the condition still exists, contact Franklin Fueling Systems' Technical Support for help on this issue.

Displayed Alarm / Warning	Device	Description	Recommended Actions
Relay module number mismatch	slot	Relay Modules detected does not match the number programmed.	Check that the number of Relay Modules installed matches the number programmed under System Configuration > Modules Expected. Check for a flashing green light or no light at all on the AC Input Module and contact FFS Technical Services for support.
Relay Module Setup Error	None	An error exists in the Relay Module configuration	Inspect the Relay Module setup configuration for possible errors. Pay particular attention to if the module is configured for 10amps or not.
Secondary Containment Monitor Setup Error	None	An error exists in the configuration of the Secondary Containment Monitoring Setup.	Inspect the Secondary Containment Monitor setup configuration for possible errors.
Set Date and Time	None	System detected an issue with the date and time	Check and set the system date and time.
System bus error	Slot	Data transfer errors occurred in the System Bus.	Upgrade to the latest version of firmware available at: <a href="http://www.franklinfueling.com">www.franklinfueling.com</a>
System Setup Error	None	There is an error in the Setup configuration.	Inspect the System setup configuration for possible errors.

## FMS Alarms

Displayed Alarm / Warning	Device	Description	Recommended Actions
Alpha volume correction error	Tank	This error is caused by a programming mistake in the Special Products section.	Verify Special Product Alpha volume correction program parameters. Contact FFS Technical Services Department for assistance.
Annual Compliance Alarm	Any	The device listed has gone out of compliance	Pass a test or clear the alarm on the device.
Annual Compliance Warning	Any	The device listed has 7 days before it will go into a compliance alarm	Pass a test or clear the alarm on the device.
API volume correction error	Tank	This error is caused by a programming mistake in the Special Products section.	Verify Special Product API volume correction program parameters. Contact FFS Technical Services Department for assistance.
Correction table error	Tank	Level and Volume mismatch detected in Correction table programming.	Verify that all levels and volumes are entered accurately into the Correction Table programming.
Density float error	Tank	A communication error has occurred involving the density float.	Verify programming and contact FFS Technical Services for support.
Density error	Tank	The density of the product is not within specifications.	Enter setup and verify the information under density in the probe programming.
Float height error	Tank	This error could indicate that the wrong float type is installed or that a programming error has occurred.	Review probe programming for proper float type, number of floats in the tank. (This would be an idea time to clean the probe and floats).
Float Missing	Tank	Probe detects a lesser number of floats than programmed.	Review probe programming for correct number of floats. If correct then inspect probe shaft, floats, and float magnets. With the probes out of the tank, this would be an idea time to clean the probe and floats. If pressures meets requirements specified, contact Franklin Fueling Systems' Technical Services Dept. for support on this issue.
FMS configuration error	None	Conflicts exist within FMS Application programming.	Verify FMS setting are correct in accordance with the site specifications.
High product level	Tank	Product level exceeded High limit set. Possible close to tank overflow condition	Acquire an accurate product level. If actual product level in tank does not match the consoles displayed current level, verify programming is correct.
High high product level	Tank	Product level exceeded High High limit set. Possible tank overflow condition.	Acquire an accurate product level. If actual product level in tank does not match the consoles displayed current level, verify programming is correct.
High product volume	Tank	The specified tank has reached the programmed High Product Volume.	Check product volume and compare to the programmed High Volume alarm Limit in the setup menu. Acquire an accurate product level and compare to the ATG. If levels differ, verify programming is correct. If alarm persists, contact FFS Technical Services for support.
High High product volume	Tank	The specified tank has reached the programmed High High Product Volume.	Check product volume and compare to the programmed High High Volume alarm Limit in the setup menu. Get an accurate product volume and compare to the ATG. If levels differ, verify programming is correct. If alarm persists, contact FFS Technical Services.
High water level	Tank	Water level exceeded High limit set.	Verify programmed level. If water is too high consult you local site policy procedures for corrective actions.

