Manual No: **577014-461** • Revision: **B**

In-Station Diagnostics (ISD)

TLS-450PLUS Consoles for Healy Assist

Install, Setup, & Operation Manual

VEEDER-ROOT

Notice

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Thoroughly examine all components and units as soon as they are received. If any cartons are damaged or missing, write a complete and detailed description of the damage or shortage on the face of the freight bill. The carrier's agent must verify the inspection and sign the description. Refuse only the damaged product, not the entire shipment.

Veeder-Root must be notified of any damages and/or shortages within 30 days of receipt of the shipment, as stated in our Terms and Conditions.

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3. Veeder-Root will file the claim with the carrier and replace the damaged/missing product at no charge to the customer. Customer Service will work with production facility to have the replacement product shipped as soon as possible.

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2. Customer may submit a replacement purchase order. Customer is responsible for all charges and freight associated with replacement order. Customer Service will work with production facility to have the replacement product shipped as soon as possible.
3. If "lost" equipment is delivered at a later date and is not needed, Veeder-Root will allow a Return to Stock without a restocking fee.
4. Veeder-Root will NOT be responsible for any compensation when a customer chooses their own carrier.

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For the parts return procedure, please follow the appropriate instructions in the "General Returned Goods Policy" pages in the "Policies and Literature" section of the Veeder-Root **North American Environmental Products** price list. Veeder-Root will not accept any return product without a Return Goods Authorization (RGA) number clearly printed on the outside of the package.

FCC INFORMATION

This equipment complies with the requirements in Part 15 of the FCC rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct the interference.

INSTALLATION IN THE STATE OF CALIFORNIA

Please refer to the Vapor Recovery Certification Phase II EVR Executive Orders at the California Air Resources Board website (www.arb.ca.gov) for the latest manual revisions pertaining to Executive Orders VR-202 (Assist Phase II EVR System Including ISD System), VR-203 (Balance Phase II EVR System) or VR-204 (Balance Phase II EVR System Including ISD System).

Warranty

This warranty applies only when the product is installed in accordance with Veeder-Root's specifications by Veeder-Root certified installers. This warranty will not apply to any product which has been subjected to misuse, negligence, accidents, systems that are misapplied or are not installed per Veeder-Root specifications, modified or repaired by unauthorized persons, or damage related to acts of God. Veeder-Root is not liable for incidental, consequential, or indirect damages or loss, including, without limitation, personal injury, death, property damage, environmental damages, cost of labor, clean-up, downtime, installation and removal, product damages, loss of product, or loss of revenue or profits. This warranty applies to the initial purchaser and any subsequent purchaser for the duration of the warranty period. T**HE WARRANTY CONTAINED HEREIN IS EXCLUSIVE AND THERE ARE NO OTHER EXPRESS, IMPLIED, OR STATUTORY WARRANTIES. WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.**

TLS-450PLUS MONITORING SYSTEM

We warrant that this product shall be free from defects in material and workmanship and is compliant with all applicable performance standards and specifications for which it has been certified, for a period of one (1) year from the date of installation when proof of date of installation is provided or twenty-four (24 months) from the date of manufacture when proof of date of installation is not provided. During the warranty period, we or our representative will repair or replace the product, if determined by us to be defective, at the location where the product is in use and at no charge to the purchaser. **LAMPS, FUSES, AND LITHIUM BATTERIES ARE NOT COVERED UNDER THIS WARRANTY.**

If "Warranty" is purchased as part of the Fuel Management Service, Veeder-Root will maintain the equipment for the life of the contract in accordance with the written warranty provided with the equipment. A Veeder-Root Fuel Management Services Contractor shall have free site access during Customer's regular working hours to work on the equipment. Veeder-Root has no obligation to monitor federal, state or local laws, or modify the equipment based on developments or changes in such laws.

MODULES, KITS, OTHER COMPONENTS (PARTS PURCHASED SEPARATE OF A COMPLETE CONSOLE)

We warrant that this product shall be free from defects in material and workmanship and is compliant with all applicable performance standards and specifications for which it has been certified, for a period of one (1) year from the date of installation when proof of the date of installation is provided or fifteen (15) months from the date of manufacture when proof of date of installation is not provided. We warrant that the lithium batteries (excluding EVR BATTERY PACK) shall be free from defects in material and workmanship for a period of three (3) months from date of invoice. We will repair or replace the product if the product is returned to us; transportation prepaid by user, within the warranty period, and is determined by us to be defective. **LAMPS AND FUSES ARE NOT COVERED UNDER THIS WARRANTY.**

IN-STATION DIAGNOSTICS (ISD)

For components used in ISD systems Air Flow Meter, Vapor Pressure Sensor, Software, TLS RF, Wireless Repeater, Wireless Transmitter & Wireless Receiver), excluding **LAMPS, FUSES, AND LITHIUM BATTERIES**, the following warranty applies:

We warrant that this product shall be free from defects in material and workmanship and is compliant with all applicable performance standards and specifications for which it has been certified, for a period of one (1) year from the date of ISD start-up when proof of the date of install is provided or twenty-four (24) months from the date of manufacture when proof of date of installation is not provided. During the warranty period, we and or our representative will repair or replace the product, if determined by us to be defective, at the location where the product is in use, at no charge to the purchaser.

For ISD components installed after the initial ISD start-up, we warrant that these products shall be free from defects in material and workmanship and is compliant with all applicable performance standards and specifications for which it has been certified, for a period of one (1) year from the date of installation when proof of the date of install is provided or fifteen

(15) months from date of manufacture when proof of date of installation is not provided. We will repair or replace the product if the product is returned to us; transportation prepaid by user, within the warranty period, and is determined by us to be defective.

EVR BATTERY PACK

We warrant that this product shall be free from defects in material and workmanship and is compliant with all applicable performance standards and specifications for which it has been certified, for a period of one (1) year from the date of installation when proof of the date of install is provided or fifteen (15) months from the date of manufacture when proof of date of installation is not provided. **The replacement EVR Battery Pack warranty period will be the REMAINING warranty period of the original EVR Battery Pack. LAMPS, FUSES, AND LITHIUM BATTERIES OTHER THAN THE EVR BATTERY PACK, ARE NOT COVERED UNDER THIS WARRANTY.**

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Introduction

In-Station Diagnostics (ISD) is designed to monitor the collection and containment of gasoline vapors by vapor recovery equipment using the Veeder-Root (V-R) TLS-450PLUS console platform, sensor inputs, and dispenser fuel events. The ISD feature provides test reports, generates alarms following test/equipment failures, and finally, shuts down the site upon the occurrence of designated alarms.

This manual provides instructions to set up, and operate the special components of the Veeder-Root ISD discussed in the Site Requirements section below. The ISD feature is an option for the TLS-450PLUS console platform, and as such, many of the setup/operation instructions for non-ISD specific ATG tasks (e.g., tank inventory, line leak detection, etc.) are covered in TLS-450PLUS/TLS4 Operator's Manual or using TLS-450PLUS Online Help.

NOTICE **Revision or reprogramming of the TLS may require notification of the local Certified Unified Program Agency (CUPA).**

Site Requirements

Below are the requirements for all vapor recovery systems except where noted.

1. TLS-450PLUS installed as per TLS-450PLUS Site Prep and Install manual 577014-073. Required TLS-450PLUS modules are listed below.
   a. A dedicated comm port is required by the Regulator for obtaining ISD reports.
   b. An Input/Output Module (IOM) or optional 10 Amp Relay Module is required to shut down each gasoline line or gasoline dispenser upon activation of certain ISD alarms. These alarms can also be assigned to a Line or 10A relay in Automatic Events>Device Tasks setup to shut down the gasoline line or gasoline dispenser - install as per instructions shipped with module. Setup ISD shutdown alarms in Automatic Events section of this manual.
   c. ISD requires dispenser transactions to be collected. Refer to TLS Consoles Point-of-Sale (POS) Application Guide (P/N 577013-401) and TLS-450PLUS / TLS4 Operator's Manual (P/N 577014-110). Console DIM requirement is dependent on dispenser type installed on site.
   d. Universal Sensor Module (USM) is required to monitor Air Flow Meters, Vapor Valve and Vapor Pressure Sensor (up to 16 devices per module). USM/ATM Module Group for TLS-450PLUS (P/N 0332812-006) may be used and or required for SVCM or PMC.

- One V-R Mag probe in each of the gasoline tanks being monitored - install as per installation manual shipped with device, setup following instructions in TLS-450PLUS / TLS4 Operator's Manual or using the TLS-450PLUS Online Help.
- Air Flow Meters (one for each gasoline dispenser) - install as per ISD Flow Meter installation manual shipped with meter, setup following instructions in this manual.
- Vapor Pressure Sensor (one per site) - install as per ISD Pressure Sensor installation manual shipped with sensor, setup following instructions in this manual.

Supported Vapor Recovery System

Table 1 lists V-R supported vapor recovery systems.

Table 1. Vapor Recovery System

Name	CARB Executive Order
Healy Assist EVR	VR-202

Contractor Certification Requirements

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

Veeder-Root Contractor Certification Requirements	Installer Certification[6]	ATG Technician Certification[7]	VR Vapor Products Certification[8]	TLS-450PLUS EVR for CA Certification
Install[1] ISD	X	X	X	X
Install PMC	X	X	X	X
Install CCVP	X	X	X	X
Install Wireless ISD/PMC	X	X	X	X
Installation Checkout[2]		X	X	X
ATG Startup[3] / Training[4] / Service[5]		X	X	X
ISD Startup / Training / Service			X	X
PMC Startup / Training / Service			X	X
CCVP Startup / Training / Service			X	X
Wireless ISD/PMC Startup / Training / Service			X	X
Install Pressure Sensor (ATG)	X	X	X	X
Maintain Pressure Sensor (ATG)		X	X	X
Calibrate Pressure Sensor (ATG)		X	X	X
Clear ATG Pressure Sensor Alarm (ATG)		X	X	X
Clear ISD/PMC Alarms (ISD/PMC)			X	X

[1]Perform wiring and conduit touting; equipment mounting
[2]Inspect wiring and conduit routing; equipment mounting
[3]Turn power on, program and test the systems
[4]Provide supervised field experience in service techniques and operations
[5]Troubleshoot and provide routing maintenance
[6]UST Monitoring Systems – Installer (Level 1)
[7]Certified UST Monitoring Technician
[8]VR Vapor Products

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

Review and comply with all the safety warnings in this an any related documents, and any other Federal, State, or Local requirements

Warranty Registrations may only be submitted by selected Distributors.

Related Manuals

The manuals in Table 2 below are included for reference.

Table 2. Related Manuals/Drawings

V-R Manual	Part Number
TLS-450PLUS Console Site Prep & Installation Manual	577014-073
ISD Assist Vapor Flow Meter Installation Guide	577013-796
Vapor Pressure Sensor for Vent Stacks Installation Guide	577014-019
Pressure Sensor Installation Guide	577013-797
TLS-450PLUS / TLS4 Operator's Manual	577014-110

Table 2. Related Manuals/Drawings

V-R Manual	Part Number
ISD Troubleshooting Manual - TLS-450PLUS	577014-463
TLS RF Wireless 2 System (W2) Installation and Maintenance Guide	577013-964
TLS-450PLUS Console Board and Software Replacement/ Upgrade	577014-076
TLS-450PLUS Console Module Replacement Instructions	577014-077
Descriptive System Document IECEx TLS-450PLUS Consoles	331940-106

Safety Precautions

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

ELECTRICITY
High voltage exists in, and is supplied to, the device. A potential shock hazard exists.

TURN POWER OFF
Live power to a device creates a potential shock hazard. Turn Off power to the device and associated accessories when servicing the unit.

⚠WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

APPROVED CONTAINER
Use nonbreakable, clearly marked containers, suitable for collecting and transporting hazardous fuels during service.

READ ALL RELATED MANUALS
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.

NOTICE

NOTICE is used to address practices not related to physical injury.

The console contains high voltages which can be lethal. It is also connected to low power devices that must be kept intrinsically safe.

Turn power Off at the circuit breaker. Do not connect the console AC power supply until all devices are installed.

FAILURE TO COMPLY WITH THE FOLLOWING WARNINGS AND SAFETY PRECAUTIONS COULD CAUSE DAMAGE TO PROPERTY, ENVIRONMENT, RESULTING IN SERIOUS INJURY OR DEATH.

Example Site Diagrams

Figure 1 shows an example site with a TLS-450PLUS controlled vapor processor.

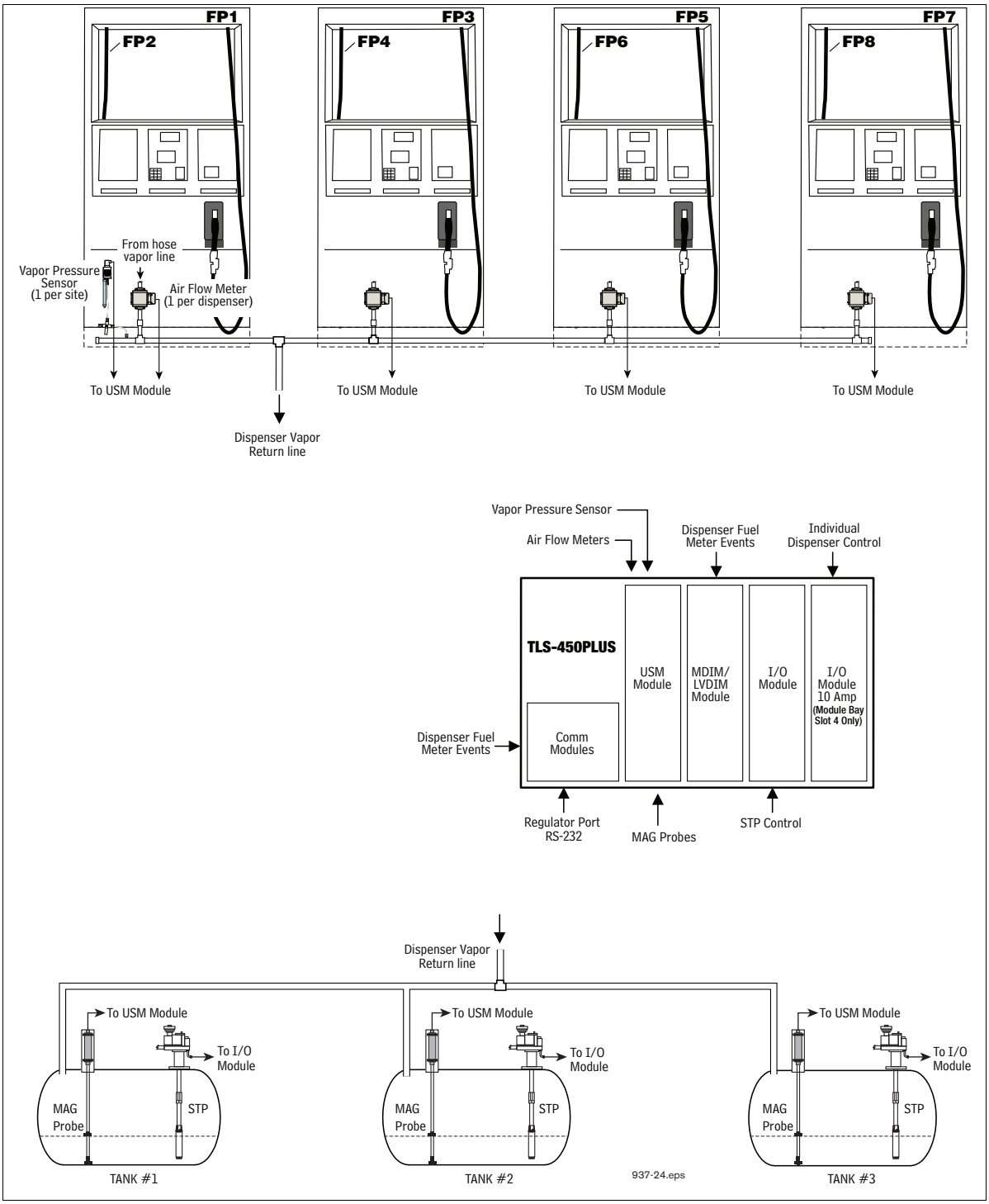


Figure 1. Example Site Diagram

Gasoline Pump and Line Requirements

All gasoline STPs (Pumps) have the following set up requirements via Setup> Pump and Lines. Each gasoline tank must be assigned to a pump via Setup> Pump and Lines> Pumps. The created pump must then be assigned to a line via Setup> Pump and Lines> Lines. These pump/line assignments are required to properly setup the ISD shutdown requirements.

ISD Shutdown Requirements

For ISD on the TLS-450PLUS, the gasoline lines must be able to be shut down for required ISD Site/Hose alarms. Dispenser relays may be used to shut down gasoline dispensers for Hose alarms.

The TLS-450PLUS setup requires at least one Line to shut down for required ISD alarms, otherwise the 'Missing Relay' warning will post. Ensure that all gasoline Lines/Hoses are configured to shutdown on required ISD Site/Hose alarms. Hoses may also be shutdown using dispenser relays. ISD shut down requirements is accomplished using Automatic Events Setup. Refer to Table 3 for required ISD Shutdown alarms.

Table 3. ISD Shutdown Alarms

Alarm	Days to Failure	Shutdown Required
ISD DEGRD PRES WARN	30	Optional
ISD DEGRD PRES FAIL	-	Yes
ISD GROSS PRES WARN	7	Optional
ISD GROSS PRES FAIL	-	Yes
ISD VAPOR LEAK WARN	7	Optional
ISD VAPOR LEAK FAIL	-	Yes
ISD SENSOR OUT WARN	7	Optional
ISD SENSOR OUT FAIL	-	Optional[1]
ISD SETUP WARN	7	Optional
ISD SETUP FAIL	-	Optional[1]
hnn: DEGRD COLLECT WARN	7	Optional
hnn: DEGRD COLLECT FAIL	-	Yes
hnn: GROSS COLLECT WARN	1	Optional
hnn: GROSS COLLECT FAIL	-	Yes
hnn: FLOW COLLECT WARN	1	Optional
hnn: FLOW COLLECT FAIL	-	Yes
ISD VP STATUS WARN	1	Optional
ISD VP STATUS FAIL	-	Yes
ISD VP PRES WARN	1	Optional
ISD VP PRES FAIL[2]	-	Yes
Assist EVR Systems Only		
Balance EVR Systems Only		
Vapor Processor Required		
[1]Shutdown is optional for these alarm conditions and it is recommended that they be enabled.		
[2]'Required for Shutdown' applies for sites equipped with HIRT and ARID Permeator.		

Setup

Introduction

This section describes how to program the TLS-450PLUS for In-Station Diagnostics using the front panel graphical user interface (GUI). The procedures in this manual follow standard TLS-450PLUS console setup programming methods. All ISD-related equipment must be installed at the site and connected to the TLS console prior to beginning the setups covered in this section. As with all TLS connections, you cannot change sensor wiring or module slots after programming or the system will not recognize the correct data. Reference the section entitled “Probe and Sensor Field Wiring” in the TLS-450PLUS Site Prep and Install manual (P/N 577014-073) for rewiring precautions.

Date/Time Setup

This screen lets you enter the current date and time for the console. It is especially important to update the time when setting up the console.

It is very important when entering the date and time, you do not set it into the future. A future date and time will affect the proper posting of ISD reports, even after making any corrections. Should this situation occur, contact Veeder-Root Tech Support.

NOTICE **Prior to setting Date and Time on initial startup, you must remove the protective tab underneath the backup battery. This tab is yellow with an X printed on it. The battery can be found on the PC board inside the left front door of the console. Date and Time will not be entered correctly if this yellow tab is not removed.**

1. Touch Menu>Setup>Date and Time (see Figure 2).

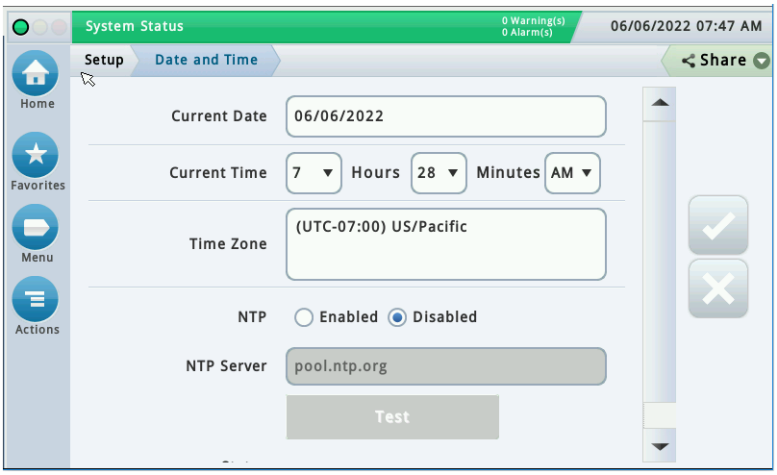


Figure 2. Date and Time Setup Screen

2. Ensure the Current Date and Current Time field entries are correct.
3. Ensure the Time Zone entry is **(UTC-07) US/Pacific** as shown in Figure 2.
4. Touch the check button to save your choices.

Device Setups

Touch Menu>Setup>Devices to assign addresses and other information for the ISD devices that will be monitored by the TLS-450PLUS, i.e. Air Flow Meter, Atmospheric Pressure Sensor, Vapor Pressure Sensor and Vapor Valve.

AIR FLOW METER SETUP

1. Touch the Devices selection (Figure 3).

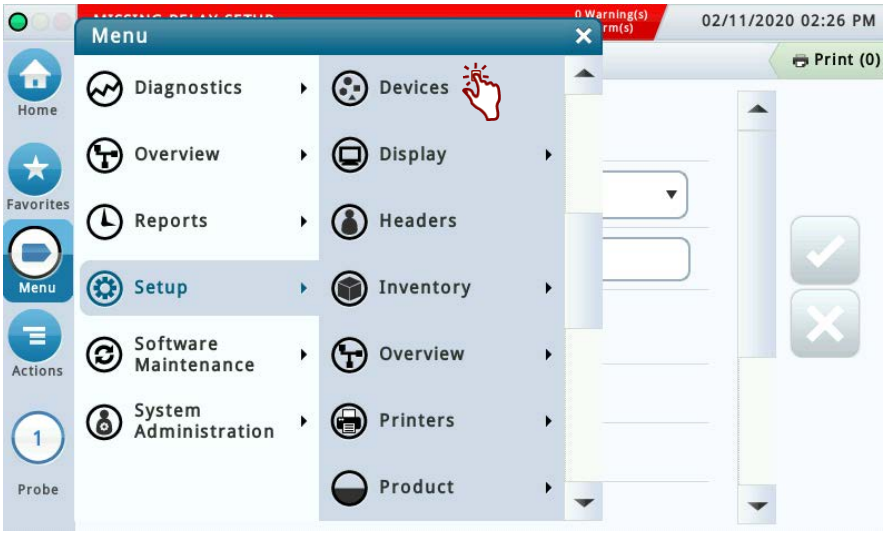


Figure 3. Accessing Device Setup

2. Touch the Air Flow Meter button in the Devices list (Figure 4) to display the Air Flow Meter setup screen (Figure 5).

Figure 4. Accessing Air Flow Meter Setup Screen

3. In the Address drop-down box select the address for the Air Flow Meter 1 (Figure 5). Touch the Label field to open the keypad and enter a name to identify the Air Flow Meter that refers to its Dispenser/FP location (e.g., AFM FP1-2), then touch the Enabled radio button to configure the device. Touch the ✔ button to save your choices. Notice after saving, the Serial Number of this AFM is now visible.

Figure 5. Air Flow Meter Setup Screen

4. On the device ribbon at the bottom of the screen, touch the next Air Flow Meter to be setup, configuring it as in shown Step 3 above for AFM 1, and continuing until all of the site's Air Flow Meters are configured.

VAPOR PRESSURE SENSOR SETUP

The Vapor Pressure Sensor (VPS) monitors the vapor pressure in the ullage space of the underground gasoline storage tanks. Only one VPS sensor needs to installed and configured for the site.

1. Touch Vapor Pressure Sensor in the Menu>Setup>Devices list (Figure 6) to open the VPS sensor setup screen (Figure 7).

Figure 6. Accessing Vapor Pressure Sensor Setup Screen

Figure 7. Vapor Pressure Sensor Setup Screen

2. Touch the Address drop down box and select the address of the VPS sensor. Touch the Label field and enter the label text for the sensor on the keypad then touch the green check button to accept the label. Touch the Enabled radio button to configure the sensor. Touch the check button ☑ to save your choices. Notice after saving, the Vapor Pressure Sensor serial number is now visible.

Vapor Recovery Setup

You must choose the appropriate data sheet from Appendix A for the vapor recovery system installed at your facility (e.g., Single or Multi-Hose Dispensers) and record in those sheets, all the unique information from sensors/ hose positions, prior to beginning the TLS-450PLUS setup procedure below.

VAPOR GENERAL SETUP

1. Go to Menu>Setup>Vapor General>General (Figure 8) to setup Assessment Time and Vapor Pressure Sensor selection (Figure 9).

