Pressure Management Control

TLS-450PLUS Consoles for Veeder-Root Polisher

Install, Setup, & Operation Manual

VEEDER-ROOT

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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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1. Contact Veeder-Root Customer Service at 800-873-3313 with the specific part numbers and quantities that were missing or received damaged.
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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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1. It is the customer's responsibility to file a claim with their carrier.
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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.

RETURN SHIPPING

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.**

PRESSURE MANAGEMENT CONTROL (PMC)

For components used in PMC systems (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 PMC 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 PMC components installed after the initial PMC 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.**

Figures

Tables

Introduction

This manual provides instructions to install, setup and operate the components of Veeder-Root Pressure Management Control (PMC) equipment. The PMC feature is an option for the TLS console platform, and as such, many of the installation/setup/operation instructions for non-PMC specific tasks are covered in the TLS-450PLUS supplied literature. Do not us the manual when PMC is installed with ISD. Use the TLS-450PLUS ISD & Operations Manual 577013-484 (Balance) or 55714-461 (Assist).

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 to be available for use by contractor or government inspectors.
   b. Universal Sensor Module (USM) is required to monitor 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.

- Vapor Pressure Sensor (one per site) - install as per Vapor Pressure Sensor installation manual shipped with sensor, setup following instructions in this manual.

- Veeder-Root Vapor Polisher or Healy CAS - If installing the Vapor Polisher, follow the instructions in the Vapor Polisher Installation and Maintenance Guide (P/N 577013-920), setup following instructions in this manual. The canister can only be installed in systems with a vapor recovery vent stack fitted with a UL Listed pressure/vacuum (P/V) valve that complies with California Air Resources Board (CARB) requirements.

- The total leak rates for P/V valves, shall be less than or equal to: 0.17 CFH at +2.0 inches H2O, 0.63 CFH at -4.0 inches H2O.

- If installing the Healy CAS, follow instructions in the accompanying manual(s). There is no TLS-450PLUS setup required for the Healy CAS.

Related Manuals

The manuals in Table 1 below are included for reference.

Table 1: Related Manuals/Drawings

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

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.

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.

⚠ WARNING

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

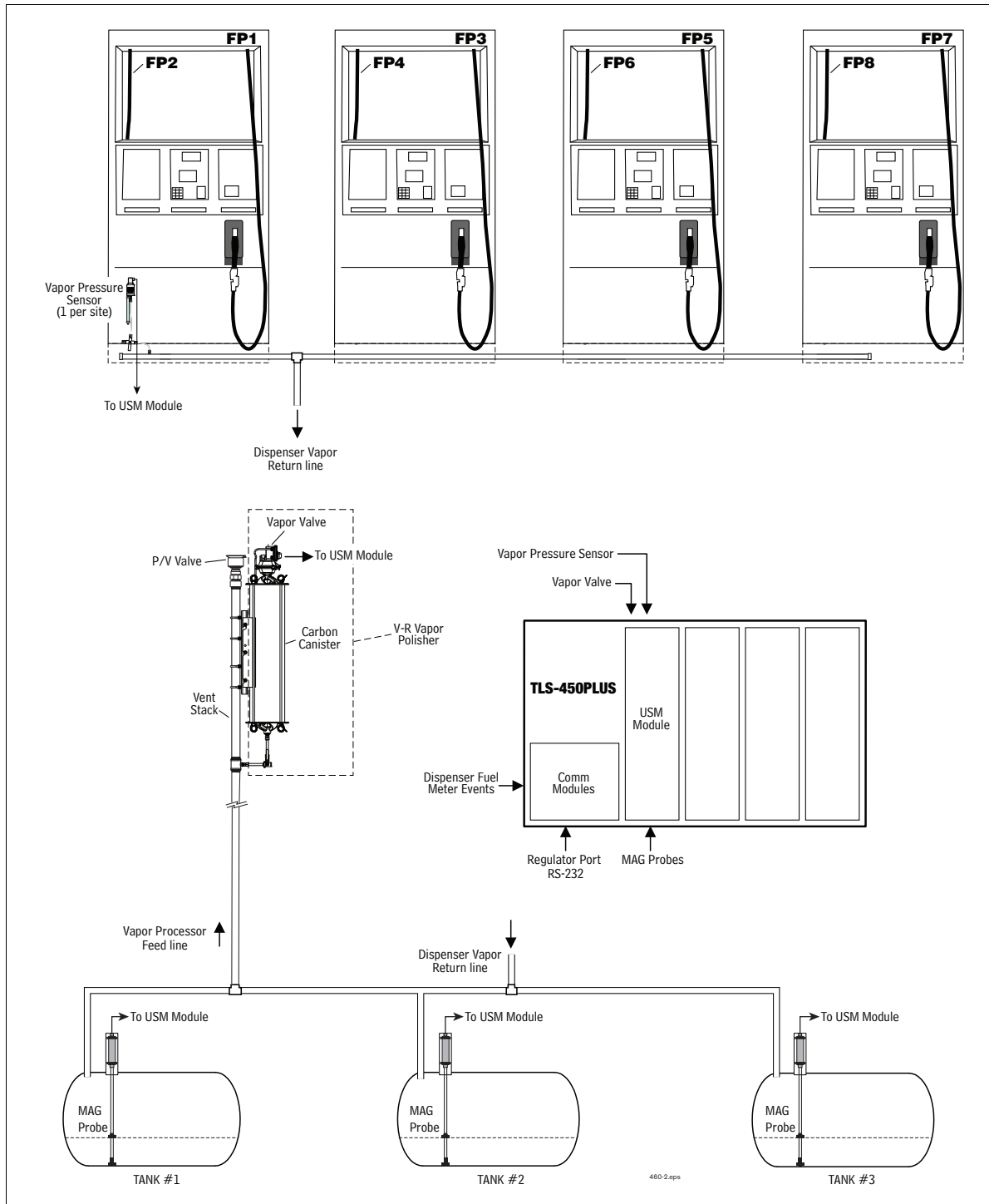Figure 1 shows an example site with a TLS-450PLUS controlled vapor processor.

Figure 1. Example Site Diagram - TLS Console Controlled V-R Vapor Processor (PMC only)

Setup

Introduction

This section describes how to program the TLS-450PLUS for PMC using the front panel graphical user interface (GUI). The procedures in this manual follow standard TLS-450PLUS console setup programming methods. All PMC-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 test results at assessment time, 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.**

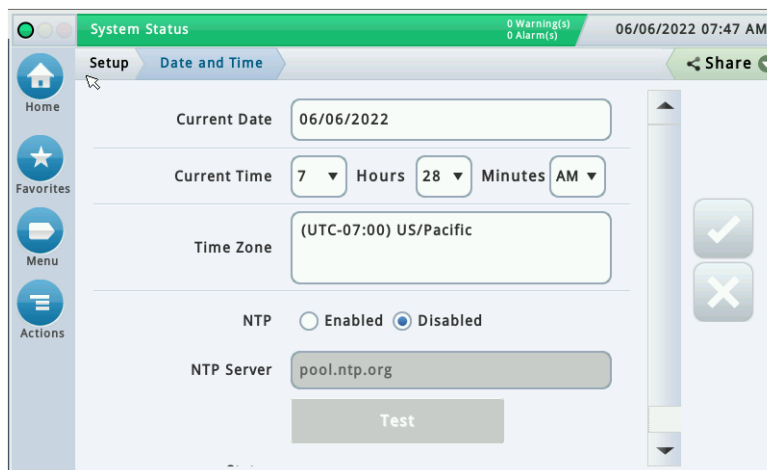1. Touch Menu>Setup>Date and Time (see Figure 2).

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 PMC devices that will be monitored by the TLS-450PLUS, i.e. Atmospheric Pressure Sensor, Vapor Pressure Sensor and Vapor Valve.

ATMOSPHERIC PRESSURE (ATM) SENSOR SETUP

The ATM Pressure Sensor is factory installed on the USM/ATM Module (P/N 0332818-006). At least one USM/ATM Module must be installed in the console. You must configure at least one USM/ATM Module for use by the Vapor Polisher or a PMC Setup Fail will occur. NOTE: if more than one ATM Pressure Sensor is installed, only one ATM Pressure Sensor needs to be configured.

1. Touch ATM Pressure Sensor in the Devices list (Figure 3) to display the ATM Sensor setup screen (Figure 4).

Figure 3. Accessing ATM Pressure Sensor Setup Screen

2. Touch the Address drop down box to select the address of a USM module ATM sensor. (The ATM on an USM module is located at address 17.). Touch the Label field to open the keypad and enter a name to identify the sensor (e.g., ATM Sensor). Touch the Enabled radio button to configure the ATM Sensor. Touch the check button ☑ to save your choice.