Displayed Alarm / Warning	Device	Description	Recommended Actions
High Water/Phase Sep	Tank	Water/Phase Separation has exceeded the High Limit set.	Remove Water/Phase Separated product form the tank.
Level error	Tank	Product level exceeds tank diameter due to an error in console of programming.	Verify tank, offset, and probe programming.
Line monitor disabled	Line	Specified line is not enabled, so line leak test will not be performed.	Verify line programming. If necessary enable line.
Low battery	Tank	Backup battery is low.	See Installation Guide for replacement instructions.
Low product volume	Tank/ Manifold	Product volume below Low limit set. The tank/manifold specified may be near empty.	Acquire an accurate product volume. If actual product volume in tank does not match the consoles displayed current volume, verify programming.
Low low product volume	Tank/ Manifold	Product volume below Low Low limit. The tank or manifold specified may be near empty.	Acquire an accurate product volume, and if does not match the consoles displayed current volume, verify programming.
Mag installation error	Sensor	The specified TSP-DMS has an installation error	Check the installation of the TSP-DMS, the sensor must be plumb. If installation is correct, then try to relearn the sensor. If the problem persist, the sensor may need to be replaced
Mag product alarm	Sensor	The specified TSP-DMS has detected product.	Inspect the sump for the presence of product.
Mag sensor configuration error	Sensor	An error has been detected in the configuration of the specified TSP-DMS.	Enter into the setup and inspect the TSP-DMS setup.
Mag sensor data error	Sensor	There is an error with the reported data from the specified TSP-DMS	Inspect wire connections at the Mag sensor. If the problem persists, contact FFS Technical Services for support.
Mag sensor float height error	Sensor	The float height has exceeded the limits as learned.	Inspect wire connections at the Mag sensor. If the problem persists, contact FFS Technical Services for support.
Mag sensor float missing	Sensor	The specified TSP-DMS is not reporting the level information for one or more float.	Inspect the Mag sensor for damage and redo the connections. If the Problem persists, contact FFS Technical Services.
Mag sensor missing	Sensor	The console is not receiving any information from the specified TSP-DMS.	Inspect wire connections at the Mag sensor. If the problem persists, contact FFS Technical Services.
Mag sensor not learned error	Sensor	The specified TSP-DMS was not properly learned.	Enter into the Control > Mag Sensor screen and have the console learn the sensor.
Mag sensor synchronization error	Sensor	The console is receiving incomplete or improperly timed data from the specified TSP-DMS	Inspect wire connections at the Mag sensor. If the problem persists, contact FFS Technical Services.
Mag water alarm	Sensor	The specified TSP-DMS has detected water.	Inspect the sump for water.
Mag water warning	Sensor	The TSP-DMS has detected water above the preset limit.	Inspect the sump for water.
Manifold Delivery Detected	Tank	A delivery has been detected on the specified manifold.	This is not an alarm and should only be a concern if there was not a delivery to the site at the specified date and time.
Manifold Gross Leak Detected	Tank	A leak in the specified manifolded tanks has been detected via a SCALD test. Suspect possible leak.	Review Tank Leak Test History and programming. Refer to Section 5: Misc/Tank Leak Tests – Type and Frequency for instructions on manually starting line leak tests.
Manifold Leak Detected	Tank	A leak in the specified manifolded tanks has been detected via a SCALD test. Suspect possible leak	Review Tank Leak Test History and programming. Refer to Section 5: Misc/Tank Leak Tests – Type and Frequency for instructions on manually starting line leak tests.
Manifold low product volume	Tank	The specified manifold has reached the programmed Low Product Volume	Check product volume and compare to the programmed Low Volume alarm Limit in the setup menu. Acquire an accurate product volume and compare to the ATG. If levels differ, verify programming is correct. If alarm persists, contact FFS Technical Services for support.
Manifold low low product volume	Tank	The specified manifold has reached the programmed Low Low Product Volume	Check product volume and compare to the programmed Low Low Volume alarm Limit in the setup menu. Acquire an accurate product volume and compare to the ATG. If levels differ, verify programming is correct. If alarm persists, contact FFS Technical Services for support.
Manifold Leak Detected	Tank	A leak in the specified manifolded tanks has been detected via a SCALD test. Suspect possible leak.	Review Tank Leak Test History and programming. Refer to Section 5: Misc/Tank Leak Tests – Type and Frequency for instructions on manually starting line leak tests.