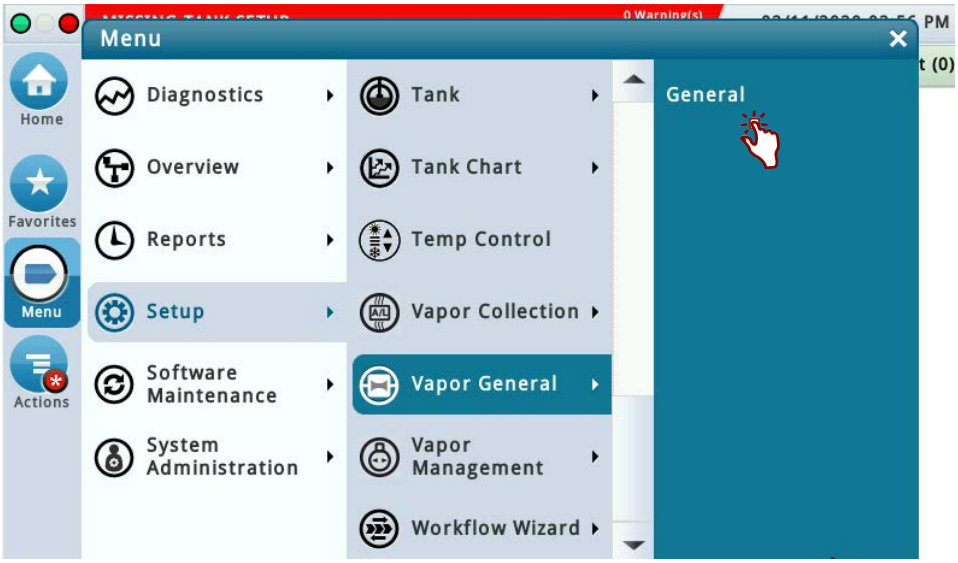


Figure 8. Accessing Vapor General: General Screen

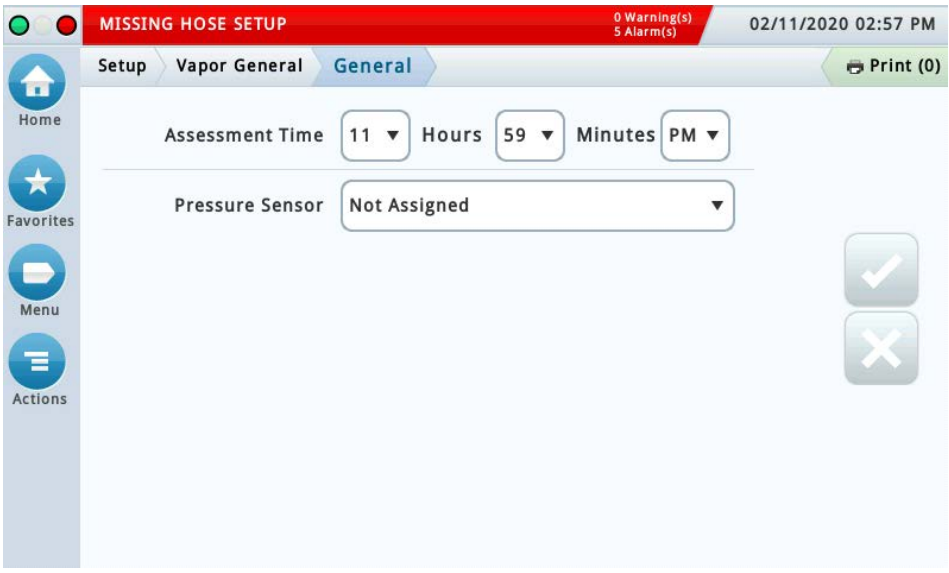


Figure 9. Vapor General: General Setup Screen

2. Assessment Time defines when vapor assessment is scheduled to begin using the last 24 hours of data. Select the Vapor Pressure Sensor configured in the Pressure Sensor drop-down box and touch the check button to save your choice.

VAPOR COLLECTION SETUP

Go to Menu>Setup>Vapor Collection to access the Vapor Collection setup screens (Figure 10).

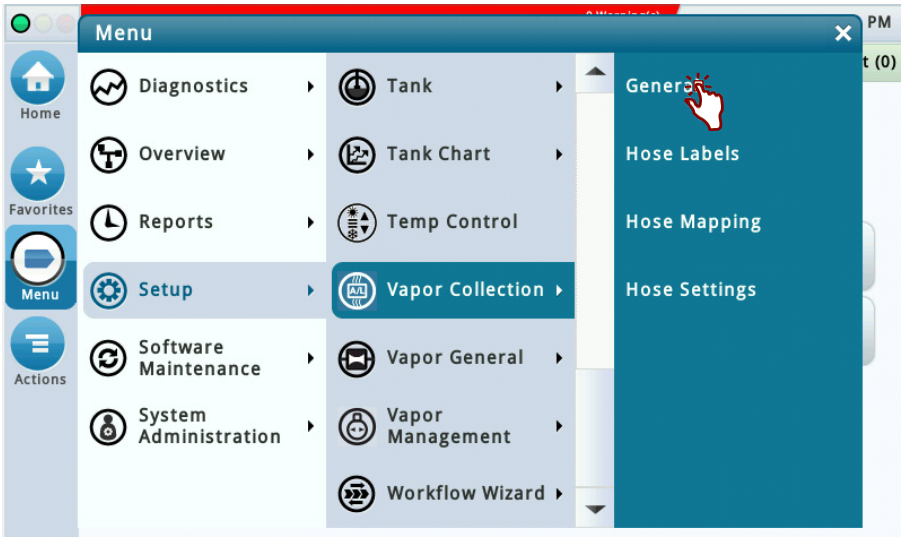


Figure 10. Accessing Vapor Collection Setup Screens

General

Touch General to access the Vapor Collection General setup screen (Figure 11).

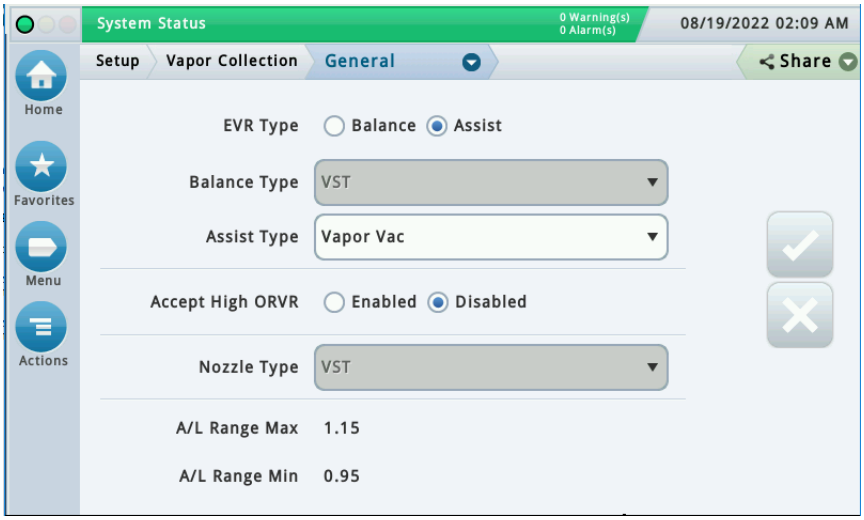


Figure 11. Example Vapor Collection General Setup Screen

Configure the following fields depending on the site's EVR Type selection:

- EVR Type - Balance (default) or Assist
- Balance Type - This field is only available when the EVR Type is set to Balance. Choices are VST
- Assist Type - This field is only available when the EVR Type is set to Assist. Choices are Vapor Vac, Wayne Vac, Healy Vac.
- Accept High ORVR - Enabled or Disabled (default). If the 'Estimated ORVRS >> EXPECTED' message is posted to the Miscellaneous Event Log, then set to Enabled.
- Nozzle Type - VST (default) - This field is only available when the EVR Type is set to Balance. Choices are: VST
- A/L Range Max - This is the upper limit of the A/L ratio operating range of the nozzle. This field is only populated when the EVR Type is set to Assist. This limit is 1.15 and is not programmable. When the EVR Type is set to Balance this field is blank.
- A/L Range Min - This is the Lower limit of the A/L ratio operating range of the nozzle. This field is only populated when the EVR Type is set to Assist. This limit is 0.95 and is not programmable. When the EVR Type is set to Balance this field is blank.

Touch the check button to save your choices.

Hose Labels

1. Touch the down arrow in the Crumb path below to return to the Vapor Collection setup screen (Figure 12).

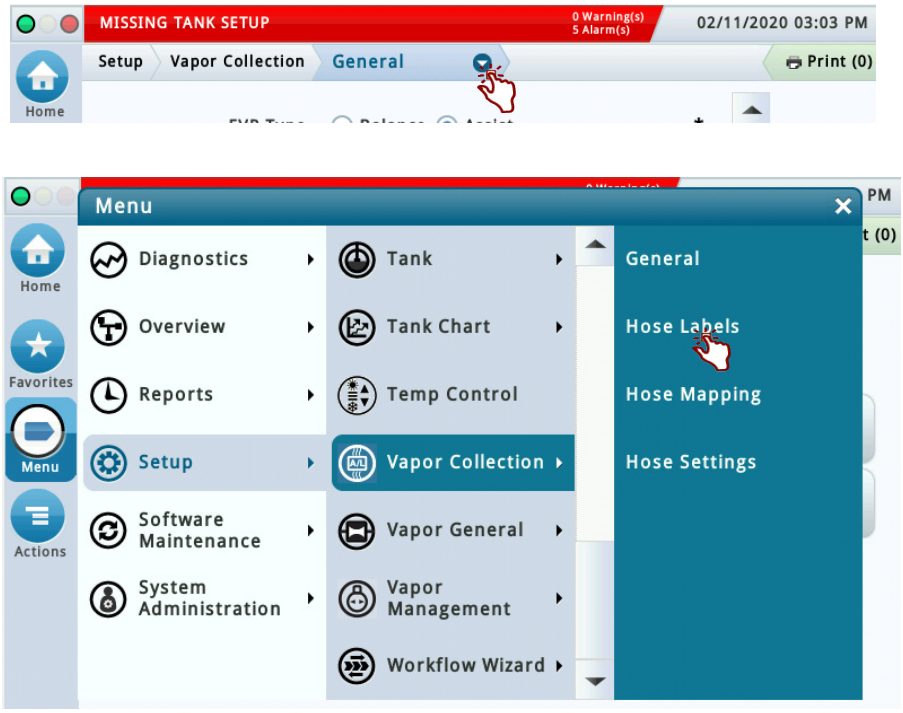


Figure 12. Accessing Vapor Collection Hose Labels Setup Screens

2. Touch Hose Labels to access the Vapor Collection Hose Labels setup screen (Figure 13).

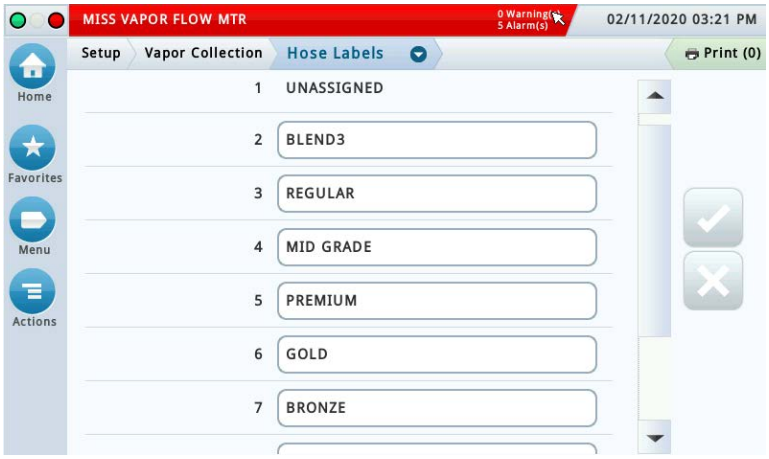


Figure 13. Vapor Collection Hose Labels Setup Screen

You can select a default hose label from this list or you can edit a hose label if necessary; it does not change the functionality of the selection. You can open Online Help for further explanation. Touch the check button to save your choices.

Hose Settings

NOTICE **See Appendix A: Site EVR/ISD Equipment Location Worksheet: You are advised to fill in all of the appropriate information about your installed equipment, complete the TLS console's Hose Settings setup.**

1. Touch Vapor Collection in the Crumb path to return to the Vapor Collection setup screen (Figure 14). Touch Hose Settings to access the Vapor Collection Hose Settings setup screen (Figure 15).

NOTICE **If while saving a Hose Setting setup and a pop up message window appears, refer to the Actions>Help for assistance.**

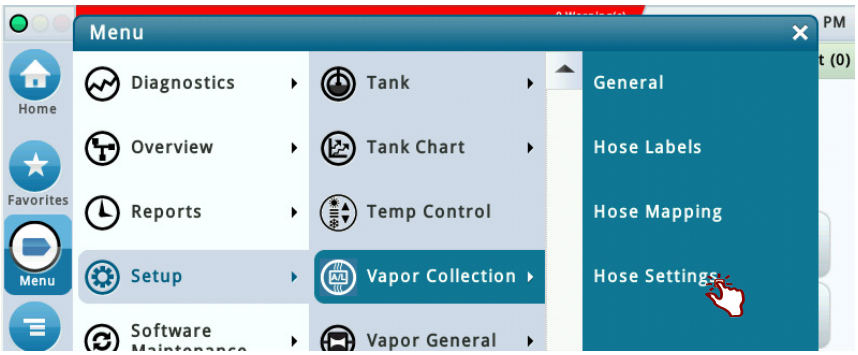


Figure 14. Accessing Vapor Collection Hose Settings Setup Screen

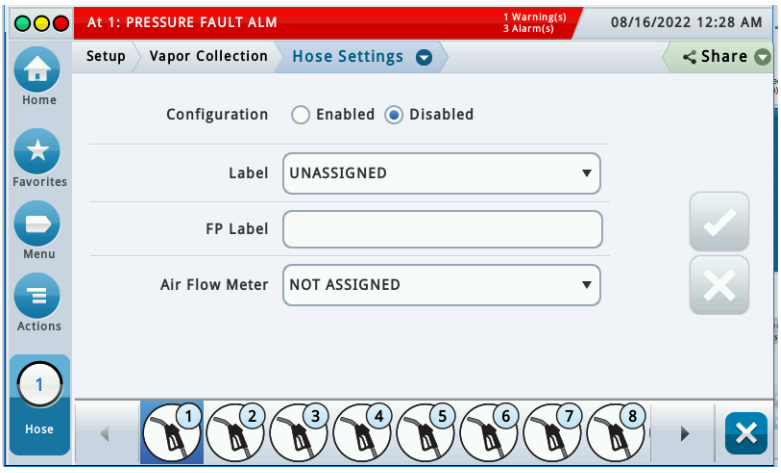


Figure 15. Vapor Collection Hose Settings Setup Screen

2. Set Configuration radio button to Enabled (see Figure 16).

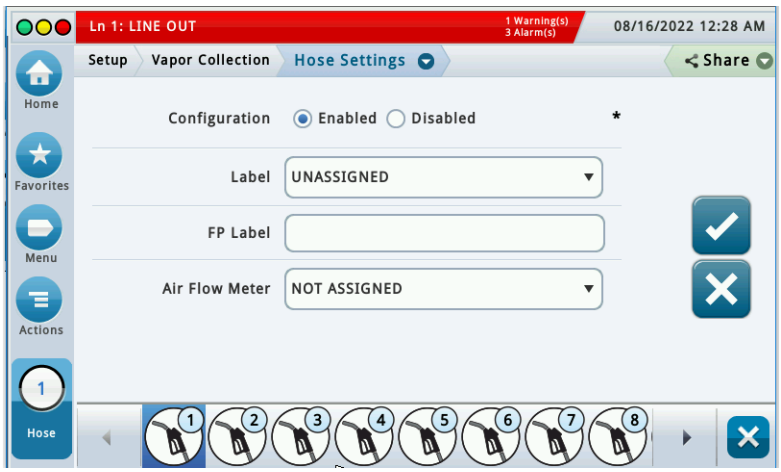


Figure 16. Vapor Collection Hose Settings Setup

3. Touch the drop-down arrow in the Label field and select the Hose Label from the list (see Figure 17).

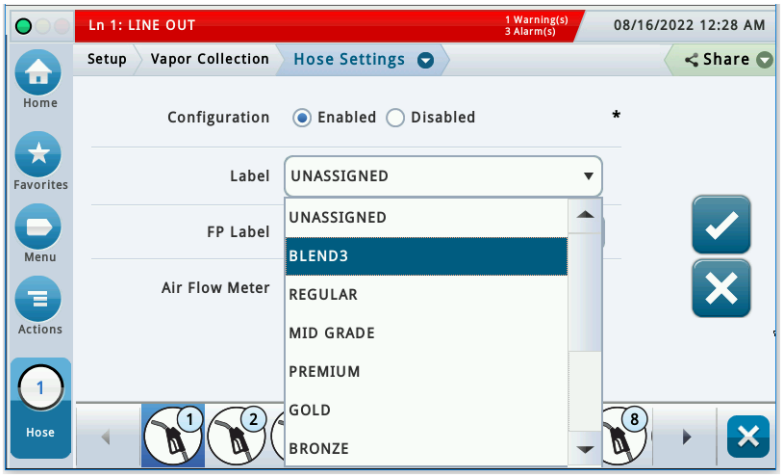


Figure 17. Vapor Collection Hose Settings Setup

4. Enter the FP Label number for this hose that is located on the dispenser (see Figure 19).

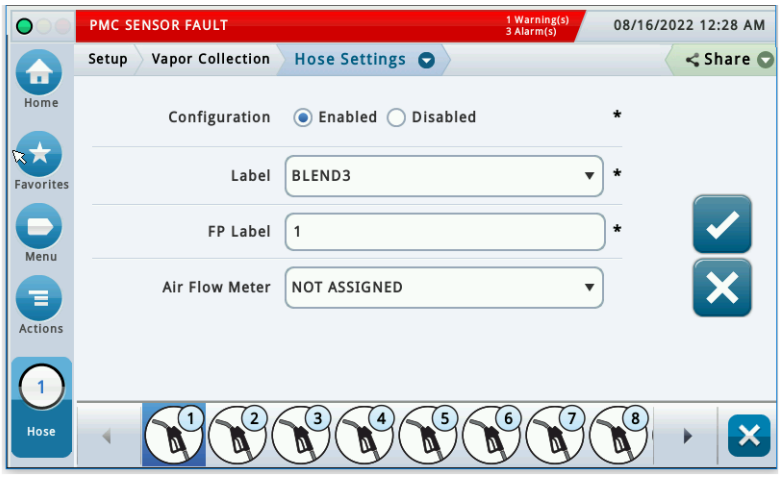


Figure 18. Vapor Collection Hose Settings Setup

5. Touch the drop-down arrow in the Air Flow Meter field and select the AFM associated with this hose (see Figure 19).

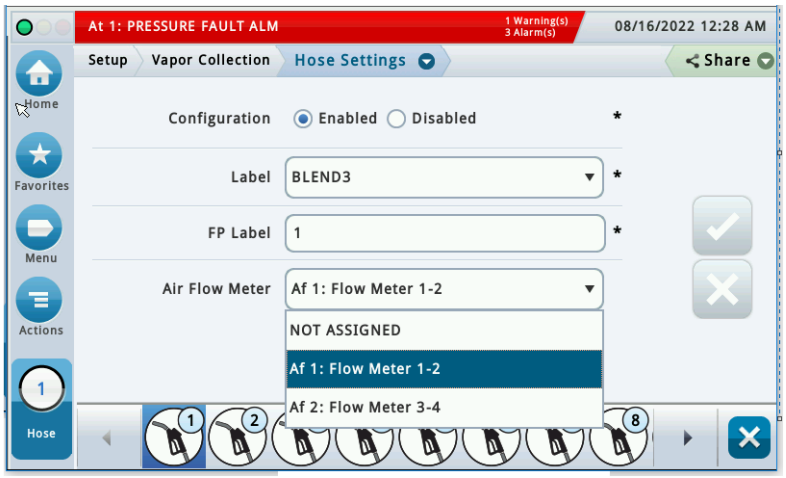


Figure 19. Vapor Collection Hose Settings Setup

6. Touch the check button to save your save your selections (see Figure 20).

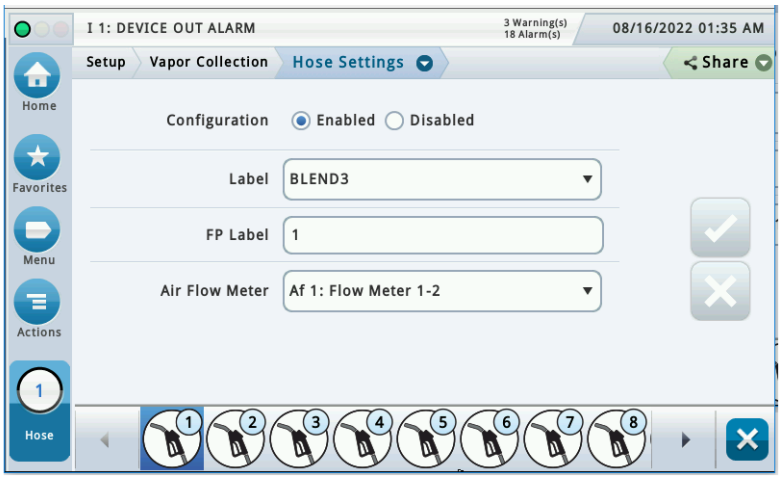


Figure 20. Vapor Collection Hose Settings Setup

7. Repeat this procedure for all appropriate hoses by selecting the hose number icons on the bottom selection ribbon.

NOTICE **After saving an edit made for a hose in Hose Setup, a pop-up message will show and advise that the action will clear the Hose Mapping. Be sure to re-map the edited hose. This can be done after all hoses are configured and Enabled.**

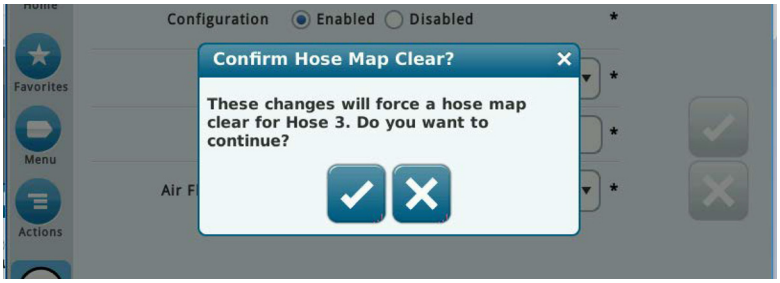


Figure 21. Confirm Hose Map Clear Message

NOTICE **If a Hose Settings is Enabled but not complete, or Hose Mapping not complete, a Hose Setup Data Warning will post (Example: h 3: SETUP DATA WARNING). Via Reports> Alarms> Active, select the hose alarm, then via Actions select Setup Data Warning to see the details of the warning.**

Hose Mapping - Assisted Mode

1. Touch Menu>Setup>Vapor Collection>Hose Mapping (Figure 22).Touch Hose Mapping to access the Vapor Collection Hose Mapping setup screen (see example in Figure 23).

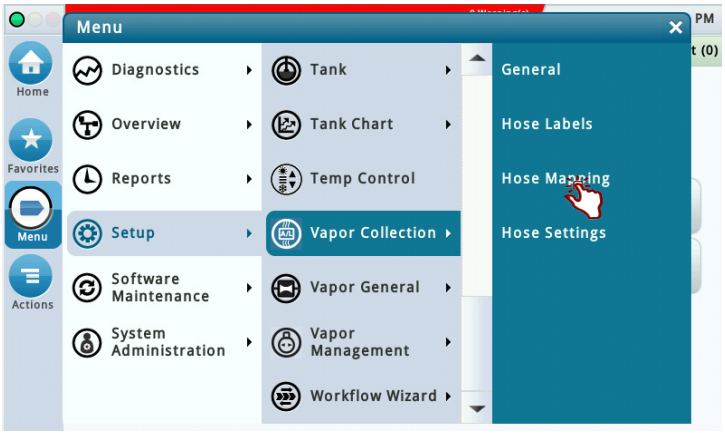


Figure 22. Accessing Vapor Collection Hose Mapping Setup Screen

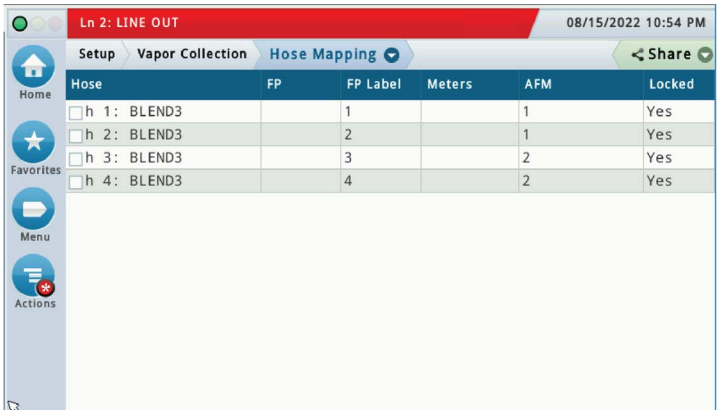


Figure 23. Vapor Collection Hose Mapping Setup Screen

2. Assisted mapping is easier on a site with previous events recorded on all fuel meters. However, we recommend that you shut down dispensing during assisted hose mapping. Ensure that all Hoses are not Locked. Touch the Actions button and select Unlock All (see Figure 24).

NOTICE **If there is a hose you do not want to map at this time, lock that hose. You can map that hose position later.**

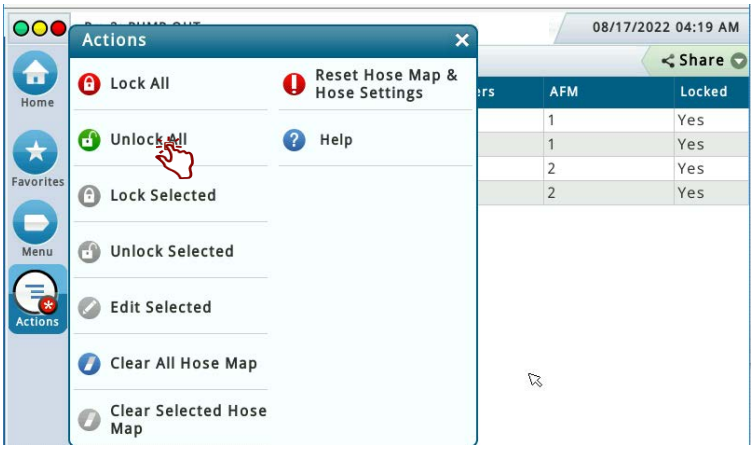


Figure 24. Unlock Hoses

3. Go to the selected fueling point for hose 1 (see example in Figure 25). This example shows dispenser with four gasoline products via 1 hose. This hose has a Hose Label of Blend 3. There are two straight grades and two blended grades.

