

# **Intelligent Pump Control**

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## **Installation and Setup**

# Notice

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# Introduction

This manual contains instructions for setting up the TLS-450PLUS console Intelligent Pump Control (IPC) feature that allows the ATG to control/monitor multiple FRANKLIN ELECTRIC (FE) controller/pump sets.

The FE controllers supported by Intelligent Pump Control are:

- STP-SCI/Guardian
- MagVFC (MagECO)
- STP-SCIII

TLS-450PLUS Console hardware/software requirements:

- RS-232/RS-485 Dual Interface Module
- Intelligent Pump Control feature enabled
- Version 8.B software or later

**NOTICE** TLS-450PLUS must have at least 1 Universal Sensor Module (USM) and 1 Universal Input/Output Interface Module (UIOM) installed.

## Contractor Certification Requirements

Veeder-Root requires the following minimum training certifications for contractors who will install and setup the equipment discussed in this manual:

**Service Technician Certification (Previously known as Level 2/3):** Contractors holding valid Technician Certifications are approved to perform installation checkout, startup, programming and operations training, system tests, troubleshooting and servicing for all Veeder-Root Series Tank Monitoring Systems, including Line Leak Detection.

**TLS-4xx Technician Certification:** Contractors holding valid TLS-450 Technician Certifications are approved to perform installation checkout, startup, programming and operations training, troubleshooting and servicing for all Veeder-Root TLS-450 Series Tank Monitoring Systems, including Line Leak Detection and associated accessories.






All service personal on site must comply with all recommended safety practices identified by OSHA and your employer.

Review and comply with all the safety warnings in the manuals listed in this document above and any other Federal, State or Local requirements.

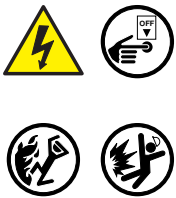
**Warranty Registrations** may only be submitted by selected Distributors.

## Safety Precautions

The following safety symbols may be used throughout this manual to alert you to important safety hazards and precautions

 <p><b>EXPLOSIVE</b> Fuels and their vapors are extremely explosive if ignited.</p>	 <p><b>FLAMMABLE</b> Fuels and their vapors are extremely flammable.</p>
 <p><b>ELECTRICITY</b> High voltage exists in, and is supplied to, the device. A potential shock hazard exists.</p>	 <p><b>TURN POWER OFF</b> Live power to a device creates a potential shock hazard. Turn Off power to the device and associated accessories when servicing the unit.</p>
<p><b>WARNING</b> Indicates a hazardous situation which, if not avoided, could result in death or serious injury.</p>	 <p><b>READ ALL RELATED MANUALS</b> Knowledge of all related procedures before you begin work is important. Read and understand all manuals thoroughly. If you do not understand a procedure, ask someone who does.</p>

## Safety Warnings

<b>⚠ WARNING</b>	
	<p>This console contains high voltages which can be lethal. It is also connected to low power devices that must be kept intrinsically safe.</p> <p><b>FAILURE TO COMPLY WITH THE FOLLOWING WARNINGS AND SAFETY PRECAUTIONS COULD CAUSE DAMAGE TO PROPERTY, ENVIRONMENT, RESULTING IN SERIOUS INJURY OR DEATH.</b></p> <ol style="list-style-type: none"> <li>1. Turn off and tag power at the circuit breaker. Do not connect the console AC power supply wires at the breaker until all devices are connected.</li> <li>2. Attach conduit from the power panel to the console's Power Area knockouts only.</li> <li>3. Comply with all applicable codes including: the National Electrical Code; federal, state, and local codes; and other applicable safety codes.</li> </ol> <p>Connecting power wires to a live circuit can cause electrical shock that may result in serious injury or death.</p> <p>Routing conduit for power wires into the intrinsically safe compartment can result in fire or explosion resulting in serious injury or death.</p>

## Related Documents

577014-073 TLS-450PLUS Console Site Prep And Installation Manual

577014-075 TLS-450PLUS Console Troubleshooting Guide

577014-110 TLS-450PLUS Console Operator's Manual

MagVFC Controller Installation and Owner's Manual

STP-SCI Controller Installation and Owner's Manual

STP-SCIII Controller Installation and Owner's Manual

Guardian Controller Installation and Owner's Manual

## Precautions Against Static Electricity

If necessary to install electronic components in the ATG to implement this feature, read the following static electricity precautions:

1. Before handling any components, discharge your body's static electric charge by touching a grounded surface.
2. Do not remove parts from their anti-static bags until you are ready to install them.
3. Do not lay parts on the anti-static bags! Only the insides are anti-static.
4. When handling parts, hold them by their edges and their metal mounting brackets.
5. Avoid touching comm board components or edge connectors that plug into slots when handling.
6. Never slide parts over any surface.
7. Avoid plastic, vinyl, and Styrofoam in your work area.

# Installation

## Installing An RS-485 Comm Module

If a RS-485 serial port is not available, refer to manual 577014-074 to install a RS-232/RS-485 Dual Interface module. Before powering off the console perform a system backup:

1. From the Home Screen touch **Menu > Software Maintenance > DB Backup** to view the Database Backup Screen (see Figure 1). Touch the down arrow in the Backup Destination field to select the Backup thumb drive, then follow the on-screen instructions to backup TLS-450PLUS console data.

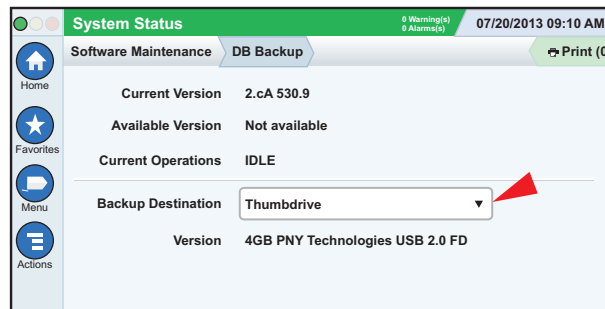


Figure 1. DB Backup Screen

1. Prior to installation, verify the RS-232/RS-485 Dual Interface Module jumpers shown in Figure 2 are placed in the indicated positions.

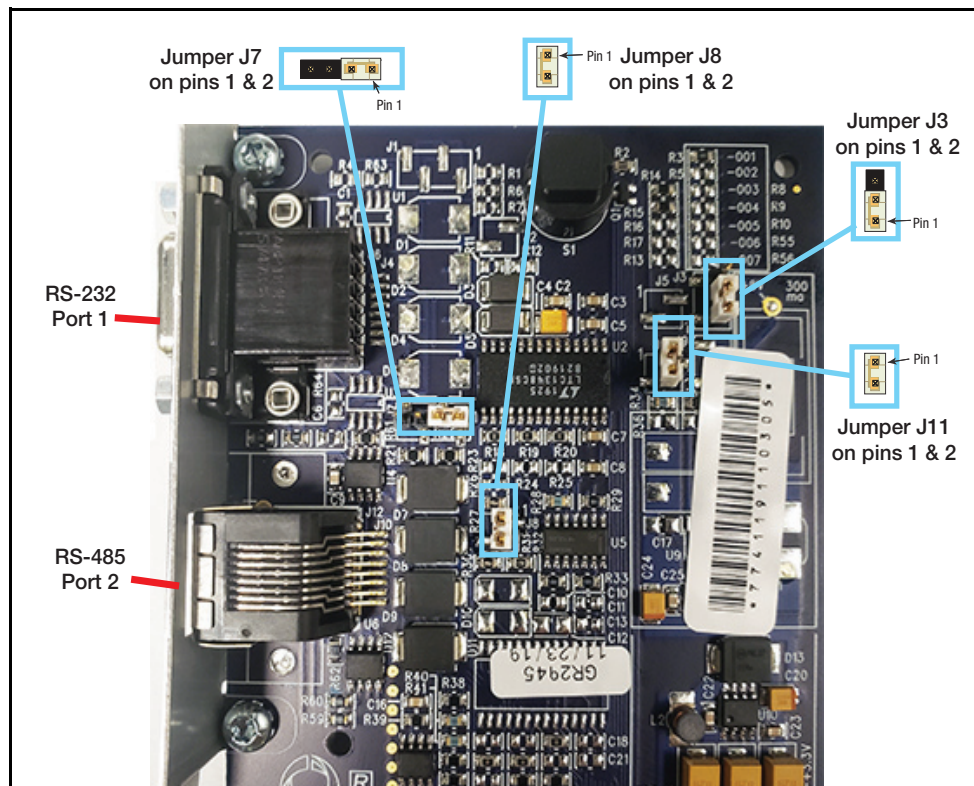


Figure 2. RS-232/RS-485 Dual Interface Module Jumper Positions

2. Install the RS-232/RS-485 Dual Interface Module into an available comm module slot 1 or 2 (see slot 1 installation example in Figure 3). Notice the port will be 2.

**NOTICE** Dual comm cards cannot go into slot 3, 4 or 5. A single port RS-485 module can be installed in slot 1, 2 or 3 if desired.

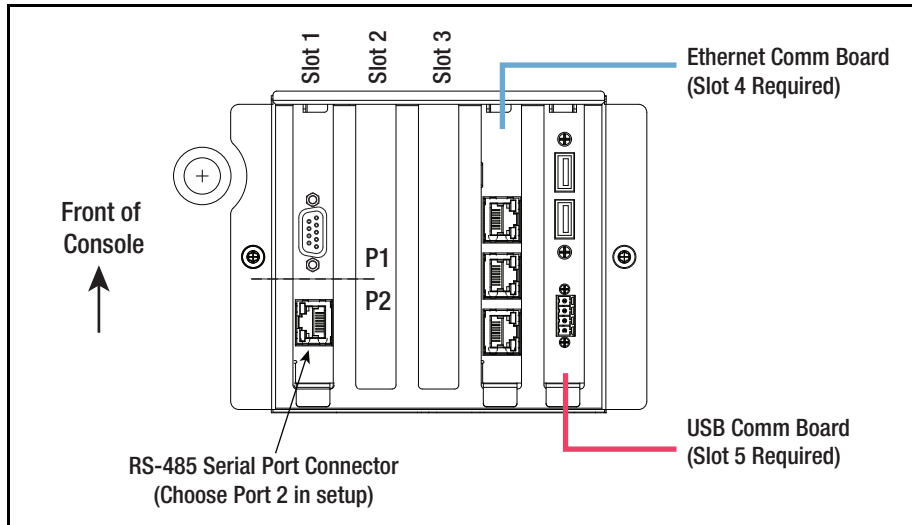


Figure 3. Example RS-485 Serial Port Connection

3. Prepare a satisfactory length of 3-wire cable having a RJ-45 connector on one end (connects to TLS-450PLUS and no connector on the end that connects to the FE Controller(s) ATG output terminals (see Figure 4).