Displayed Alarm / Warning	Device	Description	Recommended Actions
<b>Manifold Theft Detected</b>	Tank	The specified manifold has entered Sentinel Mode and detects product leaving the tank that exceeds the programmed theft limits.	Verify programming and accurate level/volume readings.
<b>Modem Error</b>	None	Indicates that a modem malfunction has occurred.	Try to recycle power on the console. Verify modem programming. If the alarm does not clear, contact Franklin Fueling Systems' Technical Services Dept. for support on this issue.
<b>Monthly Compliance Alarm</b>	Any	The device listed has gone out of compliance	Pass a test or clear the alarm on the device.
Monthly Compliance Warning	Any	The device listed has 7 days before it will go into a compliance alarm.	Pass a test or clear the alarm on the device.
<b>Net error</b>	Tank	Product net levels exceed tank diameter	Verify tank, product offset and probe programming
<b>No data available</b>	System	A communication issue has occurred between the probe and the console	Check for proper probe programming at the console and inspect wire connections at the probe. If the problem persists, contact FFS Technical Services for support.
<b>No probe detected</b>	Tank	The Console is not receiving any communication from the probe.	Check for proper probe programming at the console and inspect wire connections at the probe. If the problem persists, contact FFS Technical Services for support.
<b>Probe synchronization error</b>	Tank	Communication between the probe and the Console is either incomplete or ill timed.	Check for proper probe programming at the console and inspect wire connections at the probe. If the problem persists, contact FFS Technical Services for support.
<b>Product volume error</b>	Tank	The Product Volume as reported by the probe has exceeded the limits of the tank.	Check for proper probe and tank programming at the console. If programming is correct, inspect the probe to ensure that the float is not stuck in the riser or is otherwise obstructed.
<b>RTD table error</b>	Tank	RTD distance error; Special Probe programming error.	Verify correct RTD programming. If issue still exists, inspect wiring to probe. If the condition still exists, contact Franklin Fueling Systems' Technical Services for support.
<b>System memory error</b>	System	The system has detected a low memory situation.	Contact FFS Technical Services for support.
<b>Tank Gross Leak Detected</b>	Tank	Tank Gross leak test detected tank. Suspect possible leak.	Review tank leak test history and programming. Refer to Section 5: Misc./Tank Leak Tests – Type and Frequency for instructions on manually starting line leak tests.
<b>Tank Leak Detected</b>	Tank	Tank leak detected. Suspect possible leak.	Review tank leak test history and programming. Refer to Section 5: Misc./Tank Leak Tests – Type and Frequency for instructions on manually starting line leak tests.
<b>Tank Product Density High Limit Exceeded</b>	Tank	The Product Density exceeds the programmed high limit.	Verify programming if correct this alarm may be an indication of improper density of the fuel.
<b>Tank Product Density Low Limit Exceeded</b>	Tank	The Product Density has exceeded the programmed low limit.	Verify programming if correct this alarm may be an indication of improper density of the fuel.
<b>Tank SCALD Leak Detected</b>	Tank	SCALD leak test detected tank leak. Suspect possible leak.	Review Tank Leak Test History and programming. Refer to Section 5: Misc./Tank Leak Tests – Type and Frequency for more information on SCALD tests.
<b>Tank Delivery Detected</b>	Tank	A delivery has been detected on the specified tank.	This is not an alarm and should only be a concern if there was not a delivery to the site at the specified date and time.
Tank Water/Phase Sep Float Disabled	Tank	The Phase Separation Water Float has been disabled in setup	Verify Phase Separation Water Float level and enable the float in setup.
<b>Tank Theft Detected</b>	Tank	Product used in Sentinel Mode exceeds theft limit set. Suspect theft, and then verify theft limit in programming.	Verify theft limit in programming. Also obtain an accurate product level and compare to inventory.
<b>Temperature error</b>	Tank	Special Probe RTD temperature error detected.	Verify correct RTD table programming. If problem still exists, suspect wiring or faulty probe.
<b>Ullage error</b>	Tank	Ullage reported has exceeded tank capacity.	Check for proper probe and tank programming at the console. If programming is correct, inspect the probe to ensure that the float is not stuck in the riser or obstructed. Bring the probe inside and wire directly to the gauge to eliminate possible problems with the field wiring.
<b>Unstable probe</b>	Tank	LL Liquid Level probes can send FFSsistent data back to console.	Check for proper probe programming at the console and inspect wire connections at the probe. If the problem persists, contact FFS Technical Services for support.
<b>Water volume error</b>	Tank	Water volume has exceeded tank capacity.	Check for proper probe and tank programming at the console. If programming is correct, inspect the probe to ensure that the colored water float is on the bottom.