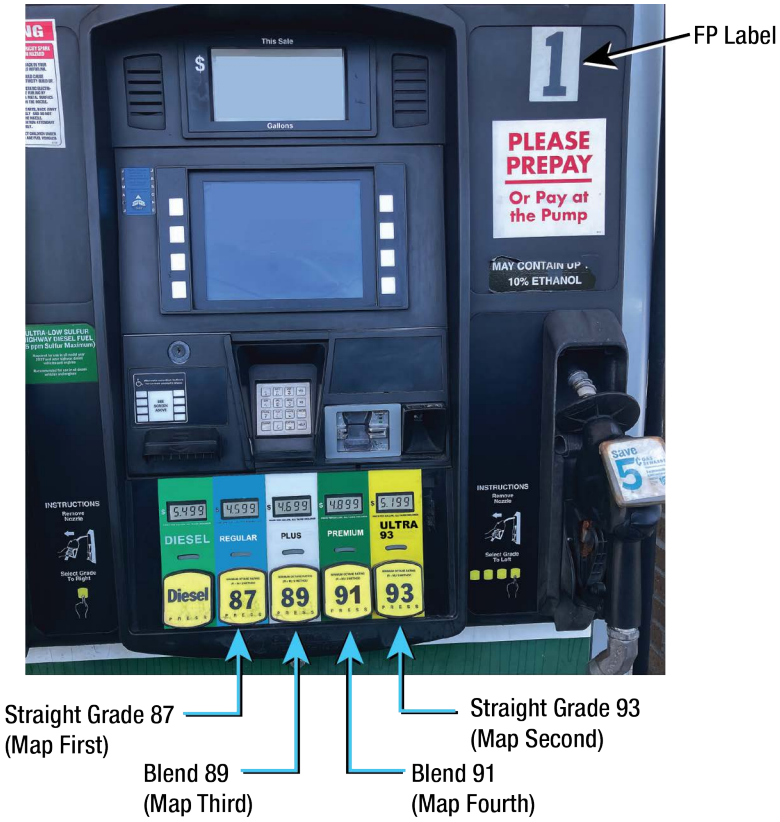


Figure 25. Example Dispenser Fuel Position 1

4. Begin the mapping process by dispensing a 0.25 to 0.5 gallons of the Straight Grade (87) into an approved container. Stop the dispense and wait approximately 30 seconds until the Hose Mapping screen (see Figure 26) assigns/displays the FP (Fueling Position – Logical); and the first Meter (Fuel Meter) number into

the h 1: Blend3 Meters column. In this example “0” will post. Meter numbers can be “0 through 5”. A blended meter number will always be 9”.

NOTICE **The FP column (Fueling Position Logical), is determined by the TLS. It may or may not match the FP Label (Fuel Position number located on the dispenser).**

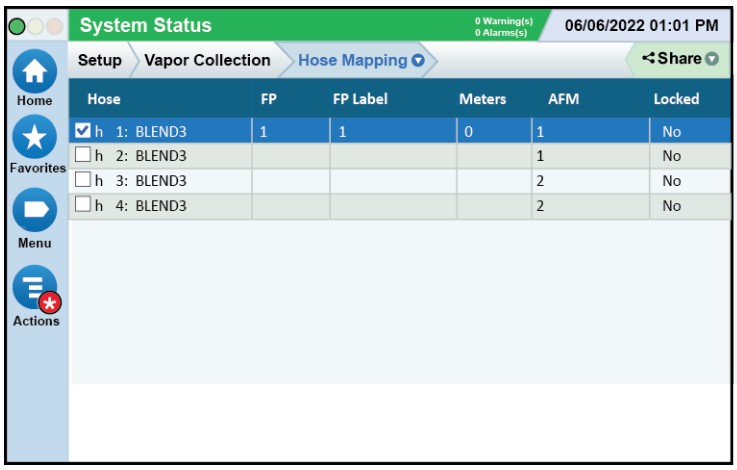


Figure 26. Example First Meter Mapped for Hose 1 - Straight Grade 87

5. Next, we will map the Straight Grade 93, by dispensing 0.25 to 0.5 gallons. Wait approximately 30 seconds until the Hose Mapping screen (see Figure 27) assigns/displays the second Meter number into the h 1: Blend3 Meters column. In this example “1” will post.

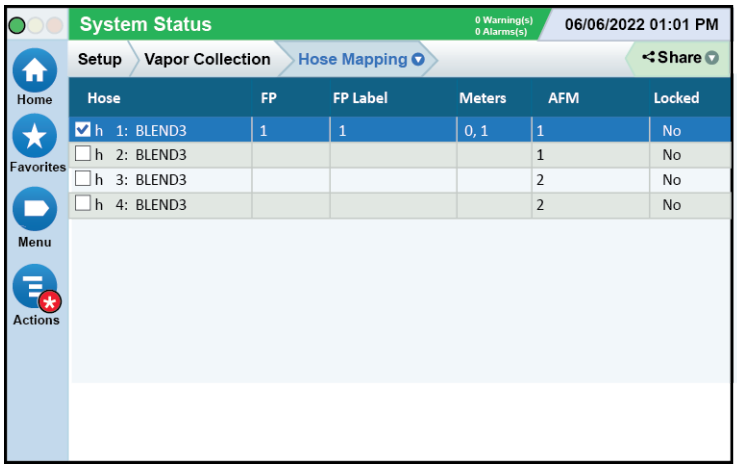


Figure 27. Example Second Meter Mapped for Hose 1 - Straight Grade 93

6. Next, we will map the Blended Grade 89. Dispense a 0.5 to 1.0 gallons. Wait approximately 30 seconds until the Hose Mapping screen (ref. Figure 28) assigns/displays the third Meter number into the h 1: Blend3 Meters column. In this example “9” will post.

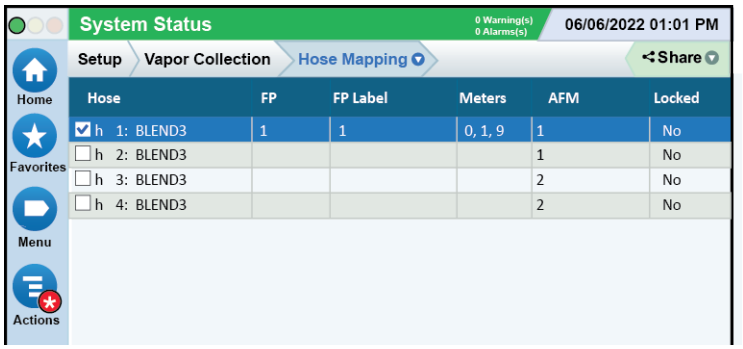


Figure 28. Example Third Meter Mapped for Hose 1 - First Blended Grade 87

NOTICE **You may have to repeat the dispense several times if Fueling Position (logical) or (Fuel) Meter does not display after waiting 30 seconds. Check mapping carefully if you repeat dispenses.**

7. Next, dispense 0.5 to 1.0 gallons of Blend Grade 91. Wait approximately 30 seconds. Since this is the second Blended Grade for this hose, no other meter will post since meter 9 has already posted for a blend grade.

8. Once completing mapping all product grades to the hose, lock that hose via the Actions dialog box (see Figure 29 and Figure 30).

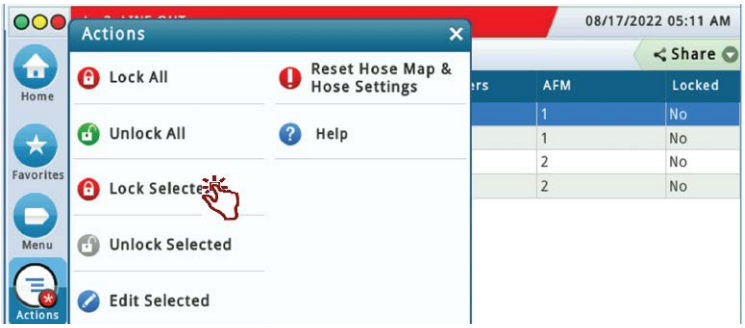


Figure 29. Locking Completed Hose Map

9.

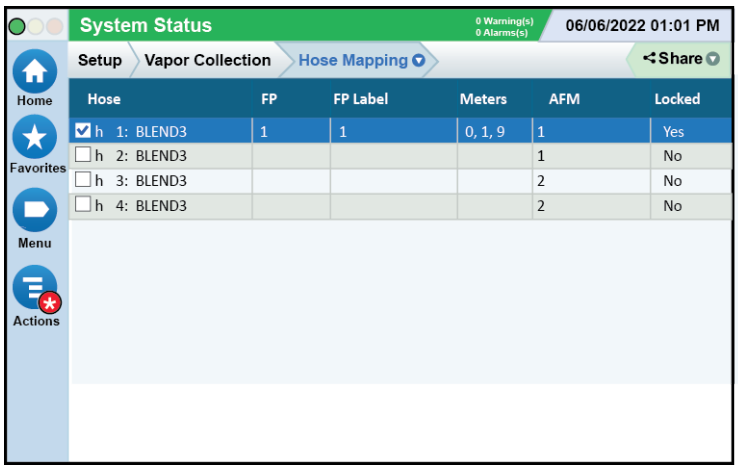


Figure 30. Example Hose 1 Hose Map Locked

10. Continue with the next hose in numeric hose order, dispensing the appropriate amount of product, checking the screen for information to populate, and then locking that hose.
    - Once the mapping process is complete, review your map.
    - Have all gasoline hoses been mapped?
    - Is the Hose ID and Hose FP Label correct?
    - Is Hose Label selection correct?
    - Is Air Flow Meter assignment correct?
    - Are the expected number of fuel meters assigned to a hose?
    - After completing hose mapping, ensure that all hoses are locked (see Figure 31).

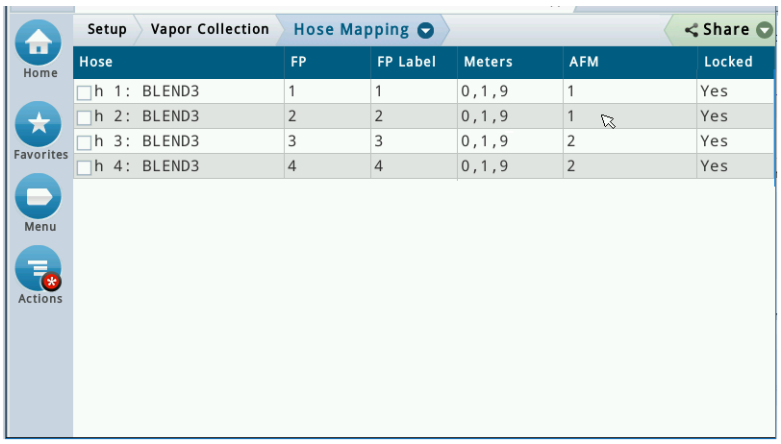


Figure 31. Example Completed and Locked Meter Map

NOTICE **If a Hose Settings is Enabled but not complete, or Hose Mapping not complete, a Hose Setup Data Warning will post (Example: h 3: SETUP DATA WARNING). Via Reports>Alarms> Active, select the hose alarm, then via Actions select Setup Data Warning to see the details of the warning.**

Hose Mapping - Manual Mode

NOTICE **If while saving a selected Hose mapping screen and a pop up message window appears, refer to the Actions> Help for assistance.**

Manual hose mapping can be used with the Hose Locked or Unlocked. To manually map or make an edit to a hose map, knowledge of the FP (Logical) and the Meter (Fuel Meter) number is needed.

Example: After using Assist Mode to create the Hose Mapping Hose Map, it was discovered that Straight Grade 93 was skipped when mapping h 3: Blend3. Fuel Meter “1” needs to be added (see Figure 32).

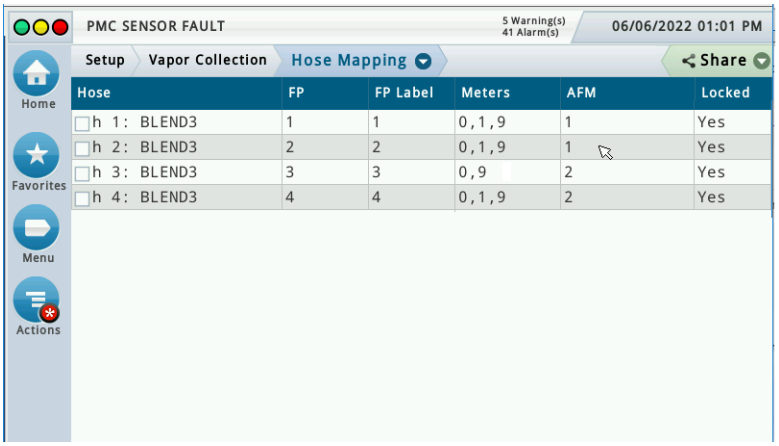


Figure 32. Example Missing Meter Map for Hose 3

1. To correct the hose 3 map manually, select h 3: Blend3 to be edited (see Figure 33).

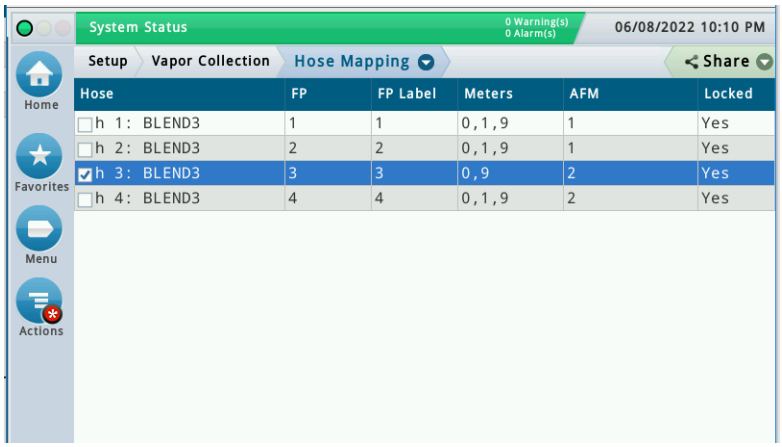


Figure 33. Example Hose 3 Selected for Editing

1. Touch Actions > Edit Selected [Web: Click Edit button] to open the hose 3 edit screen (see Figure 34 and Figure 35).

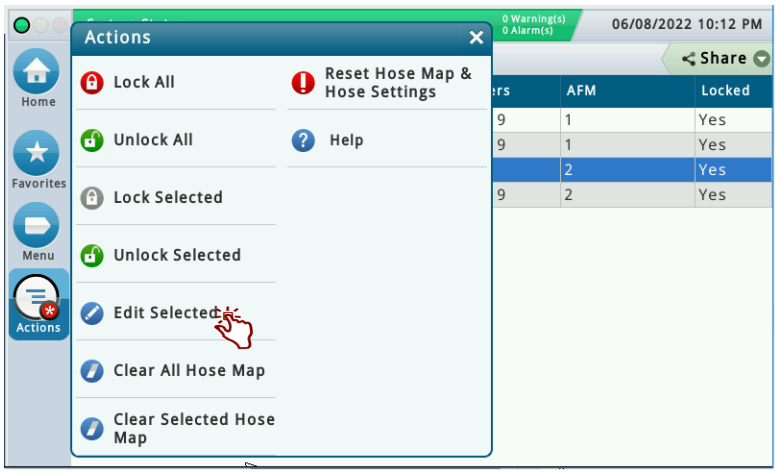


Figure 34. Example Selecting Hose 3 for Editing

Figure 35. Hose 3 Edit Screen

2. For Meter 3, select Fuel Meter "1" from the drop down and touch the check button ☑ to save the screen.

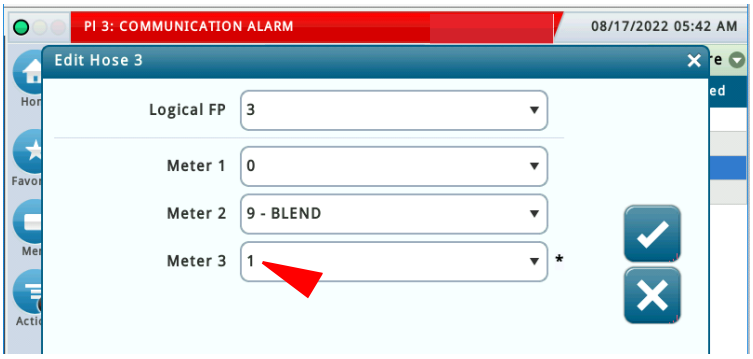


Figure 36. Enter Missing Meter Number for Hose 3

3. Verify that h 3: Blend3 correction was made (see Figure 37).

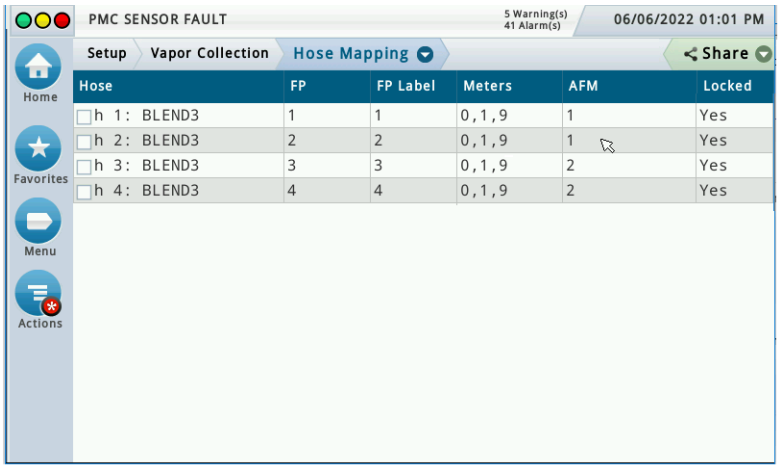


Figure 37. Verify Corrected Hose 3 Meter Map

NOTICE **Depending on changes made to an existing Hose Map, it may be necessary to select "Reset Hose Map and Hose Settings" option in Actions, to default values, to clear the entire Hose Mapping and Hose Setting screens. Then proceed to create all the Hoses in Hose Settings, and re-map all the hoses in the Hose Mapping screen.**

VAPOR MANAGEMENT

Processor

1. Touch Setup>Vapor Management>Processor (see Figure 38).

Figure 38. Vapor Management Setup Screen

2. Ensure Type is selected as None (default)(see Figure 39).

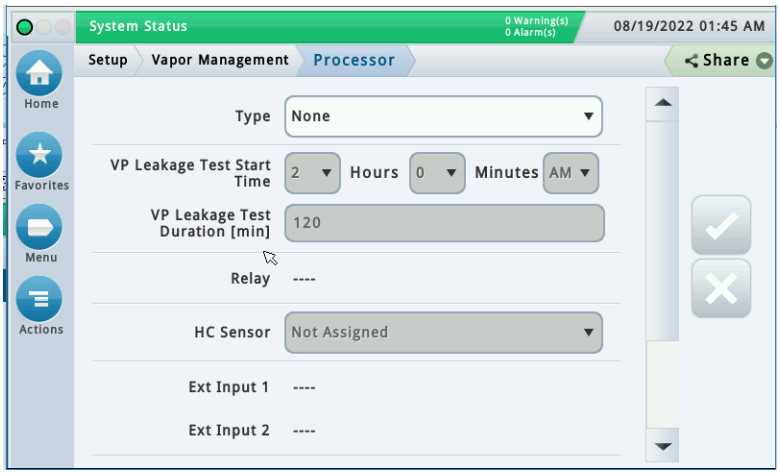


Figure 39. Vapor Management Processor Setup Screen

Automatic Events Setup: (Shutdown Requirements (ISD)

These instructions will illustrate the minimum setup requirements as per Pump Mode to complete the ISD Shutdown Requirements.

For In-Station Diagnostics (ISD), the California Air Resources Board (CARB) requires that gasoline dispensing be shutdown for specific ISD Site alarms and Hose alarms (See Table 3, Page 5). This can be accomplished by assigning the required ISD Site alarms and Hose Alarms to an Automatic Event for each gasoline line. For Hose alarms this can also be accomplished by assigning the required Hose alarms to an Automatic Event for each dispenser relay.

NOTICE **ISD only applies to gasoline tanks:**

1. The TLS-450PLUS considers a tank to be a gasoline tank if its thermal coefficient is greater than or equal to 0.00060 and less than or equal to 0.00079. (Typically, the thermal coefficient for a gasoline tank is programmed to 0.000700.)
2. All gasoline tanks must be assigned to a pump and that pump has to be assigned to a line. A tank cannot be assigned to a relay in the TLS-450PLUS.

PUMP MODE SETUPS

These steps are required for ISD Shutdown **as per pump mode**.

Available Pump Modes in **Setup > Pumps and Lines> Pumps**:

Setup > Automatic Events: (Pump Mode = TLS Pump Control): Pump is controlled locally by the console. There are two ways of controlling a pump: 1) with a relay or 2) with a Pump Controller.

Setup > Automatic Events: (Pump Mode = Pump Sense): The console senses if the pump is active when a pump request signal is sent to turn on/off the pump (this signal also acts as a tank "active" signal to the console).

Setup > Automatic Events: (Pump Mode = External Pump Control): Pump is controlled externally to the console and identifies tanks that are line manifolded together.

Automatic Events: (Pump Mode = TLS Pump Control)

These are the steps required for ISD Shutdown if pump mode selected = TLS Pump Control

Available Pump Modes in **Setup > Pumps and Lines > Pumps**:

TLS Pump Control: Pump is controlled or actuated locally by the console. This includes control by Intelligent Pump Control. There are two ways of controlling a pump: 1) with a relay or 2) with a Pump Controller.

PUMP MODE = TLS PUMP CONTROL

1. For each Pump on a Gasoline line:
   a. Via: **Setup > Devices > Relay**:
      i. Configure/Enable a Relay
      ii. Set the Type to Pump Control Output
   b. Via: **Setup > Devices > External Input**:
      i. Configure/Enable an External Input
      ii. Set the Type to Pump Sense
   c. Via: **Setup > Pumps and Lines > Pumps**:
      i. Configure/Enable a Pump
      ii. Set the Mode to TLS Pump Control
      iii. Assign the appropriate Tank to the Pump
      iv. Set the Pump Control to the appropriate Relay
      v. Set the Pump Sense to the appropriate External Input
2. For each Gasoline Line:
   a. Via: **Setup > Pumps and Lines > Lines**:
      i. Configure/Enable a Line
      ii. Assign the appropriate gasoline Pump(s) to the Line
   b. Via: **Setup > Automatic Events > Device Tasks**:

      Add a task for required ISD Site Alarms

NOTICE **California Air Resources Board (CARB) requires that gasoline dispensing be shutdown for specific ISD Site alarms and Hose alarms (See Table 3 on page 5).**

      i. Set the Device to the Gasoline Line
      ii. Select each required ISD Site Alarm as a Trigger
      iii. Hose Site Shutdown Option (if available): select the Hose Alarms for each Gasoline Hose as a Trigger

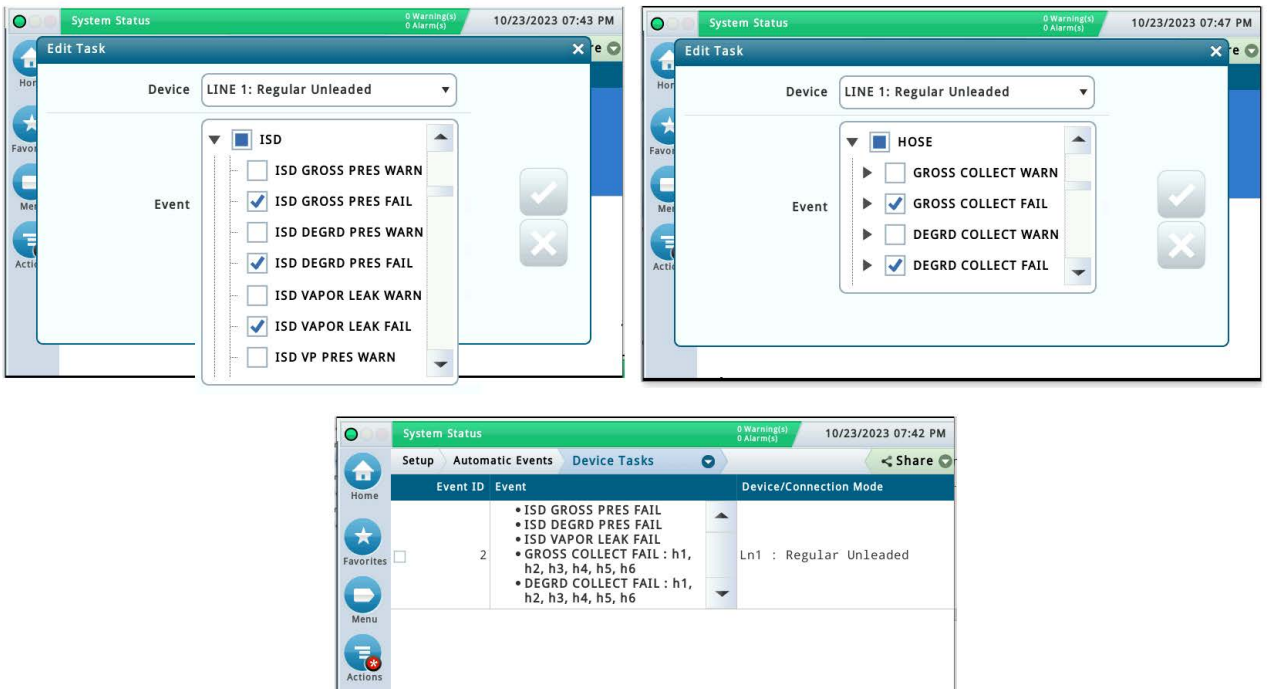


Figure 40. Example Device Task – TLS Pump Control (No Dispenser Relay(s))

3. Dispenser Relay Shutdown Option: For each Dispenser Relay:
   a. Via: **Setup > Devices > Relay**:
      i. Configure/ Enable Relay
      ii. Set the Type to Standard
   b. Via: **Setup > Automatic Events > Device Tasks**:
   a. Add a task for each Dispenser Relay:
      i. Set the Device to the Relay
      ii. Select each required Hose Alarm for the appropriate Gasoline Hose(s) as a Trigger

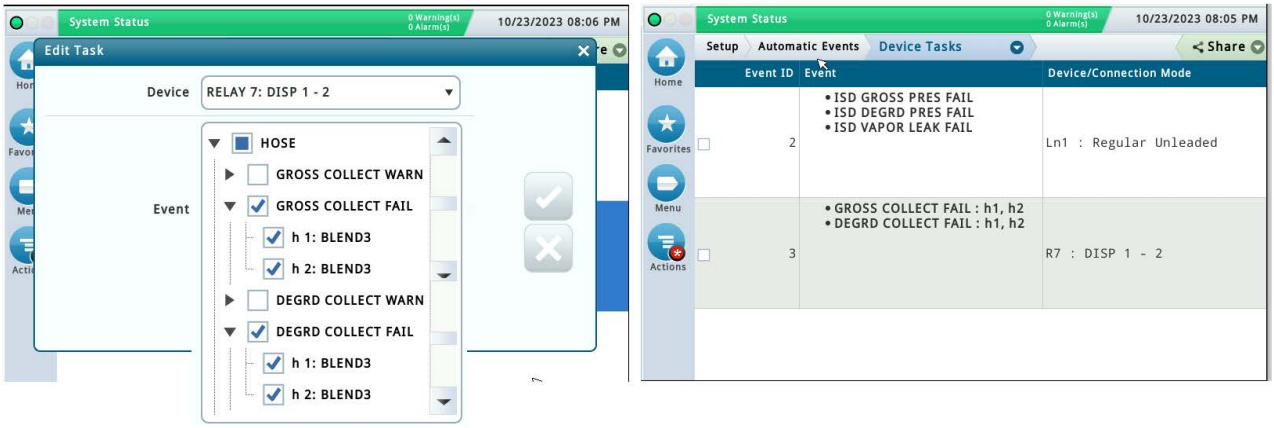


Figure 41. Example Device Task – TLS Pump Control (With Dispenser Relay(s))

Automatic Events: (Pump Mode = Pump Sense)

These are the steps required for ISD Shutdown If pump mode selected = Pump Sense.