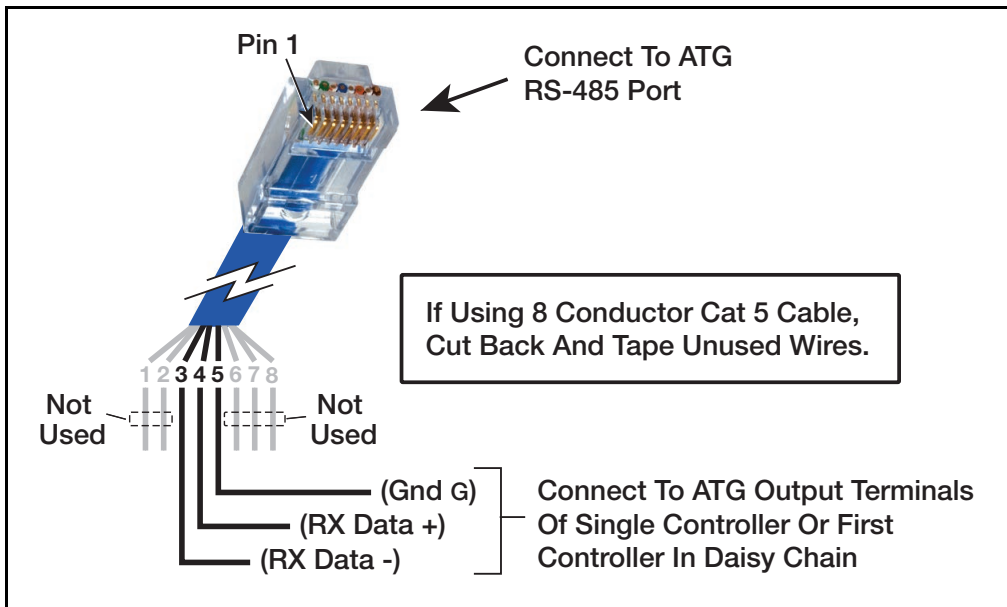


Figure 4. RS-485 Serial Cable Pinouts



## Controller Wiring Inputs

Multiple pump controllers are daisy-chained together. The cable from the last controller in the chain terminates in a RJ-45 male plug that connects to the ATG (see Figure 5).

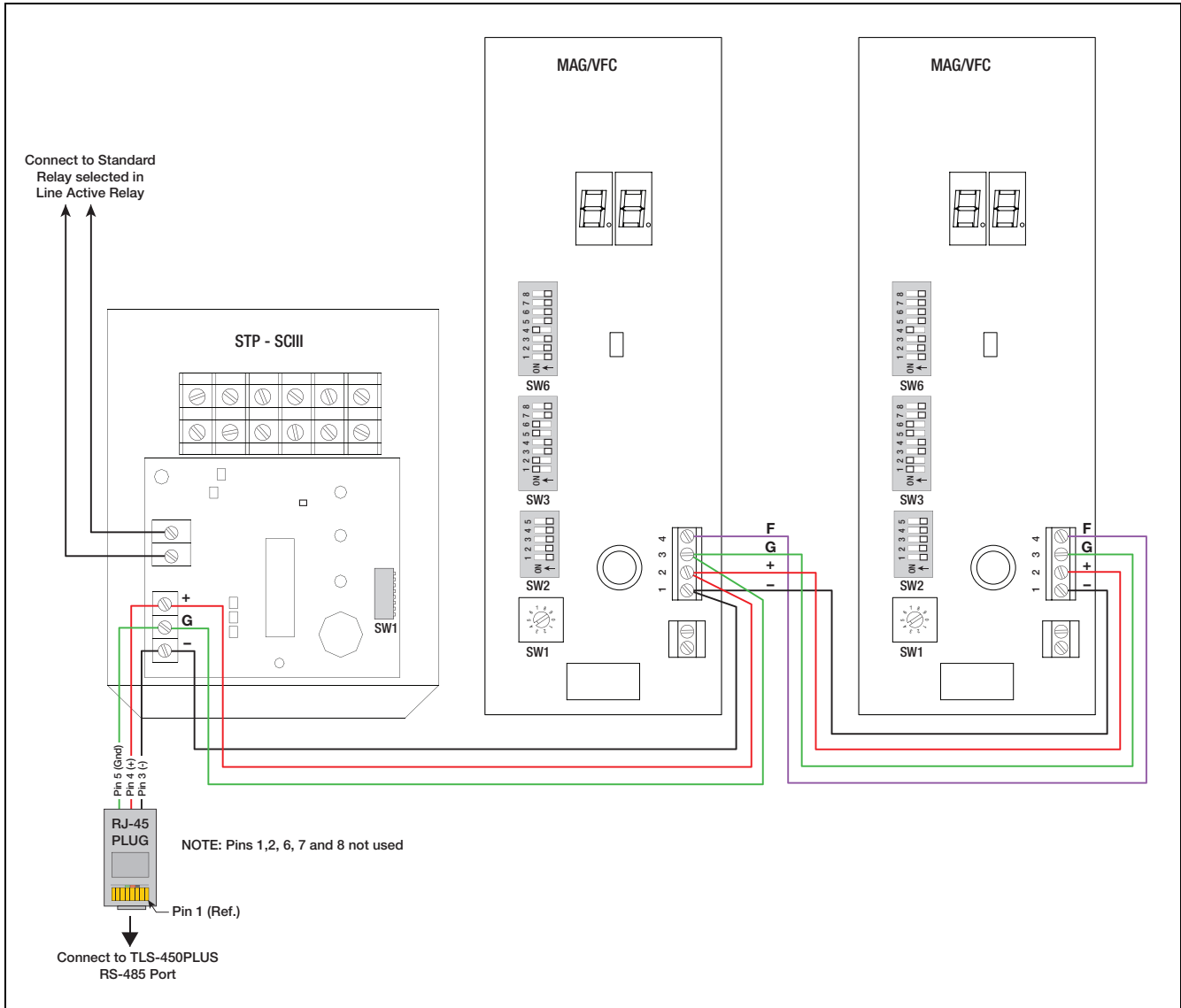


Figure 5. Multi-Controller Wiring Example

The TLS-450PLUS console can be configured for any combination of the controllers mentioned on page 1 of this manual, up to a maximum of 31. The controllers themselves have address restrictions due to DIP switch limitations (see Table 2 on page 21). The TLS-450PLUS is the Primary (address '0') and the controllers are Secondaries. The controllers must have unique addresses starting at Secondary 1. Record each controller's address (1 to 31) prior to IPC setup.

**NOTICE** If a STP-SCIII controller controls a 6" fixed speed STP, ranging from 3 to 5 hp, an additional Relay module will be needed to provide a 110 VAC source for the hook signals. The IPC communication signal supplied by the TLS-450PLUS will not engage these relays. The STP control relay is to be wired as Normally Open and programmed as Inverted. The STP will turn off if the ATG loses power.

## Controller Address Settings

IPC supports up to 31 pump controllers on the serial port network. The TLS-450PLUS is the Primary Address (0) and all the controllers addresses are setup as Secondaries (1-31). Selectable addresses for FE Petro Controllers are shown in the table below:

Table 1.- FE Controller Address Settings

Address Range*	FE Petro Controller
1 - 24	MAG/VFC (Appears as MagEco in the TLS-450PLUS)
1 - 31	SCI/Guardian
1 - 7	SCIII

\* **NOTICE** Each Controller connected to the TLS-450PLUS must have an unique address.