NOTICE **After saving, the Serial Number of this ATM is now visible.**
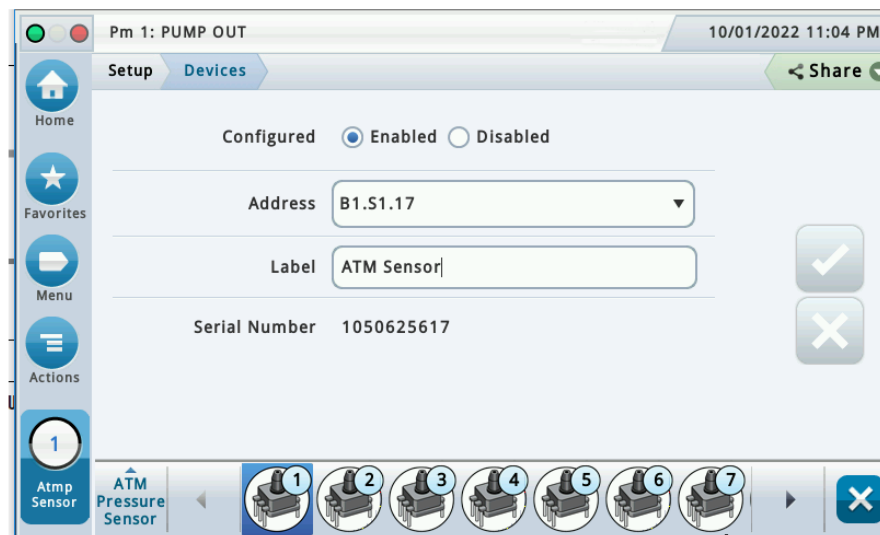
Figure 4. ATM Sensor Setup Screen

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 5) to open the VPS sensor setup screen (Figure 6).

Figure 5. Accessing Vapor Pressure Sensor Setup Screen

Figure 6. 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.

3. Notice after saving, the Vapor Pressure sensor serial number is now visible (see Figure 6).

VAPOR VALVE SETUP

1. Touch Vapor Valve in the Menu>Setup>Devices list (Figure 7) to open the Vapor Valve setup screen (Figure 8)
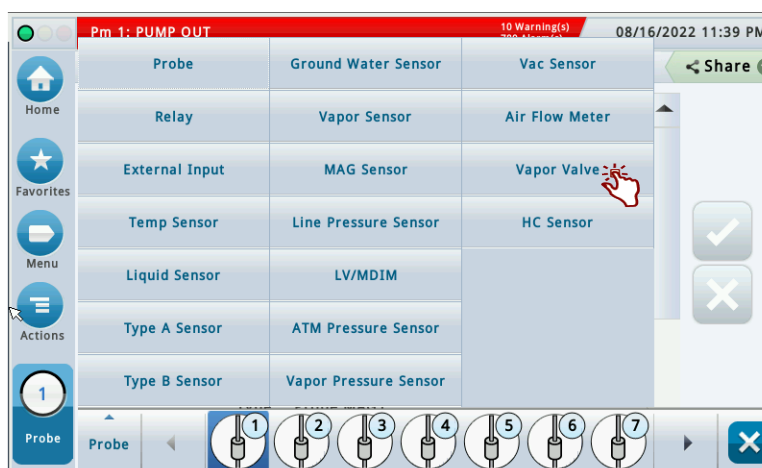
Figure 7. Accessing Vapor Valve Setup Screen

Figure 8. Example Vapor Valve Setup Screen

2. Touch the Address drop-down box and select the address of the Vapor Valve. Touch the Label field and enter the label text for the Vapor Valve on the keypad (e.g., Vapor Valve) then touch the green check button to accept the label. Touch the Enabled radio button to configure the Vapor Valve. Touch the check button ✔ to save your choices.

3. Notice after saving the Vapor Valve serial number is now visible (see Figure 9).
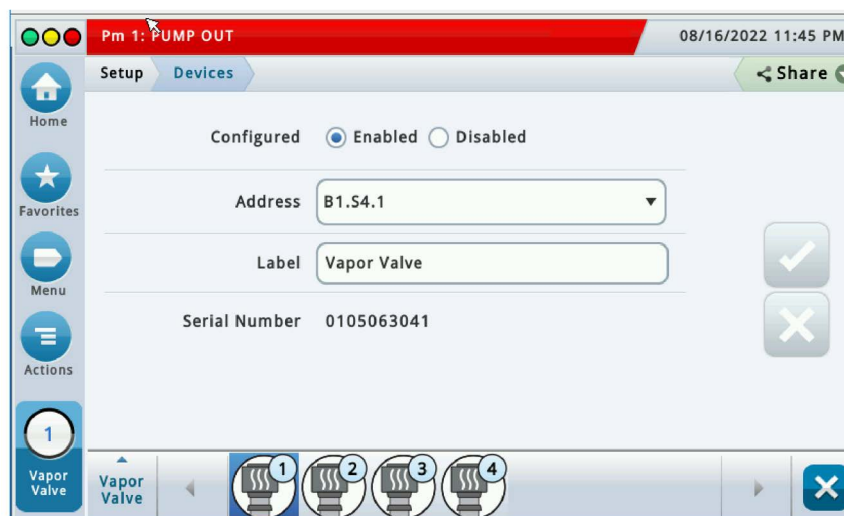
Figure 9. Example Vapor Valve Completed Setup Screen

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 set up procedure below.

VAPOR GENERAL SETUP

1. Go to Menu>Setup>Vapor General>General (Figure 10) to setup Assessment Time and Vapor Pressure Sensor selection (Figure 11).
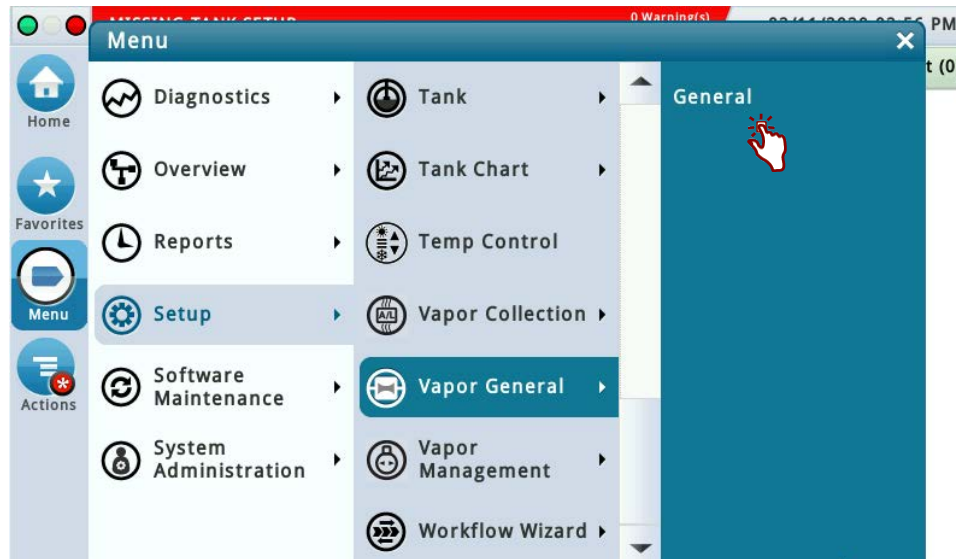
Figure 10. Accessing Vapor General: General Screen
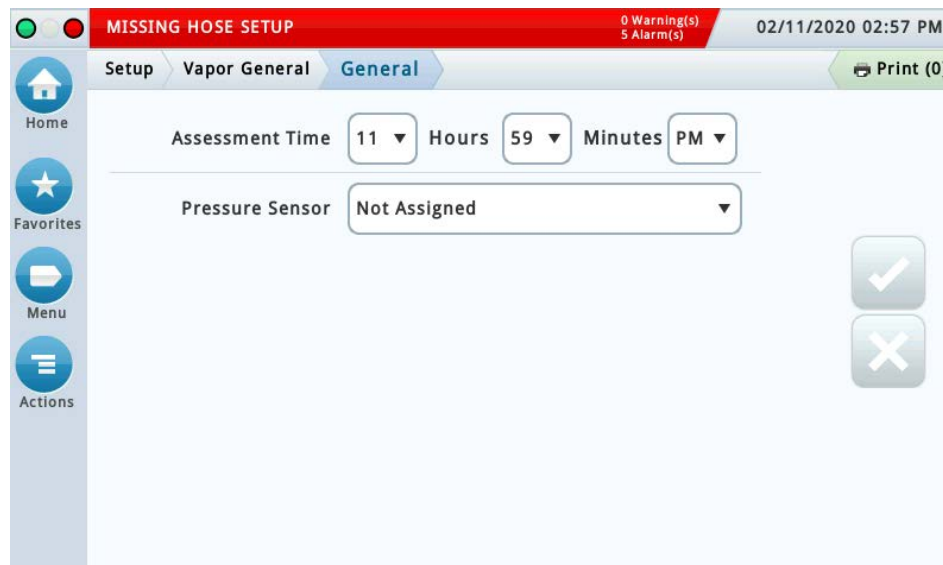
Figure 11. Vapor General: General Setup Screen

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 MANAGEMENT

Processor

1. Touch Setup>Vapor Management>Processor (see Figure 12).
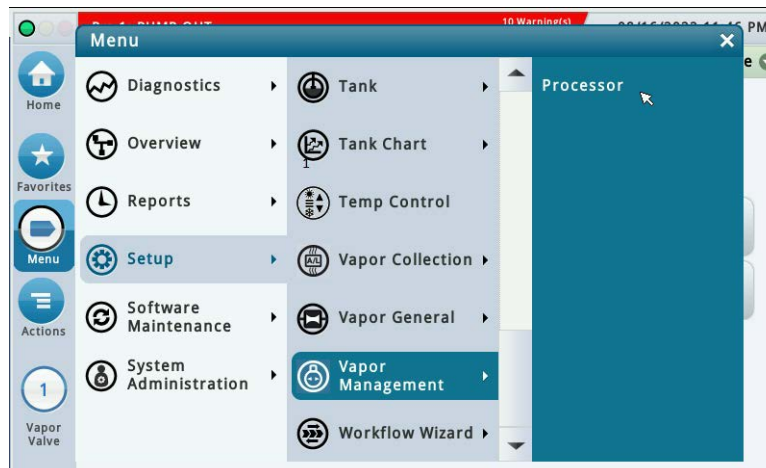
Figure 12. Vapor Management Setup Screen