Available Pump Modes in **Setup > Pumps and Lines > Pumps**:

Pump Sense: The console senses if the pump is active when a pump request signal is sent to turn on/off the pump (this signal also acts as a tank "active" signal to the console).

PUMP MODE = PUMP SENSE

1. For each Pump on a Gasoline Line:
   a. Via: **Setup > Devices > Relay**:
      i. Configure/Enable a Relay to supply power to pump control device
      ii. Set the Type to Standard
   b. Via: **Setup > Devices > External Input**:
      i. Configure/Enable an External Input (Pump Sense) for the pump
      ii. Set the Type to Pump Sense
   c. Via: Setup > Pumps and Lines > Pumps:
      i. Configure/Enable a Pump
      ii. Set the Mode to Pump Sense
      iii. Assign the appropriate Tank to Pump
      iv. Set the Pump Sense to the appropriate External Input
2. For each Gasoline Line:
   a. Via: **Setup >Pumps and Lines > Lines**:
      i. Configure / Enable a Line
      ii. Assign the appropriate gasoline Pump(s) to the Line
   b. Via: Setup > Automatic Events > Device Tasks:
      Add a task for required ISD Site Alarms

NOTICE **California Air Resources Board (CARB) requires that gasoline dispensing be shutdown for specific ISD Site alarms and Hose alarms (See Table 3 on page 5).**

      i. Set the Device to the Gasoline Line
      ii. Select each required ISD Site Alarm as a Trigger
      iii. Hose Site Shutdown Option: Select the Hose Alarms for each Gasoline Hose as a Trigger

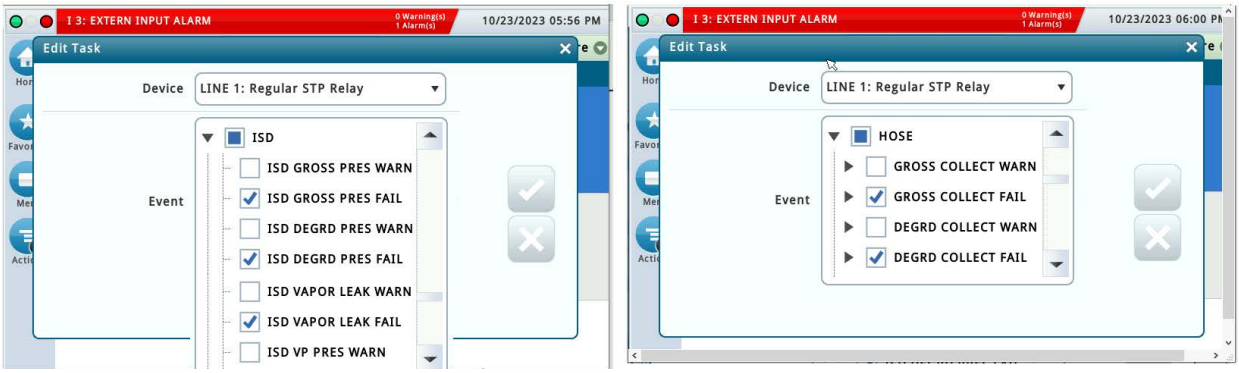


Figure 42. Example Device Task – Pump Sense (No Dispenser relay(s))

3. For each Relay setup in Step 1a above:
   a. Via: **Setup > Automatic Events > Device Tasks**:

      Add a Task for LINE OUT alarm:

      i. Set the Device to the Relay

      ii. Select LINE OUT for the appropriate Line as a Trigger

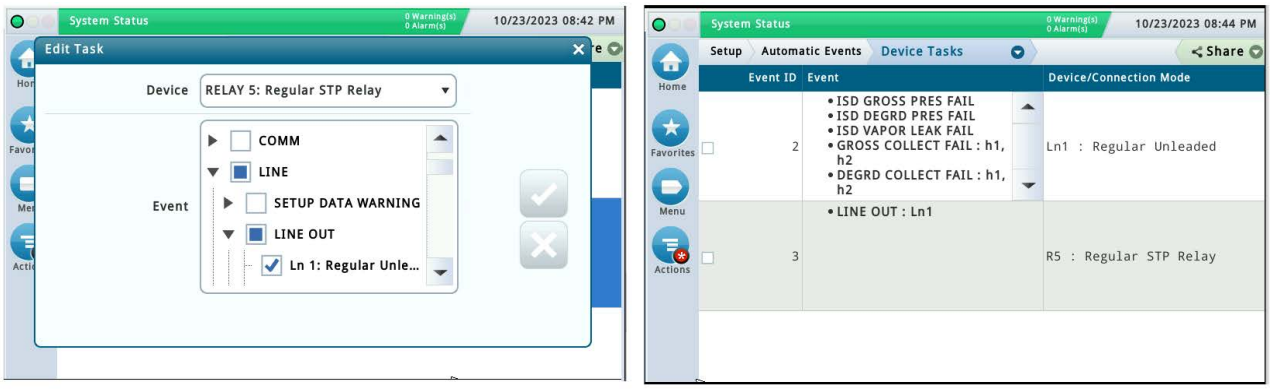


Figure 43. Example Device Task – Pump Sense: Line Out (No Dispenser relay(s))

4. Dispenser Relay Shutdown option: For each Dispenser Relay:
   a. Via: **Setup > Devices > Relay**:

      i. Configure/Enable Relay

      ii. Set the Type to Standard

   b. Via: **Setup > Automatic Events > Device Tasks**:

      Add a task for each Dispenser Relay:

      i. Set the Device to the Relay

      ii. Set each required Hose Alarm for the appropriate Gasoline Hose(s) as a Trigger

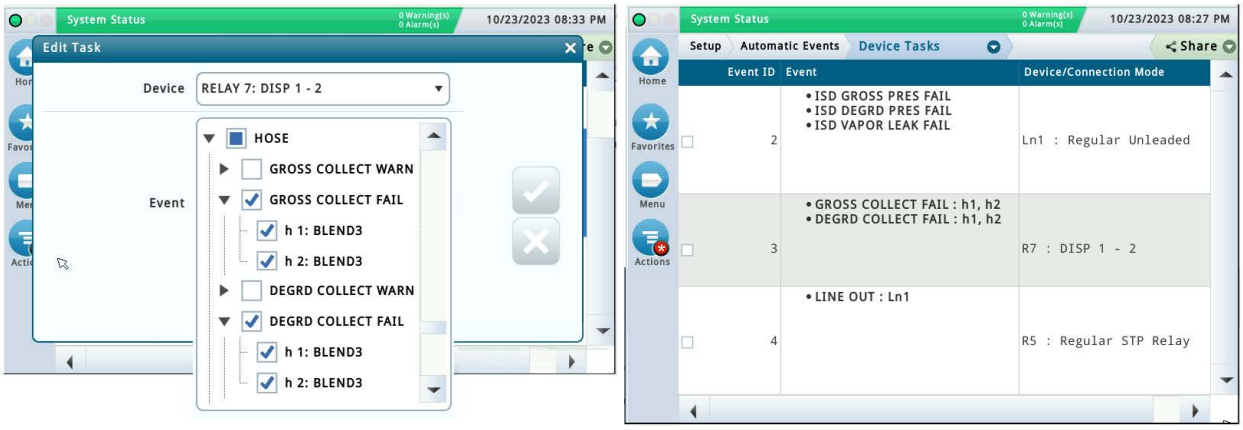


Figure 44. Example Device Task – Pump Sense (With Dispenser Relay(s))

Automatic Events: (Pump Mode = External Pump Control)

1. For each Pump on a Gasoline Line:
   a. Via: **Setup > Devices > Relay**:
      i. Configure/Enable a Relay to supply power to pump control device
      i. Set the Type to Standard
   b. Via: **Setup > Pumps and Lines > Pumps**:
      i. Configure/Enable a Pump
      i. Set the Mode to External Pump Control
      i. Assign the appropriate Tank to Pump
2. For each Gasoline Line:
   a. Via: **Setup > Pumps and Lines > Lines**:
      i. Configure/Enable a Line
      ii. Assign the appropriate gasoline Pump(s) to the Line
   b. Via: Setup > Automatic Events > Device Tasks:

      Add a task for required ISD Site Alarms:

NOTICE **California Air Resources Board (CARB) requires that gasoline dispensing be shutdown for specific ISD Site alarms and Hose alarms (See Table 3 on page 5).**

      i. Set the Device to the Gasoline Line
      ii. Select each required ISD Site Alarm as a Trigger
      iii. Hose Site Shutdown Option: Select the Hose Alarms for each Gasoline Hose as a Trigger

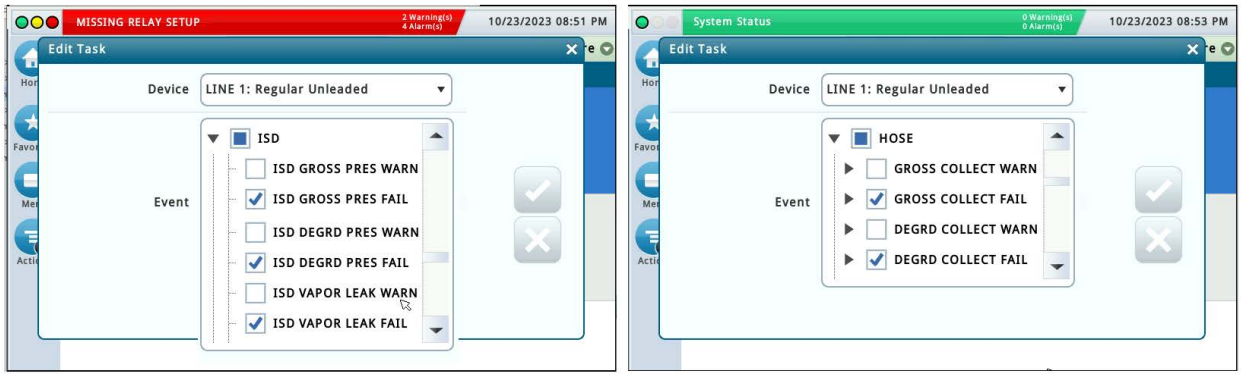


Figure 45. Example Device Task – External Pump Control (No Dispenser Relay(s))

3. For each Relay setup in Step 1a above:
   a. Via: **Setup > Automatic Events > Device Task**s:

      Add a task for a LINE OUT alarm:

      i. Set the Device to the Relay

ii. Select LINE OUT for the appropriate Line as a Trigger

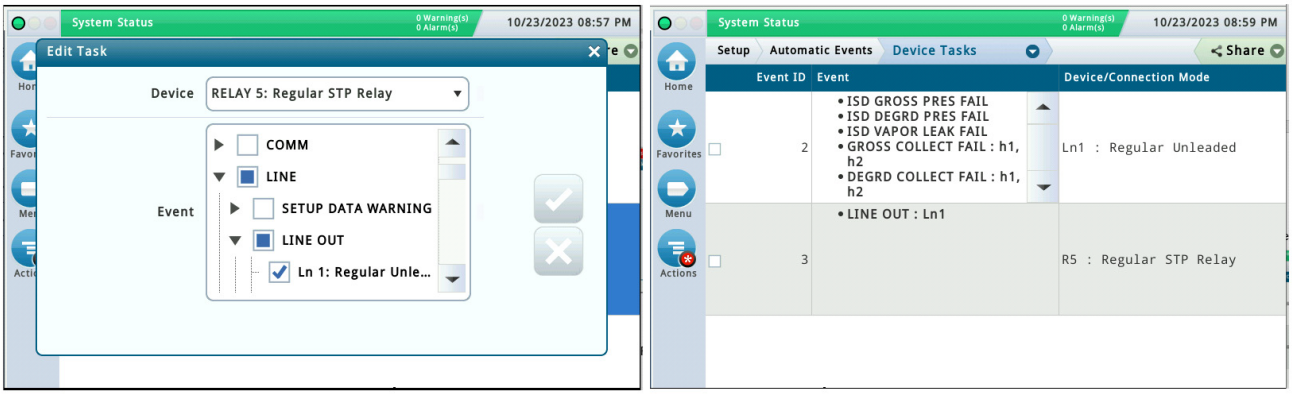


Figure 46. Example Device Task – External Pump Control - LINE OUT (No Dispenser Relay(s))

4. Dispenser Relay Shutdown option: For each Dispenser Relay:
   a. Via: Setup > Devices > Relay:
      i. Configure/Enable Relay
      ii. Set the Type to Standard
   b. Via: Setup > Automatic Events > Device Tasks:

      Add a task for each Dispenser Relay:
      i. Set the Device to the Relay
      ii. Select each required Hose Alarm for the appropriate Gasoline Hose(s) as a Trigger

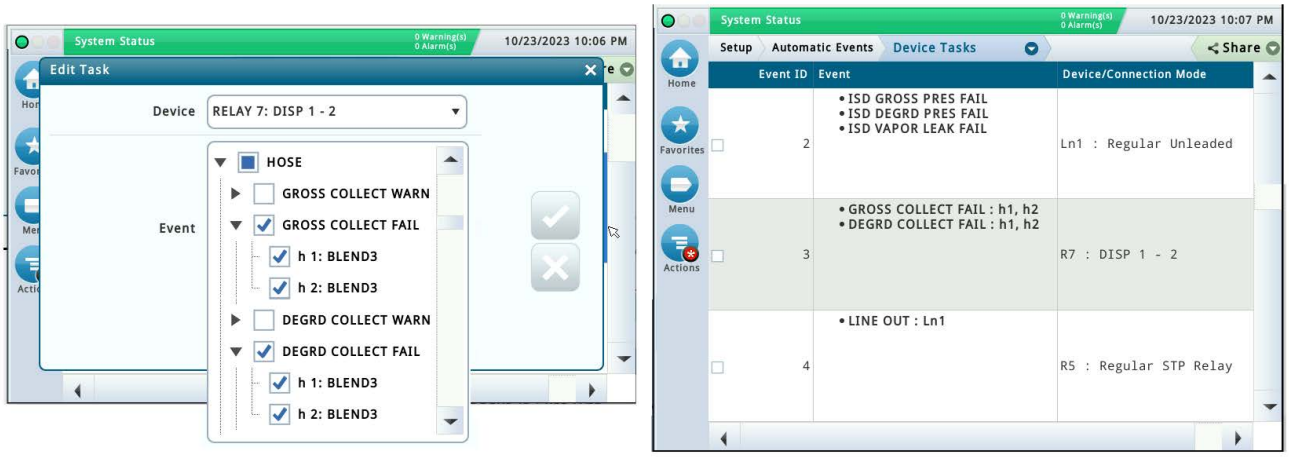


Figure 47. Example Device Tasks – External Pump Control (With Dispenser Relay(s))

Single CARB EVR/ISD Setup Printout

NOTICE **GUI only; Not available in Web view**

For **CARB EVR / ISD** setup, a single printout for the **EVR / ISD** setup for the California Air Resources Board (CARB) can be generated.

This is the same as EVR / ISD setup printout format that can be created with the TLS-350 console.

The "**CARB EVR / ISD**" Printout:

1. Via **Menu > Setup > Generate Setup**, select the Setup Group option of "**CARB EVR / ISD**" (see Figure 48
2. Touch the "**Generate**" button to create the printout (see Figure 49).

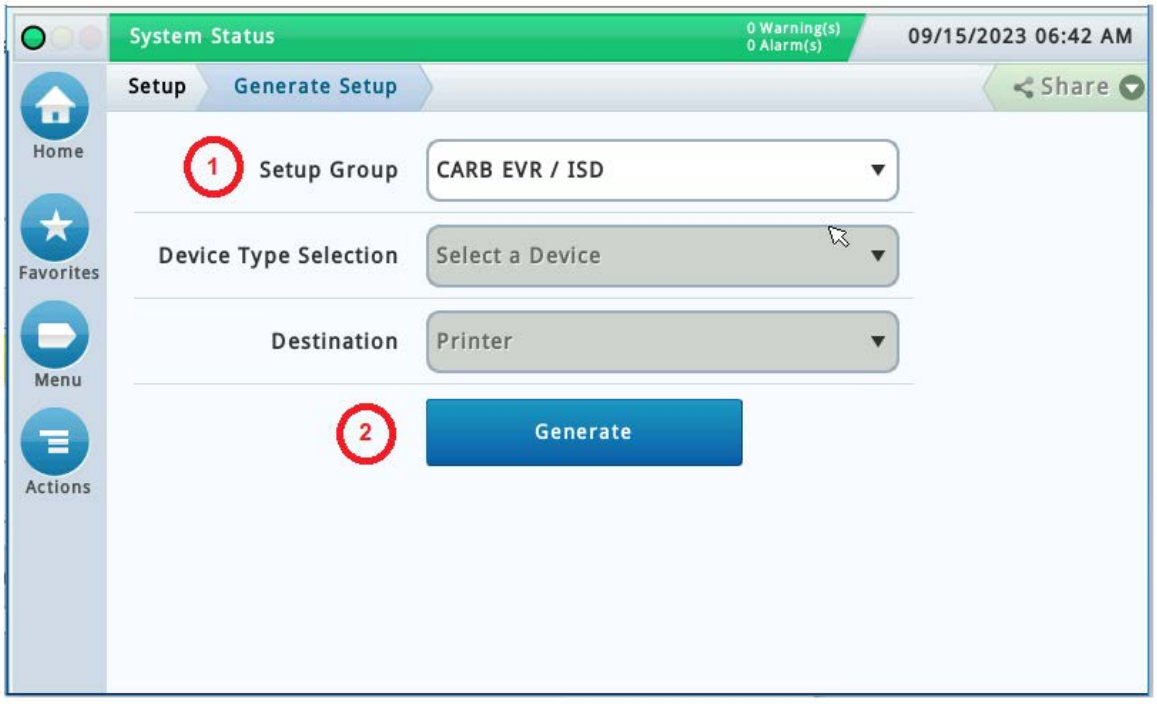


Figure 48. Generate Setup Screen

```
EVR/ISD SETUP

EVR TYPE: BALANCE

BALANCE NOZZLE TYPE
VST

VAPOR PROCESSOR TYPE
VEEDER-ROOT POLISHER

ANALYSIS TIMES
TIME: 11:59 PM
DELAY MINUTES:   1

ACCEPT HIGH ORVR:
DISABLED

ISD HOSE TABLE
ID  FP  FL  HL  AA  RR
------------------------
01  01  01  02  01  00
02  02  02  02  01  00
03  03  03  02  02  00
04  04  04  02  02  00
05  05  05  02  03  00
06  06  06  02  03  00

ISD AIRFLOW METER MAP
ID SERIAL NUM LABEL
------------------------
 1 105062881  Flow Meter
 2 105062882  Flow Meter
 3 105062883  Flow Meter

ISD FUEL GRADE HOSE MAP
    1   2   3   4
FP MHH MHH MHH MHH AA
------------------------
01 001 101 901 U U  1
02 002 102 902 U U  1
03 003 103 903 U U  2
04 004 104 904 U U  2
05 005 105 905 U U  3
06 006 106 906 U U  3

LABEL TABLE
------------------------
 1: UNASSIGNED
 2: BLEND3
 3: REGULAR
 4: MID GRADE
 5: PREMIUM
 6: GOLD
 7: BRONZE
 8: SILVER
 9: BLEND2
10: BLEND4
```

EVR TYPE = Type of Enhanced Vapor Recovery (EVR) equipment at the site.

EVR NOZZLE TYPE = Type of EVR nozzles installed at the dispensers.

VAPOR PROCESSOR TYPE = Name of vapor processor type if applicable.

ANALYSIS TIMES = The Assesment Time when the vapor assessment is scheduled to begin using the last 24 hours of data.

ACCEPT HIGH ORVR = If estimated number of ORVR dispenses is greater than expected, this is Enabled, otherwise it is set to Disabled.

ID = Hose Number
FP = Mapped Logical Fuel Position Number as recognized by the TLS Console (**UU** = Unassigned)
FL = Fuel Position Label (Number) as displayed on the dispenser (**UU** = Unassigned)
HL = Hose Label ID assigned
AA = Air Flow Meter ID assigned
RR = Relay assigned to shutdown dispenser

ID = Air Flow Meter Sensor Number assigned
Serial Number = Air Flow Meter's Serial Number
LABEL = Air Flow Meter Name

FP = Mapped Logical Fuel Position Number
MHH = Fuel Meter (M) and Hose Number (HH) for Product (**UU** = Unassigned)
AA = Air Flow Meter assigned to Fuel Position (FP)

= Label ID Number
Labels ID 2 thru 10 are User definable

Figure 49. Example EVR/ISD Setup Printout

ISD Device Diagnostic Screens

AIR FLOW METER OVERVIEW

1. Touch Menu>Diagnostics>Air Flow Meter>Overview (see Figure 50) to display the Air Flow Meter Overview screen (see Figure 51).

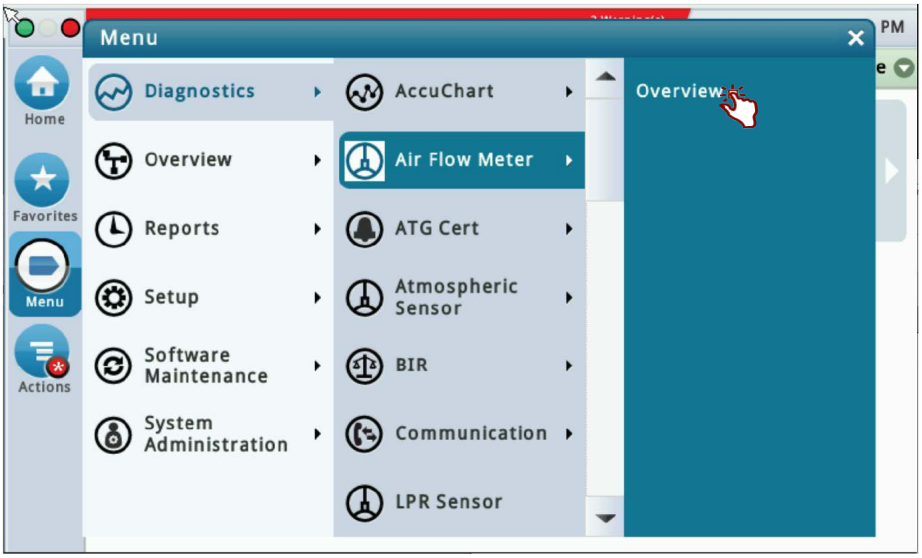


Figure 50. Accessing the Air Flow Meter Overview Screen

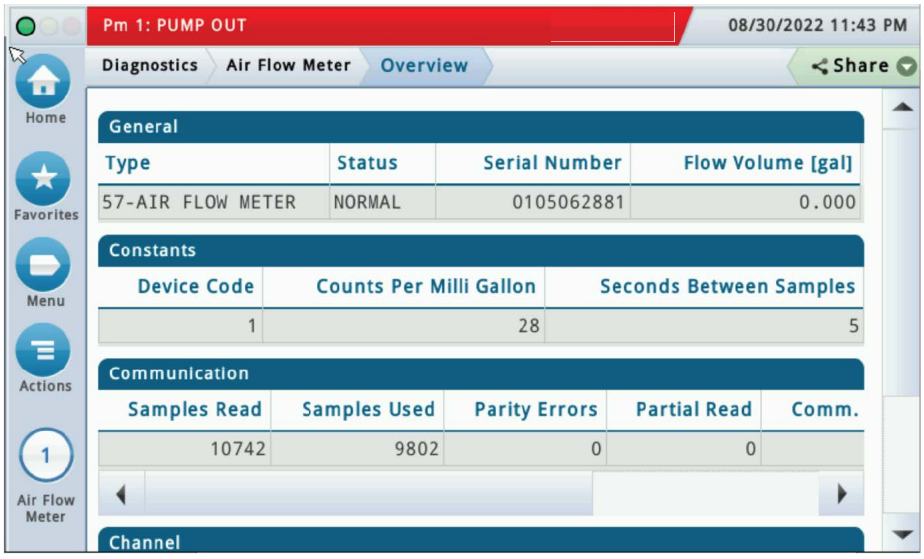


Figure 51. Air Flow Meter Overview Screen - Page 1

The four tables in this screen display status information for the selected Air Flow Meter. Touch the scroll down arrow to view the rest of the Air Flow Meter data tables (see Figure 52).