Displayed Alarm / Warning	Device	Description	Recommended Actions
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### SCM Alarms

Containment Not Learned	SCM	The learning process has not been completed.	Refer to Secondary Containment Monitoring Installation and User's Guide 000-0528 for more information.
Containment Program Error Detected	SCM	An error has been detected in the containment programming.	
Containment Program Error Warning	SCM	An error has been detected in the containment programming.	
Containment Pump Request Ignored	Engineering	The containment called for the STP to turn on but has not seen an increase in vacuum level.	
Failed to Hold Vacuum	SCM	The rate of vacuum decay faster than the learned rate.	
Failed to Reach Target Vacuum	SCM	6"hg could not be reached in the learned time.	
Low Vacuum	SCM	The vacuum level has dropped below 1"hg.	
Low Vacuum And Pump Request Ignored	Engineering	Low vacuum level due to Pump Request Ignored.	
Not Configured	SCM	Containment programming has not been completed.	
Unstable Vacuum	SCM	Vacuum level is fluctuating at a rate that is inconsistent with the learned parameters.	
Vacuum Sensor Failed	SCM	The 4-20mA vacuum transducer has failed and is no longer detected.	
Vacuum Too High	SCM	The vacuum level has reached above 10"hg.	

### Wire Sensor Alarms

Displayed Alarm / Warning	Device	Description	Recommended Actions
SN2 Sensor On	ChannelSN2	Sensor shows alarm status.	Inspect location for presence of liquid. In the case of a leak, follow site policy procedures. If no liquid is present, and alarm still exists, sensor may be tripped on error. Check wiring continuity from sensor to console. Test sensor at console, trip sensor on purpose. Verify console terminal wiring. If issue still exists, inspect wiring to sensor. Contact Franklin Fueling Systems' Technical Services for support.
SN2 Fuse Blown	ChannelSN2	2-Wire Sensor Module fuse blown due to unknown causes.	The fuses on the Sensor boards are non-serviceable per UL listing standards. The module must be replaced if the fuse is blown.
SN3 Data Error	ChannelSN3	Console has received erroneous data from sensor.	Check wiring continuity from sensor to console. Test sensor at console, trip sensor on purpose. Verify console terminal wiring. If issue still exists, inspect wiring to sensor. If the condition still exists, contact Franklin Fueling Systems' Technical Services for support.
SN3 Dry Well	ChannelSN3	Monitoring well is dry.	Visually verify that the alarm is correct.
SN3 Fuse Blown	ChannelSN3	3-Wire Sensor Module fuse blown due to unknown causes.	The fuses on the Sensor boards are non-serviceable per UL listing standards. The module must be replaced if the fuse is blown.
SN3 High Brine	ChannelSN3	Brine solution has tripped high level brine sensor.	Verify actual level of solution and sensor installed location.
SN3 Low Brine	ChannelSN3	Brine solution has tripped low level brine sensor.	Verify brine level and sensor location.
SN3 ID Error	ChannelSN3	Discriminating sensor is given an improper ID.	Verify sensor programming and Auto configuration.
SN3 No Signal	ChannelSN3	Console is not receiving data from a discriminating sensor.	Verify programming of sensor type and wiring connection.
SN3 Product	ChannelSN3	Discriminating sensor has detected product present at location.	Visually inspect location carefully for presence of liquid. In the case of a leak, follow site policy procedures. If no liquid is present, and alarm still exists, sensor may be tripped on error. Check wiring continuity from sensor to console.