## STP - SCI CONTROLLER SWITCH SETTINGS

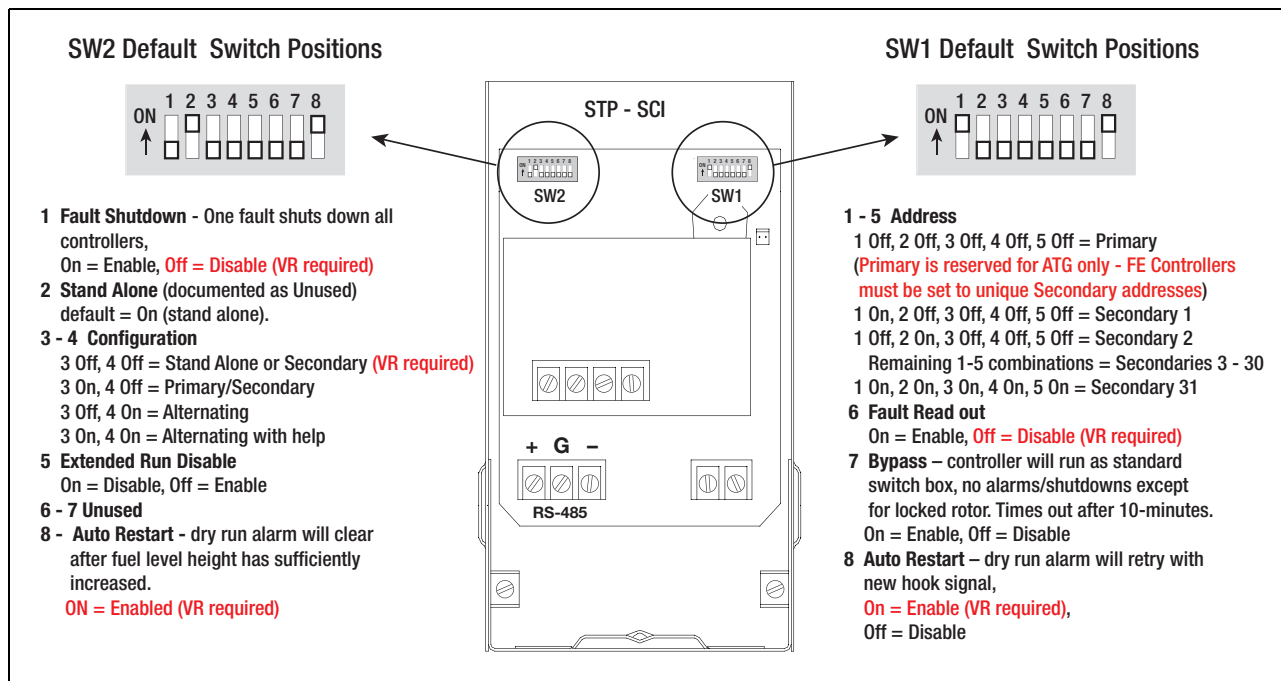


Figure 6. STP - SCI Switch Settings

### STP - GUARDIAN CONTROLLER SWITCH SETTINGS

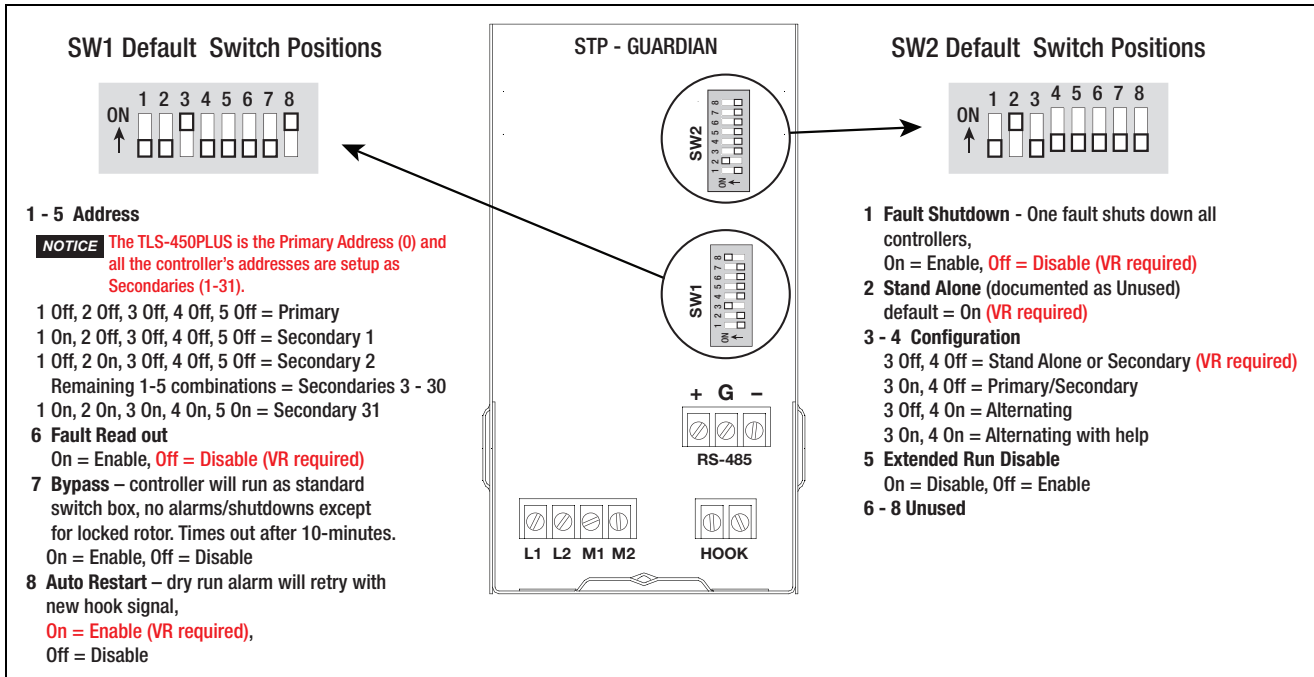


Figure 7. STP - Guardian Switch Settings

### STP - SCIII CONTROLLER ADDRESS SETTINGS

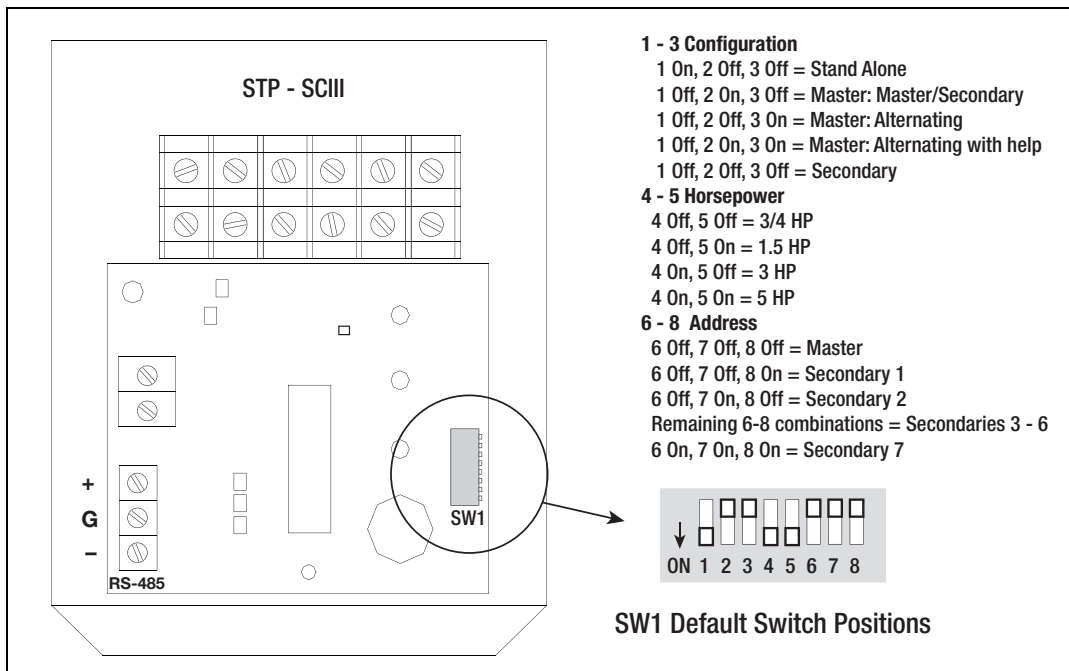


Figure 8. STP - SCIII Address Settings

### MAG VFC CONTROLLER SWITCH SETTINGS

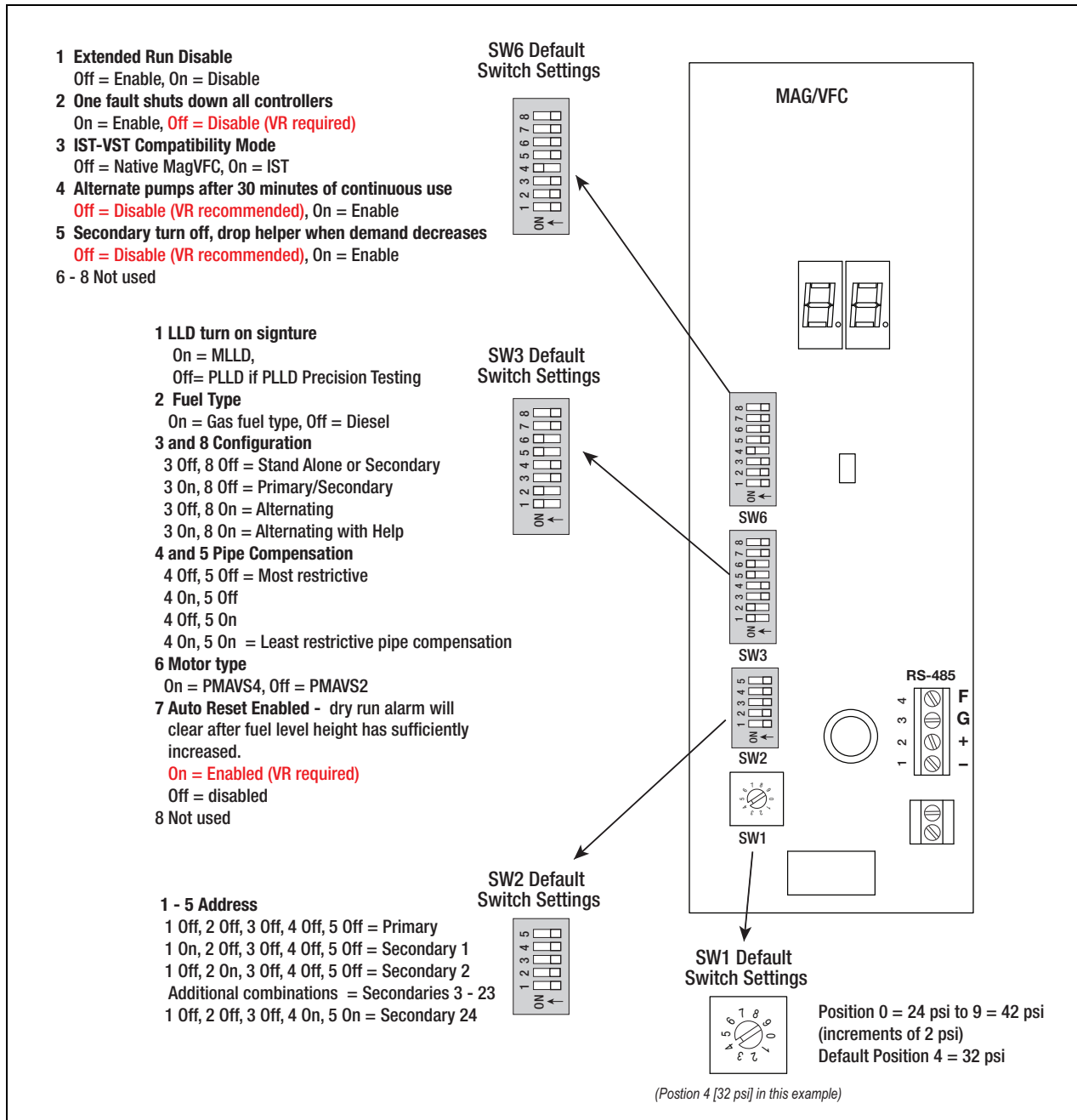


Figure 9. Mag VFC Address Settings

## IPC Setup

After the controllers are connected to the TLS-450PLUS RS-485 serial port, apply power to the console and let it boot up and display the Home Screen (see Figure 10).

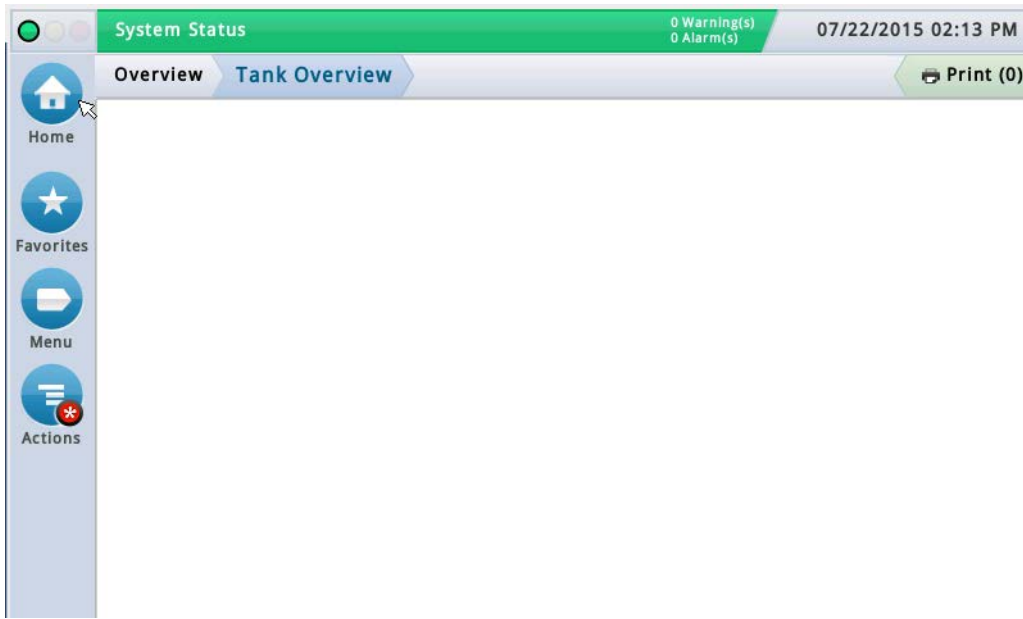


Figure 10. Initial Setup Home Screen

Access Workflow Wizard (WW) setup by touching **Menu>Setup>Workflow Wizard>Setup Workflow**:

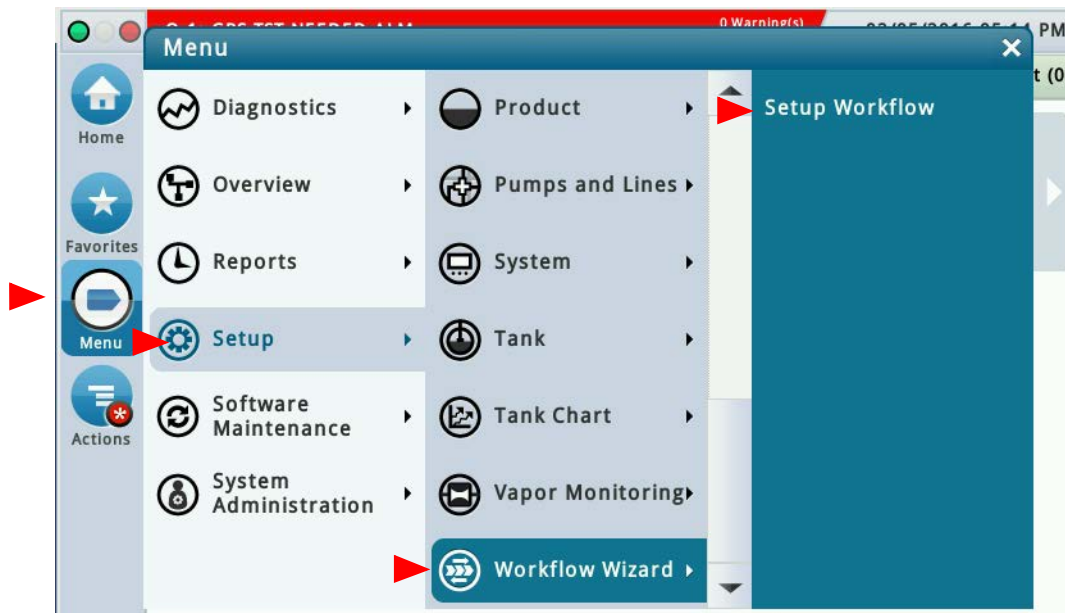


Figure 11. Accessing Workflow Wizard Setup

This manual assumes all devices are connected and recommends you are accessing WW setup at the console's front panel display. Other setup interface methods vary in feature and accessibility options.

The initial setup screen in the Workflow Wizard app is shown Figure 12. Note that the Workflow Wizard app steps through setup screens in the V-R recommended sequence.

Navigating Workflow Wizard is described in the figure below. When you exit Workflow Wizard, or it times out, reentering the app always returns you to the initial screen (Figure 12). To return to the screen you were working on after exiting the app, touch the Next button repeatedly until the desired screen is displayed.

Once the console is setup and functioning and a screen needs modification, the user would likely use the standard quicker path (from the home screen) to the desired screen, e.g., Menu>Setup>etc>etc..

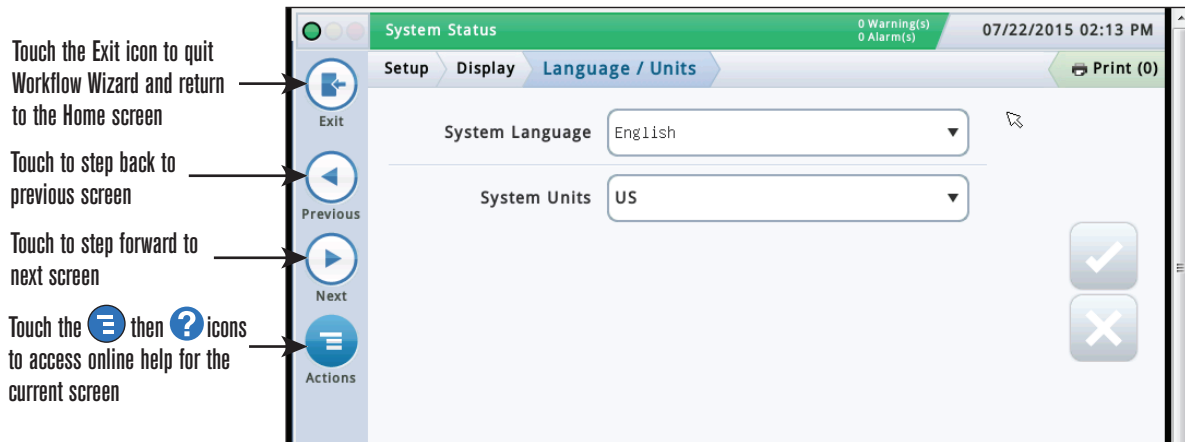


Figure 12. Initial WorkFlow Wizard Setup Screen

## SERIAL PORT SETUP

1. From the initial Workflow Wizard screen, touch the Next button until you see the Serial Port setup screen (see Figure 13). In the 'Usage' field, choose 'IPC Comms'.

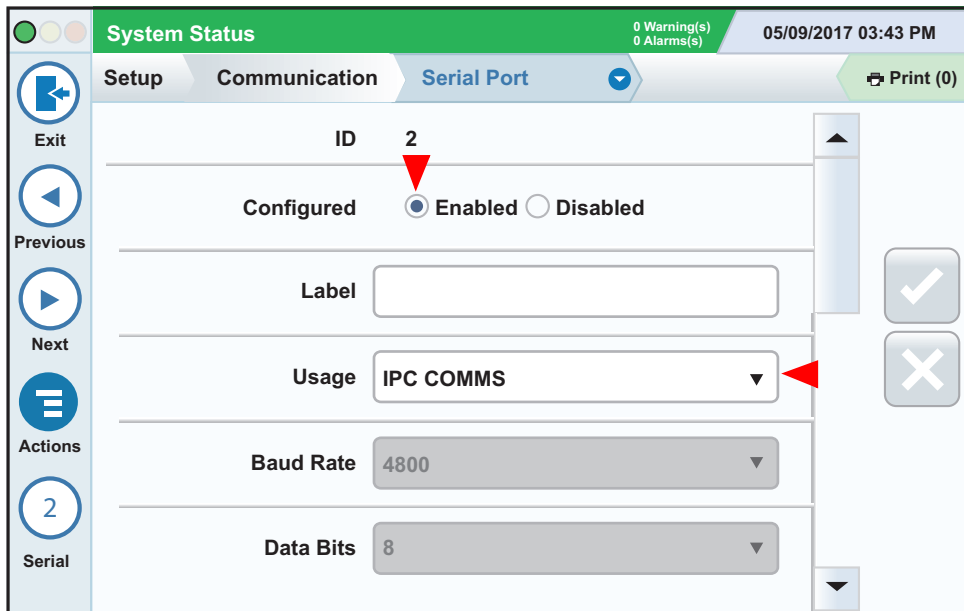




Figure 13. Serial Port Assignment

2. Select remaining serial port settings as per your site's requirements. To view allowable selections for the remaining fields, for this and the following IPC setup screens, touch the Actions icon  then touch the Help icon .

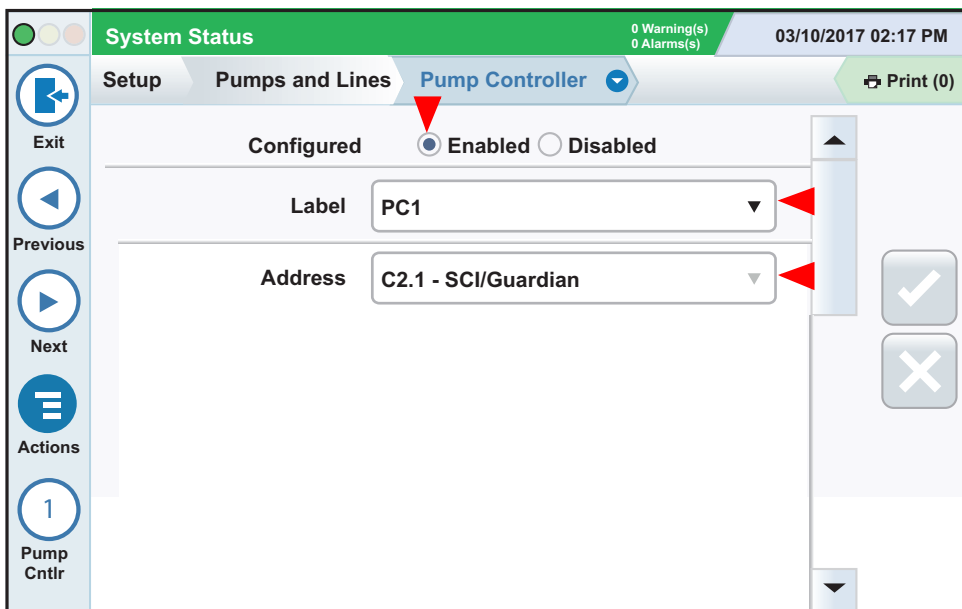
Upon entering Help, the field information and allowable selections associated with the currently displayed screen will be visible. For multiple screen pages, touch the side scroll bar up/down arrows to scroll through all of the fields. Touch the 'X' in the right corner of the Help screen title bar to return to the TLS-450PLUS screen you were viewing.

3. Enable the Serial Port before saving.

## PUMP CONTROLLER SETUP

**NOTICE** The Serial Port must be configured before pump controllers are configured.

1. Navigate to the **Setup > Pumps and Lines > Pump Controller** screen (see Figure 14).



**Figure 14. Selecting Pump Controller Screen**

2. In the Label field enter a name for this Pump Controller (see Figure 14).
3. The Address field will contain all of the available pump controller types connected to IPC Comms serial port (e.g., MagEco [MagVFC], STP-SCI/Guardian, STP-SCIII). Reference your record of each controller's assigned Secondary address (1 to 31), to select the desired controller from the drop-down list. For example, the Address field in Figure 14, C2.1 SCI – C2 = the IPC Comms serial port; 1 = Secondary address 1; and SCI/Guardian = the FE Petro Controller type assigned to that address (STP-SCI/Guardian).
4. Enable the Pump Controller before saving.

## PUMP SETUP

**NOTICE** The pump controllers must be configured before pumps are configured.

1. Navigate to the **Setup > Pumps and Lines > Pumps** screen. This screen includes both pump controllers and relays in the pump control field (see Figure 15).
  - a. In the Label field, enter a label for the pump.
  - b. In the Mode field, select TLS Pump Control. This indicates the pump is controlled or actuated by the console.
  - c. In the Tank field select the Tank in which the pump is installed.
  - d. In the Pump Control field select the pump's Controller.
  - e. In the Pump Sense field select the input to the pump.
  - f. Enable Pumps before saving.