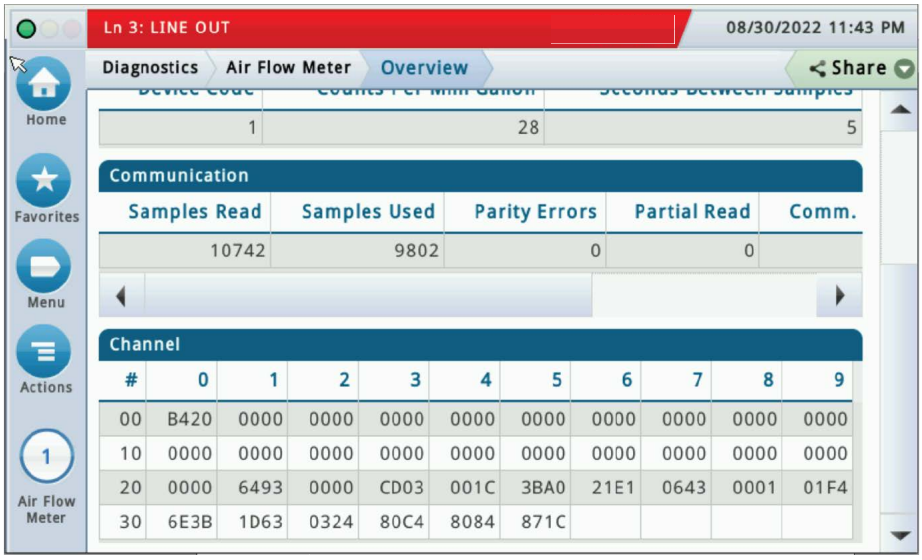


Figure 52. Air Flow Meter Overview Screen - Page 2

2. Touching Actions>Help opens the Online Help to view descriptive information about the data in the tables for this device.

VAPOR PRESSURE SENSOR OVERVIEW

1. Touch Menu>Diagnostics>Vapor Pressure Sensor>Overview to display the Vapor Pressure Sensor Overview screen (see Figure 54).

Figure 53. Accessing the Vapor Pressure Sensor Overview Screen

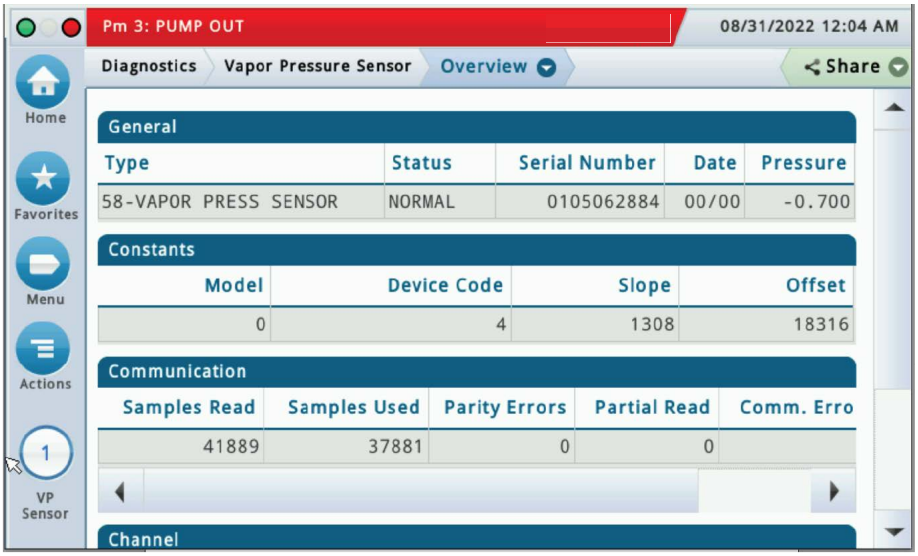


Figure 54. Vapor Pressure Sensor Overview Screen - Page 1

2. The four tables in this screen display status information for the selected Vapor Pressure Sensor. Touch the scroll down arrow to view the rest of the Vapor Pressure Sensor data tables (see Figure 55).

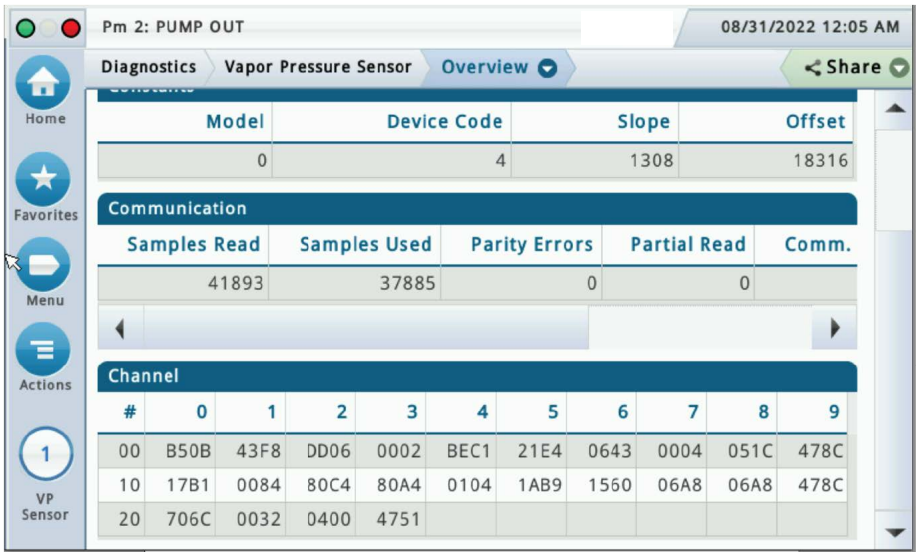


Figure 55. Vapor Pressure Sensor Overview Screen - Page 2

3. Touching Actions>Help opens the Online Help to view descriptive information about the data in the tables for this device.

PMC Status

Touch Menu>Diagnostics>PMC>Status (Figure 56) to open the PMC Version screen (Figure 57).

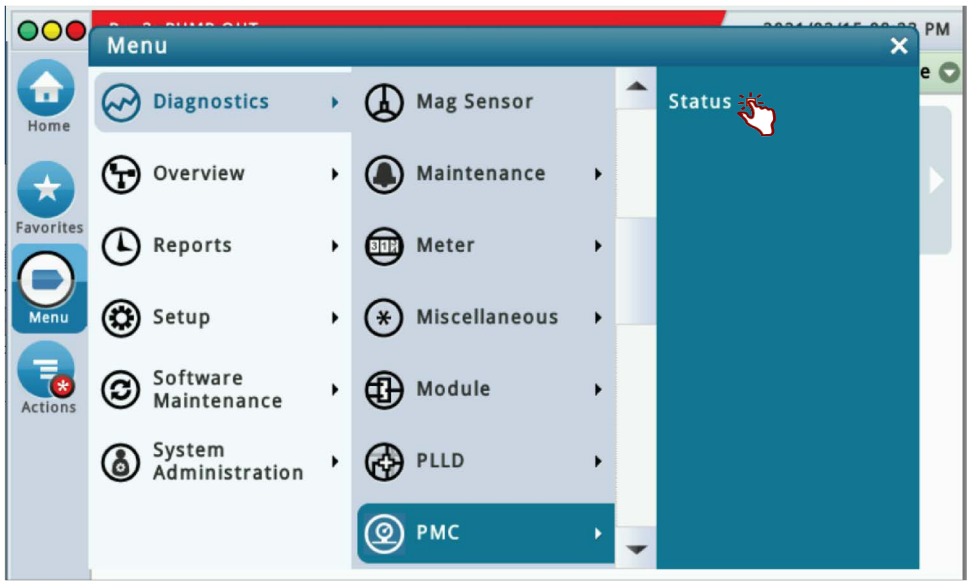


Figure 56. Accessing PMC Status Diagnostic Screen

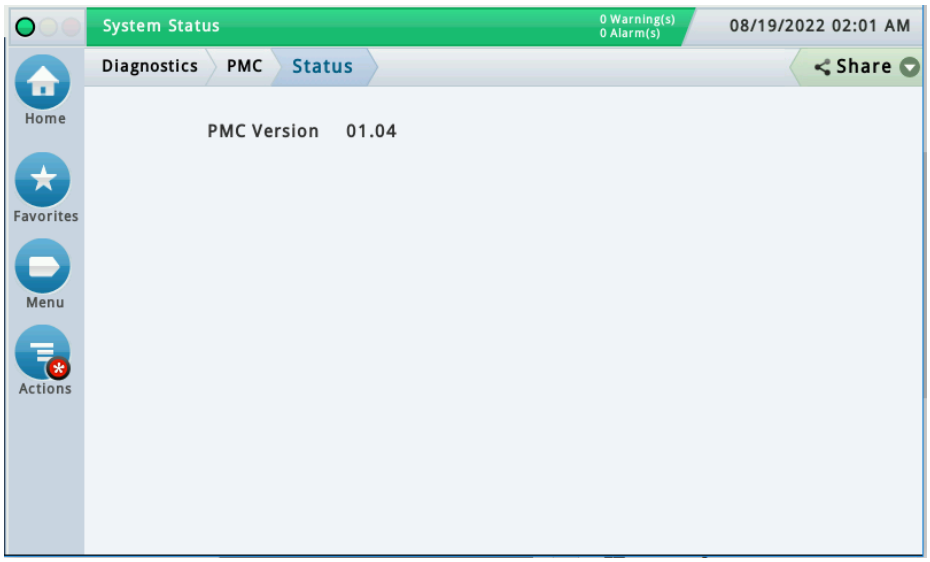


Figure 57. PMC Version Screen Example

Vapor Monitor - Clear Test After Repair

Since ISD monitoring tests operate on sensor data gathered over a fixed time interval (calendar days), in normal operation, following a repair, it will be necessary for an Authorized Service Contractor (ASC) to perform a CLEAR TEST AFTER REPAIR (CTAR). This function clears specific posted warnings and alarms for the selected ISD tests. This will prevent data for the selected Test Type prior to the Last Clear Date/Time posted from being used at the next Assessment Time. The result will be a 'No Test' until the correct amount (days) of new data are available for the cleared test(s). Using this feature will result in a logged entry in the ISD 'Shutdown & Misc. Event Log'. The customer would be expected to retain evidence that a repair was performed.

EXAMPLE PROCEDURE

1. The Vapor Monitor posts a Vapor Leak Fail alarm. Navigate to Diagnostics>Vapor Monitor>Clear Test After Repair (see Figure 58).

Figure 58. Vapor Monitor Clear Test After Repair Screen

2. In the Test Type drop-down box, scroll down to test type to clear, in this example, Vapor Leak (Figure 59).

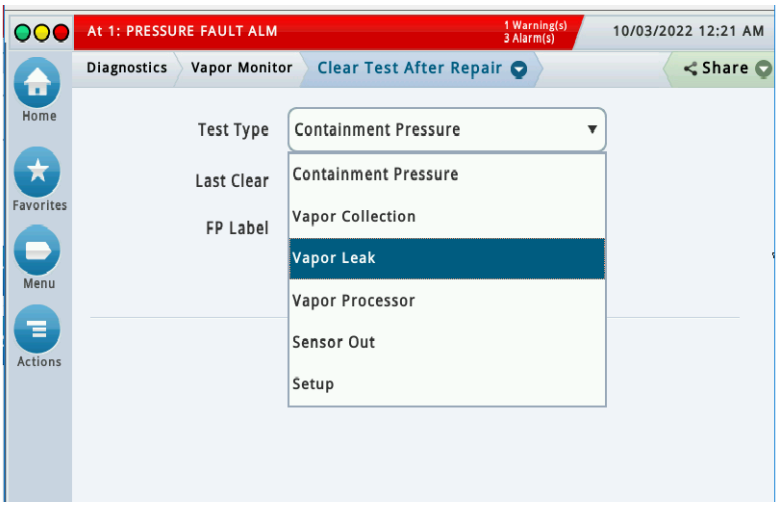


Figure 59. Select Test Type

3. Touch the **Clear Test** button to clear the test (Figure 60).

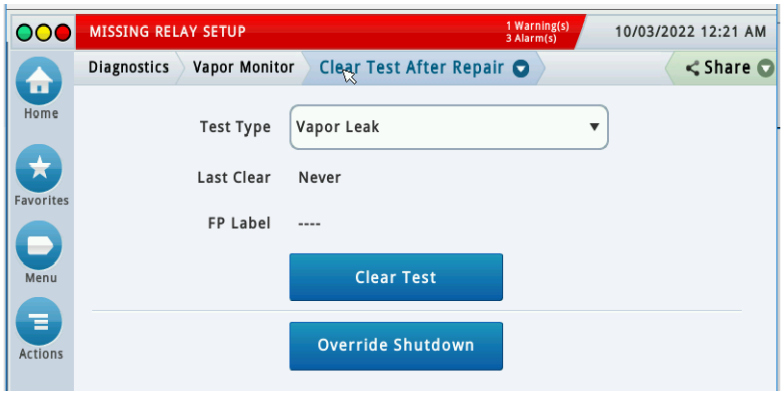


Figure 60. Clear Test

4. A Confirmation Message dialog box appears.

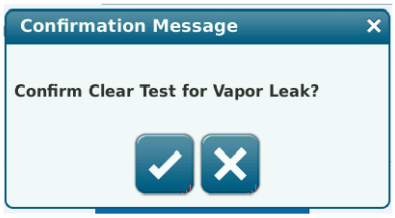


Figure 61. Confirmation Message Dialog Box

5. Touch the ☑ button to clear the warnings and alarms for the selected test. This will prevent data for the selected Test Type prior to the Last Clear Date/Time posted from being used at the next Assessment Time. Using this feature will result in a 'TEST MANUALLY CLEARED' logged entry in the ISD 'Shutdown & Misc. Event Log' and the Last Clear field will also update.

6. The date and time in the Last Clear field updates (see Figure 62).

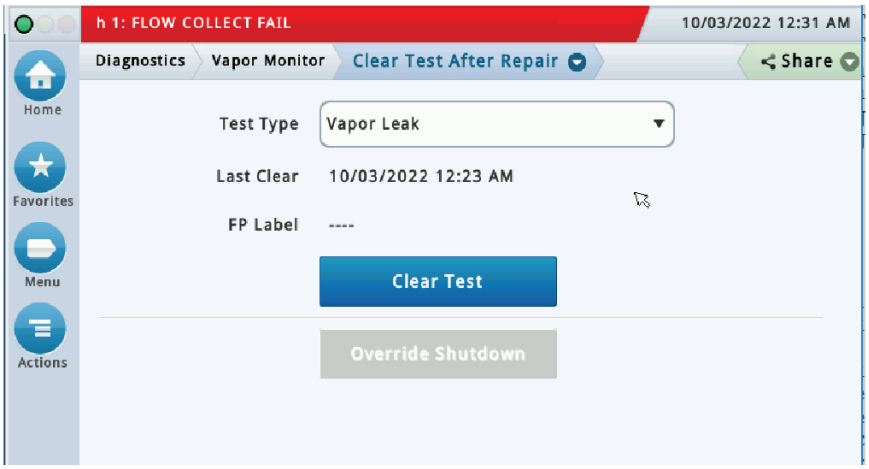
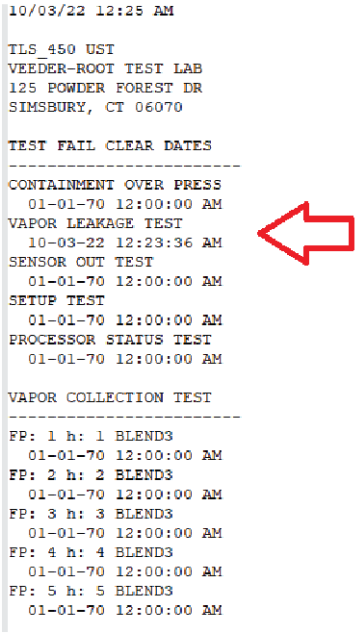


Figure 62. Last Clear Field Updates

7. Touch the Share drop-down arrow to print out the updated Clear After Test Repair history (GUI only) (Figure 63).



```
10/03/22 12:25 AM

TLS_450 UST
VEEDER-ROOT TEST LAB
125 POWDER FOREST DR
SIMSBURY, CT 06070

TEST FAIL CLEAR DATES
-------------------------
CONTAINMENT OVER PRESS
  01-01-70 12:00:00 AM
VAPOR LEAKAGE TEST
  10-03-22 12:23:36 AM
SENSOR OUT TEST
  01-01-70 12:00:00 AM
SETUP TEST
  01-01-70 12:00:00 AM
PROCESSOR STATUS TEST
  01-01-70 12:00:00 AM

VAPOR COLLECTION TEST
-------------------------
FP: 1 h: 1 BLEND3
  01-01-70 12:00:00 AM
FP: 2 h: 2 BLEND3
  01-01-70 12:00:00 AM
FP: 3 h: 3 BLEND3
  01-01-70 12:00:00 AM
FP: 4 h: 4 BLEND3
  01-01-70 12:00:00 AM
FP: 5 h: 5 BLEND3
  01-01-70 12:00:00 AM
```

Figure 63. Clear After Test Repair History Printout

8. Notice - The Vapor Collection test type lets you to clear a collection test on specific fuel position hoses (see Figure 64).

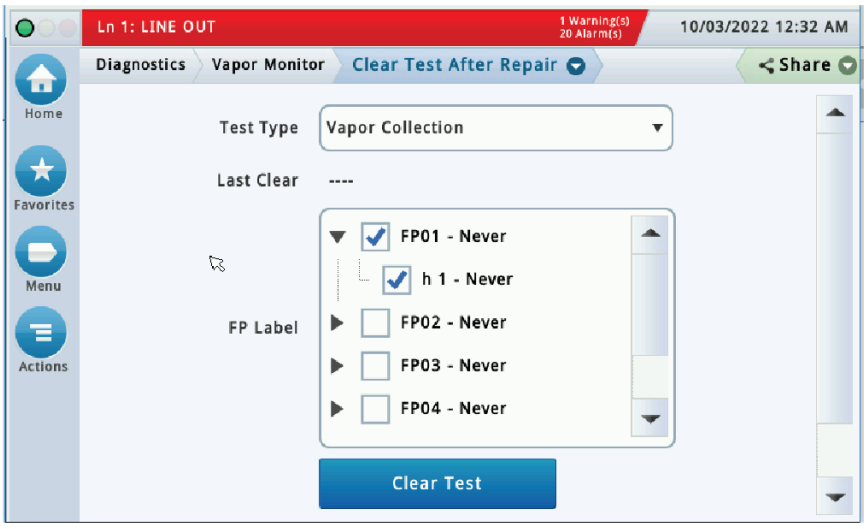


Figure 64. Clearing Vapor Collection Test By Hose

Vapor Monitor - Hose Events

1. Touch Menu>Diagnostics>Vapor Monitor (Figure 65), then touch Hose Events (Figure 66).

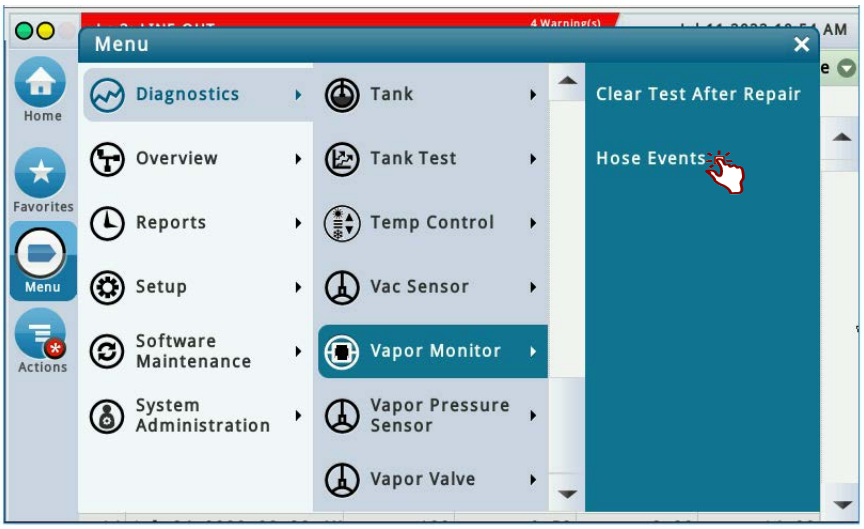


Figure 65. Selecting Vapor Monitor Hose Events

2.

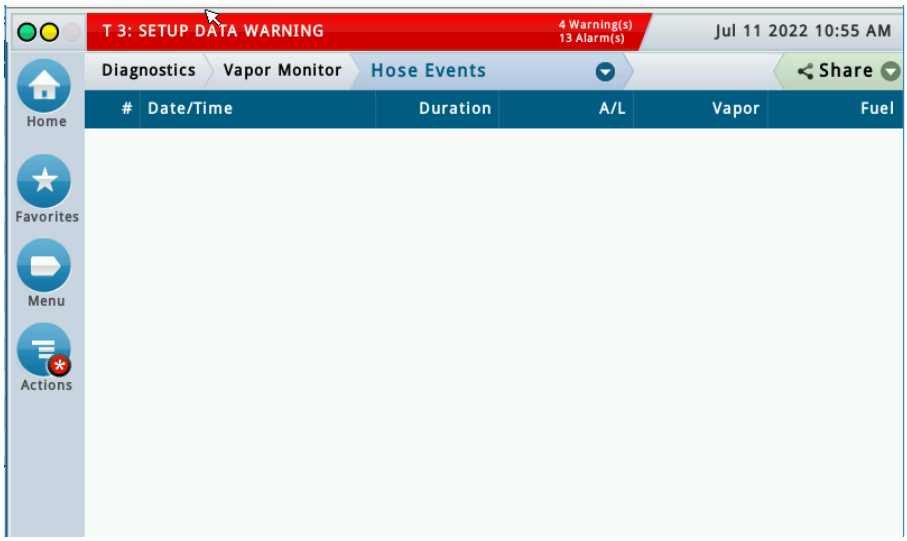


Figure 66. Vapor Monitor Hose Events Screen

3. Touch the Actions button, then select a Fuel Position (FP) and Hose (item 1 Figure 67), Hose # (item 2) and touch the ☑ button to display the vapor collection events for the selected hose (fig).

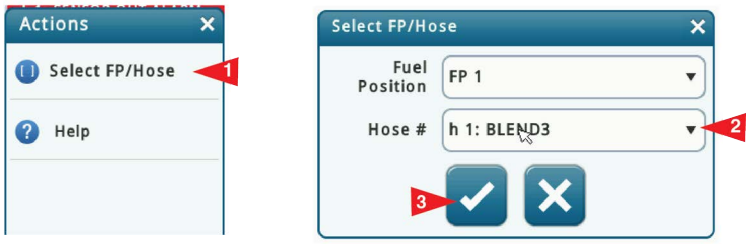


Figure 67. Selecting Fuel Position and Hose

#	Date/Time	Duration	A/L	Vapor	Fuel
1	Jul 04 2022 07:21 AM	118	4.23	59.18	14.00
2	Jul 04 2022 07:31 AM	181	1.49	17.90	12.00
3	Jul 04 2022 07:42 AM	133	0.35	3.19	9.00
4	Jul 04 2022 07:49 AM	97	0.22	1.35	6.00
5	Jul 04 2022 07:59 AM	157	1.59	34.91	22.00
6	Jul 04 2022 08:08 AM	97	0.22	1.35	6.00
7	Jul 04 2022 08:12 AM	97	0.45	5.46	12.00
8	Jul 04 2022 08:21 AM	151	1.66	33.20	20.00
9	Jul 04 2022 08:41 AM	109	0.29	2.06	7.00
10	Jul 04 2022 09:05 AM	145	1.87	41.25	22.00
11	Jul 04 2022 09:12 AM	181	0.51	6.63	13.00
12	Jul 04 2022 09:19 AM	145	0.38	3.83	10.00
13	Jul 04 2022 09:25 AM	157	0.75	15.10	20.00

Figure 68. Vapor Collection Hose Events Screen

This diagnostic screen contains vapor collection performance by hose events. In this screen you can verify, over time, vapor collection results on a selected hose. Recorded hose events on the screen are qualified as follows:

- Single hose dispenses from the selected dispenser
- Fuel dispenses greater than 3.0 gallons
- A/L ratio between 0.0 and 5.0.

It may take a few minutes after a dispense for the event to show in the data.

- If there was a recent Clear Test After Repair (CTAR) performed, the data shown is from all dispense events since last CTAR was performed.
- The data on this screen is the same as shown on the Hose Histogram (Web GUI only).

To refresh the data shown on the 450PLUS GUI, touch the **Actions** button>Select FP/Hose #>✔ [In the Web GUI refresh data by selecting **Refresh**].

ISD Operability Test Procedures

The following procedures shall be used at field sites to determine the operability of the Veeder-Root ISD system to satisfy the requirements documented in VAPOR RECOVERY CERTIFICATION PROCEDURE, CP-201, CERTIFICATION PROCEDURE FOR VAPOR RECOVERY SYSTEMS AT GASOLINE DISPENSING FACILITIES. Testing the ISD equipment in accordance with this procedure will verify the equipment's operability for Vapor Containment Monitoring and Vapor Collection Monitoring.

Veeder-Root's TLS console ISD System Self-Test Monitoring algorithms are designed to verify proper selection, setup and operation of the TLS console modules and sensors and will not complete and report passing test results in the event of a failure of components used in the system. Completed ISD monitoring tests are evidence that:

- The system was properly powered for data collection
- All necessary ISD sensors were setup and connected
- All necessary ISD sensors were operating within specification
- All internal components including TLS console modules were properly setup and operating within specification

Veeder-Root recommends printing a copy of the 'ISD Status Events (Monthly)' and 'ISD CARB Daily' reports periodically to determine that compliance tests are being completed in accordance with local and state regulations.