Displayed Alarm / Warning	Device	Description	Recommended Actions
SN3 Pwr Short	Slot	3-Wire sensor malfunction.	If a 2-Wire sensor is used on a 3-wire module ensure that the red/pwr terminal is not used. If a 3-wire sensor is used, disconnect wires and see if alarm clears. If alarm clears inspect shorts in wiring. If alarm stays at PWR short replace module. Contact Franklin Fueling Systems' Technical Services Dept. for support.
SN3 Sensor On	ChannelSN3	Discriminating sensor shows alarm status.	Inspect location for presence of liquid. In the case of a leak, follow site policy procedures. If no liquid is present, and alarm still exists, sensor may be tripped on error. Check wiring continuity from sensor to console. Test sensor at console, trip sensor on purpose. Verify console terminal wiring. If issue still exists, inspect wiring to probe. If the condition still exists, contact Franklin Fueling Systems' Technical Services for support.
SN3 Sump Full	ChannelSN3	3-wire sensor detected sump full of liquid.	Inspect location for presence of liquid. In the case of a leak, follow site policy procedures. If in alarm with no liquid is present, sensor may be tripped on error. Check wiring continuity from sensor to console.
SN3 Sync Error	ChannelSN3	3-wire sensor data signals not in sync with module.	Verify correct wiring and re-make the connections. Verify sensor type.
SN3 Vapor	ChannelSN3	3-wire discriminate sensor detecting vapors at location.	Visually inspect area for product presence. Verify the vapor level has been calibrated correctly.
SN3 Water	ChannelSN3	3-wire discriminate sensor detecting water at location.	Visually inspect area for water presence.

## Line Leak Detector (LLD) Alarms

Displayed Alarm / Warning	Device	Description	Recommended Actions
0.1 GPH Compliance Expired	Line	A 0.1 gph test has not been completed within the last 365 days.	Verify that no pertinent alarm conditions have been reoccurring. Ensure that there is enough time to pass the test.
0.2 GPH Compliance Expired	Line	A 0.2 gph test has not been completed within the last 30 days.	Verify that no pertinent alarm conditions have been reoccurring. Ensure proper seating pressure. If Firmware revision is older than 1.7.4.5535, upgrade to make use of the Statistical Line Leak Detection enhancement.
3 GPH Compliance Expired	Line	The required daily 3 GPH test has not been completed.	Check for continuous pump on conditions that could be caused by a sticky handle switch or relay.
Air in Line	Line	Air has been detected in the line.	Purge all air from the line starting at the furthest dispenser and working in toward the STP. Verify tightness of lines and investigate other sources for air infiltration.
Dispensing Pressure Test Failed	Line	Pressure during dispensing dropped below 7.5 psi. This is seen as a catastrophic leak during dispensing.	Inspect all sumps for product. Use a pressure gauge to test line pressure during dispensing. See "LS500 Auto Learn Line Leak Detection Installation & User's Guide" FFS 000-2145. Contact Franklin Fueling Systems' Technical Services Dept. for support.
Extended Hook Signal	Line	A hook signal has been detected for more than 60 minutes with the line pressure staying the same.	Check for voltage to the AC-Input module. If issue still exists contact Franklin Fueling Systems' Technical Services Dept. for support.
Failed to Catch Pressure	Line	The pump OFF pressure has dropped below 7 psi within 1 second after the pump was turned off	Inspect all sumps for product. Refer to "LS500 Auto Learn Line Leak Detection Installation & User's Guide" FFS 000-2145 for more information.
Failed to Pressure Up	Line	The Line has called for the pump to turn on but did not see the pressure increase	Inspect all sumps for product. Refer to "LS500 Auto Learn Line Leak Detection Installation & User's Guide" FFS 000-2145 for more information.
Gross Leak Detected	Line	The console has detected a line leak greater than 3 gph.	Inspect all sumps for product. Refer to "LS500 Auto Learn Line Leak Detection Installation & User's Guide" FFS 000-2145 for more information.
High Pump Pressure	Line	The Pump Off pressure has stayed above 49 psi for 3 consecutive times.	Inspect all sumps for product. Ensure that no other check valves are used within the system. Observe multi-point line pressure readings during pump on and off using a pressure gauge in the line. If line pressure is high, there may be a blockage in the line. Refer to "LS500 Auto Learn Line Leak Detection Installation & User's Guide" FFS 000-2145 for more information.

