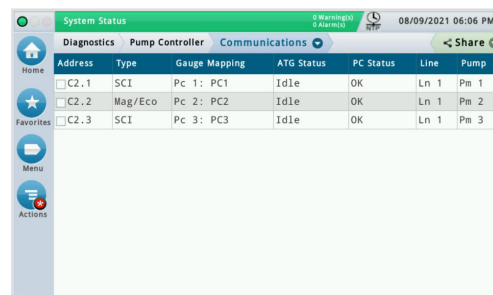# Intelligent Pump Control

Integration Solution for 3rd Party Pump Controllers

What is Intelligent Pump Control?

Intelligent Pump Control (IPC) allows the TLS-450PLUS Automatic Tank Gauge (ATG) to display and report Submersible Turbine Pump (STP) activity through a direct communication link between a STP pump controller and the TLS-450PLUS system via a RS-485 connection.
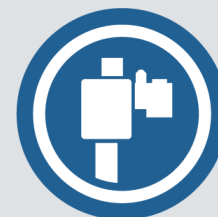
TLS-450PLUS → **3rd Party Pump Controller** → **3rd Party Pump**

▶ REMOTE DIAGNOSTICS & CONTROL

IPC supports the following categories of diagnostics for each controller:

- **Current Operational Status** – Provides pump electrical current value
- **Pump Metrics** – Indicates other vital STP electrical system data
- **Pump Activity Log** – Tracks when the pump activates
- **Pump Controller Settings** – Indicates setup of IPC software

▶ FUNCTIONALITY

- **Advanced Pump Control** – Utilizes TLS Dispense Mode
- **Line and Pump Priority** – Determines what pump or line to activate based on tank and pump feedback
- **Dispense Modes:**
  - Sequential
  - Alternate by Height
  - Alternate by Volume
  - Alternate by Pump
- **Staging (Helper Mode):**
  - Primary – Secondary
  - Alternate
  - In-Tank Staging
  - Across Tank Staging
- **Automatic Events for Alarm and Email Notification**

▶ PUMPING OPERATION USE CASES

- **Sequential** – The Sequential dispense mode selects a tank based on tank numbers (lowest number tank used first). Fuel is pumped from the initial tank until a certain low product level is reached (e.g., "pump threshold %" of volume) before moving to the next tank.

- **Alternate by Height or by Volume** – The system will try to keep the products in the tanks level based on volume or height. Alternate by Volume is suggested when there are multiple sized tanks connected to the line.

- **Alternate by Pump** – Alternate by Pump is a new dispense mode, which is used to provide pump selection purely based on pump sequence. In this mode, tank selection is ignored. Pumps are engaged in pump number order. For each new hook-signal, the next pump in sequence is engaged (e.g., P1, P2, P3 , P1…).

- **Priority** – Based on tank and flow rate information.

▶ ASSET PROTECTION

- **Flow Optimization**
  - Utilizes pump staging to optimize consistent delivery of product at the nozzle (Helper Mode)
  - Switch on the Fly – Provides continuous line pressure during staging from pump to pump
- **Operational Redundancy**
  - Utilizes TLS-based logic to understand when one pump needs the assistance of another pump
- **Equipment Loading**
  - Data feedback provides electrical loads to help understand UMP performance
- **Inventory Control**
  - Manages inventory based on three criteria: (1) low product threshold in tank, (2) height of product in tank, or (3) volume of product in tank
- **Equipment Protection**
  - Provides feedback via TLS on controller operational status
  - Monitors pump status to provide details for proactive service

Functionality Alarms	
Alarm	**Active When**
Setup Data Warning	Incorrect or missing programming
Comm Out Alarm	More than 16 timeouts
Comm Error Fault	More than 16 LRC errors in a row
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
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	• A tank is not assigned • A probe out alarm is active (Probe Out alarm in a tank on the line) • Controller Device sends an Underload fault and the Pump Controller Switch Setting for Auto Restart/Reset is OFF • Controller Device sends an Underload fault, and a Low Product alarm is active, and the Pump Controller Switch Setting for Auto Restart/Reset is ON, and product level has increased
Under Voltage	Controller Device sends Under Voltage Fault
Locked Rotor	Controller Device sends Locked Rotor Fault
Open Circuit	Controller Device sends Open Circuit Fault
Capacitor Failing	Controller Device sends Ripple Fault (Reports a capacitor failing FE)
High Temperature	Controller Device sends Over Temp Fault (Reports a high temperature condition FE)
Uncalibrated	Controller Device sends Uncalibrated Fault (Reports that it has not been calibrated FE)
Over Speed	Controller Device sends Over Speed Fault
Extended Run	Controller Device sends Extended Run Fault
Relay Fault	Controller Device sends Relay Fault
L2 Open	Controller Device sends L2 Open Fault
Over Voltage	Controller Device sends Over Voltage Fault
Voltage Unbalanced	Controller Device sends Voltage Unbalanced Fault
Load Unbalanced	Controller Device sends Load Unbalanced Fault
Short Circuit	Controller Device sends Short Circuit Fault
Unknown Fault	Controller Device sends Unknown Fault
Overload	SCI posts this alarm instead of Locked Rotor (See Locked Rotor)

▶ EQUIPMENT COMPATIBILITY

FE Petro® controllers supported by IPC:

- STP-SCI
- MagVFC™ (MagECO)
- STP-SCIII

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MagVFC™ is a trademark of Franklin Electric Company, Inc.

Software Solution

VEEDER-ROOT