Vapor Pressure Sensor Verification Test

See EO VR 202 Exhibit 9 for the Pressure Sensor Verification Test.

Vapor Flow Meter Operability Test

See EO VR 202 Exhibit 9 for the ISD Vapor Flow Meter Operability Test Procedure.

Readiness/Function Code

The TLS-450PLUS ISD software shall store a code upon first completing a full diagnostic check of all monitored components and systems. This is applicable when the ISD feature is initially setup or when power is restored.

The TLS will store a readiness code following power-up and once a day at the ISD test time until the ISD feature is fully operational (ready). There are five fields that make up the Result Code, ABCDE, defined below.

ISD equipment self-tests Field:

A - ISD feature setup test. Failing this test indicates one or more ISD setup parameters are incorrect.

B - ISD data streams performance test. Failing this test indicates that there is either:

- One or more ISD sensor-out alarms.
- One or more data streams have been missing for a 24 hour period.

ISD tests:

C - Collection Gross A/L (or Flow Performance) – All hoses

D - Containment Gross Over Pressure & Vapor Leakage

E - Vapor Processor – All vapor processor tests (if Vapor Processor is installed)

Result Codes by Priority:

P – Pass

F – Fail

N – No Test

Standard ISD test codes that represent multiple devices (e.g. collection tests on all hoses) are the combined individual test results (e.g. any test with an 'F' result yields a combined tests result of 'F', etc., so that a combined 'P' only results when all tests are 'P').

The Readiness code is reported on every power up. If any of the results do not pass ('P'), the Readiness code is updated daily, until all tests pass.

TLS-450PLUS ISD is considered ready once all five readiness code parameters report pass ('P'), at which point a readiness code is no longer recorded until triggered by the next power up event.

The readiness code is available via the ISD Monthly Report - printout if queued in the most recent 10 events:

```
Shutdown & Misc. Event Log
Date       Time  Description                    Action or Name
2002/03/05 23:59 Readiness Code ISD: PP EVR: PPPP EVR/ISD System Ready
```

Under the heading "Action or Name" the following can be used based on the Readiness Code reported:

```
Date       Time  Description                Action or Name
2002/12/26 21:59 Readiness ISD: PP EVR: PPPP EVR/ISD System Ready
2002/12/26 21:59 Readiness ISD: PP EVR: NNNN EVR Readiness Pending
2002/12/26 21:59 Readiness ISD: PF EVR: NNNN Check ISD Sensors
2002/12/26 21:59 Readiness ISD: FN EVR: NNNN Check Setup Configuration
```

Descriptions should support readiness code conditions, prioritized left to right.

An ISD Monthly Report printout example is shown in Figure 69.

4. .

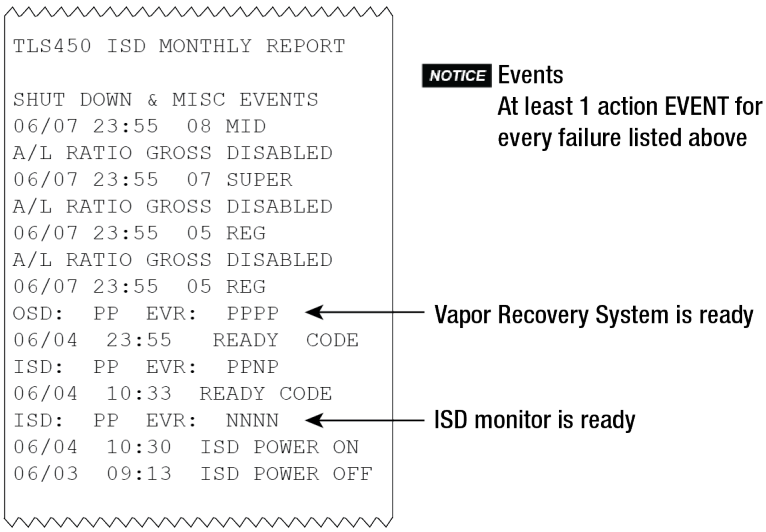


Figure 69. ISD Monthly Report - Printout Example

REPORT ACCESS PRINTING

- ISD CARB Monthly (see Figure 76).
- ISD Status Events (Monthly) (see Figure 82).

Alarms

The TLS console is continuously monitoring the vapor recovery system and ISD sensors for alarm conditions such as excessively high or low vapor collection, containment system vapor leakage and equipment problems.

ALARM MESSAGES

ISD monitoring tests operate once each day. Warning and failure conditions are posted at the designated posting time after the tests are complete.

Warnings

WARNINGS indicate when attention is required. When a WARNING is posted a warning alarm event is logged in the ISD reports, posted on the status bar of the GUI and printed to the printer if setup in Automatic Events. If the condition persists, a WARNING will remain active for a 1, 7 or 30 day warning period depending on the test type.

Failures

If a WARNING condition persists, a FAILURE alarm will be posted after the warning period and THE SITE DISPENSING EQUIPMENT IS SHUTDOWN (see RESTARTING STATION AFTER ISD SHUTDOWN for instructions on restarting dispensing). When a FAILURE is posted a failure alarm event is logged in the ISD reports, posted on the status bar of the GUI and printed to the printer if setup in Automatic Events.

RESTARTING STATION AFTER ISD SHUTDOWN ALARMS

NOTICE **Consult state and local regulations prior to restarting equipment.**

After one of the ISD Shutdown Alarms occurs press Menu>Diagnostics>Vapor Monitor>Clear Test After Repair, to display the screen below and press the **Override Shutdown** button, then touch the **Confirm** message to continue operation of the site after the alarm has posted (see Figure 70). If the site or dispenser(s) are not shutdown, this button is grayed out, otherwise press to override a shutdown in effect and resume dispensing. Dispensing resumes, the alarm light continues to flash, and any alarm messages display until the alarm has been cleared. A 'PUMPS MANUALLY RE-ENABLED' event is entered in the 'Shutdown & Misc Event Log'.

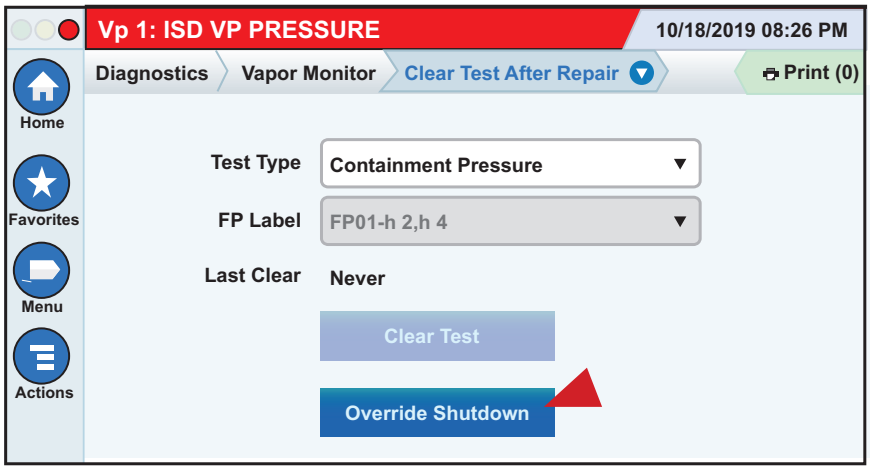


Figure 70. Clear Test After Repair Screen

ALARM LOGS

Alarms will be recorded in the Warning Log or Failure Log of the monthly reports, which can be viewed electronically or via the integral printer (if queued in the most recent 10 events). The following example shows an excerpt from an electronically accessed monthly report.

Warning Alarms

Date	Time	Description	Reading	Value
2022/01/0	23:59	VAPOR VAPOR CONTAINMENT LEAKAGE	CFH@2"WC	14
2022/01/0	23:59	A/L RATIO DEGRADATION	FP2 MID	0.69
2022/12/3	23:59	VAPOR VAPOR CONTAINMENT LEAKAGE	CFH@2"WC	13
2022/12/3	23:59	A/L RATIO DEGRADATION	FP2 MID	0.67

Failure Alarms

Date	Time	Description	Reading	Value
2022/01/0	23:59	A/L RATIO GROSS BLOCKAGE	FP1 REG	0.06
2022/01/0	23:59	A/L RATIO DEGRADATION	FP1 REG	0.14
2022/01/0	23:59	A/L RATIO GROSS BLOCKAGE	FP1 MID	0.13
2022/01/0	23:59	A/L RATIO DEGRADATION	FP1 MID	0.15

Figure 71. Monthly Report Warning & Failure Log Example

ALARM SEQUENCE

Each ISD monitoring test operates once a day on sensor data gathered over a fixed time interval and with a minimum required number of monitored events. The interval is a fixed number of calendar days depending on the test being run. As an example, the A/L Degradation Vapor Collection Monitoring test requires seven calendar days of data and at least 30 fueling events. In this example, each daily test result represents a test based on the prior seven days' time period. When a test first fails, a warning is posted and a warning event is logged. If this condition persists for seven more consecutive days, an alarm is posted, a failure alarm event is logged and the site is shutdown. If the condition continues, additional failure events are logged and the site will continue to be shutdown each day.

ISD ALARM SUMMARY

Table 4 summarizes the ISD Alarms.

NOTICE **Alarms with footnote 2 will result in a site shutdown.**

Table 4. ISD Alarm Summary

Displayed Message	ISD Monitoring Category	Light Indicator	Cause	Suggested Troubleshooting[1]
ISD VAPOR LEAK WARN	Containment	Yellow	Vapor Leakage Detection test warning	•Exhibit 7 Nozzle Bag Test •Exhibit 9/10 Operability Test •T.P. 201.1E-PVV Test •Exhibit 4 Clean Air Separator Test •TP-201.3
ISD VAPOR LEAK FAIL[2]	Containment	Red	Vapor Leakage Detection test - 8th consecutive failure	
ISD GROSS PRESS WARN	Containment	Yellow	Gross Over Pressure test warning	•Are ball valves for the clean air separator in the correct position? •Is the ball valve near the pressure sensor in the correct position? •Exhibit 7 Bag Test •T.P. 201.1E-PVV Test •T.P. 201.3 •Look for problems using one or more of the following VR-202 procedures/ tests: Dispenser Integrity Test B-3 (i.e. 'Plumbing Tightness' test), Exhibit 4, Exhibit 5, Exhibit 9 (pressure sensor only) or Flow Rate Verification per section 1.2.3.
ISD GROSS PRESS FAIL[2]	Containment	Red	Gross Over Pressure test - 8th consecutive failure	
ISD DEGRD PRESS WARN	Containment	Yellow	Degradation Over-Pressure test warning	
ISD DEGRD PRESS FAIL[2]	Containment	Red	Degradation Over-Pressure test - 30th consecutive failure	
hnn: GROSS COLLECT WARN	Collection	Yellow	1-Day Gross A/L Test warning	•Visually inspect hanging hardware at the affected fueling point •Exhibit 7 Nozzle Bag Test •VR-202 Exhibit 5
hnn: GROSS COLLECT FAIL[2]	Collection	Red	1-Day Gross A/L Test failure - 2nd consecutive failure	
hnn: DEGRD COLLECT WARN	Collection	Yellow	7-Day Degradation A/L Test warning	
hnn: DEGRD COLLECT FAIL[2]	Collection	Red	7-Day Degradation A/L Test - consecutive failure	
ISD VP PRESS WARN[3]	Processor	Yellow	90th percentile of 1 day ullage pressure exceeds 2.3 IWC	Exhibit test for ARID Permeator Processor
ISD VP PRESS FAIL[3]	Processor	Red	2nd consecutive failure of vapor	
ISD SENSOR OUT WARN	Self-Test	Yellow	ISD Sensor Out Self-Test warning	Confirm ISD sensor & module installation / communication per Setup section.
ISD SENSOR OUT FAIL[2]	Self-Test	Red	ISD Sensor Out Self-Test - 8th consecutive failure	
ISD SETUP WARN	Self-Test	Yellow	System Setup Self-Test warning	Confirm ISD programing per Setup section.
ISD SETUP FAIL[2]	Self-Test	Red	System Setup Self-Test failure - 8th consecutive failure	

[1] See ISD Troubleshooting Manual P/N 577014-463 for a complete list of suggestions.

[2] ISD Shutdown Alarms - see ISD Quick Reference Guide P/N 577014-462.

3 ARID Permeator Processor

OTHER ALARMS

Table 5 summarizes additional alarms that may be posted by ISD related equipment. These alarms are not critical to vapor recovery functionality, but could indicate erroneous setup or equipment malfunction.

NOTICE **Additional TLS console alarms listed in the TLS-450PLUS Console Troubleshooting Guide (P/N 577014-075) may be posted and may lead to an ISD shutdown alarm if persistent.**

Table 5. Other Alarms

Displayed Message	Light Indicator	Set Condition	Clear Condition
MISSING RELAY SETUP	Red	At least one gasoline line/relay to shutdown on required ISD alarms.	Complete required shutdown alarms via Settings> Automatic Events> Device Tasks for all vapor recovery (gasoline) products.
MISSING TANK SETUP	Red	There are no vapor recovery (gasoline) tanks defined, or at least one gasoline pump (STP) does not have a gasoline tank assigned to it.	Complete gasoline tank setup and ensure shutdown requirements are complete.
MISSING HOSE SETUP	Red	The Hose Mapping needs at least one Hose mapped.	Complete the Hose Mapping.
hnn: SETUP DATA WARNING	Yellow	Missing hose setup parameter(s).	Touch Status Bar to view alarms. Touch box next to hnn: Setup Data Warning to select alarm. Via Actions, select Setup Data Warnings to view missing setup parameters. Look at Table 6 to view Hose Setup Data Warning messages.
hnn: VAPOR FLOW MTR SETUP	Red	Incoming transaction from a hose with an unavailable Air Flow Meter.	Ensure assigned Air Flow Meter is configured Enabled for the specific hose.
MISS VAPOR PRES SEN	Red	There is no Vapor Pressure Sensor configured Enabled or assigned to ISD.	Complete Vapor Pressure Setup and assign VPS in Setup> Vapor General> General.
MISS AIR FLOW MTR	Red	At least one AFM must be assigned to a Configured/Enabled Hose.	Assign an AFM to all Configured/ Enabled Hose(s) in Hose Settings.
afnn: CHK VAPOR FLOW MTR	Red	Failure of locked rotor test - possible locked Air Flow Meter.	Locked rotor test passes or Air Flow Meter deconfigured, or test cleared.

Table 6 summarizes Hose Setup warning messges and Table 7 contains wireless related alarms.

Table 6. Hose Setup Data Warning Messages

Message	Cause	Action
Label Not Assigned	Missing hose label selection	Check hose settings in Setup>Vapor Collection>Hose Settings
FP Label Not Set	Fuel Position label not set.	
Air Flow Meter Not Assigned	Air Flow Meter not selected and assigned to the hose.	
Assigned Air Flow Meter Not Configured	Air flow meter is assigned to a hose but is disabled in Device Setup.	Check Air Flow Meter setup in Setup>Device>Air Flow Meter
Meter Not Mapped	Fuel meter not mapped to hose.	Check meter mapping in Setup>Vapor Collection>Hose Mapping

Table 7. Wireless Related Sensor Alarms

Displayed Message	Devices	Light Indicator	Description	Suggested Troubleshooting
BATTERY WARNING	Vapor Valve, VPS, AFM and Probe	Yellow	Device transmitter reports battery status as 'Replace' for 24 hours	Remove and replace battery pack

Reports

There are two main reports (CP-201 required) that are stored by the ISD system: the Monthly Status Report (CARB Monthly), stored for 12-months, and the Daily Status Report (CARB Daily), stored for 365 days. You can access and view or print out ISD reports from the TLS console front panel by touching Menu>Reports>ISD (see Figure 72). In addition, there are three additional reports available with ISD; Daily Collection; Daily Containment; and Status Events Monthly.

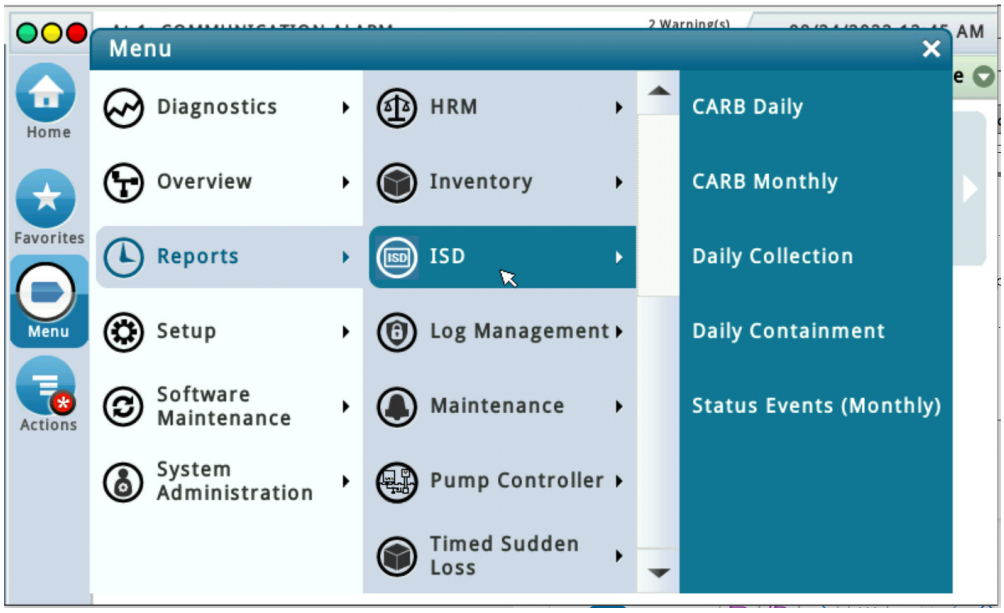


Figure 72. Accessing ISD Reports

- The Daily Status Report (CARB Daily) includes:
  - Maximum and minimum ullage pressures
  - Results of the Vapor Containment Monitoring Gross (75th percentile), Degradation (95th percentile) ullage pressure test and Vapor Leakage Detection (CVLD) tests
  - Vapor Collection monitoring test results for each fueling position
- The Monthly Status Report (CARB Monthly) includes:
  - ISD operational up-time (as a percentage)
  - EVR/ISD system pass time (as a percentage)
  - Last 10 Warnings log
  - Last 10 Failures log
  - Last 10 Misc. Events log
- Daily Collection Report includes daily results of:
  - ISD EVR Status
  - % Up Time
  - Vapor Collection Monitoring test results for each gasoline fueling position.
  - The printout will also include the ISD Status Report.

- Daily Containment Report includes daily results of:

  -ISD EVR Status

  -Vapor Containment Monitoring Gross (75th percentile), Degradation (95th percentile) with Max and Min daily pressures.

  - Vapor Leakage Detection (CVLD)

  - The printout will also include the ISD Status Report

- Status Events (Monthly) Report (The selected day range: Status Report - includes:

  - Status Report

  - Warning Alarms

  - Failure Alarms

  - Shutdown & Misc. Event Log

NOTICE **Additional report details can viewed within reports by touching the Actions button and then touching Help.**

VIEWING AND PRINTING CARB DAILY REPORT

On the TLS-450PLUS screen, touch Menu>Reports>ISD>CARB Daily (see Figure 73 and Figure 74).

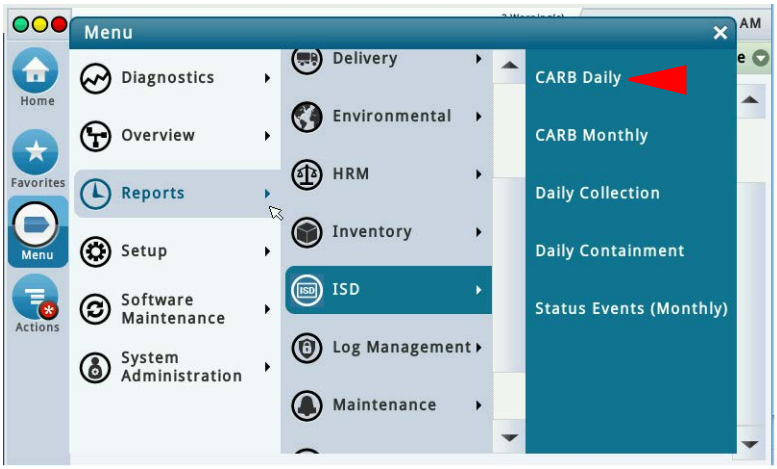


Figure 73. Accessing CARB Daily Report

Touch the **Actions** button to select a date/range then touch the **Check** button to accept the date/range and view the report.

Figure 74. Example CARB Daily Report

Touch the **Share** button down arrow and touch **Print** to print out the report on the console printer (see Figure 75).

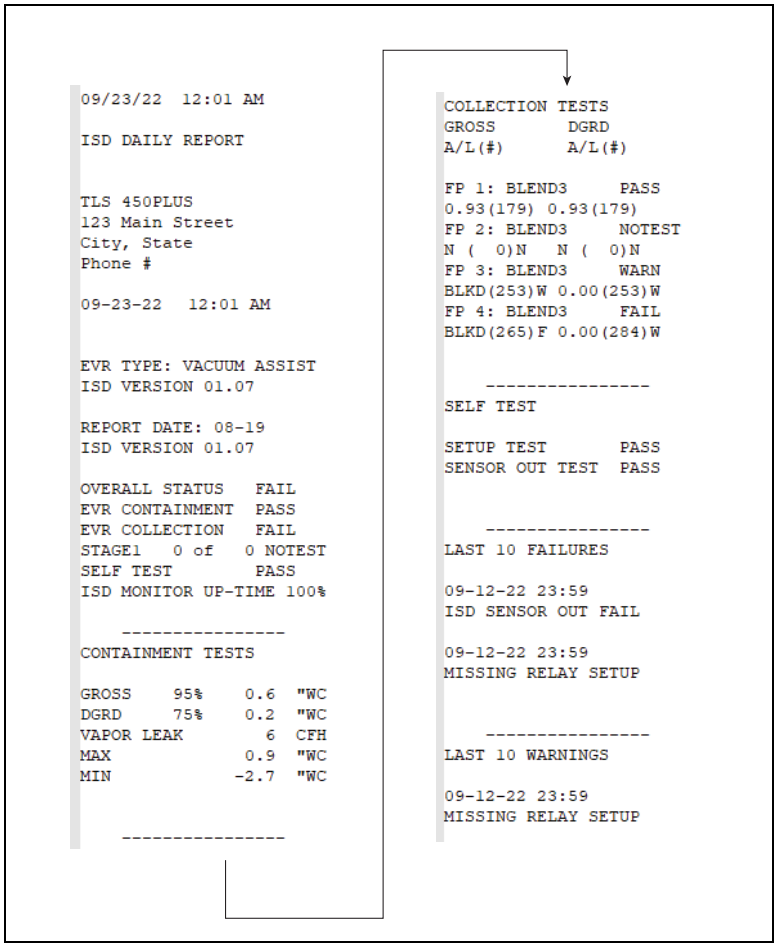


Figure 75. Example CARB Daily Report Printout

VIEWING AND PRINTING CARB MONTHLY REPORT

On the TLS-450PLUS screen, touch Menu>Reports>ISD>CARB Monthly (see Figure 73 and Figure 76).

Touch the **Actions** button to select a date/range then touch the **Check** button to accept the date/range and view the report.

Figure 76. Example CARB Monthly Report

Touch the **Share** button down arrow and touch **Print** to print out the report on the console printer (see Figure 77).

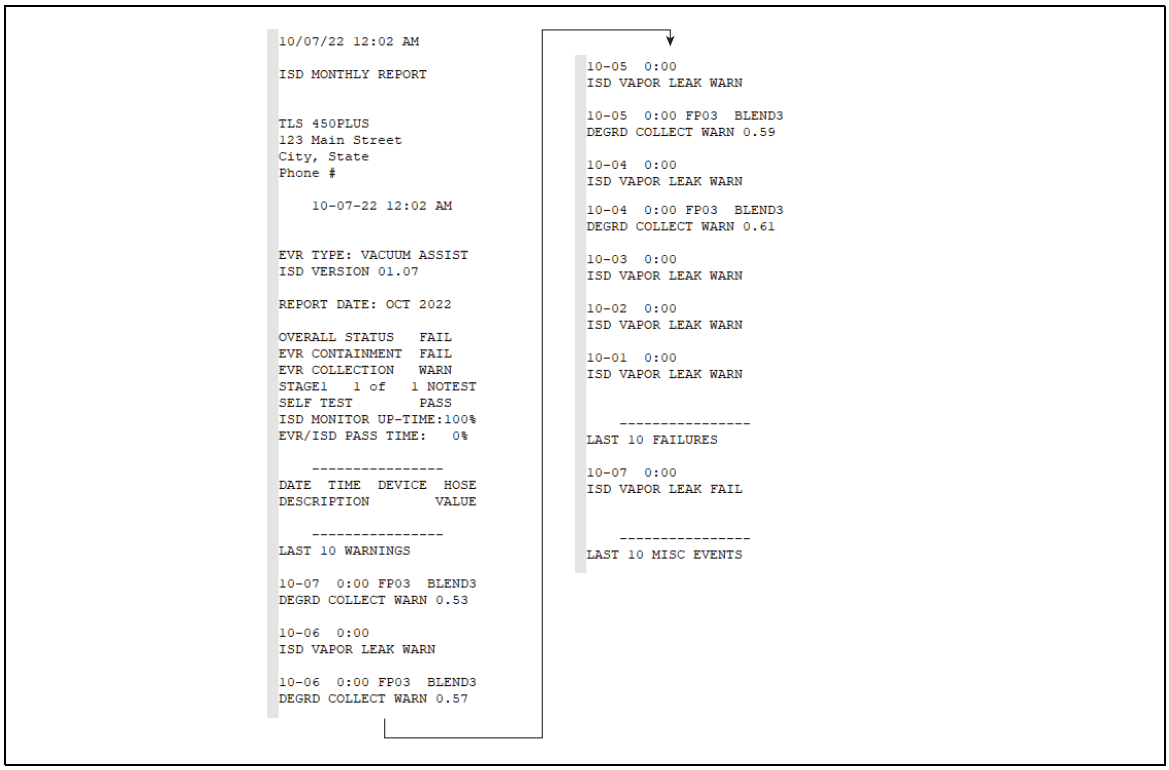
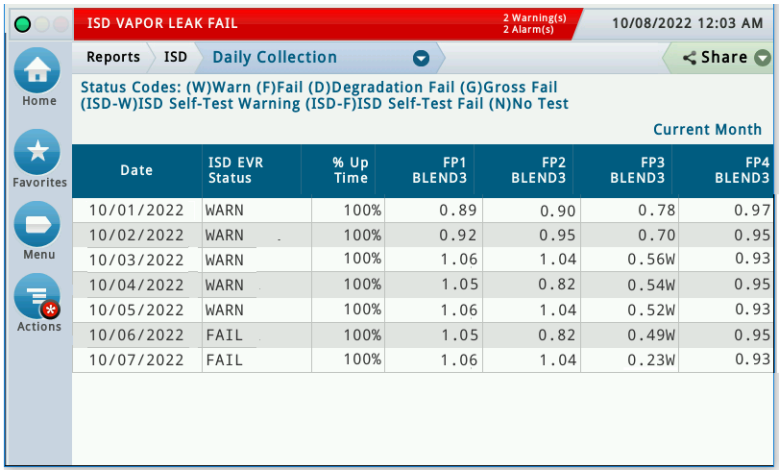


Figure 77. Example CARB Monthly Report Printout

VIEWING AND PRINTING DAILY COLLECTION REPORT

On the TLS-450PLUS screen, touch Menu>Reports>ISD>Daily Collection (see Figure 73 and Figure 78).