2. Touch the Type drop-down box and select Veeder-Root Polisher (see Figure 13).
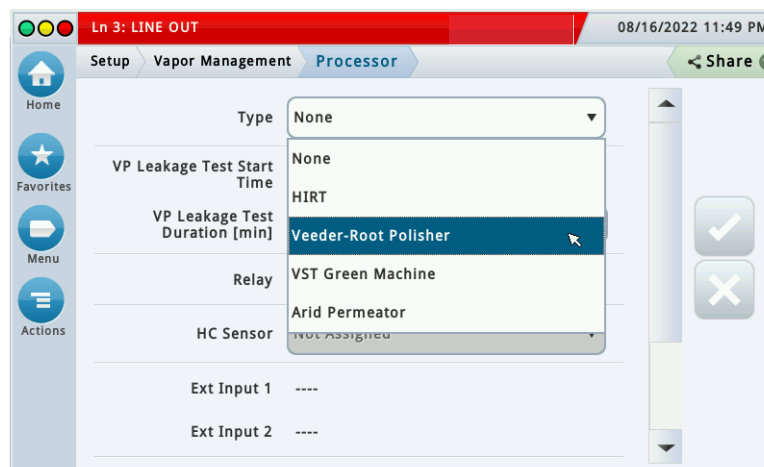
Figure 13. Vapor Management Processor Setup Screen - Page 1

3. Notice the Vapor Valve field self populates when there is a Vapor Valve configured (as in this example).

Figure 14. Vapor Management Processor Screen - Page 2

4. Touch the check button ✓ to save your processor choice.

SINGLE CARB PMC SETUP PRINTOUT

[GUI only; Not available in Web view]

For **CARB PMC** Setup, a single printout for the California Air Resources Board (CARB) can be generated.

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

The "CARB PMC" Printout:

1. Via **Menu > Setup > Generate Setup**, select the Setup Group option of "**CARB PMC**."

2. Touch the "**Generate**" button to create the printout (see Figure 15).
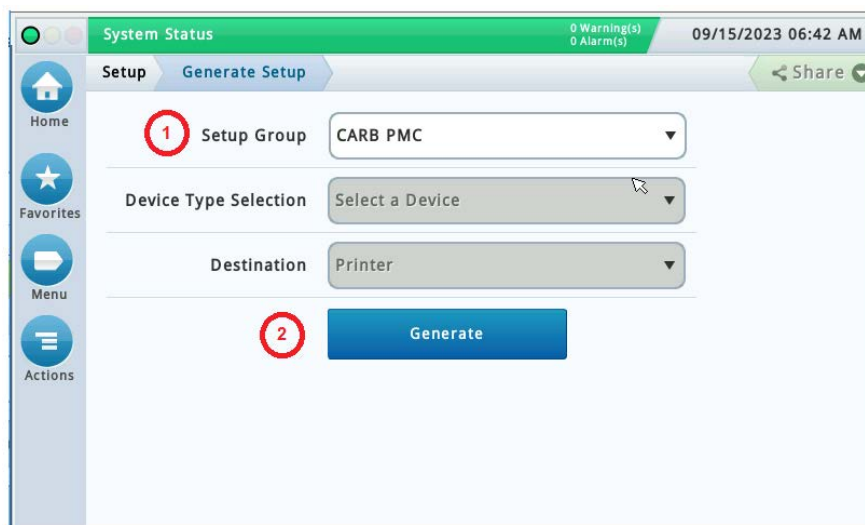
Example Printout

Figure 15. General Setup Screen with Example CARB PMC Printout

Diagnostics

PMC Device Diagnostic Screens

ATMOSPHERIC SENSOR OVERVIEW

1. Touch Menu>Diagnostics>Atmospheric Sensor>Overview to display the Atmospheric Sensor overview screen (see Figure 17).
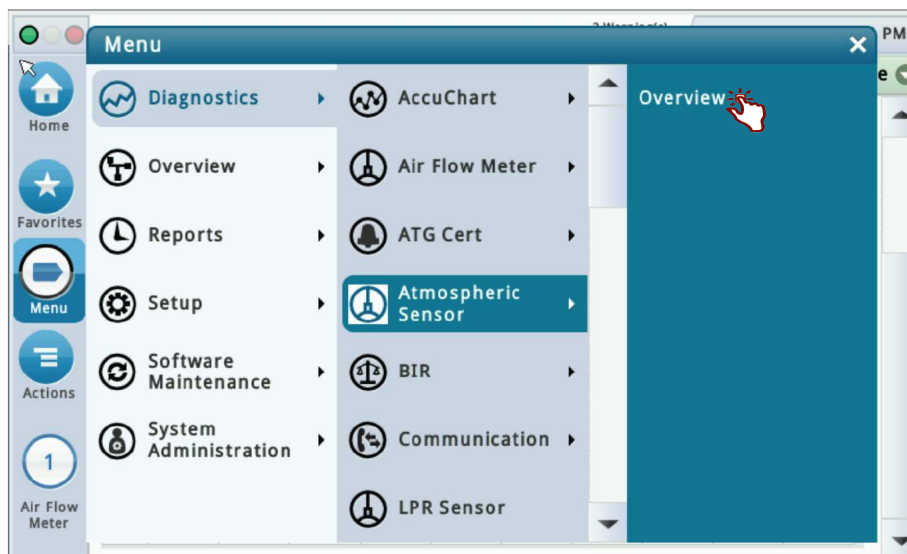
Figure 16. Accessing the Atmospheric Sensor Overview Screen
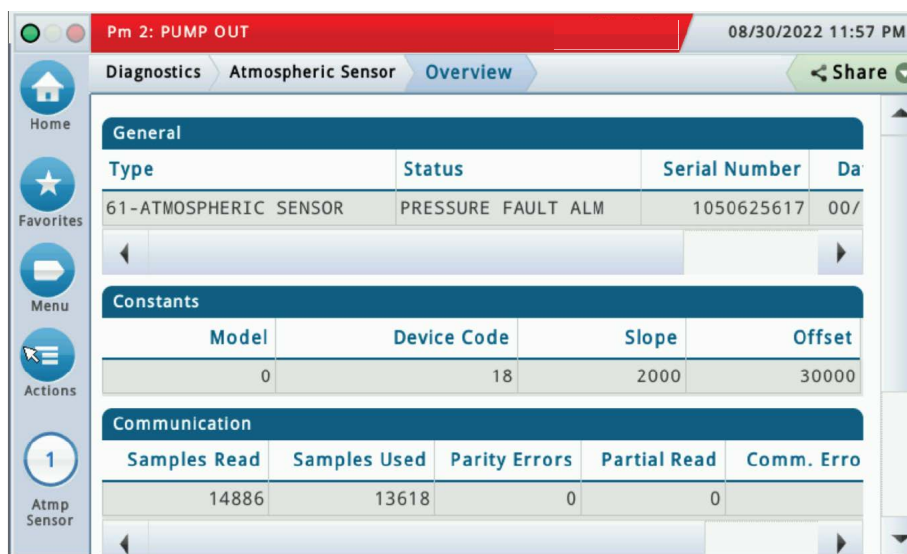
Figure 17. Atmospheric Sensor Overview Screen - Page 1

2. The four tables in this screen display status information for the selected Atmospheric Sensor. Touch the scroll down arrow to view the rest of the Atmospheric Sensor data tables (see Figure 18).

Figure 18. Atmospheric 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.

VAPOR PRESSURE SENSOR OVERVIEW

1. Touch Menu>Diagnostics>Vapor Pressure Sensor>Overview to display the Vapor Pressure Sensor Overview screen (see Figure 20).