The screenshot displays the 'Pumps Setup' screen within the 'System Status' application. The top navigation bar shows 'Setup > Pumps and Lines > Pumps'. The status bar at the top right indicates '0 Warning(s)' and '0 Alarms(s)' with a timestamp of '05/09/2017 03:52 PM'. A 'Print (0)' button is visible in the top right corner. The main configuration area includes a radio button group for 'Configured', 'Enabled' (selected), and 'Disabled'. Below this are five input fields: 'Label' (P1), 'Mode' (TLS Pump Control), 'Tank' (TANK 1: \* Regular), 'Pump Control' (Pc 1: PC1), and 'Pump Sense' (EXTERNAL INPUT 1). A 'Line' field at the bottom is set to 'LINE 1'. On the left side, there is a vertical toolbar with icons for 'Exit', 'Previous', 'Next', 'Actions', and 'Pump'. On the right side, there are 'Save' (checkmark) and 'Cancel' (X) buttons.

Figure 15. Pumps Setup Screen



## CONFIGURE A LINE

**NOTICE** The pumps must be configured before lines are configured.

1. Navigate to the **Setup > Pumps and Lines > Line** screen. This screen lets you configure individual lines monitored by the console. This includes leak monitoring, Recirculation, IPC and line manifold settings. Make the selections to page 1 of the Line screen based on the site's requirements (see Figure 16).

Figure 16. Line Setup Screen - Page 1

2. Line Active Relay  
The selections in the Line Active Relay drop-down field will be standard relays. The communication signal supplied by TLS-450PLUS is not enough to engage the relay so the additional relay selected in this field provides the 110 Vac source needed to start the pump (ref. Figure 5 on page 5). If you are using a STP-SCIII, a setup data warning will be posted if a standard relay is not selected in this field.
3. Select a Dispense Mode [Only enabled if Manifolded field is set to "Yes"].

For IPC requirements, page 2 of the Line screen lets you select the Dispense Mode and Staging Methods for multiple pumps on the line (see Figure 17). The Dispense Mode determines the order in which pumps are activated on a line. The staging method determines which pumps will provide additional pump capacity for a line when requested. Pumps can be designated to be in a Primary/Secondary configuration or can be selected to alternate.

**NOTICE** With FE SCI/Guardian controllers, using the Alternate feature in conjunction with electronic line leak detection is not recommended.

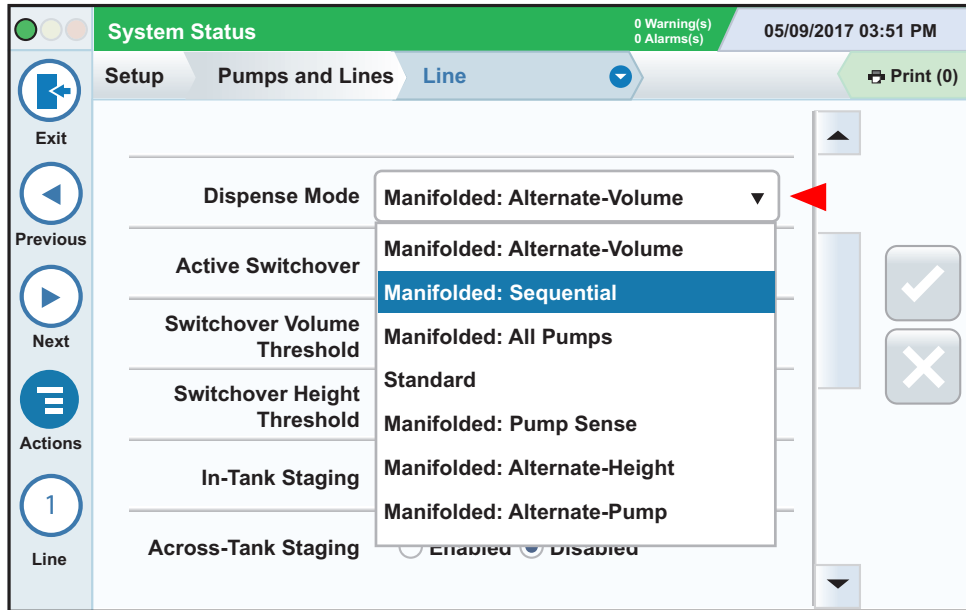


Figure 17. Line Setup Screen - Page 2

- a. Standard  
Typically this means that only one pump feeds the line.
- b. Manifolded: Alternate - Volume  
For line manifolded tanks, the console chooses the tank with the greatest inventory volume and switches to an alternate tank based on the Active Switchover and Threshold settings below.
- c. Manifolded: Sequential  
If there is more than one tank with a pump on the line, tanks are pumped one at a time until the volume drops below the Pump Threshold (%) value set in the Setup > Tank > General screen. At that point, pumping will commence on the next available tank in the line set in sequential order by tank number.
- d. Manifolded: All Pumps  
All pumps on the line are run
- e. Manifolded: Pump Sense  
This is used for manifolded lines with pump sets that are controlled externally to the TLS (e.g., direct Primary/Secondary through pump controllers). Pump Sense input helps to evaluate busy periods for CSLD/SLD/Timed Sudden Loss.
- f. Manifolded: Alternate-Height  
For line manifolded tanks, the console chooses the tank with the greatest height and switches to an alternate tank based on the Active Switchover and Threshold settings below.
- g. Manifolded: Alternate-Pump  
Pump selection is based on pump number order. For each new hook signal, the next pump in the sequence (by pump number) is selected. If a tank has a Primary/Secondary pump configuration, only the Primary pumps are selected. There is no tank selection in this mode. This mode is intended for multiple pumps in the same tank or siphon-manifolded tanks. Use In-Tank Staging (see below) if you want to configure help for a pump.

#### 4. Active Switchover

This field is active if either Alternate-Volume or Alternate-Height is selected in the Dispense Mode field above. Choices are:

- Yes - Enables the switchover to an alternate tank when dispensing, based on which tank has the greatest volume/height, taking into account the threshold value below
- No - Disables the switchover to an alternate tank when dispensing (default).

#### 5. Switchover Volume Threshold

The volume used to determine when to switch over to an alternate tank in Manifolder: Alternate-Volume mode. When dispensing, the console switches to an alternate tank (without losing line pressure) when the difference is greater than this threshold. Set to a value between 10 and 999 gallons. The default value is 200 gallons.

#### 6. Switchover Height Threshold

The height used to determine when to switch over to an alternate tank in Manifolder: Alternate-Height mode. When dispensing, the console switches to an alternate tank (without losing line pressure) when the difference is greater than this threshold. Set to a value between 1 and 99 inches. The default value is 2 inches.

#### 7. In Tank Staging (IPC)

Enables/disables additional pump capacity (staging) provided by pumps within the same tank on the line when feedback from active pump controllers indicate help is necessary. The additional pumps stop when the hook signal is dropped. If pumps have a Primary/Secondary configuration (see below), the Secondary pumps must be in the same tank to be used for In Tank Staging.

**NOTICE** If all devices are relays, staging is not available.

#### 8. Across-Tank Staging (IPC)

Enables/disables additional pump capacity (staging) provided by pumps on the line, associated with other tanks. The additional pumps stop when the hook signal is dropped.

#### 9. For the Line selected, page 3 of the Line screen lets you assign the appropriate pumps to the line (see Figure 18). Select a pump to assign to the line. If the Line Manifolder field above is set to Yes, you can select multiple pumps for this line. With Intelligent Pump Control, the pump name (P1 / T5 - Primary) may also include the pump (P1), the tank (T5) if assigned, and how this pump is used (Primary):

- In applicable Dispense Modes, when there is one pump in a tank (or siphon-manifolder tank group), it is marked 'Stand-Alone'. It is the only pump available to run.
- In applicable Dispense Modes, when there are two or more pumps in a tank (or siphon-manifolder tank group) and none are marked as a Primary pump, they are marked 'Alternate'. They alternate with each switch hook as determined by the Dispense Mode.
- If there are two or more pumps in a tank (or siphon-manifolder tank group) and one is checked as a Primary pump, all other pumps are marked 'Secondary'.

Primary (checkbox) - This checkbox indicates that this is a Primary pump in a Primary/Secondary multiple pump configuration for staging purposes. Only one pump per tank can be selected as a Primary. The Primary pump is always employed before the Secondary pump. If the Primary pump is unusable, the lowest numbered Secondary pump in the configuration becomes a temporary Primary.

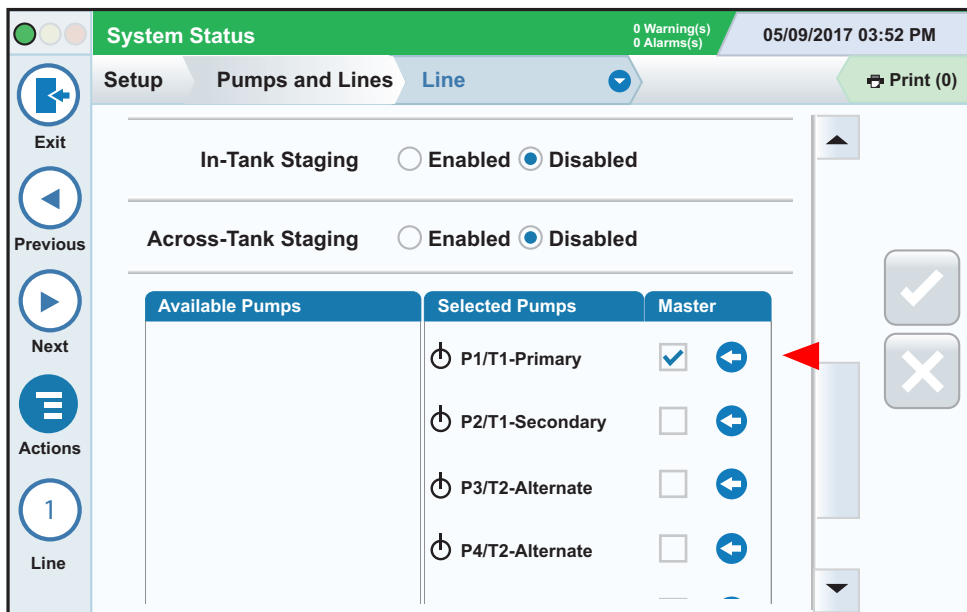


Figure 18. Line Setup Screen - Page 3

# Diagnostics

## Pump Controller Communications

You can view pump controller information such as fault codes, pumps and lines associated with a pump controller and pump controller status by navigating to **Diagnostics > Pump Controller > Communications** (see Figure 19 and Figure 20).