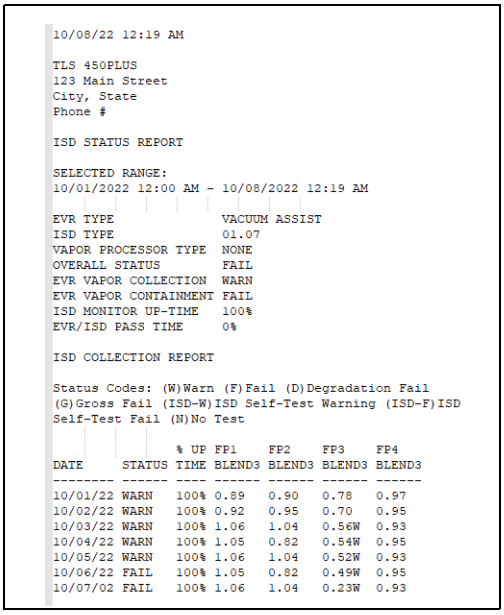
Touch the **Actions** button to select a Period/Range then touch the **Check** button to accept the Period/Range and view the report.



Date	ISD EVR Status	% Up Time	FP1 BLEND3	FP2 BLEND3	FP3 BLEND3	FP4 BLEND3
10/01/2022	WARN	100%	0.89	0.90	0.78	0.97
10/02/2022	WARN	100%	0.92	0.95	0.70	0.95
10/03/2022	WARN	100%	1.06	1.04	0.56W	0.93
10/04/2022	WARN	100%	1.05	0.82	0.54W	0.95
10/05/2022	WARN	100%	1.06	1.04	0.52W	0.93
10/06/2022	FAIL	100%	1.05	0.82	0.49W	0.95
10/07/2022	FAIL	100%	1.06	1.04	0.23W	0.93

Figure 78. Example Daily Collection Report

Touch the **Share** button down arrow and touch **Print** to print out the report on the console printer (see Figure 79).



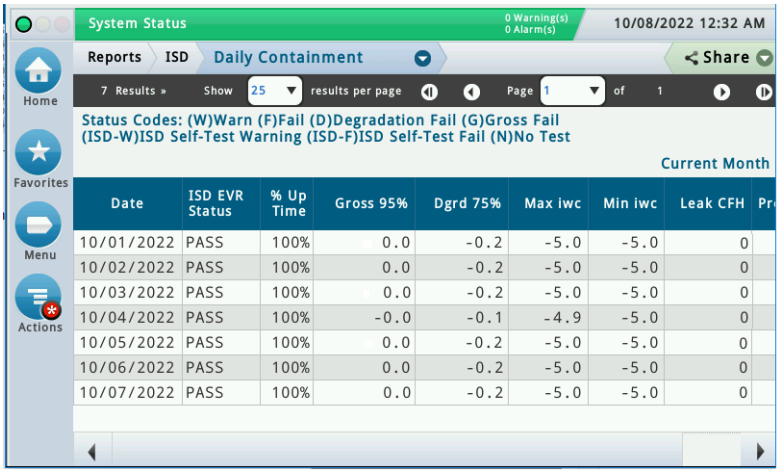
```
10/08/22 12:19 AM

TLS 450PLUS
123 Main Street
City, State
Phone #

ISD STATUS REPORT

SELECTED RANGE:
10/01/2022 12:00 AM - 10/08/2022 12:19 AM

EVR TYPE               VACUUM ASSIST
ISD TYPE               01.07
VAPOR PROCESSOR TYPE   NONE
OVERALL STATUS         FAIL
EVR VAPOR COLLECTION   WARN
EVR VAPOR CONTAINMENT  FAIL
ISD MONITOR UP-TIME    100%
EVR/ISD PASS TIME      0%

ISD COLLECTION REPORT

Status Codes: (W)Warn (F)Fail (D)Degradation Fail
(G)Gross Fail (ISD-W)ISD Self-Test Warning (ISD-F)ISD
Self-Test Fail (N)No Test

                 % UP FP1    FP2    FP3    FP4
DATE     STATUS  TIME BLEND3 BLEND3 BLEND3 BLEND3
-------- ------  ---- ------ ------ ------ ------
10/01/22 WARN    100% 0.89   0.90   0.78   0.97
10/02/22 WARN    100% 0.92   0.95   0.70   0.95
10/03/22 WARN    100% 1.06   1.04   0.56W  0.93
10/04/22 WARN    100% 1.05   0.82   0.54W  0.95
10/05/22 WARN    100% 1.06   1.04   0.52W  0.93
10/06/22 FAIL    100% 1.05   0.82   0.49W  0.95
10/07/02 FAIL    100% 1.06   1.04   0.23W  0.93
```

Figure 79. Example Daily Collection Report Printout

VIEWING AND PRINTING DAILY CONTAINMENT REPORT

On the TLS-450PLUS screen, touch Menu>Reports>ISD>Daily Containment (see Figure 73 and Figure 80).

Touch the **Actions** button to select a Period/Range then touch the **Check** button to accept the Period/Range and view the report.



Date	ISD EVR Status	% Up Time	Gross 95%	Dgrd 75%	Max iwc	Min iwc	Leak CFH
10/01/2022	PASS	100%	0.0	-0.2	-5.0	-5.0	0
10/02/2022	PASS	100%	0.0	-0.2	-5.0	-5.0	0
10/03/2022	PASS	100%	0.0	-0.2	-5.0	-5.0	0
10/04/2022	PASS	100%	-0.0	-0.1	-4.9	-5.0	0
10/05/2022	PASS	100%	0.0	-0.2	-5.0	-5.0	0
10/06/2022	PASS	100%	0.0	-0.2	-5.0	-5.0	0
10/07/2022	PASS	100%	0.0	-0.2	-5.0	-5.0	0

Figure 80. Example Daily Containment Report

Touch the **Share** button down arrow and touch **Print** to print out the report on the console printer (see Figure 81).

```
10/08/22 12:52 AM

TLS 450PLUS
123 Main Street
City, State
Phone #

ISD STATUS REPORT

SELECTED RANGE:
10/01/2022 12:00 AM - 10/08/2022 12:52 AM

EVR TYPE                VACUUM ASSIST
ISD TYPE                01.07
VAPOR PROCESSOR TYPE    NONE
OVERALL STATUS          PASS
EVR VAPOR COLLECTION    PASS
EVR VAPOR CONTAINMENT   PASS
ISD MONITOR UP-TIME     100%
EVR/ISD PASS TIME       100%

ISD CONTAINMENT REPORT

Status Codes: (W)Warn (F)Fail (D)Degradation Fail
(G)Gross Fail (ISD-W)ISD Self-Test Warning (ISD-F)ISD
Self-Test Fail (N)No Test

                    ISD
            ISD EVR %UP  GROSS  DGRD  MAX  MIN LEAK VAPOR
DATE        STATUS  TIME   95%   75%  "WC  "WC  CFH PRCSR
10/01/2022 PASS     100%  0.0  -0.2  -5.0 -5.0    0
10/02/2022 PASS     100%  0.0  -0.2  -5.0 -5.0    0
10/03/2022 PASS     100%  0.0  -0.2  -5.0 -5.0    0
10/04/2022 PASS     100% -0.0  -0.1  -4.9 -5.0    0
10/05/2022 PASS     100%  0.0  -0.2  -5.0 -5.0    0
10/06/2022 PASS     100%  0.0  -0.2  -5.0 -5.0    0
10/07/2022 PASS     100%  0.0  -0.2  -5.0 -5.0    0
```

Figure 81. Example Daily Containment Report Printout

VIEWING AND PRINTING STATUS EVENTS (MONTHLY) REPORT

On the TLS-450PLUS screen, touch Menu>Reports>ISD>Status Events (Monthly) (see Figure 73 and Figure 82).

Touch the **Actions** button to select a Period/Range then touch the **Check** button to accept the Period/Range and view the report. Scroll down to view the complete report.

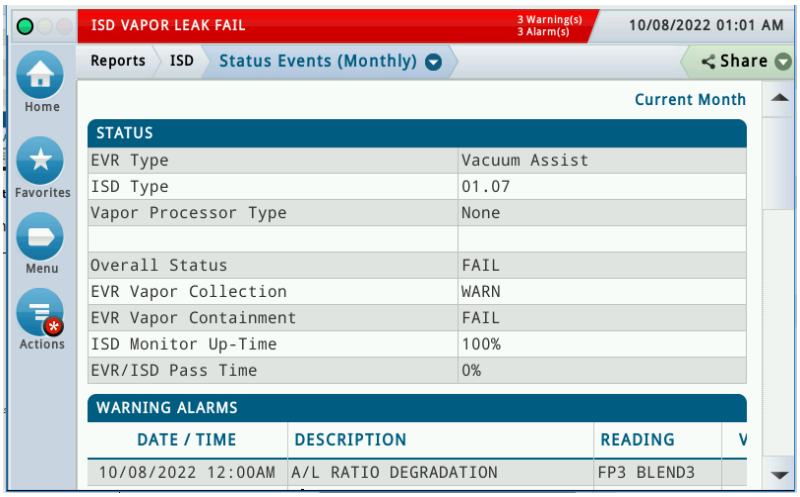


Figure 82. Example Status Events (Monthly) Report

Touch the **Share** button down arrow and touch **Print** to print out the report on the console printer (see Figure 83).

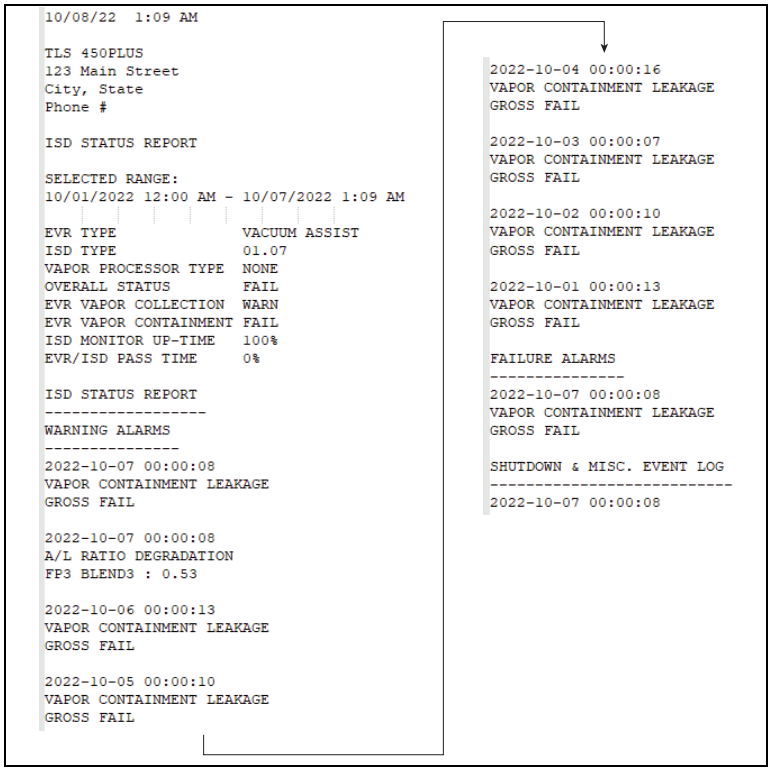


Figure 83. Example Status Events (Monthly) Report Printout

Viewing ISD Reports via RS-232 Connection

CONNECTING LAPTOP TO TLS-450PLUS

1. Connect your laptop to one of the TLS-450PLUS RS-232 Comm port using one of the methods shown in the in Figure 84 below.

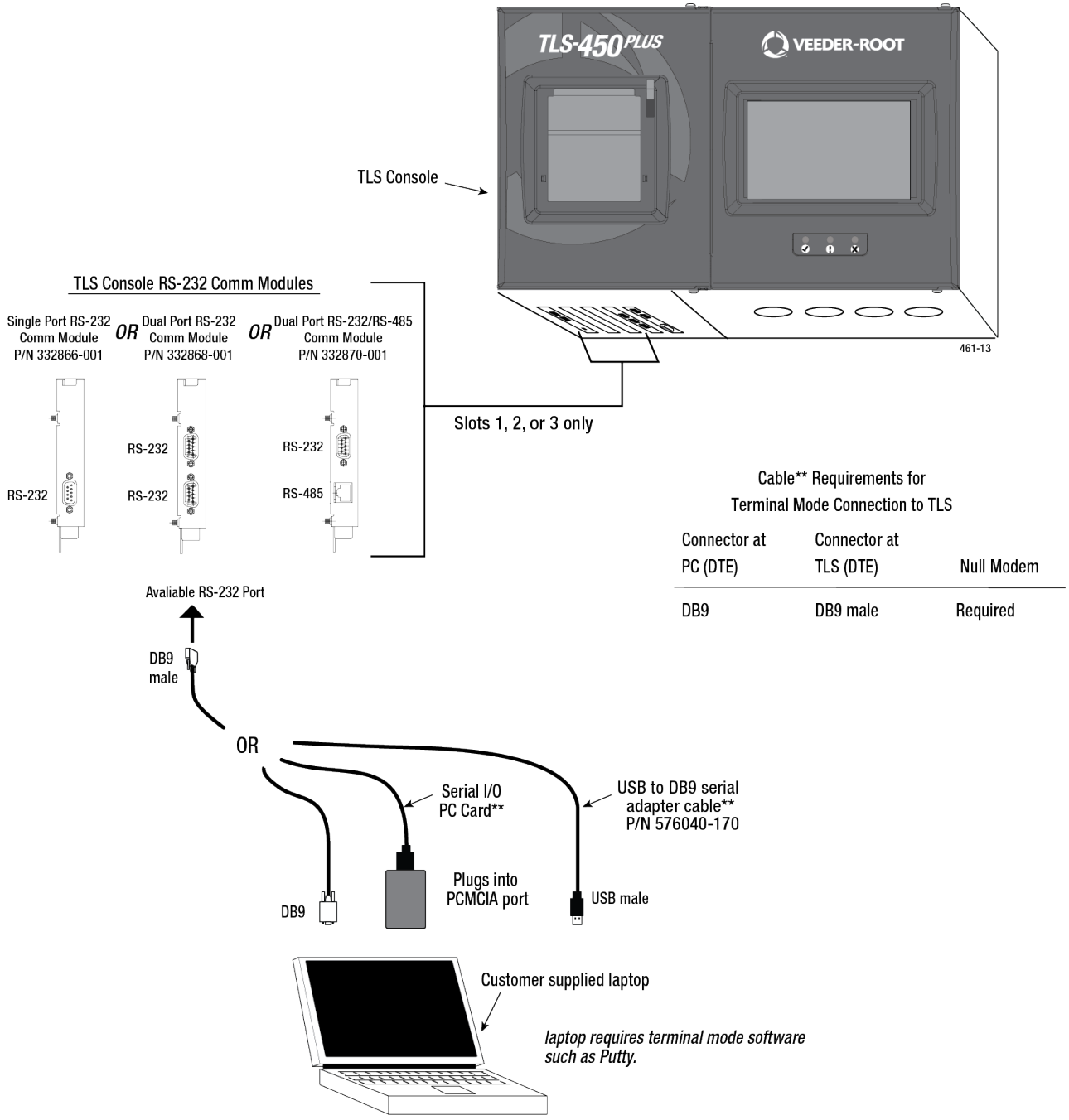


Figure 84. Connecting Laptop to TLS-450PLUS for Serial Communication

If using a USB to DB9 Serial adapter cable (P/N 576040-170), or equivalent, you will need to follow the instructions shipped with the adapter cable.

2. Select an available RS-232 Comm port on the TLS-450PLUS Comm cage (see Figure 85).

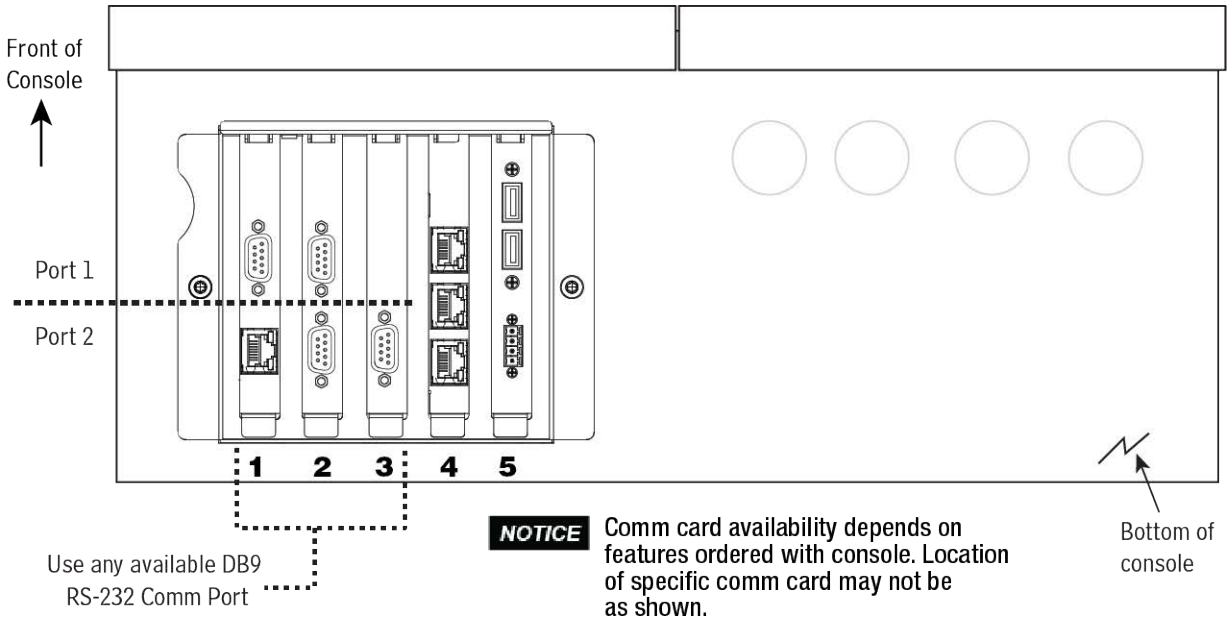


Figure 85. Connect Laptop to an Available RS-232 Comm Port

3. The TLS-450PLUS RS-232 connector pin outs are shown in Figure 86.

Pin	Signal	Pin	Signal
1	Data Carrier Detect	6	Data Set Ready
2	Received Data	7	Request to Send
3	Transmitted Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicator
5	Signal Ground		

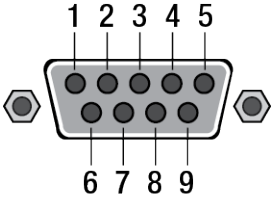


Figure 86. TLS-450PLUS RS-232 Connector Pin Outs

NOTICE **To avoid attaching your Comm cable to a non-configurable (NC) port, identify the configurable (C) RS-232 ports by referring to Table 8.**

Table 8. Selectable Comm Module Permissible Slots And Port Availability

Comm Module	Comm Type	Slot 1		Slot 2		Slot 3	
		Port		Port		Port	
		1	2	1	2	1	2
RS-232 Single Port	Serial	NC	C	NC	C	NC	C
RS-232 Dual Port		C	C	C	C	NC	C
RS-232/RS-485 Dual Port		C (RS-232)	C RS-485	C (RS-232)	C (RS-485)	NC	C (RS-485)

SETTING UP THE TLS-450PLUS SERIAL PORT FOR ISD REGULATOR ACCESS

1. On the TLS-450PLUS touch Menu>Setup>Communication>Serial Port. Use the required ISD dedicated Comm port, e.g., select serial port 3 (Figure 87).

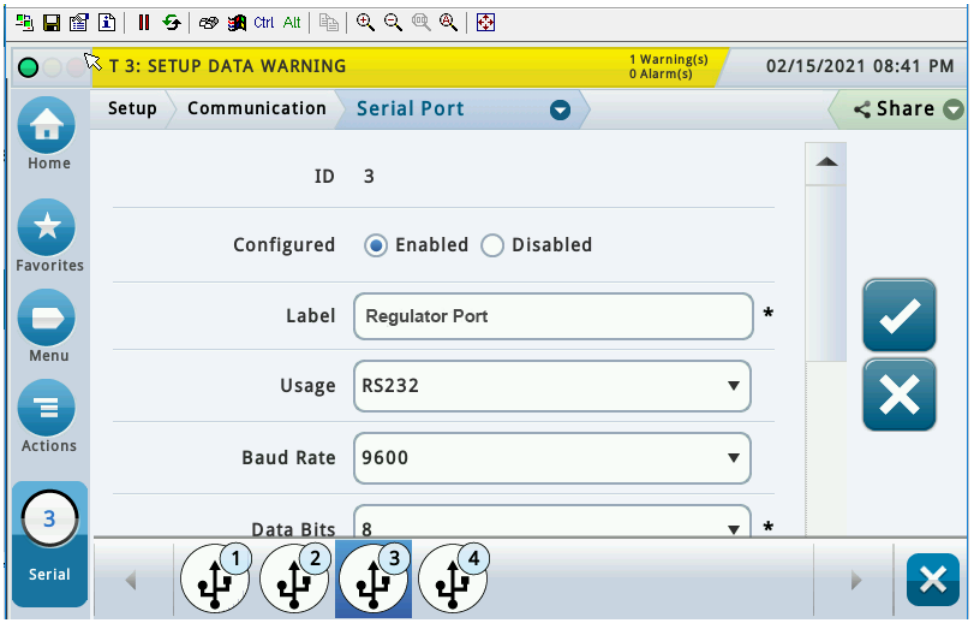


Figure 87. Example Serial Port Setup Screen

c. Verify that the Usage entry is RS-232 and copy the settings, especially Baud Rate, Data Bits, Parity and Stop Bits.

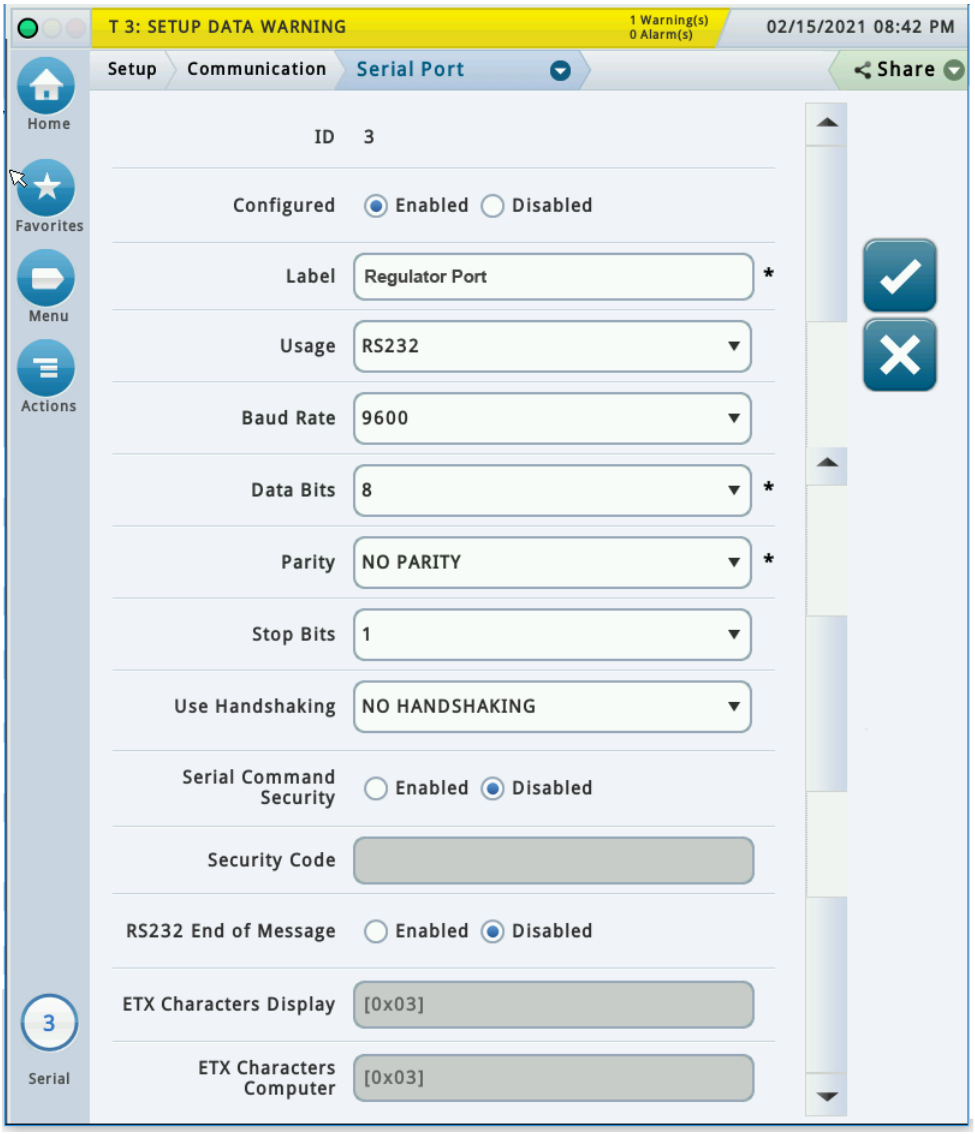


Figure 88. Example Serial Port 3 Setup Screen

SETTING UP COMMUNICATION BETWEEN LAPTOP AND TLS-450PLUS

1. There are many free, open source, terminal emulator, serial console, and network file transfer applications that work with Windows computers. PuTTy is such a program it can be downloaded using the link below:

   https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html

2. Determine which laptop COM port you will use to connect to the TLS-450PLUS.

   a. Right click Start and then click Device Manager.

   b. In the Device Manager screen click the expand arrow (>) next to **Ports (COM & LPT)**.