Figure 19. Accessing the Vapor Pressure Sensor Overview Screen
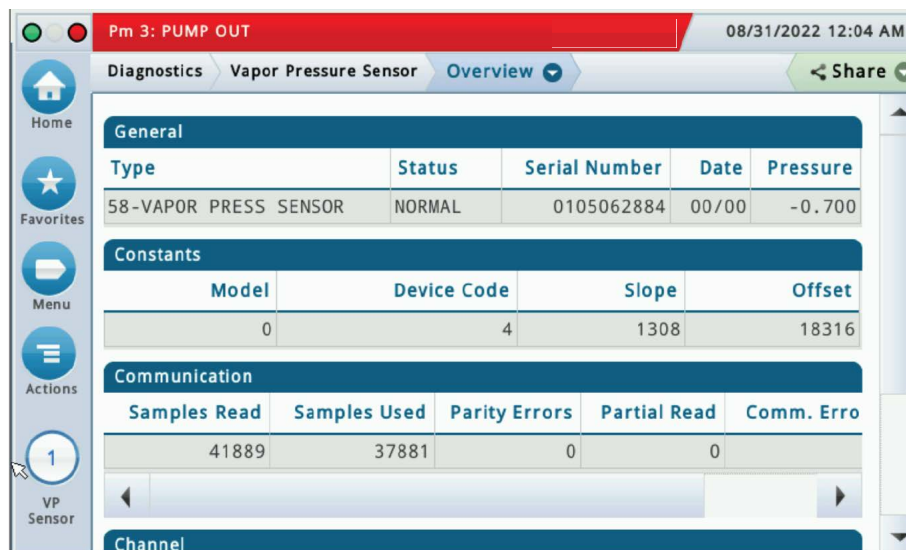
Figure 20. Vapor Pressure Sensor Overview Screen - Page 1

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 21).
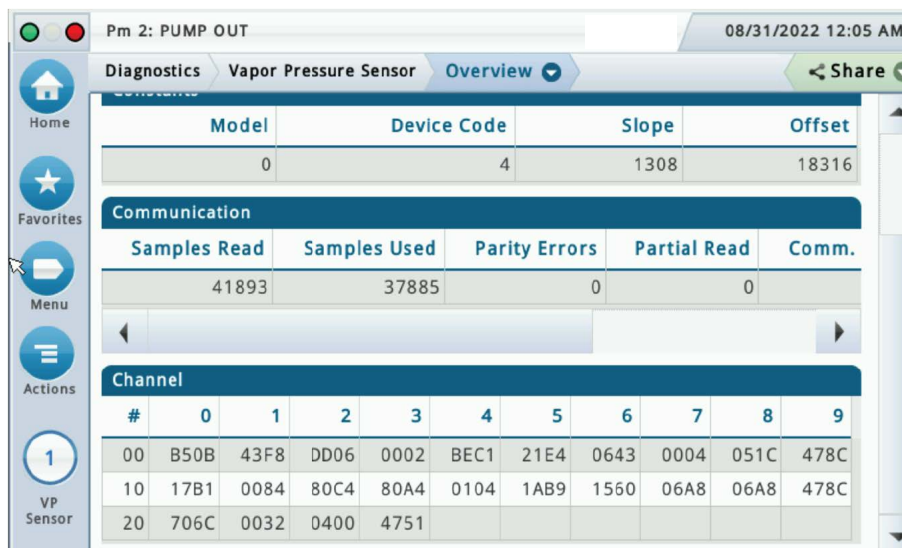
Figure 21. Vapor Pressure Sensor Overview Screen - Page 2

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

VAPOR VALVE OVERVIEW

1. Touch Menu>Diagnostics>Vapor Valve>Overview to display the Vapor Valve Overview screen (see Figure 23).
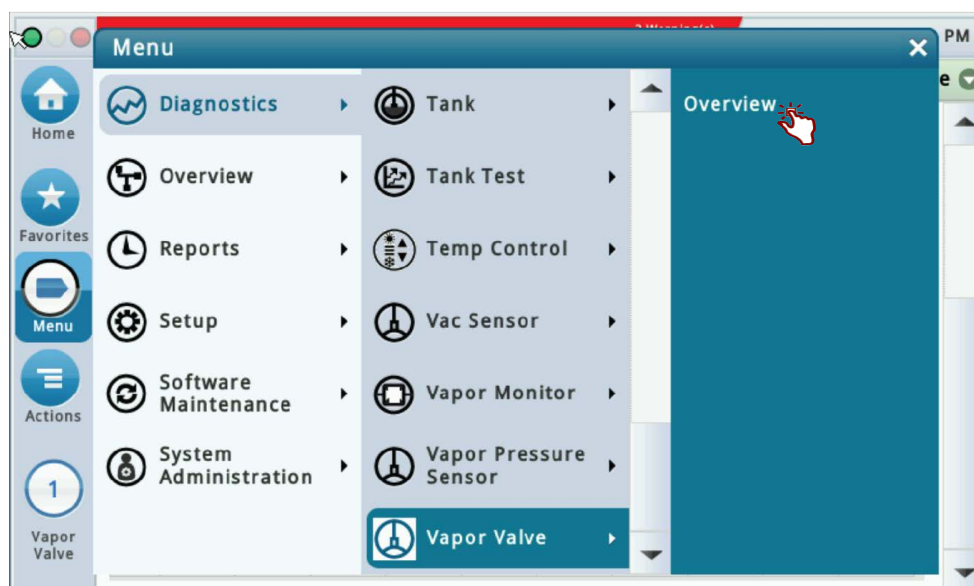
Figure 22. Accessing the Vapor Valve Overview Screen
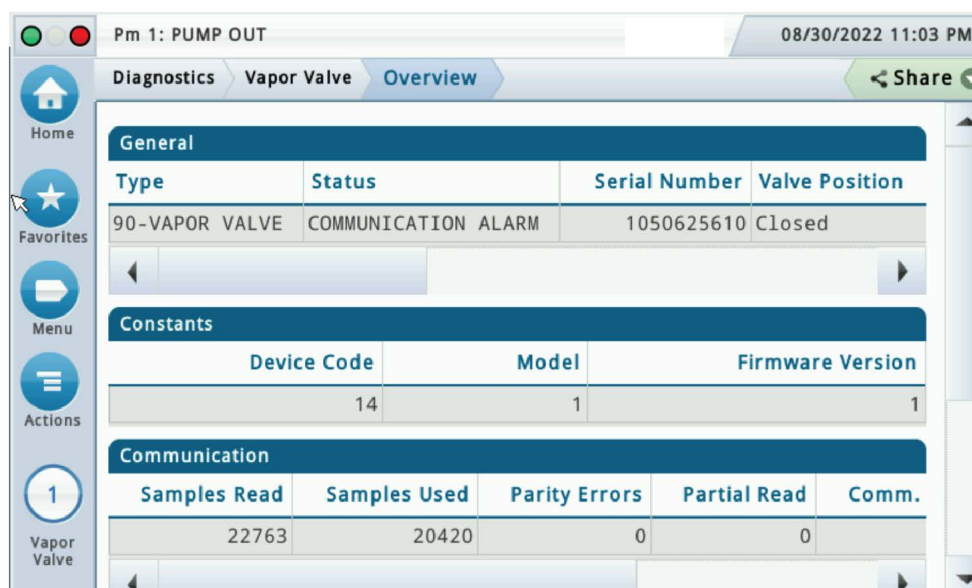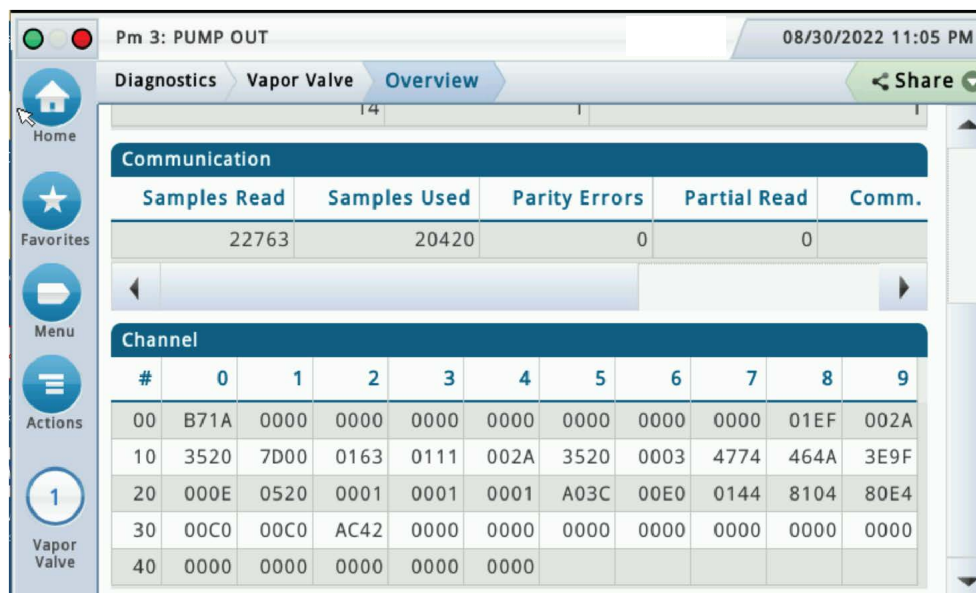
Figure 23. Vapor Valve Overview Screen - Page 1

2. The four tables in this screen display status information for the selected Vapor Valve. Touch the scroll down arrow to view the rest of the Vapor Valve data tables (see Figure 24).

