

Continuous Pressure Monitoring (CPM)

Install, Setup, & Operation Manual



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1 Introduction

Continuous Pressure Monitoring (CPM) equipment is designed to monitor the containment of vapors. Using the existing Veeder-Root (V-R) TLS-350 console platform and sensor inputs, the CPM software continuously monitors vapor pressure, maintains test records, provides test reports and generates alarms following test/equipment failures.

This manual provides instructions to install, setup, and operate the special components of the Veeder-Root CPM system that are not covered in existing documentation shipped with other non-CPM specific V-R equipment (e.g., magnetostrictive (Mag) probes, line leak detection, etc.). The CPM feature is an option for the TLS-350 console platform, and as such, many of the installation/setup/operation instructions for non-CPM specific tasks (e.g., line leak detection) are covered in TLS-3XX supplied literature.

Site Requirements

Below are the requirements for all CPM systems except where noted.

- V-R TLS-350R/EMC w/BIR, TLS-350 Plus/EMC Enhanced, TLS-350/EMC and Red Jacket ProMax consoles with ECPU2 - install as per TLS-3XX Site Prep manual, setup following instructions in TLS-3XX System Setup Manual.
- A Memory Expansion Module (P/N 332966-203) for CPM software storage - installed on the ECPU2 board in place of the console's 1/2 Meg RAM board - install as per TLS-350 Series Board and Software Replacement Manual, no setup required.
- A RS-232 or TCP/IP module is required for serial access to CPM reports - install as per instructions shipped with module, setup following instructions in this manual.
- 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-3XX Setup Manual.
- Smart Sensor module is required to monitor Vapor Pressure Sensor (up to 8 devices per module, or 7 if customer is using Smart Sensor module / embedded pressure). Install and connect following instructions in the Pressure Sensor installation Guide.
- Vapor Pressure Sensor (one per site) - install as per Pressure Sensor installation manual shipped with sensor, setup following instructions in this manual.
- Software Enhancement Module (SEM) (P/N 330160-2XX and -3XX) - Activates CPM software technology.

Contractor Certification Requirements

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

Installer (Level 1) Certification: Contractors holding valid Installer Certification are approved to perform wiring and conduit routing; equipment mounting; probe, sensor and carbon canister vapor polisher installation; wireless equipment installation; tank and line preparation; and line leak detector installation.

ATG Technician (Level 2/3 or 4) Certification: Contractors holding valid ATG Technician Certifications are approved to perform installation checkout, startup, programming and operations training, system tests, troubleshooting and servicing for all Veeder-Root Series Tank Monitoring Systems, including Line Leak Detection. In addition, Contractors with the following sub-certification designations are approved to perform installation checkout, startup, programming, system tests, troubleshooting, service techniques and operations training on the designated system.

VR Vapor Products Certification: Contractors holding this certification are approved to perform installation checkout, startup, programming, system tests, troubleshooting, service techniques and operations training on the CPM system. A current Veeder-Root Technician Certification is a prerequisite for the VR Vapor Products course.

Warranty Registrations may only be submitted by selected Distributors.

Related Manuals

The manuals in Table 1-1 below are shipped with the equipment on the V-R Tech Docs CD-ROM and will be needed to install non-CPM specific equipment.

Table 1-1. Related Manuals

V-R Manual	Part Number
TLS-3XX Site Prep Manual	576013-879
Pressure Sensor Installation Guide	577013-797
TLS-3XX Series Consoles System Setup Manual	576013-623
TLS-3XX Series Consoles Operator's Manual	576013-610
Serial Comm Modules Installation Guide	577013-528
TLS-350 Series Board and Software Replacement Manual	576013-637
TLS-350R Point-of-Sale (POS) Application Guide	577013-401

Safety Precautions

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

	<p>ELECTRICITY High voltage exists in, and is supplied to, the device. A potential shock hazard exists.</p>		<p>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.</p>
	<p>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.</p>		<p>WARNING Heed the adjacent instructions to avoid damage to equipment, property, environment or personal injury.</p>

⚠ WARNING

	<p>The console contains high voltages which can be lethal. It is also connected to low power devices that must be kept intrinsically safe.</p>
	<p>Turn power Off at the circuit breaker. Do not connect the console AC power supply until all devices are installed.</p>
<p>FAILURE TO COMPLY WITH THE FOLLOWING WARNINGS AND SAFETY PRECAUTIONS COULD CAUSE DAMAGE TO PROPERTY, ENVIRONMENT, RESULTING IN SERIOUS INJURY OR DEATH.</p>	

2 Installation

This section discusses the installation and wiring of the hardware required to enable the TLS console to perform CPM monitoring of the site's gasoline vapor recovery equipment (non-gas tanks are not monitored):

- Vapor Pressure Sensor
- Smart Sensor Interface Module (8 input and 7 input w/embedded pressure versions)
- NVMEM board - required
- 4-Relay Output Module
- Probe Interface Module



All field wiring, its type, its length, etc., used for TLS console sensors must conform to the requirements outlined in the Veeder-Root TLS-3XX Site Prep manual (P/N 576013-879).