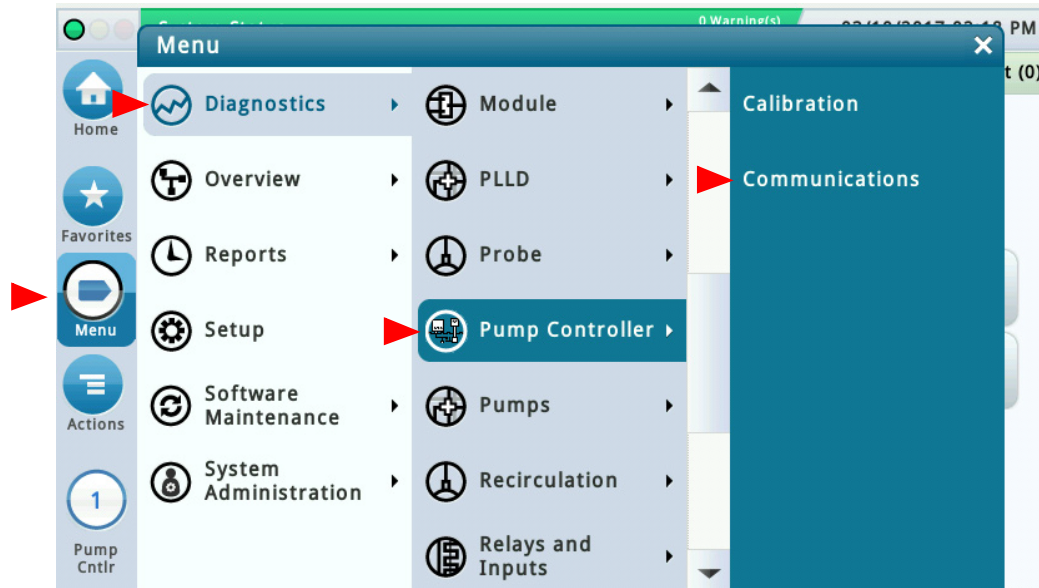


Figure 19. Accessing Pump Controller Communications Diagnostics Screen

System Status 0 Warning(s)  
0 Alarm(s) 03/10/2017 02:19 PM

Diagnostics > Pump Controller > Communications Print (0)

Address	Type	Gauge Mapping	ATG Status	PC Status	Line	Pump
<input type="checkbox"/> C1.1	SCI/Guardian	Pc 1: PC1	Idle	OK	Ln 1	Pm 1
<input type="checkbox"/> C1.2	SCIII	Pc 2: PC2	Idle	OK	Ln 1	Pm 2
<input type="checkbox"/> C1.3	Mag/Eco	Pc 3: PC3	Idle	OK	Ln 2	Pm 3
<input type="checkbox"/> C1.4	Mag/Eco	Pc 4: PC4	Idle	OK	Ln 2	Pm 4
<input type="checkbox"/> C1.5	Mag/Eco	Pc 5: PC5	Idle	OK	Ln 3	Pm 5
<input type="checkbox"/> C1.6	Mag/Eco	Pc 6: PC6	Idle	OK	Ln 3	Pm 6

Figure 20. Pump Controller Diagnostics Screen

### DISPLAY OPTIONS

Addresses for active and/ or configured pump controllers display by default. You can show all pump controller addresses by touching the Actions button, then Show All Addresses in the Actions pop-up box (see Figure 21).

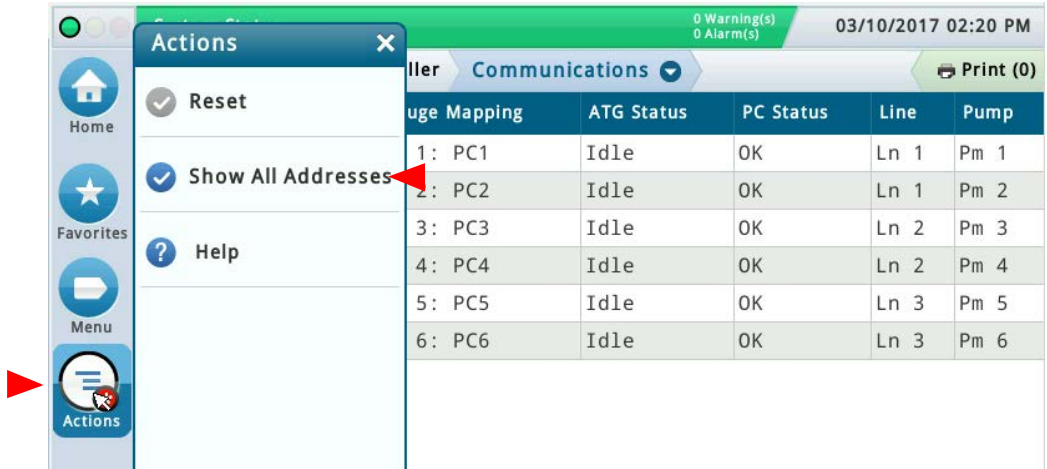


Figure 21. Displaying All Controller Addresses (Active and Configured)

### Reset

You can check a pump controller for proper operation by depressing the push button on its front panel for between three and ten seconds.

Alternately, in the Address column of the Pump Controller Diagnostics screen, touch the check box by the controller you want to reset (see Figure 20), then touch Actions to open the Actions box (see Figure 22). Touch Reset in the Actions pop up box, to reset pump controllers. Note: This reset option is only available to Administrator Roles.

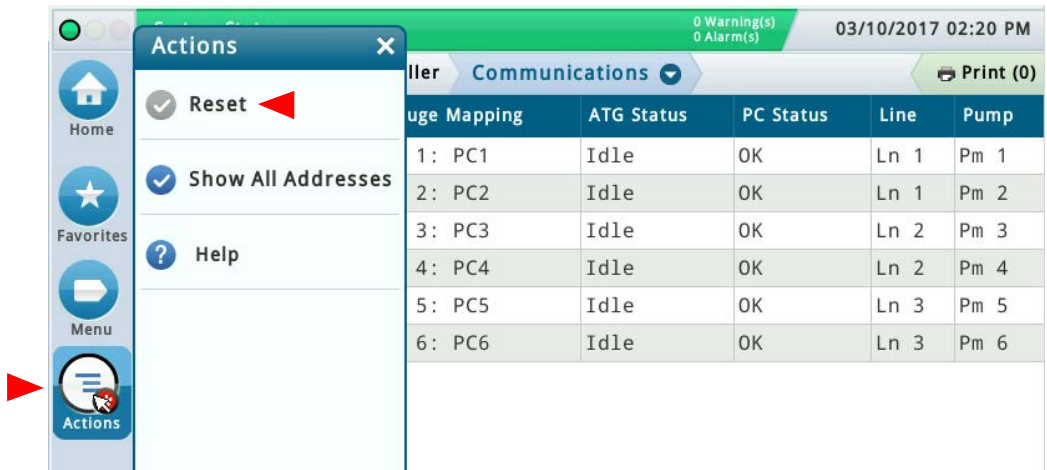


Figure 22. Resetting Controllers

**NOTICE** A manual reset is required at the physical pump controller if the Type is “unknown”, if a Comm Fault is active or if the pump controller doesn’t support it.

## Calibration

1. Bag off the dispenser nozzle(s) that need calibration. Pumps that are dispensing cannot be calibrated.  
NOTE: Some pump controllers (e.g., Mag/Eco) cannot be calibrated using this screen, even though they are displayed. If there are no pump controllers that need calibration, the Start Calibration action is not available.
2. Put the pump controller in Calibration mode using the button on the physical pump controller box. Refer to the pump controller User's manual for more information.
3. Navigate to the **Diagnostics > Pump Controller > Calibration** screen on the TLS-450PLUS (see Figure 23 and Figure 24).

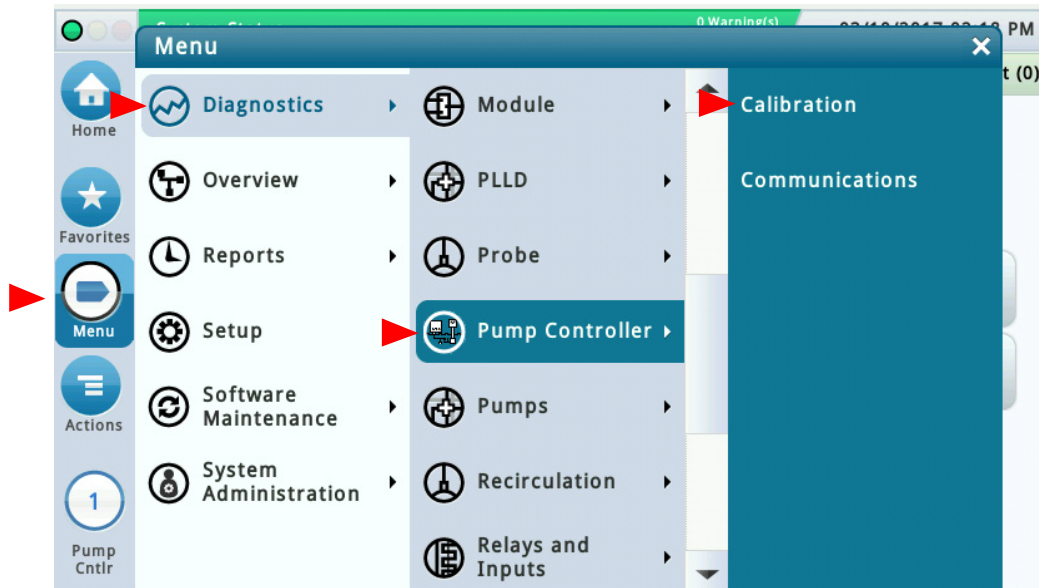


Figure 23. Accessing Pump Controller Communications Diagnostics Screen

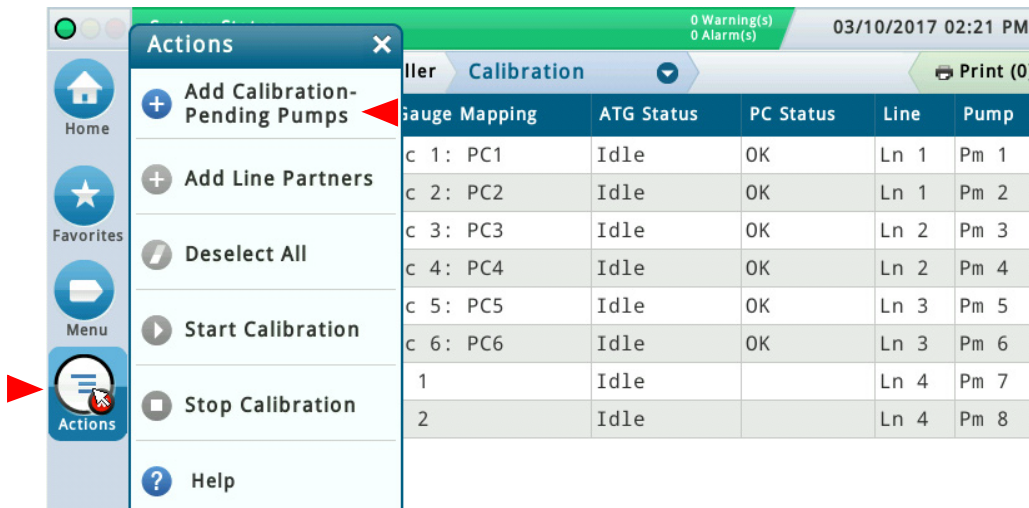


Figure 24. Pump Controller Diagnostics Screen

4. In the Address column of the screen, touch the checkbox(es) next to the pump controller(s) that you want to calibrate.
5. Touch the Actions button then touch Add Calibration – Pending Pumps in the Actions pop-up box to add pumps that are waiting to be turned on for calibration.
6. Touch the Actions button then touch Add Line Partners to add any necessary pumps on the same line for selected pumps. This is a way to manually select any additional pumps necessary for calibration (e.g., blended products require a pump from associated lines to also be running during calibration).
7. Touch the Actions button then touch Start Calibration to begin the calibration process. Calibration can take several minutes. If you need to stop the calibration process, touch the Actions button then touch Stop Calibration.