Figure 24. Vapor Valve 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 25) to open the PMC Status screen (Figure 26).
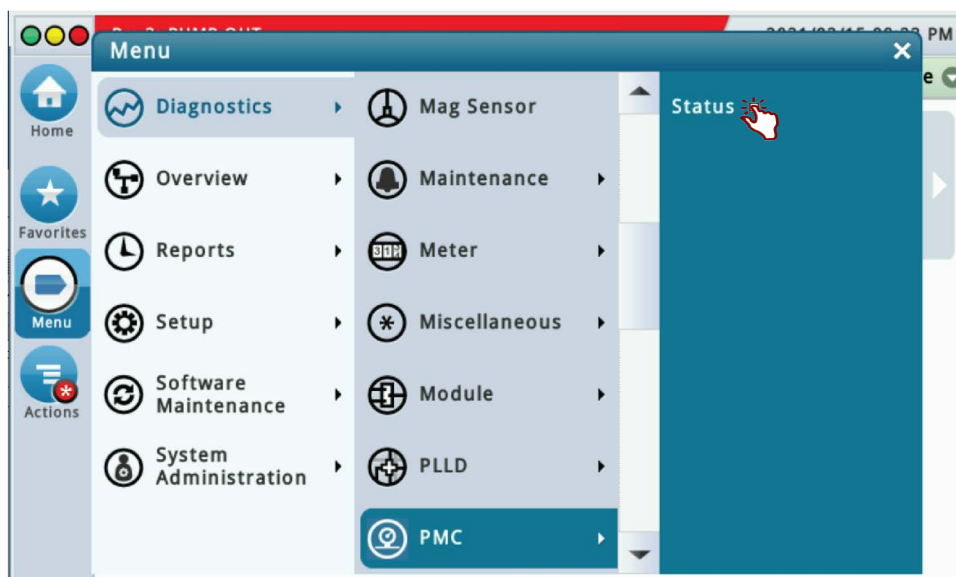
Figure 25. Accessing PMC Status Diagnostic Screen
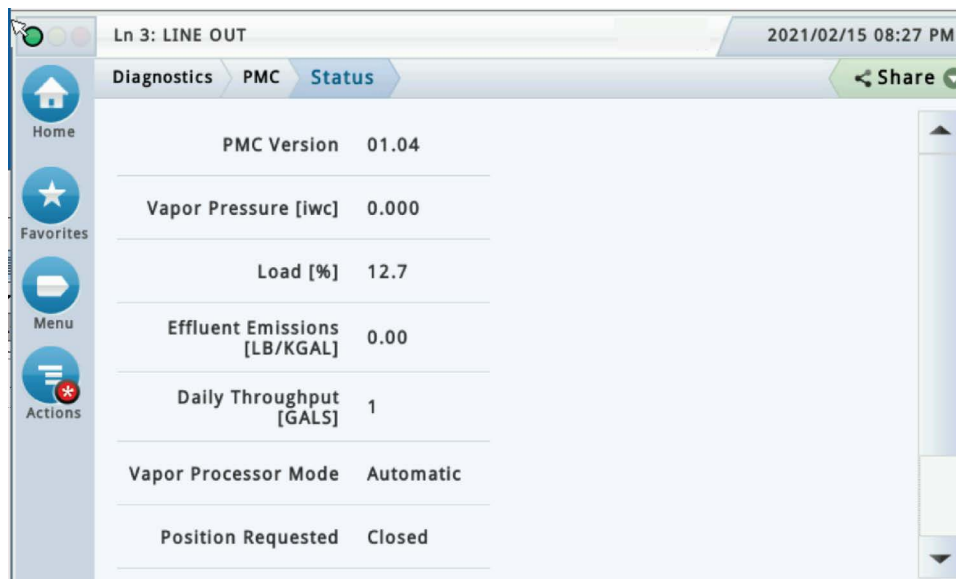
Figure 26. PMC Status Diagnostic Screen (Scroll Down to View Additional Fields)

AUTOMATIC MODE

If PMC mode is in AUTOMATIC, PMC will control flow through the Vapor Polisher using its vapor control valve. The control algorithms will monitor tank pressure, vapor temperature and carbon temperature to monitor carbon canister loading. Typically the valve opens to relieve the pressure and begin loading the canister. When the UST pressure becomes negative the valve opens and the purging process begins. The valve closes when the canister either reaches capacity or is empty after purging.

MANUAL MODE

If PMC mode is in MANUAL, touch the **Actions** button to manually set the valve to be opened (Set Requested: OPEN) or closed ((Set Requested: CLOSED). This feature tests the operation of the valve without waiting for the Vapor Polisher to reach loading or purging thresholds. It also provides the necessary controls to perform 2" decay tests. The current UST ullage space vapor pressure is available in this screen.

When set to Manual Mode, the system will reset to Automatic Mode after 4 hours.

SWITCHING BETWEEN VAPOR PROCESSOR MODES

With the Vapor Polisher Mode in Automatic, touch the **Actions** button to switch the PMC Mode to Manual (see Figure 27), or when in Manual Mode, touch the **Actions** button to set the vapor valve Open or Closed and /or touch 'Set VP Mode: Automatic' to exit Manual Mode.
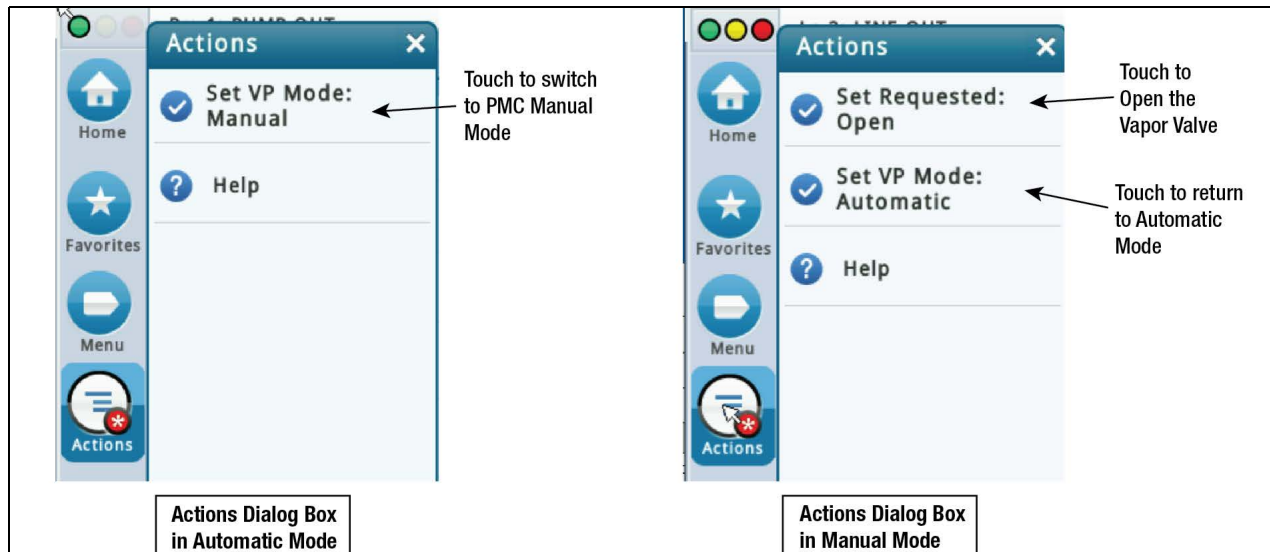
Figure 27. Manually Switching Between PMC Modes

Vapor Monitor - Clear Test After Repair

Since PMC 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 Vapor Processor 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. 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).

EXAMPLE PROCEDURE

1. The Vapor Monitor posts a Vapor Leak Fail alarm. Navigate to Diagnostics>Vapor Monitor>Clear Test After Repair (see Figure 28).

Figure 28. 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 Processor (Figure 29).

Figure 29. Select Test Type

3. Touch the **Clear Test** button to clear the test (Figure 30).

Figure 30. Clear Test

4. A Confirmation Message dialog box appears.
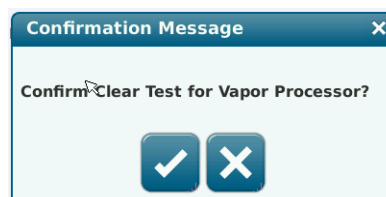
Figure 31. Confirmation Message Dialog Box

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.

6. The date and time in the Last Clear field updates (see Figure 32).
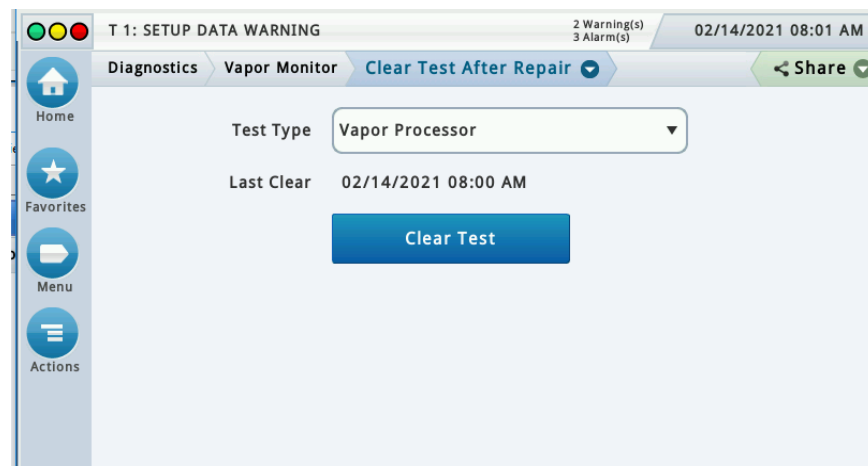
Figure 32. Last Clear Field Updates

7. Touch the Share drop-down arrow to print out the updated Clear After Test Repair history (GUI only) (Figure 33).

Figure 33. Clear After Test Repair History Printout

Operations

Alarms

The TLS console is continuously monitoring the vapor recovery system and PMC sensors for alarm conditions.

PMC Alarm Summary

Table 2 contains a listing of the PMC generated alarms including a brief description of each and associated front panel indicator.

Table 2. PMC Alarm Summary

Displayed Message	Description	Light Indicator	Suggested Troubleshooting[1]
VP EMISSION WARN	Mass emission exceeded the certified daily threshold.	Yellow	Ensure Polisher is in Automatic Mode. Resolve any Vapor Valve Sensor Fault Alarms.
VP EMISSION FAIL	2nd consecutive mass emission failure	Red	
PMC SETUP FAIL	PMC is not configured or missing components.	Red	Ensure that all required components are installed and operational.
PMC SENSOR FAULT	Component used by PMC has failed or reported an error condition. See Troubleshooting section for complete description of sensors and associated conditions that can cause a sensor fault.	Red	Check for Device Alarm or Fault.