Vapor Pressure Sensor

Install one Vapor Pressure Sensor in the vapor vent stack following the instructions in the Pressure Sensor Installation guide (P/N 577013-797). Program the sensor following instructions in this manual.

Installing TLS Console Modules - General Notes

TLS-350 consoles have three bays in which interface modules can be installed; Comm bay (left door) and Power and Intrinsically-Safe bays (right door). Smart Sensor modules are installed in the Intrinsically-Safe (I.S.) bay only (Figure 2-1).

Most consoles will be shipped with modules installed as ordered. If additional features are added at a later date, modules will be field installed.

In all cases, the position of the modules, their respective connectors and the devices wired to the connectors must be recorded to prevent improper replacement during installation or service. A circuit directory for Power and I.S. bay Interface Modules is adhered to the back of the right-hand door for this purpose.

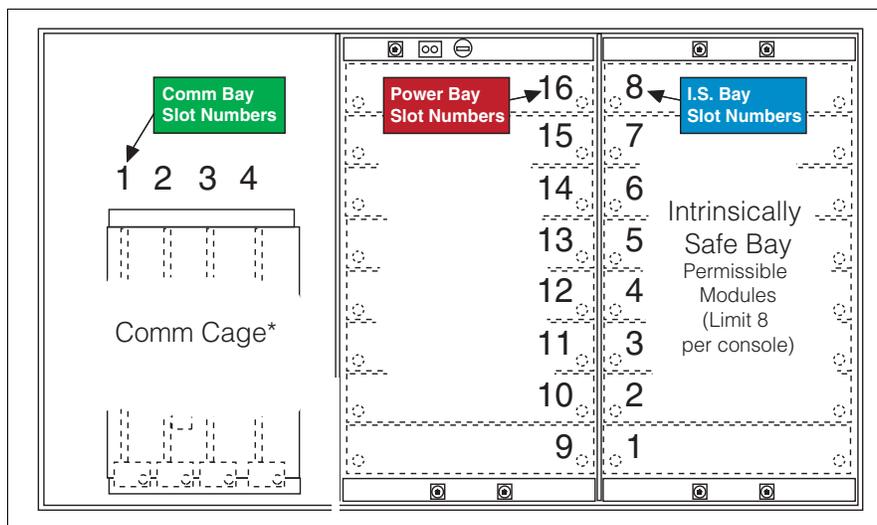


Figure 2-1. TLS Console Interface Module Bays



CAUTION! During programming, module positions and the devices wired to each module are identified and stored in memory. If a connector is removed and reinstalled on a different module after programming, or if an entire module with its connector is removed and reinstalled in a different module slot, the system will not properly recognize the data being received.

Module Position

1. Record on the circuit directory the type of module in each slot location.
2. If a system contains multiple modules of a single type (i.e., two Smart Sensor Modules), they may be swapped between their respective slot locations, **however, the connectors must remain with their original locations, not with the original modules.**

Connector Position

1. Identify all connectors according to their slot location using the self-adhesive numbering labels furnished with each module. Accurately record on the circuit directory the location of each device wired to the connector **as you attach wires** to the module.
2. Once a device has been wired to certain terminals on a connector and the system has been programmed, the wires from that device may not be relocated to other terminals without reprogramming the system.

Grounding Probe and Sensor Shields

Connect probe and sensor cable shields to ground at the console only. Do not ground both ends of the shield.

CIRCUIT DIRECTORY

A circuit directory is adhered to the inside of the right-hand door. It should be filled out by the installer as the module's connectors are being wired.

The following information should be recorded for each slot:

- Module Type: record what type of module has been installed in the slot, e.g., Smart Sensor Module.
- Position Record: record the physical location and/or type of device wired to each terminal of the module connector in the slot, e.g., VPS1.

Smart Sensor Interface Module

The Smart Sensor Interface Module 8 input or 7 input w/embedded pressure versions monitor Vapor Pressure Sensor (VPS) inputs.



Switch off power to the TLS console while you install modules and connect sensor wiring.

Open the right door of the console and slide the necessary Smart Sensor modules into empty I.S. Bay slots. Connect the field wiring from each of the sensors following instructions in the Pressure Sensor manual. Setup the Smart Sensor module(s) following instructions in this manual.

NVMEM Board

Verify that a NVMEM board is installed in the TLS console (ref. Figure 2-14 in the V-R TLS-3XX Series Consoles Troubleshooting Manual P/N 576013-818, Rev J or later). This board contains flash EEPROM and RAM needed to run CPM software and store CPM reports. No setup is required.

Probe Interface Module

Verify that a Probe Interface Module(s) is installed (Intrinsically-Safe bay) and that a Mag probe is in each gasoline tank and is connected to the module(s). Program the Mag probes following instructions in the TLS-3XX System Setup manual.