Displayed Alarm / Warning	Device	Description	Recommended Actions
Line is not configured	Line	Specified line is not configured, therefore line leak test will not be performed.	Verify line programming. If necessary configure line.
Line Not Learned	Line	Specified line not learned.	Complete learn process, if any learn alarms occur follow the proper procedure. Refer to "LS500 Auto Learn Line Leak Detection Installation & User's Guide" FFS 000-2145 for more information.
Line Program Error Detected	Line	An error has been detected in the programming of the specified line.	Verify programming of line under the setup menu.
Line Pump Request Ignored	Engineering	The line has called for the pump to be turned on but another application is currently using the STP	Verify that other applications are operating properly. Contact Franklin Fueling Systems' Technical Services Dept. for support.
Marginal Pass of Gross Leak Test	Line	The last passed gross test detected a leak just under the 3gph threshold.	Verify there is no sign of leaks within any of the sumps. Run additional tests. Refer to "LS500 Auto Learn Line Leak Detection Installation & User's Guide" FFS 000-2145 for more information.
Monthly Leak Test Failed	Line	The Console has detected a line leak greater than 0.2gph.	Inspect all sumps for product. Refer to "LS500 Auto Learn Line Leak Detection Installation & User's Guide" FFS 000-2145 for more information.
Not Enabled	Line	Line testing has not been enabled.	Verify no other alarm is present then enter the line control menu and enable the line testing feature.
Precision Leak Test Failed	Line	0.1 GPH Line leak test failed.	Follow site policy on line leak procedures.
Pressure Transducer Fail	Line	The transducer is not being detected by the console.	Inspect the wiring to the specified transducer and the channel it terminates at. Refer to "LS500 Auto Learn Line Leak Detection Installation & User's Guide" FFS 000-2145 for more information.
Sudden Pressure Loss	Line	During a 45 minute quiet period the pressure was seen to drop by a 2 times the learned 3gph slope.	Inspect all sumps for product. Refer to "LS500 Auto Learn Line Leak Detection Installation & User's Guide" FFS 000-2145 for more information.