[1]Refer to the Troubleshooting Section of this manual and the ISD/PMC Troubleshooting Guide 577014-463.

Table 3. Wireless Related Sensor Alarms

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

Reports - PMC Status

1. You can access and view the PMC Status report from the TLS console front panel by touching Menu>Reports>PMC>Status (see Figure 34 and Figure 35).
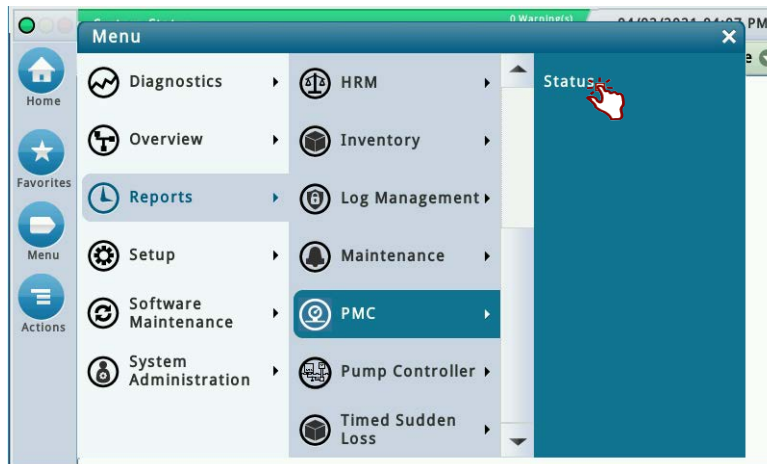
Figure 34. Accessing PMC Report
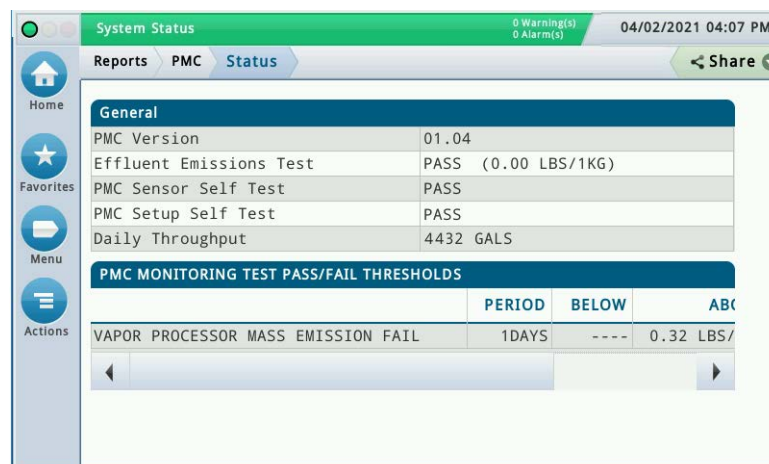
Figure 35. PMC Status Report Example

2. Touch the Share button and select Print to printout the PMC Status report (see Figure 36).


```
04/02/21  4:54 PM


PMC STATUS REPORT
-----------------

GENERAL
-------

PMC VERSION             01.04
EFFLUENT EMISSIONS TEST PASS (0.00 LBS/1KG)
PMC SENSOR SELF TEST    PASS
PMC SETUP SELF TEST     FAIL
DAILY THROUGHPUT        1 GALS

PMC MONITORING TEST PASS/FAIL THRESHOLDS
----------------------------------------

                                PERIOD BELOW       ABOVE
                                ------ ----- ------------
VAPOR PROCESSOR MASS EMISSION
FAIL                            1DAYS  ---- 0.32 LBS/1KG
```

Figure 36. PMC Status Report Printout

Viewing PMC 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 37 below.
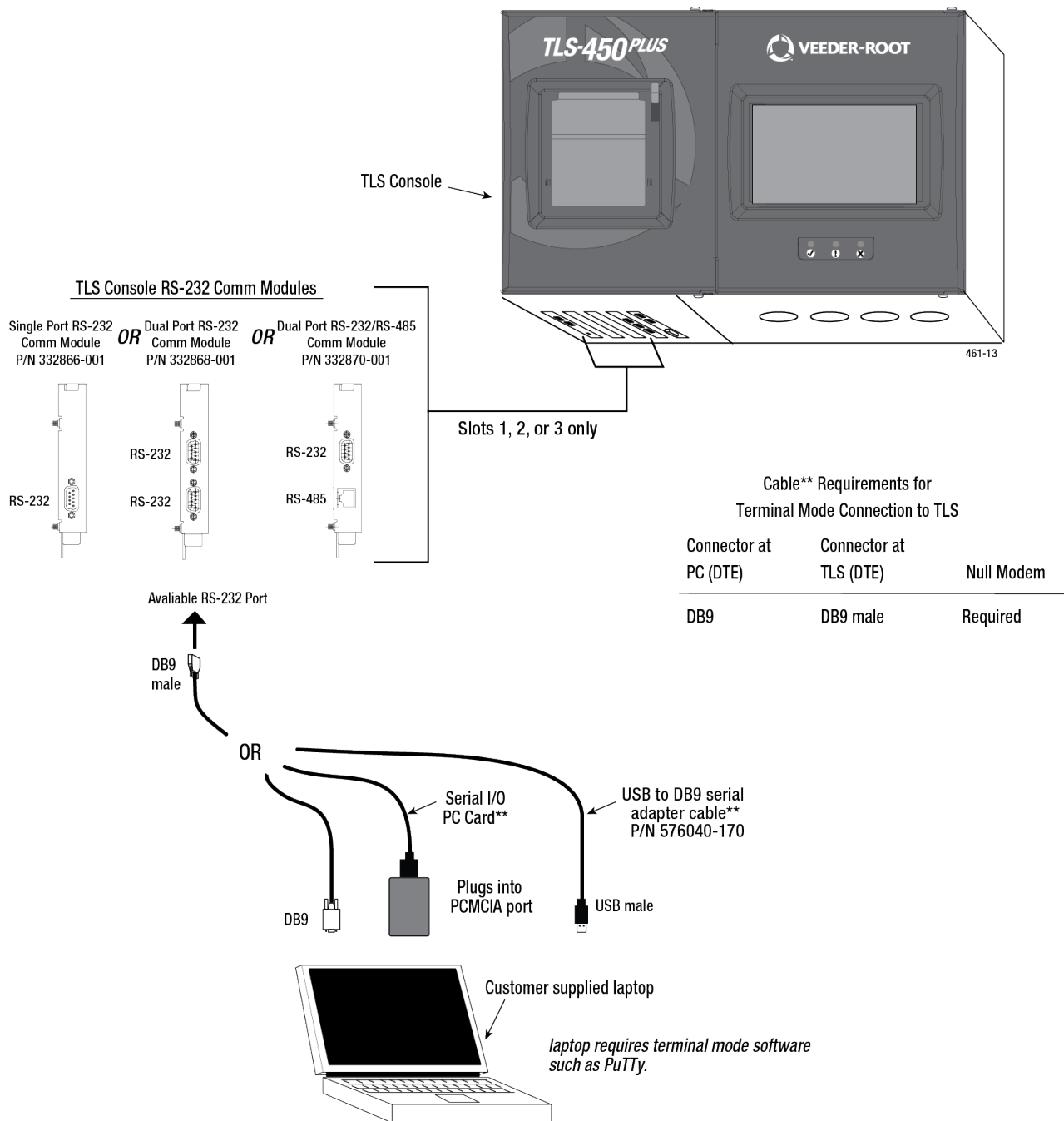
Figure 37. Connecting Laptop to TLS-450PLUS for Serial Communication

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 38).
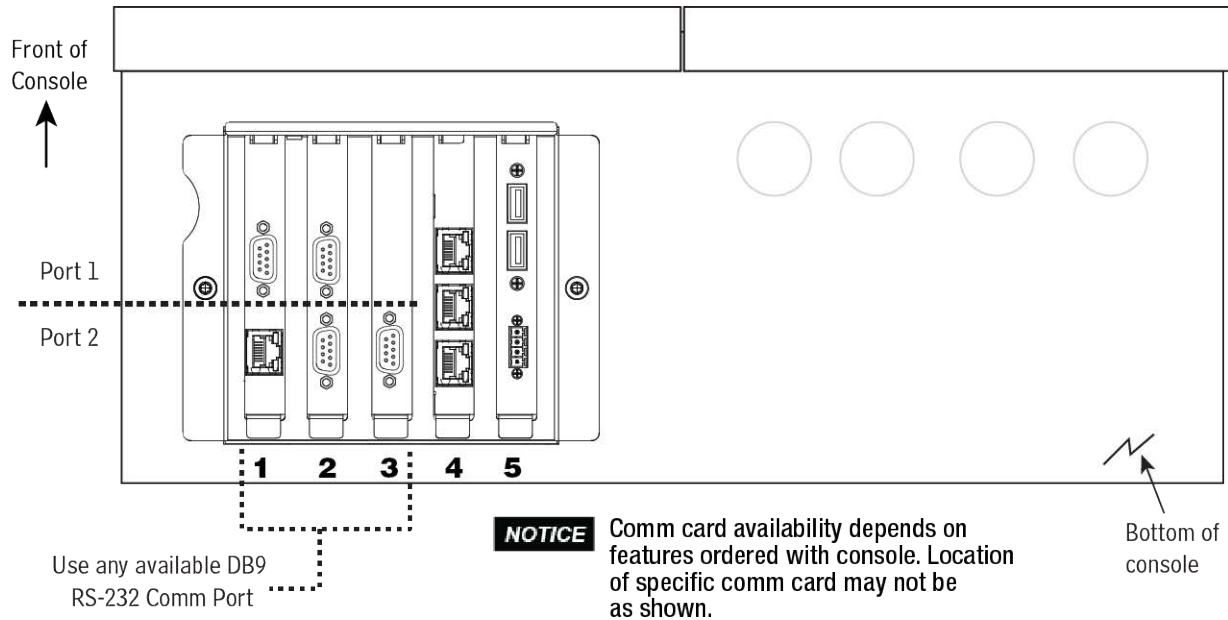
Figure 38. Connect Laptop to an Available RS-232 Comm Port