## Tanks And Pumps

Table 2 shows examples of which pump runs on a hook signal based on two tanks with two pumps in each tank (see Figure 25).

Two settings in **Setup > Pumps and Lines > Line** determine which pumps run on a hook signal with Intelligent Pump Control: The Dispense Mode and the pump controller mode (Stand-alone, Primary/Secondary, or Alternate). The Dispense Mode determines which tank is selected. (Siphon-manifolded tanks are considered one tank for this purpose.) The pump controller mode determines which of the pumps contained in the tank (also known as a pump set) pumps next.

When staging is included in the configuration, In Tank Staging enables help within a pump set. Across Tank Staging enables help across line-manifolded tanks.

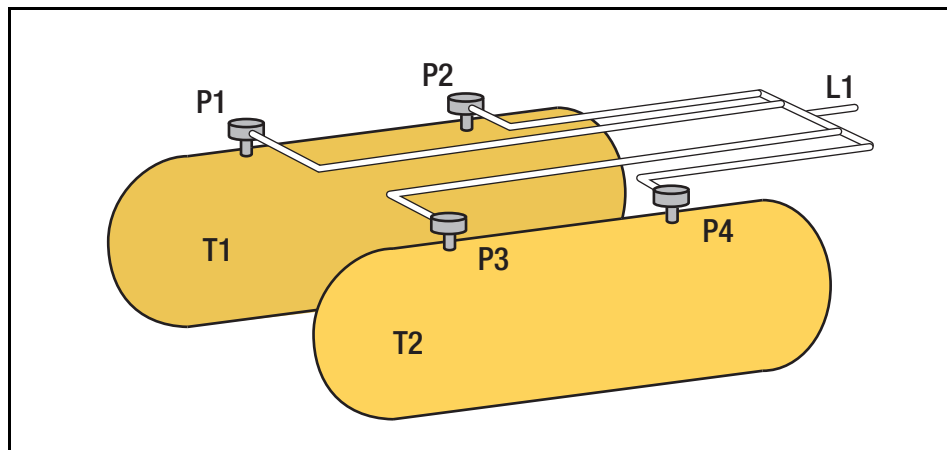


Figure 25. Two Tanks Each With Two Pumps



Table 2. Tank Staging Examples - Two Tanks W/Two Pumps Each

Dispense Mode	Pump Controller Mode (One Pump, Primary/Secondary, Or Alternate)	Pump That Runs At Hook Signal
Standard	The ATG does not do any tank-based pump control. It will turn on the pumps that inputs are connected to and will only inhibit dispensing due to alarms. This mode does not support staging, redundancy, or backfill protection.	
Pump Sense	This mode does not control pumps with an ATG.	
All Pumps	This mode does not support Intelligent Pump Control staging, redundancy, or backfill protection.	All pumps are engaged when a hook signal is received.
Manifolded – Alternate Volume or Height (Tanks alternate based on volume or height.)	Stand-alone (one pump in a tank group - P1 and P3 in Figure 25 above)	The lone pump in the tank that meets the Alternate Volume or Height requirements at the time of hook signal.
	Pumps designated as: P1 Primary /P2 Secondary; P3 Primary /P4 Secondary	P1 (Primary only) or P3 (Primary only), depending on which tank meets requirements of alternate by volume or height. If staging is requested, the designated Secondary pumps assist in pump number order. NOTE: If a Primary pump is disabled, the lowest number Secondary becomes the temporary Primary.
	Pumps designated as: Alternate	P1 and P2 alternate (one at a time) or P3 and P4 (one at a time) alternate, depending on which tank meets requirements of alternate by volume or height. If staging is requested, the lowest numbered available pump run. With In Tank Staging, it will be a pump in the same tank. With Across Tank Staging, it will be a pump in any tank.

**Table 2. Tank Staging Examples - Two Tanks W/Two Pumps Each**

Dispense Mode	Pump Controller Mode (One Pump, Primary/Secondary, Or Alternate)	Pump That Runs At Hook Signal
Sequential (Lowest number tank used first)	Stand-alone (one pump in a tank group- P1 and P3 in Figure 25 above)	The lowest number tank is selected, then the lone pump.
	Pumps designated as: P1 Primary /P2 Secondary; P3 Primary /P4 Secondary	P1 (Primary in lowest number tank) until tank reaches low product level, then P3 (Primary in next number tank) only. If staging is requested, P2 (the designated Secondary pump in pump order.) When the tank reaches the low product level, pumping will switch to the next tank with P3 (with P4 if staging is requested) until that tank reaches the low product level. In Tank Staging is used most often in this scenario. NOTE: If a Primary pump is disabled, the lowest number Secondary becomes the temporary Primary
	Pumps designated as: Alternate	P1 and P2 (in lowest number tank) alternate until the tank reaches the low product level. When the tank reaches the low product level, pumping will switch to the next tank with P3 and P4 alternating until that tank reaches the low product level. If staging is requested: P1 and P2 (pumps in the lowest number tank) alternate. If both pumps are on and staging is requested, the remaining pumps are used in pump number order – this may be in a different tank if Across Tank Staging is enabled).
Alternate by Pump (Pump selection by pump number; tank selection is ignored)  NOTE: Although pumps may be out of order in tanks, they are in order in this example.	Stand-alone (one pump in a tank group- P1 and P3 in Figure 25 above)	The lone pump is selected.
	Pumps designated as: P1 Primary /P2 Secondary; P3 Primary /P4 Secondary	P1 then P3 (only Primary pumps run in pump number order, regardless of tank.) If staging is requested, P2 helps P1 and P4 helps P3. NOTE: If a Primary pump is disabled, the lowest number Secondary becomes the temporary Primary.
	Pumps designated as: Alternate	P1, then P2, then P3, then P4 (pumps alternate in pump number order) If staging is requested: the next pump helps in pump number order - this may be in a different tank if Across Tank Staging is enabled).

## Pumps Overview Diagnostics Screen

The Pumps Overview screen lets you view diagnostic and status information for pumps and pump controllers without having to get this information from the pump controller codes. Select the desired pump from the icon list on the bottom of the screen.

Navigate to the **Diagnostics>Pumps> Overview** screen (see Figure 26 and Figure 27).

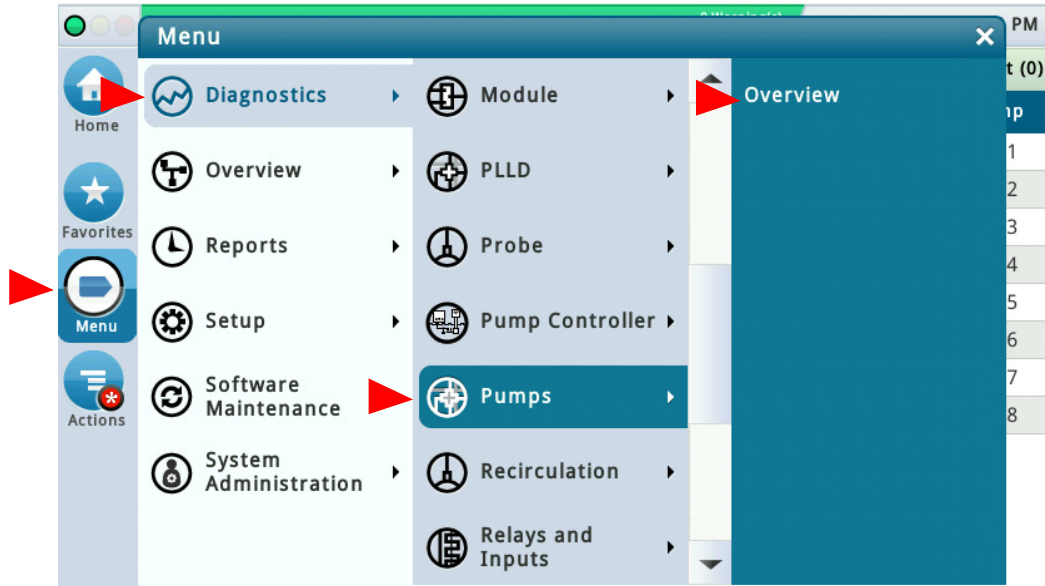


Figure 26. Selecting The Pump Overview Diagnostics Screen

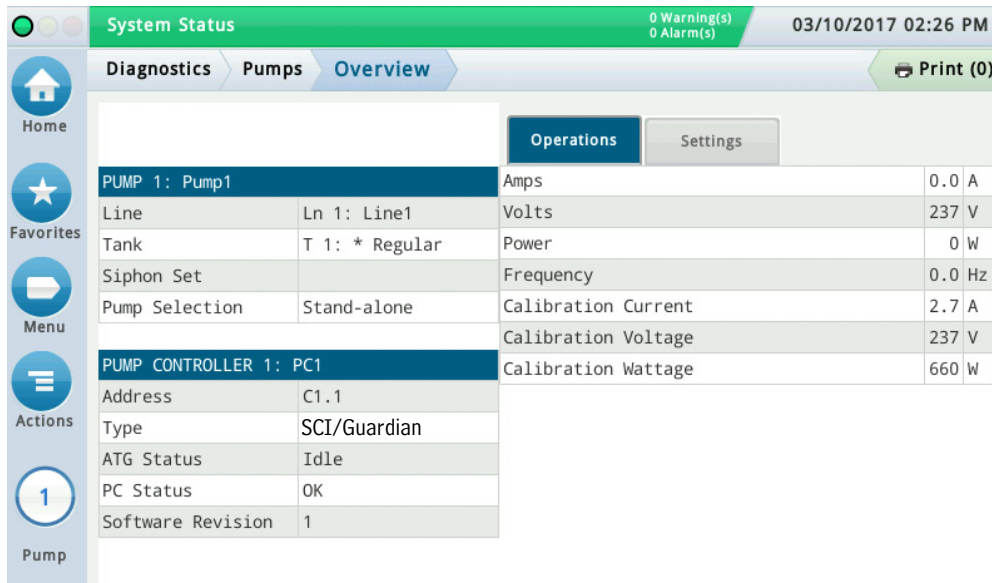


Figure 27. Pump Overview Diagnostics Screen

The Pump Diagnostics Overview screen contains four areas of information:

- Pump - Displays information about the selected pump.
- Pump Controller - Displays information about the pump controller if one is associated with the selected pump.
- Relay - If the pump is controlled by a relay, the following fields display (Operations and Settings tabs are not available):
  - Address
  - Type
  - Status
- Operations - [Not available if the pump controller type is not supported by Intelligent Pump Control or if the pump is controlled by a relay.]