## TPI Alarms

Displayed Alarm / Warning	Device	Description	Recommended Actions
Capacitor Failing	TPI	The STP controller is reporting a capacitor failure.	Refer to the applicable Smart controller Installation guide for details.
Clogged Intake	TPI	The STP controller has reported a dry run condition but the associated tank shows a product level above the intake.	Ensure proper programming of the TPI and calibration of the Smart Controller. If correct, check for an obstruction on the PMA.
Communication Failure	TPI	Communication from the TPI to the STP controller has failed. The Console is seeing the controller but the controller is not responding to commands.	Verify all wiring connections. Call FFS Technical Services Department for support.
Controller Type Error	TPI	The programmed controller type does not match what the console is detecting.	Verify proper programming of the TPI as well as the Smart controller type and address.
Dry Tank	TPI	The STP Controller has reported a dry run condition and the tank level is at or below the programmed intake.	Ensure proper programming of the TPI and calibration of the Smart Controller. If correct, add fuel.
Extended Run	TPI	The STP controller is reporting an extended run condition.	
Hardware Fault	TPI	The STP controller is reporting is reporting a hardware fault condition.	
High Temperature	TPI	The STP controller is reporting a high temperature condition.	
Locked Rotor	TPI	The STP controller is reporting a locked rotor rating.	
Not Calibrated	TPI	The STP controller is reporting that it has not been calibrated.	
Open Circuit	TPI	The STP controller is reporting an open circuit condition.	

Displayed Alarm / Warning	Device	Description	Recommended Actions
Over Speed	TPI	The STP controller is reporting an over speed condition.	Refer to the applicable Smart Controller Installation guide for details
Over Voltage	TPI	The STP controller is reporting an over voltage condition.	
Pump Communication Fail	TPI	Communication from the TPI to the STP controller has failed.	Check all wiring connections and ensure that there is power supplied to the Smart Controller.
Pump In Water	TPI	The water level has risen to within 3 inches of the programmed intake level.	Ensure proper programming of the TPI and calibration of the Smart Controller. If correct, have water removed from the tank
Relay Fault	TPI	The STP controller is reporting a relay fault error.	Refer to the applicable Smart Controller Installation guide for details.
Short Circuit	TPI	The STP controller is reporting a short circuit condition.	
Unbalanced Load	TPI	The STP controller is reporting an unbalanced load condition.	
Unbalanced Voltage	TPI	The STP controller is reporting an unbalanced voltage condition.	
Under Voltage	TPI	The STP controller is reporting a voltage level under 200VAC.	
Under Load	TPI	The STP controller is reporting an underload condition.	
Unknown Fault	TPI	The STP controller is reporting an unknown fault code.	

## Printer Alarms

Check Printer	Printer	Printer is out of paper, or the printer door is open.	Make sure the printer has paper, and the printer door is closed completely.
Printer Head Temperature	Printer	Print head high temperature persists for at least 2 minutes	Printer will resume printing and the alarm will clear after a short cool-down period. Keep the console area cool and ventilated. If the alarm does not clear, contact FFS Technical Support.
Printer Motor Temperature	Printer	Printer motor has exceeded temperature limit	Allow printer to cool. Keep the console area cool and ventilated. If the alarm does not clear, contact FFS Technical Support.

# Appendix A - Standard Tanks Table

## Legend

O/C = Owens Corning / FC Fluid Containment

D = Diameter (Dia.)

L = Length

S = Single Wall

DW = Double Wall Tank (DWT)