   If Ports (COM & LPT) is not showing in 'Device Manager', look for unknown devices or a yellow exclamation point (see Figure 89).

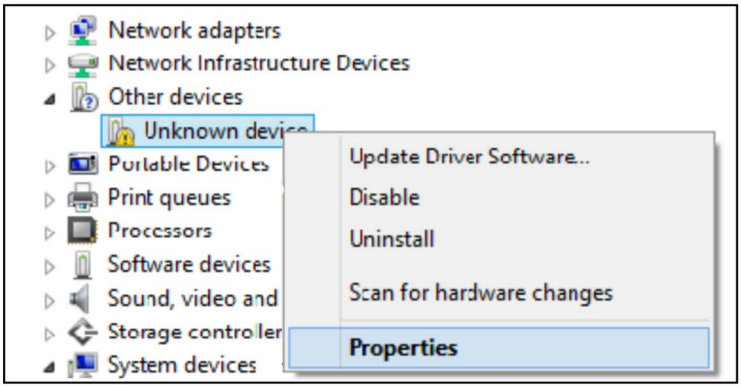


Figure 89. Laptop Device Manager

- Right click choose uninstall this device.
- Scan for new devices.
- If the yellow exclamation point reappears install the manufacturer's driver for the device.
- If there are no unknown devices and the port is a USB device unplug and plug the device back in.
- If no change try another port if available.
- If still no change reboot the machine.

   c. Open your preferred terminal program. be sure to select the correct serial port and set the proper baud rate data bits stop bits and parity.

   d. Open a new session with the correct settings.

e. After clicking the **Ope**n button, the terminal window opens in which you enter desired commands (see Figure 90).

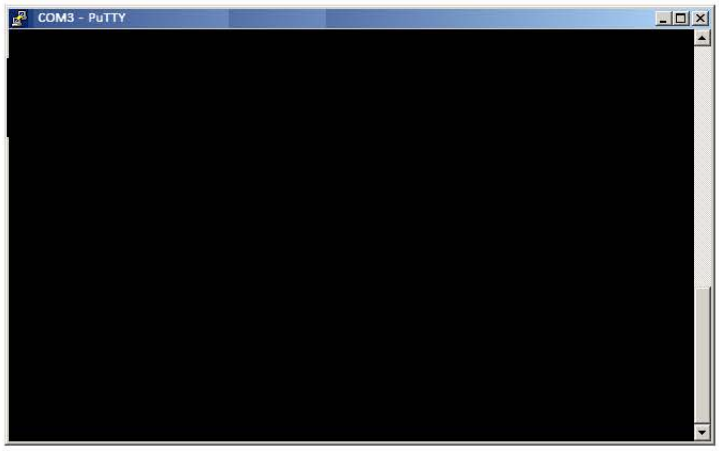


Figure 90. PuTTY Terminal Window

SENDING CONSOLE COMMANDS

Table 9 shows four important ISD console commands: IV0500, IV0200, IV0100, and IB6100. The <SOH> shown in the table means that you must press and hold the **Ctrl** key while you press the **A** key.

For example, you want to see the Daily Report Details for the last 10 days.

NOTICE **If you want to see the characters of the command as you type them in, look for a setting in your terminal emulator 'Echo typed characters locally', and set it active.**

If the RS-232 Security Code is disabled - press and hold the Ctrl key while you press the A key, then type in IV0500010. If the RS-232 Security Code is enabled (e.g., 000016) you must enter the security code before the command - press and hold the Ctrl key while you press the A key, then type in 000016IV0500010.

If you have local echo enabled you will see the typed command on the screen: ☺IV0500010 followed by the response (report) from the console. The ☺ symbol indicates CrtlA and the ♥ symbol indicates the end of the response.

If the console recognizes the command the response displays as soon as the command is typed in.

If the console does not recognize the command you would see something like ☺IV0500010☺9999FF1B which indicates the console did not recognize the command.

All responses (Reports) can be printed or saved to a file. See the terminal program's help file for instructions.

Table 9. Serial Commands for ISD Alarm, Monthly, and Daily Reports

Report Type	Serial Command (PC to Console)[1]
Daily Report Details (See example Figure 91)	<SOH>IV0500ddd Where ddd = number of days, 001 = yesterday and today, 002 = two days ago, etc.
Monthly Status Report (See example Figure 92)	<SOH>IV0200yyyymm Where yyyy = year number, e.g. 2003, mm = month number, 01 = January, 02 = February, etc.
Alarm Status (See example Figure 93)	<SOH>IV0100
Non-Priority Alarm History Report (See example Figure 94)	<SOH>I11100
Priority Alarm History Report (See example Figure 95)	<SOH>I11200

[1]<SOH> = Control A. For more information on TLS console serial commands, refer to the V-R Serial Interface Manual.

```
IV0500
MAR  1, 2004 12:20 AM

(SITE NAME)
(SITE STREET)
(CITY,ST)
(PHONE)
(MMM DD, YYYY HH:MM XM)

ISD DAILY REPORT DETAILS

EVR TYPE: VACUUM ASSIST
ISD TYPE: XX.XX
VAPOR PROCESSOR TYPE: NO VAPOR PROCESSOR

OVERALL STATUS             :FAIL            EVR VAPOR COLLECTION :FAIL
EVR VAPOR CONTAINMENT      :PASS
ISD MONITOR UP-TIME        :100%            STAGE I TRANSFERS: 39 of 39 PASS
EVR/ISD PASS TIME          : 85%

Status Codes: (W)Warn (F)Fail (D)Degradation Fail (G)Gross Fail
(ISD-W)ISD Self-Test Warning (ISD-F)ISD Self-Test Fail (N)No Test

       ISD   ISD  ---CONTAINMENT TESTS---     STAGE        ---COLLECTION TESTS
       EVR   %UP  GROSS  DGRD  MAX  MIN  LEAK   I   VAPOR  FP1   FP2   FP3
DATE  STATUS TIME  95%    75%  "WC  "WC  CFH   XFR  PRCSR  BLEND BLEND BLEND
02/10   PASS 100% -1.4N -3.1N -1.1 -5.0    0N PASS         1.09  1.10  1.11
02/11   PASS 100% -1.7N -3.5N  0.4 -5.0    0N PASS         1.05  1.14  1.06
02/12   PASS 100% -1.7N -3.4N -1.2 -5.0    0N              1.06  1.07  1.05
02/13   PASS 100% -1.8N -3.4N -1.0 -5.0    2N PASS         1.08  1.10  1.00
02/14   PASS 100% -1.6N -3.3N -0.3 -5.0    2N PASS         1.05  1.09  1.08
02/15   PASS 100% -1.5N -3.3N  1.3 -5.0    2  PASS         1.07  1.11  1.05
02/16   PASS 100% -1.2  -3.0N -0.3 -5.0    3  PASS         1.06  1.10  1.14
02/17   PASS 100% -1.2  -2.9N  0.0 -5.0    3  PASS         1.06N 1.10N 1.14
02/18   PASS 100% -1.0  -2.9N  1.0 -5.0    3  PASS         1.06N 1.10N 1.06
02/19   PASS 100% -0.9  -2.9N  1.6 -5.0    4  PASS         1.06N 1.10N 1.09
02/20   PASS 100% -0.6  -2.7N  2.9 -5.0    4  PASS         1.06N 1.10N 1.03
02/21   PASS 100% -0.6  -2.7N  1.1 -5.0    1  PASS         1.06N 1.10N 1.13
02/22   PASS 100%  0.1  -2.5N  3.1 -5.0    0  PASS         1.06N 1.10N 1.03
02/23   PASS 100%  0.1  -2.6N  0.9 -5.0    0  PASS         1.06N 1.10N 1.04
02/24   PASS 100%  0.2  -2.6N  0.9 -5.0    0  PASS         1.08  1.09  1.07
02/25   W    100%  0.8  -2.3N  2.8 -5.0    0  PASS         1.10  1.11  1.08
02/26   F    100%  1.1  -2.2N  5.0 -5.0    0  PASS         1.10  1.12  1.11
02/27   F    100%  1.0  -2.4N -0.8 -5.0    0  PASS         1.11  1.13  1.11
02/28   PASS 100%  1.0  -2.4N  0.3 -5.0    0  PASS         1.09  1.16  1.08
02/29   PASS 100%  0.9  -2.3N  1.6 -5.0    0  PASS         1.01  1.14  1.08N

---COLLECTION TESTS-DAILY AVERAGE HOSE A/L RATIO-----------------------------
      FP4   FP5   FP6   FP7   FP8   FP9   FP10  FP11  FP12
DATE  BLEND BLEND BLEND BLEND BLEND BLEND BLEND BLEND BLEND
02/10 1.12  1.03  0.97  1.04  1.07  1.05  1.09  1.08  1.06
02/11 1.09  1.04  1.04  0.98  1.03  1.06  1.06  1.14  1.07
02/12 1.10  1.09  1.04  1.04  1.06  1.09  1.10  1.03  1.04
02/13 1.06  1.11  1.04  1.07  1.09  1.08  1.09  1.13  1.08
02/14 1.05  1.07  1.05  1.07  1.02  1.07  1.08  1.13  1.06
02/15 1.07  1.04  1.04  0.94  1.09  1.05  1.08  1.13  1.07
02/16 1.09  1.08  1.06  1.05  1.10  1.06  1.13  1.03  1.04
02/17 1.08  1.05  1.05  1.06  1.08  1.13  1.10  1.10  1.07
02/18 1.08  1.06  1.05  1.03  1.08  1.00  1.09  1.05  1.09
02/19 1.09  1.11  1.04  1.01  1.08  1.06  1.08  1.06  1.05
02/20 1.07  1.07  1.05  1.05  1.10  1.12  1.10  1.11  1.07
02/21 1.08  1.10  1.06  1.00  1.07  1.13  1.16  1.09  1.09
02/22 1.08  1.04  1.09  1.05  1.09  1.06  1.10  1.11  1.10
02/23 1.06  1.17  1.09  1.06  1.12  1.09  1.14  1.12  1.08
02/24 1.10  1.12  1.08  0.98  1.08  1.11  1.15  1.11  1.02
02/25 1.10  BLKDW BLKDW 1.07  1.06  1.09  1.16  1.03  1.05
02/26 1.11  BLKDF BLKDF 1.05  1.10  1.11  1.10  1.08  1.05
02/27 1.12  BLKDF BLKDF 1.08  1.08  1.06  1.15  1.13  1.09
02/28 1.08  1.11  1.08  1.07  1.07  1.10  1.18  1.05  1.08
02/29 1.09  1.14  1.08  1.03  1.10  1.06  1.19  1.09  1.09
                                                    healyfig5-9.eps
```

Figure 91. ISD Daily Report Details - Serial to PC Format

```
IV0200
MAR  1, 2004 12:20 AM

(SITE NAME)
(SITE STREET)
(CITY,ST)
(PHONE)
(MMM DD, YYYY HH:MM XM)

ISD MONTHLY STATUS REPORT

EVR TYPE: VACUUM ASSIST
ISD TYPE: XX.XX
VAPOR PROCESSOR TYPE: NO VAPOR PROCESSOR

OVERALL STATUS             :FAIL            EVR VAPOR COLLECTION :FAIL
EVR VAPOR CONTAINMENT      :PASS
ISD MONITOR UP-TIME        :100%            STAGE I TRANSFERS: 39 of 39 PASS
EVR/ISD PASS TIME          : 85%

CARB EVR CERTIFIED OPERATING REQUIREMENTS
                                                    MIN      MAX
VAPOR COLLECTION ASSIST SYSTEM A/L RANGE          0.95     1.15

ISD MONITORING TEST PASS/FAIL THRESHOLDS
                                                      PERIOD    BELOW  ABOVE

VAPOR COLLECTION ASSIST SYSTEM A/L GROSS FAIL        1DAYS     0.33  1.90
VAPOR COLLECTION ASSIST SYSTEM A/L DEGRADATION FAIL  7DAYS     0.81  1.32

VAPOR CONTAINMENT GROSS FAIL, 95th PERCENTILE        7DAYS     ----  1.30"wcg
VAPOR CONTAINMENT DEGRADATION, 75th PERCENTILE      30DAYS     ----  0.30"wcg
VAPOR CONTAINMENT LEAK DETECTION FAIL @2"WCG         7DAYS     ----  8.50cfh
STAGE I VAPOR TRANSFER FAIL, 50th PERCENTILE        20MINS     ----  2.50"wcg


WARNING ALARMS
DATE     TIME     DESCRIPTION                     READING         VALUE
04-02-27 23:59:00 A/L RATIO DEGRADATION           FP 6 BLEND        0.80
04-02-27 23:59:00 A/L RATIO DEGRADATION           FP 5 BLEND        0.76
04-02-26 23:59:00 A/L RATIO DEGRADATION           FP 5 BLEND        0.79
04-02-25 23:59:00 A/L RATIO GROSS BLOCKAGE        FP 6 BLEND       BLKD
04-02-25 23:59:00 A/L RATIO GROSS BLOCKAGE        FP 5 BLEND       BLKD

FAILURE ALARMS
DATE     TIME     DESCRIPTION                     READING         VALUE
04-02-27 23:59:00 A/L RATIO GROSS BLOCKAGE        FP 6 BLEND       BLKD
04-02-27 23:59:00 A/L RATIO GROSS BLOCKAGE        FP 5 BLEND       BLKD
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE        FP 6 BLEND       BLKD
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE        FP 5 BLEND       BLKD

SHUTDOWN & MISCELLANEOUS EVENTS
DATE     TIME     DESCRIPTION                      ACTION/NAME
04-02-27 23:59:00 A/L RATIO GROSS BLOCKAGE       DISABLED FP 06 BLEND
04-02-27 23:59:00 A/L RATIO GROSS BLOCKAGE       DISABLED FP 05 BLEND
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE       DISABLED FP 06 BLEND
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE       DISABLED FP 05 BLEND
04-02-15 23:59:00 READINESS ISD:PP EVR:PP        ISD & EVR READY
04-02-14 23:59:00 READINESS ISD:PP EVR:PN        EVR READINESS PENDING
04-02-13 23:59:00 READINESS ISD:PP EVR:PN        EVR READINESS PENDING
04-02-12 23:59:00 READINESS ISD:PP EVR:PN        EVR READINESS PENDING
04-02-11 23:59:00 READINESS ISD:PP EVR:PN        EVR READINESS PENDING
04-02-10 23:59:00 READINESS ISD:PP EVR:PN        EVR READINESS PENDING
```

Figure 92. ISD Monthly Status Report - Serial to PC Format

```
IV0100
MAR  1, 2004 12:05 AM

(SITE NAME)
(SITE STREET)
(CITY,ST)
(PHONE)
(MMM DD, YYYY HH:MM XM)

ISD ALARM STATUS REPORT

EVR TYPE: VACUUM ASSIST
ISD TYPE: XX.XX
VAPOR PROCESSOR TYPE: NO VAPOR PROCESSOR

OVERALL STATUS             :PASS            EVR VAPOR COLLECTION :PASS
EVR VAPOR CONTAINMENT      :PASS
ISD MONITOR UP-TIME        :100%            STAGE I TRANSFERS:  2 of  2 PASS
EVR/ISD PASS TIME          :100%

WARNING ALARMS
DATE     TIME     DESCRIPTION                    READING         VALUE
04-02-27 23:59:01 A/L RATIO DEGRADATION          FP 6 BLEND        0.80
04-02-27 23:59:01 A/L RATIO DEGRADATION          FP 5 BLEND        0.76
04-02-26 23:59:00 A/L RATIO DEGRADATION          FP 5 BLEND        0.79
04-02-25 23:59:01 A/L RATIO GROSS BLOCKAGE       FP 6 BLEND       BLKD
04-02-25 23:59:01 A/L RATIO GROSS BLOCKAGE       FP 5 BLEND       BLKD

FAILURE ALARMS
DATE     TIME     DESCRIPTION                    READING         VALUE
04-02-27 23:59:01 A/L RATIO GROSS BLOCKAGE       FP 6 BLEND       BLKD
04-02-27 23:59:01 A/L RATIO GROSS BLOCKAGE       FP 5 BLEND       BLKD
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE       FP 6 BLEND       BLKD
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE       FP 5 BLEND       BLKD

SHUTDOWN & MISCELLANEOUS EVENTS
DATE     TIME     DESCRIPTION                    ACTION/NAME
04-02-27 23:59:01 A/L RATIO GROSS BLOCKAGE      DISABLED FP 06 BLEND
04-02-27 23:59:01 A/L RATIO GROSS BLOCKAGE      DISABLED FP 05 BLEND
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE      DISABLED FP 06 BLEND
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE      DISABLED FP 05 BLEND
04-02-15 23:59:00 READINESS ISD:PP EVR:PP       ISD & EVR READY
04-02-14 23:59:00 READINESS ISD:PP EVR:PN       EVR READINESS PENDING
04-02-13 23:59:00 READINESS ISD:PP EVR:PN       EVR READINESS PENDING
04-02-12 23:59:00 READINESS ISD:PP EVR:PN       EVR READINESS PENDING
04-02-11 23:59:00 READINESS ISD:PP EVR:PN       EVR READINESS PENDING
04-02-10 23:59:00 READINESS ISD:PP EVR:PN       EVR READINESS PENDING
```

Figure 93. ISD Alarm Status Report - Serial to PC Format

Figure 94 shows an example Non-Priority Alarm History Report.

```
I11200
DEC  9, 2010  4:20 AM

<Site Name>
<Site Address>
<Site Address>
<Site Address>

NON-PRIORITY ALARM HISTORY
ID  CATEGORY  DESCRIPTION          ALARM TYPE           STATE    DATE    TIME
T 3 TANK      DIESEL               LOW TEMP WARNING     CLEAR  12-08-10  3:00PM
T 3 TANK      DIESEL               LOW TEMP WARNING     ALARM  12-08-10  3:00PM
T 3 TANK      DIESEL               HIGH PRODUCT ALARM   CLEAR  12-08-10  3:00PM
T 3 TANK      DIESEL               HIGH PRODUCT ALARM   ALARM  12-08-10  2:56PM
    SYSTEM                         PRINTER ERROR        CLEAR  11-17-10 10:51AM
    SYSTEM                         PAPER OUT            CLEAR  11-17-10 10:51AM
    SYSTEM                         PAPER OUT            ALARM  11-17-10 10:50AM
    SYSTEM                         PRINTER ERROR        ALARM  11-17-10 10:50AM
```

Figure 94. Non-Priority Alarm History Report - Serial to PC Format

Figure 95 shows an example Priority Alarm History Report.

```
I11100
DEC  9, 2010  4:20 AM

<Site Name>
<Site Address>
<Site Address>
<Site Address>

PRIORITY ALARM HISTORY
ID  CATEGORY  DESCRIPTION          ALARM TYPE           STATE    DATE    TIME
T 2 TANK      91 OCTANE            PROBE OUT            CLEAR  12-08-10  7:55PM
T 2 TANK      91 OCTANE            PROBE OUT            ALARM  12-08-10  7:07PM
T 2 TANK      91 OCTANE            OVERFILL ALARM       CLEAR  11-17-10 11:46AM
T 2 TANK      91 OCTANE            OVERFILL ALARM       ALARM  11-17-10 11:45AM
```

Figure 95. Priority Alarm History Report - Serial to PC Format

Appendix A: Site EVR/ISD Equipment Location Worksheet

You should create a table listing each hose, fueling point, Air Flow Meter's serial number, etc.. This information will be required when you perform the EVR/ISD Setup hose/meter dispenses. This appendix contains blank worksheets for sites with single- and multi-hose dispensers. You are advised to fill in all of the appropriate information about your installed equipment, complete the TLS console's Hose Settings setup, then perform the product meter ID dispensing setup procedure.

Single-Hose Fueling Position Dispensers

FILL OUT - USE TO SETUP HOSE TABLE					Assist Mode Check List			
					Product Dispense(s)[7]			
Hose ID[1]	FP[2]	Hose Label[3]	AFM ID[4] & AFM Serial Number[5]	AFM Label[6]	1st	2nd	3rd	4th
1		Blend		AFM FP__&__				
2		Blend						
3		Blend		AFM FP__&__				
4		Blend						
5		Blend		AFM FP__&__				
6		Blend						
7		Blend		AFM FP__&__				
8		Blend						
9		Blend		AFM FP__&__				
10		Blend						
11		Blend		AFM FP__&__				
12		Blend						
13		Blend		AFM FP__&__				
14		Blend						
15		Blend		AFM FP__&__				
16		Blend						

[1]Each hose must have a unique number (1 - 99).

[2]This is the Fuel Position Label which is the visible number on the outside of the dispenser (1 -2 digits).

[3]The hose label is always Blend for single-hose dispensers.

[4]The AFM ID number associated in Device Setup.

[5]This is the serial number on the Air Flow Meter (1 per dispenser).

[6]This is the AFM label entered in Device Setup (1 per dispenser and must be in the format shown, e.g., AFM FP1&2 - *where 1 and 2 refer to the one [or two] numbers on the outside of the dispenser*).

[7]After you have entered the contents of columns 1 - 5 enter as needed in Hose Settings setup, you now must follow Assist Mode Mapping procedure and dispense from each gas meter AND one blend grade that feeds each hose. Enter a check beneath each product following a dispense from the hose.

FILL OUT - USE TO SETUP HOSE TABLE					Assist Mode Check List			
					Product Dispense(s)			
Hose ID	FP	Hose Label	AFM ID & AFM Serial Number	AFM Label	1st	2nd	3rd	4th
17		Blend		AFM FP__&__				
18		Blend						
19		Blend		AFM FP__&__				
20		Blend						
21		Blend		AFM FP__&__				
22		Blend						
23		Blend		AFM FP__&__				
24		Blend						
25		Blend		AFM FP__&__				
26		Blend						
27		Blend		AFM FP__&__				
28		Blend						
29		Blend		AFM FP__&__				
30		Blend						
31		Blend		AFM FP__&__				
32		Blend						
33		Blend		AFM FP__&__				
34		Blend						
35		Blend		AFM FP__&__				
36		Blend						

FILL OUT - USE TO SETUP HOSE TABLE					Assist Mode Check List			
					Product Dispense(s)			
Hose ID	FP	Hose Label	AFM ID & AFM Serial Number	AFM Label	1st	2nd	3rd	4th
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						

Multi-Hose Fueling Position Dispensers

FILL OUT - USE TO SETUP HOSE TABLE					Assist Mode Check List
Hose ID[1]	**FP[2]**	**Hose Label[3]**	**AFM ID[4] & AFM Serial Number[5]**	**AFM Label[6]**	**Product Dispense[7]**
				AFM FP__&__	
				AFM FP__&__	

[1]Each hose must have a unique number (1 - 99).

[2]This is the Fuel Position Label which is the visible number on the outside of the dispenser (1 -2 digits).

[3]The hose label is the grade.

[4]The AFM ID number associated in Device Setup.

[5]This is the serial number on the Air Flow Meter (1 per dispenser).

[6]This is the AFM label entered in Device Setup (1 per dispenser and must be in the format shown, e.g., AFM FP1&2 - *where 1 and 2 refer to the one [or two] numbers on the outside of the dispenser*).

[7]After you have entered the contents of columns 1 - 5 enter as needed in Hose Settings setup, you now must follow Assist Mode Mapping procedure and dispense from each hose. Enter a check in this column following a dispense from the hose.

FILL OUT - USE TO SETUP HOSE TABLE					Assist Mode Check List
Hose ID	**FP**	**Hose Label**	**AFM ID & AFM Serial Number**	**AFM Label**	**Product Dispense**
				AFM FP__&__	
				AFM FP__&__	
				AFM FP__&__	

FILL OUT - USE TO SETUP HOSE TABLE					Assist Mode Check List
Hose ID	**FP**	**Hose Label**	**AFM ID & AFM Serial Number**	**AFM Label**	**Product Dispense**
				AFM FP__&__	
				AFM FP__&__	
				AFM FP__&__	

FILL OUT - USE TO SETUP HOSE TABLE					Assist Mode Check List
Hose ID	**FP**	**Hose Label**	**AFM ID & AFM Serial Number**	**AFM Label**	**Product Dispense**
				AFM FP__&__	
				AFM FP__&__	
				AFM FP__&__	

FILL OUT - USE TO SETUP HOSE TABLE					Assist Mode Check List
Hose ID	**FP**	**Hose Label**	**AFM ID & AFM Serial Number**	**AFM Label**	**Product Dispense**
				AFM FP__&__	
				AFM FP__&__	
				AFM FP__&__	

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