Displays information about how the pump controller is operating. The information displayed depends on the type of pump controller. Consult the Operators/Owner's Guide for the specific brand and model of pump controller for more information.

- Settings - [Not available if the pump controller type is not supported by Intelligent Pump Control or if the pump is controlled by a relay.]

Displays information about dip switch settings of supported pump controllers. For example, "S1-1-5: Address Secondary-12" would mean that on this model of pump controller, the dip switches 1-5 are configured so it is a Secondary pump. Consult the Operators/Owner's Guide for the specific brand and model of pump controller for information about pump controller configuration and dip switch settings.

# Troubleshooting

## Alarms and Warnings

Alarms and warnings can be generated by faults reported by the pump controller as well as conditions reported by the ATG.

Line shutdowns for faults can be set in Automatic Events.

Site Shutdown Detect in **Setup > System > Alarm Filtering** can be used to suppress Communication alarms (PC Comm Fault) when the site is shut down (e.g., at night) since the alarm is only active because of the shutdown process. Communication alarms that were active before the shutdown process began persist when the site reopens.

**Table 3. System Alarm**

Alarm	Active When	Clears When
PC Address 0 Found	Pump Controller assigned an invalid address of 0.	No Pump Controllers are assigned to address 0.

**Table 4. Line Setup Data Warnings**

Setup Data Warning	Active When	Clears When
Primary/Secondary Not Supported By Dispense Mode	Dispense Mode is All Pumps, Pump Sense, or Standard and a pump is configured as a Primary.	Dispense mode is not All Pumps, Pump Sense, nor Standard, or there is no configured pump as Primary.
In-Tank Staging Needs More Than 1 Pump In a Tank	In-Tank Staging is Enabled and there are not at least 2 pumps in 1 tank or siphon manifold set.	In-Tank Staging is Disabled or there are at least 2 pumps in 1 tank or siphon manifold set.
Across-Tank Staging Needs More Than 1 Tank	Across-Tank Staging is Enabled and there is not at least 1 pump in 2 non-siphon manifolded tanks.	Across-Tank Staging is Disabled or there is at least 1 pump in 2 non-siphon manifolded tanks.
Staging Not Supported By Dispense Mode	Dispense Mode is All Pumps, Pump Sense, or Standard and In-Tank Staging is Enabled or Across-Tank Staging is Enabled.	Dispense Mode is not All Pumps Pump Sense, nor Standard, or In-Tank Staging and Across-Tank Staging are Disabled.
Staging Not Supported With All Relays	In-Tank or Across-Tank Staging is Enabled and all pumps have relays.	In-Tank and Across-Tank Staging are Disabled or at least one pump has a Pump Controller.
Relay Controlled Pumps Cannot Be Primary	There is at least 1 pump with a relay configured as Primary.	There are no pumps with a relay configured as Primary.
More Than One Primary Pump In Tank Group	There is more than one Primary pump in a tank/siphon.	There is one or no Primary pump in all tank/siphon sets.
Dispense Mode Needs More Than 1 Tank	Dispense Mode is Alternate by Volume, Alternate by Height or Sequential and there is not at least 1 pump in 2 non-siphon manifolded tanks.	Dispense Mode is not Alternate by Volume, Alternate by Height or Sequential or there is at least 1 pump in 2 non-siphon manifolded tanks.

**Table 4. Line Setup Data Warnings**

Setup Data Warning	Active When	Clears When
Line Active Relay Not Assigned	A pump with an SCIII controller is assigned to the line and a Standard relay has not been selected as the Line Active Relay field.	An SCIII controller is assigned to the line and a Standard relay has been set as the Line Active Relay field.
Line Active Relay Disabled	A Line Active Relay is assigned to the line and it is disabled.	The Line Active Relay assigned is enabled.
Line Active Relay Not Standard Type	A Line Active relay is assigned to the line and it has the wrong Relay Type (i.e. not Standard).	The Line Active Relay is 'Standard' Relay type.
Line Active Relay Setup Warning	A Line Active Relay is assigned to the line and the Relay has a Setup Data Warning.	The Setup Data Warning on the Line Active relay clears.

**Table 5. Line Alarms**

Alarm	Active When	Clears When
Setup Data Warning	Setup Data Warning detected - see Table 4.	Setup Data Warning clears - see Table 4.
Line Out	There is a Pump Out alarm or a Pump Disabled alarm for all pumps on the line.	The Pump Out alarm or a Pump Disabled alarm for one of the pumps on the line clears.
	The line is disabled by an auto event.	The auto event causing the line to be disabled clears.
	Dispense Mode is Alternate by Volume, Alternate by Height, Sequential, or Alternate by Pump and is at least one pump with a Pump Out or Pump Disabled alarm in a tank that is over the backfill volume limit.	Dispense Mode is Alternate by Volume, Alternate by Height, Sequential, or Alternate by Pump and all tanks are under the backfill volume limit.
	Leak Monitoring is set to Monitoring PLLD and there is a PLLD Shutdown Alarm.	Leak Monitoring is set to Monitoring PLLD and the PLLD Shutdown Alarm clears.
	Leak Monitoring is set to Monitoring PLLD and there is a Communication Alarm for the assigned Pressure Sensor.	Leak Monitoring is set to Monitoring PLLD and the Communication Alarm for the assigned Pressure Sensor clears.
	Leak Monitoring is set to Monitoring PLLD and there is a Pump Out alarm or Pump Disabled alarm for the PLLD Controlling pump.	Leak Monitoring is set to Monitoring PLLD and the Pump Out alarm or Pump Disabled alarm for the PLLD Controlling pump clears.
No Backfill Protect	Dispense Mode is Alternate by Volume, Alternate by Height, Sequential, or Alternate by Pump and there is a Probe Out alarm in a tank on the line.	Dispense Mode is not Alternate by Volume, Alternate by Height, Sequential, or Alternate by Pump, or there is not a Probe Out alarm in a tank on the line.

**Table 6. Pump Controller Setup Data Warning**

Setup Data Warning	Active When	Clears When
Setup Data Warning	The pump controller is not assigned to a pump.	The pump controller is assigned to a pump.

**Table 7. Pump Controller Alarms**

<b>Alarm</b>	<b>Active When</b>	<b>Clears When</b>
Setup Data Warning	Setup Data Warning detected - see Table 6.	Setup Data Warning clears - see Table 6.
Comm Out Alarm	More than 16 timeouts	Reply received.
Comm Error Fault	More than 16 LRC errors in a row	Reply received with valid LRC.
Dry Run	Controller Device sends an Underload fault and the Low Product alarm is active and Pump Controller Switch Setting for Auto Restart/Reset is ON.	Clears after product level increases.
Pump Inlet Blocked	Controller Device sends an Underload fault and Low Product alarm is not active and Pump Controller Switch Setting for Auto Restart/Reset is ON.	Underload Faults clears. Refer to the applicable Smart Controller Installation guide for details.
Underload	Controller Device sends an Underload fault and at least one of the following: <ul style="list-style-type: none"> <li>- A tank is not assigned</li> <li>- A probe out alarm is active (Probe Out alarm in a tank on the line)</li> <li>- The Pump Controller Switch Setting for Auto Restart/Reset is OFF</li> <li>- A Low Product alarm is active and the Pump Controller Switch Setting for Auto Restart/Reset is ON and product level has increased.</li> </ul>	Underload Faults clears. Refer to the applicable Smart Controller Installation guide for details.
Under Voltage	Controller Device sends Under Voltage Fault.	Refer to the applicable Smart Controller Installation guide for details.
Locked Rotor	Controller Device sends Locked Rotor Fault.	Refer to the applicable Smart Controller Installation guide for details.
Open Circuit	Controller Device sends Open Circuit Fault.	Refer to the applicable Smart Controller Installation guide for details.
Capacitor Failing	Controller Device sends Ripple Fault (Reports a capacitor failing FE).	Refer to the applicable Smart Controller Installation guide for details.
High Temperature	Controller Device sends Over Temp Fault (Reports a high temperature condition FE).	Refer to the applicable Smart Controller Installation guide for details.
Uncalibrated	Controller Device sends Uncalibrated Fault (reports that it has not been calibrated FE).	Refer to the applicable Smart Controller Installation guide for details.
Over Speed	Controller Device sends Over Speed Fault.	Refer to the applicable Smart Controller Installation guide for details.
Extended Run	Controller Device sends Extended Run Fault.	Refer to the applicable Smart Controller Installation guide for details.
Relay Fault	Controller Device sends Relay Fault.	Refer to the applicable Smart Controller Installation guide for details.
L2 Open	Controller Device sends L2 Open Fault.	Refer to the applicable Smart Controller Installation guide for details.

**Table 7. Pump Controller Alarms**

<b>Alarm</b>	<b>Active When</b>	<b>Clears When</b>
Over Voltage	Controller Device sends Over Voltage Fault.	Refer to the applicable Smart Controller Installation guide for details.
Voltage Unbalanced	Controller Device sends Voltage Unbalanced Fault.	Refer to the applicable Smart Controller Installation guide for details.
Load Unbalanced	Controller Device sends Load Unbalanced Fault.	Refer to the applicable Smart Controller Installation guide for details.
Short Circuit	Controller Device sends Short Circuit Fault.	Refer to the applicable Smart Controller Installation guide for details.
Unknown Fault	Controller Device sends Unknown Fault.	Check fault condition on Smart Controller and contact Franklin Fueling Systems Technical Services for more information.
Overload	SCI posts this alarm instead of Locked Rotor. See Locked Rotor.	SCI posts this alarm instead of Locked Rotor. See Locked Rotor.

**Table 8. Pump Alarms**

<b>Alarm</b>	<b>Active When</b>	<b>Clears When</b>
Pump Disabled	Pump is disabled by an automatic event.	Pump is not disabled by an automatic event.