3. The TLS-450PLUS RS-232 connector pin outs are shown in Figure 39.

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		
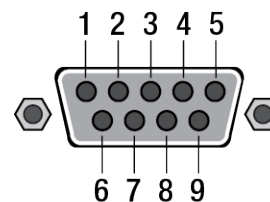
Figure 39. TLS-450PLUS RS-232 Connector Pin Outs

NOTICE **To avoid attaching your Comm cable to a non-configurable (NC) port, identify the configurable (C) RS-232 ports by referring to Table 4.**

Table 4. Selectable Comm Module Permissible Slots And Port Availability

Comm Module	Comm Type	Slot 1 Port		Slot 2 Port		Slot 3 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 PMC REGULATOR ACCESS

1. On the TLS-450PLUS touch Menu>Setup>Communication>Serial Port. Use the required PMC dedicated Comm port, e.g., select serial port 3 (Figure 40).
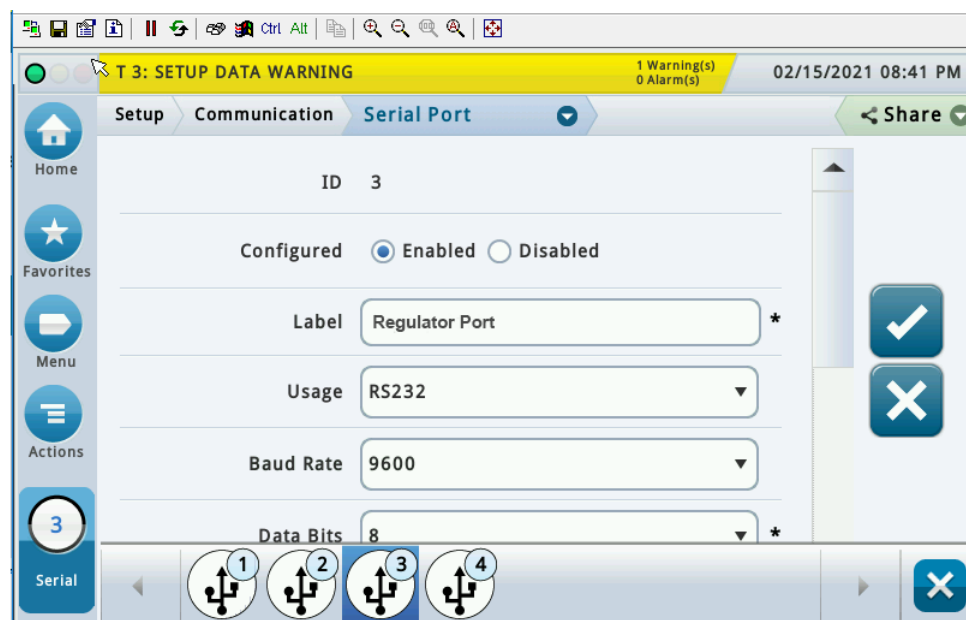
Figure 40. Example Serial Port Setup Screen

c. Verify that the Usage entry is RS-232 and copy the settings, especially Baud Rate, Data Bits, Parity and Stop Bits which we will use to setup PuTTy.

Figure 41. 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 42).
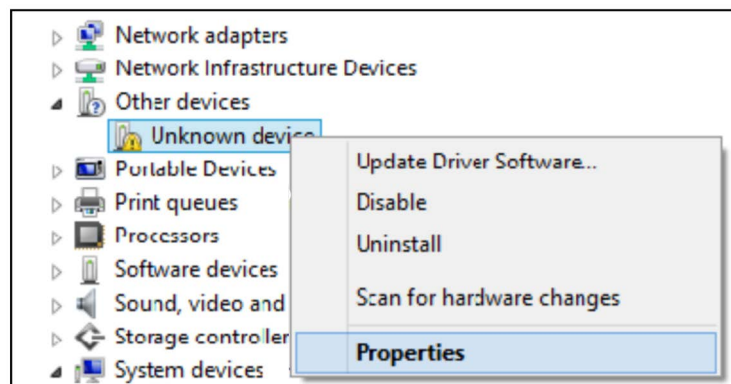
Figure 42. Laptop Device Manager

    - 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, 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 43).
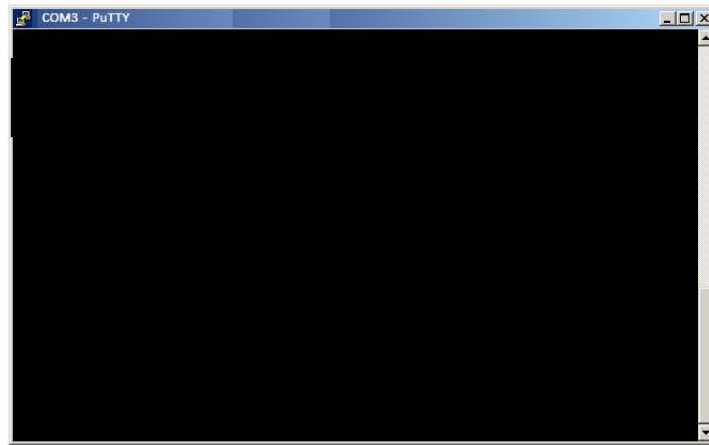
Figure 43. PuTTY Terminal Window

SENDING CONSOLE COMMANDS

Table 5 shows four important PMC console commands: IV8000, IV8200, IV8800, 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 IV8000. 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 000016IV8000.

If you have local echo enabled you will see the typed command on the screen: ☺IV8000 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 ☺IV8000☺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 5: Serial Commands for PMC Reports

Report Type	Serial Command (PC to Console)[1]
Vapor Processor Runtime Diagnostic Report[2] (See example Figure 44)	`<SOH>IV8000`
Vapor Processor Status Report[2] (See example Figure 45)	`<SOH>IV8200`
Vapor Valve Diagnostic Report[2] (See example Figure 46)	`<SOH>IB6100`
Daily Vapor Polisher Diagnostic Report (See example Figure 47)	`<SOH>IV8800yyyymmddnnnn` Where: yyyy = year number, e.g., 2003, mm = month number (01 = January, 02 = February, etc.), dd = day of the month, nnnn = number of records after the date entered (9999 = all).
Non-Priority Alarm History Report (See example Figure 48)	`<SOH>I11100`
Priority Alarm History Report (See example Figure 49)	`<SOH>I11200`

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

[2]Not available for FFS-CAS Processor or Hirt VCS 100.

Figure 44 shows an example V-R Vapor Polisher Runtime Diagnostic Report and Table 6 explains the `IV8000` report's event codes (not available with FFS-CAS or Hirt VCS 100).

```
IV8000
OCT  24, 2023  9:49PM

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


VAPOR POLISHER
VALVE EVENT          PRESSURE
DATE-TIME               "WC      EVENT CODE
10-21-23  6:59AM       1.301     OPEN FILL
10-21-23  7:06AM       1.037     CLOSE NEAR FULL
10-21-23  7:21AM       1.307     OPEN FILL
10-21-23  7:28AM       1.046     CLOSE NEAR FULL
10-21-23  7:46AM       1.300     OPEN FILL
10-21-23  7:51AM       0.973     CLOSE NEAR FULL
10-21-23  8:39AM      -0.261     OPEN PURGE
10-21-23  8:46AM       0.014     CLOSE NEAR FULL
10-21-23  8:52AM      -0.264     OPEN PURGE
10-23-23  7:25PM      -0.517     CANISTER EMPTY
10-23-23  7:27PM      -0.492     CLOSE PURGE Hi P
10-24-23  5:36AM       0.752     OPEN FILL
10-24-23 11:45AM      -0.450     CANISTER EMPTY
10-24-23 11:47AM      -0.425     CLOSE PURGE Hi P
10-24-23 12:16PM       0.832     OPEN FILL
10-24-23  6:43PM      -0.409     CANISTER EMPTY
10-24-23  6:45PM      -0.313     CLOSE PURGE Hi P
10-24-23  9:49PM       0.753     OPEN FILL
```

Figure 44. Vapor Polisher Runtime Diagnostics Report - Serial to PC Format

Table 6: Vapor Processor Runtime Diagnostic Report Event Codes

Event Code	Cause	Event Code	Cause
NO EVENT	The valve changed state outside of the carbon canister algorithm.	CLOSE NEAR FULL	Canister load is between 80 and 100% and pressure is <1.05.
CLOSE TEST	Manual operation of the valve	OPEN PURGE	Canister load is >0% and pressure <-0.25
OPEN TEST	Manual operation of the valve	OPEN EXCESS PURGE	Canister load is 0%, Excess purge is incomplete, pressure <-1.5, time is between 6AM and 4PM.
CLOSE PURGE HI P	The canister state is in excess purge and the pressure is above -0.5.	OPEN FILL	Canister valve is open for loading: • When pressure is greater than or equal to 0.75 IWC and Canister load is less than 80%. • Pressure is greater than or equal to 1.3 IWC and Canister load is greater than 80%.
CLOSE PURGE TIME	The canister state is in excess purge and the time is outside 6AM to 4PM.	CLOSE CVLD TEST	Valve was closed to collect data for PMC contamination leak test.
CLOSE FORCE PURGE	Canister is in startup period. Loading with pressures <+1.05 is not allowed until startup period is complete.	CLOSE LIMIT	Valve closed because canister has reached allowable extended capacity loading limit.
CANISTER EMPTY	Canister was loaded above 1% and purged to 0%. No valve state change.	CANISTER FULL	No valve state change. The canister load passed from below 95% to/thru the 100% point and not yet at day's emission limit.
CLOSE EMPTY	Excess purging has completed.		