Type #	Manufacturer	Model	Capacity (Gallons)	Dimensions D x L (inches)	S / DW Wall
01	O/C Tanks	D5	550	48 x 78	S
		DWT-4 (4)	550	51 x 83	DW
02	O/C Tanks	D-5	1,000	50 x 132	S
		DWT-4 (4)	1,000	53 x 138	DW
03	O/C Tanks	D-2B	2,000	74 x 133	S
		D-6	2,000	74 x 133	S
04	O/C Tanks	DWT-2 (6)	2,500	75 x 151	DW
05	O/C Tanks	D-6	4,000	74 x 236	S
		DWT-2 (6)	4,000	75 x 239	DW
06	O/C Tanks	G-5	4,000	92 x 167	S
		G-6	4,000	95 x 167	S
07	O/C Tanks	G-3	4,000	92 x 165	S
08	O/C Tanks	D-6	6,000	74 x 354	S
		DWT-2 (6)	6,000	75 x 357	DW
09	O/C Tanks	G-3	6,000	92 x 231	S
10	O/C Tanks	DWT-2 (8)	6,000	95 x 237	DW
11	O/C Tanks	G-3	8,000	92 x 300	S
12	O/C Tanks	G-5	8,000	92 x 299	S
		G-6	8,000	95 x 299	S
		DWT-2 (8)	8,000	95 x 303	DW
13	O/C Tanks	DWT-2 (6)	8,000	75 x 472	DW
14	O/C Tanks	G-3	10,000	92 x 362	S
15	O/C Tanks	G-5	10,000	92 x 365	S
		G-6	10,000	95 x 365	S
16	O/C Tanks	D-6	10,000	120 x 245	S
17	O/C Tanks	DWT-2(6)	10,000	75 x 570	DW
18	O/C Tanks	G-3	12,000	92 x 432	S
19	O/C Tanks	G-5	12,000	92 x 431	S
		G-6	12,000	95 x 431	S
		DWT-2(8)	12,000	95 x 435	DW
20	O/C Tanks	DWT-2(10)	15,000	124 x 348	DW
21	O/C Tanks	DWT-2(10)	20,000	124 x 458	DW
22	O/C Tanks	DWT-2(10)	25,000	125 x 554	DW
23	O/C Tanks	DWT-2(10)	30,000	124 x 656	DW
24	Xerxes	—	2,000	96 x 108	S
25	Xerxes	—	2,000	76 x 166	DW
26	Xerxes	—	2,000	75 x 144	S

Type #	Manufacturer	Model	Capacity (Gallons)	Dimensions D x L (inches)	S / DW Wall
27	Xerxes	—	3,000	96 x 147	S
28	Xerxes	—	4,000	75 x 263	S
29	Xerxes	—	4,000	96 x 180	S
30	Xerxes	—	4,000	76 x 252	DW
31	Xerxes	—	6,000	75 x 353	S
32	Xerxes	—	6,000 6,000	96 x 246 97 x 251	S DW
33	Xerxes	— —	8,000 8,000	96 x 312 97 x 317	S DW
34	Xerxes	— —	10,000 10,000	96 x 378 97 x 383	S DW
35	Xerxes	— —	10,000 10,000	124 x 257 125 x 262	S DW
36	Xerxes	— —	12,000 12,000	96 x 444 97 x 449	S DW
37	Xerxes	— —	12,000 12,000	124 x 288 125 x 293	S DW
38	Xerxes	— —	15,000 15,000	124 x 353 125 x 359	S DW
39	Xerxes	— —	20,000 20,000	124 x 452 125 x 458	S DW
40	Corespan	—	4,000	99 x 162	DW
41	Corespan	—	5,000	99 x 192	DW
42	Corespan	—	6,000	99 x 216	DW
43	Corespan	—	8,000	99 x 282	DW
44	Corespan	—	10,000	99 x 342	DW
45	Corespan	—	12,000	99 x 402	DW
46	Corespan	—	15,000	99 x 576	DW
47	—	—	275	44 Vertical	S
48	—	—	550	44 Vertical (Dual 275 gal.)	S
49	—	—	275	44 Horizontal	S

## **Appendix B - Standard Products Table**

<b>Product Name</b>	<b>API Gravity (6B Compensation)</b>
Leaded Regular	63.5
Unleaded Regular	63.5
Unleaded Plus	62.8
Unleaded Extra	62.8
Unleaded Super	51.3
Diesel	32.8
Kerosene	41.8
#2 Fuel Oil	32.8
Ethanol	46.1
LPG	146.0

## **Appendix C - Typical Tank Leak Test Times**

### **Tank Sizes at Half Capacity**

<b>Tank Size in Gallons</b>	<b>Typical - Tank Leak Test Times (to Finish)</b>
4,000	2.0 hours
6,000	3.0 hours
8,000	4.0 hours
10,000	5.0 hours
12,000	6.0 hours
15,000	7.5 hours
20,000	8.0 hours

**Note:** The Leak Threshold value is one half of the Leak Test value.





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