Figure 45 shows an example Vapor Processor Status Report (not available with FFS-CAS or Hirt VCS 100).

```
IV8200
DEC  8, 2010  4:29 AM

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

VAPOR PROCESSOR STATUS REPORT

PMC VERSION: XX.XX

ASSESSMENT TIME: DEC  7, 2010 11:59 PM


VAPOR PROCESSOR TYPE: VEEDER-ROOT POLISHER

PMC MONITORING TEST PASS/FAIL THRESHOLDS
                                        PERIOD    BELOW  ABOVE
VAPOR PROCESSOR MASS EMISSION FAIL        1DAYS    ----   0.32 LBS/1KG

EFFLUENT EMISSIONS TEST : PASS     (0.00 LBS/1KG)

DAILY THROUGHPUT  :   6989 GALS
```

Figure 45. Vapor Processor Status Report - Serial to PC Format

Figure 46 shows an example Vapor Valve Diagnostic report.

```
IB61vv
JAN 22, 2020  3:11  PM

VAPOR VALVE DIAGNOSTIC REPORT

VV 1:VAPOR VALVE 1

VAPOR VALVE
SERIAL NUMBER   47466902
VALVE POSITION  CLOSED
BATTERY             FULL      (only if wireless)
OPEN CAP        CHARGED
CLOSE CAP       CHARGED
AMBNT TEMP      70.12 F
OUTLET TEMP     72.34 F
SENSOR FAULTS
 VALVE COMMAND FAULT       (only active reason(s) for alarm/warning
                           are listed)
CAP NOT CHARGING FAULT
CAP NOT HOLDING FAULT
REF RESISTOR FAULT
VAPOR RESISTANCE FAULT
TEMPERATURE RANGE FAULT
DATA NOISE FAULT
VALVE NOISE FAULT
NONE
<ETX>
```

Figure 46. Vapor Valve Diagnostic Report - Serial to PC Format

Figure 47 shows an example Daily Vapor Polisher Diagnostic report.

```
IV8800
OCT 2, 2008  2:58 PM

PMC DAILY VAPOR POLISHER DIAGNOSTIC


                  LOAD   PRGE   MIN%   MAX%   SELF    EMISSION
DATE/TIME          HRS    HRS   LOAD   LOAD   TEST    TEST
08-10-02 14:58:58  3.1    2.5     15     69   WARN    FAIL
```

Figure 47. Daily Vapor Polisher Diagnostic Report - Serial to PC Format

Figure 48 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 48. Non-Priority Alarm History Report - Serial to PC Format

Figure 49 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 49. Priority Alarm History Report - Serial to PC Format

Troubleshooting

PMC Setup Fail

A PMC Setup Fail warning occurs when the PMC setup is not complete. Follow the diagnostic steps in Table 7 below to resolve this issue.

Table 7: PMC Setup Fail Diagnostic Procedure

Step	Procedure
1	Gasoline Tanks Configured and Enabled?
2	ATM Sensor Configured and Enabled?
3	Vapor Valve installed, Configured and Enabled?
4	In **Setup>Vapor Management>Processor**: Is the Vapor Valve assigned?
5	In **Setup>Vapor General>General**: Is the Vapor Pressure Sensor assigned?
6	Exiting out of Setup will cause the TLS Console System Self-Test.
7	If alarm does not clear, contact Veeder-Root Technical Support at (800) 323-1799.

PMC Sensor Faults

Table 8 contains a listing of the PMC Device generated alarms including their cause and suggested troubleshooting. TLS Console PMC alarms may be interspersed amongst non-PMC alarms, please see TLS Series manuals for more information.

Table 8. PMC Device Fault Summary

Fault Message	Devices	Cause	Suggested Troubleshooting
Communication Alarm	Vapor Valve, Vapor Pressure Sensor, Tank Probe, Atmospheric Pressure Sensor	Device not communicating with TLS	Check wiring and connections of device in alarm
			Power cycle the TLS
			Verify device addressing in Setup>Devices
Pressure Fault Alarm	Atmospheric Pressure Sensor	The pressure readings are invalid (out-of-range, or have not changed for an extended period of time).	USM/ATM Module Group (P/N 0332812-006) may need to be replaced. ATM sensor may be faulty. Contact VR Technical Support for further assistance.

Table 8. PMC Device Fault Summary

Fault Message	Devices	Cause	Suggested Troubleshooting
Valve Command Fault		The valve fails calibration	
Valve Noise Fault		The valve fails calibration due to data noise. If successful, calibration cannot be completed in 24 hours the alarm posts.	
Cap (Capacitor) Not Charging		Vapor valve capacitor does not initially charge within 60 minutes, or subsequent recharges after 15 minutes.	
Cap (Capacitor) Not Holding Fault	Vapor Valve	Vapor valve capacitor discharges when idle (i.e., not resulting from an open/close request) more than 3 times in 24 hours.	Check installation of all Vapor Valve components including Thermal Probe and Vapor Sensor Assembly. Refer to manual 577013-920. Call V-R Technical Support if further assistance is needed.
Reference Register Fault		At least 1 of the 4 reference resistors is out-of-range repeatedly.	
Vapor Sensor Resistance Fault		The vapor sensor resistance reads out-of-range repeatedly.	
Temperature Range Fault		Outlet temperature reads out-of-range repeatedly.	
Data Noise Fault		Frequent noise is affecting sensor readings for more than 30 minutes.	

Wireless Related Sensor Alarms

The TLS RF Wireless 2 System (W2) features two-way communication utilizing a client/server architecture. When the Veeder-Root Polisher Vapor Valve uses this type of technology, the following alarm may occur:

Displayed Message	Description	Light Indicator	Suggested Troubleshooting
BATTERY WARNING	Vapor Valve transmitter reports battery status as 'Replace' for 24 hours.	Yellow	Remove and replace battery pack.

VP Emission Alarm

In the even that a VP EMISSION WARNING is present when the valve is in Automatic mode for 24 hours and there are no PMC Sensor Fault alarms on the system, notify Veeder-Root Technical Support.

Example PMC reports

```
IB6100
FEB  4,  2008  1:09  PM
s 2:Vapor valve

VAPOR VALVE
SERIAL NUMBER      123456
VALVE POSITION:       OPEN
OPEN CAP:         CHARGED
CLOSE CAP:        CHARGED
AMBNT TMP:        65.08 F
OUTLET TMP:       75.05 F
SENSOR FAULTS:
VALVE COMMAND FAULT
```

```
IB6100
FEB  4,  2008  1:09  PM
s 2:Vapor valve

VAPOR VALVE
SERIAL NUMBER      123456
VALVE POSITION:       OPEN
OPEN CAP:         CHARGED
CLOSE CAP:        CHARGED
AMBNT TMP:        65.08 F
OUTLET TMP:       75.05 F
SENSOR FAULTS:
CAP NOT HOLDING
```

```
IB6100
FEB  4,  2008  1:09  PM
s 2:Vapor valve

VAPOR VALVE
SERIAL NUMBER      123456
VALVE POSITION:       OPEN
OPEN CAP:         CHARGED
CLOSE CAP:        CHARGED
AMBNT TMP:        65.08 F
OUTLET TMP:       75.05 F
SENSOR FAULTS:
CAP NOT CHARGING
```

```
IB6100
FEB  4,  2008  1:09  PM
s 2:Vapor valve

VAPOR VALVE
SERIAL NUMBER      123456
VALVE POSITION:       OPEN
OPEN CAP:         CHARGED
CLOSE CAP:        CHARGED
AMBNT TMP:        65.08 F
OUTLET TMP:       75.05 F
SENSOR FAULTS:
TEMPERATURE RANGE
```

```
IB6100
FEB  4,  2008  1:09  PM
s 2:Vapor valve

VAPOR VALVE
SERIAL NUMBER      123456
VALVE POSITION:       OPEN
BATTERY:             FULL           ········ 'Wireless' vapor
OPEN CAP:         CHARGED                    valve example
CLOSE CAP:        CHARGED
AMBNT TMP:        65.08 F
OUTLET TMP:       75.05 F
SENSOR FAULTS:
TEMPERATURE RANGE
```

Figure 50. PMC Report Examples