3 Setup

Introduction

This section describes how to program the CPM system using the TLS console's front panel buttons and display. The procedures in this manual follow standard TLS console setup programming input, i.e., keypad/display interaction. If necessary, refer to Section 2 of the TLS-3XX System Setup manual (P/N 576013-623) to review entering data via the front panel keypads.

All CPM-related equipment must be installed in 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 "Connecting Probe/Sensor Wiring to Consoles" in the TLS-3XX Site Prep and Installation manual (P/N 576013-879) for rewiring precautions.

SYSTEM SETUPS

- Smart Sensor Setup - All CPM sites - Figure 3-1
This setup mode function programs the Smart Sensor Interface module to monitor the Vapor Pressure Sensor.
- CPM Setup - All CPM sites - Figure 3-3, Figure 3-4
This setup mode function programs the TLS console for CPM vapor monitoring and reporting.
- Verify Console Date/Time - Check the console front panel to confirm display of current date and time. Reset if necessary (refer to current date/current time setups in TLS-3XX System Setup manual).

Smart Sensor Setup

The Smart Sensor Interface Module is installed in the intrinsically-safe bay of the TLS console. This module monitors the Vapor Pressure Sensor. Figure 3-1 diagrams the Smart Sensor setup procedure. Figure 3-2 shows a printout of the Smart Sensor setup.

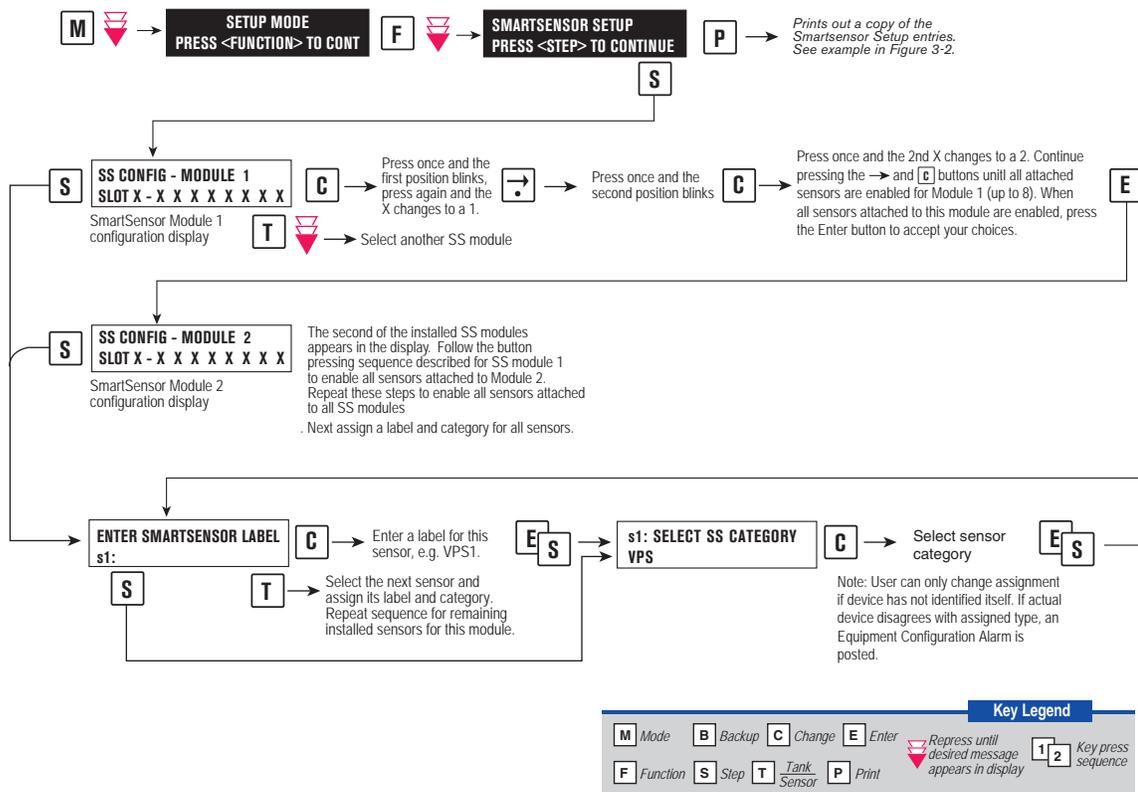


Figure 3-1. Smart Sensor Setup

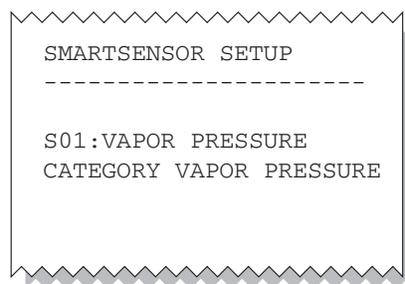
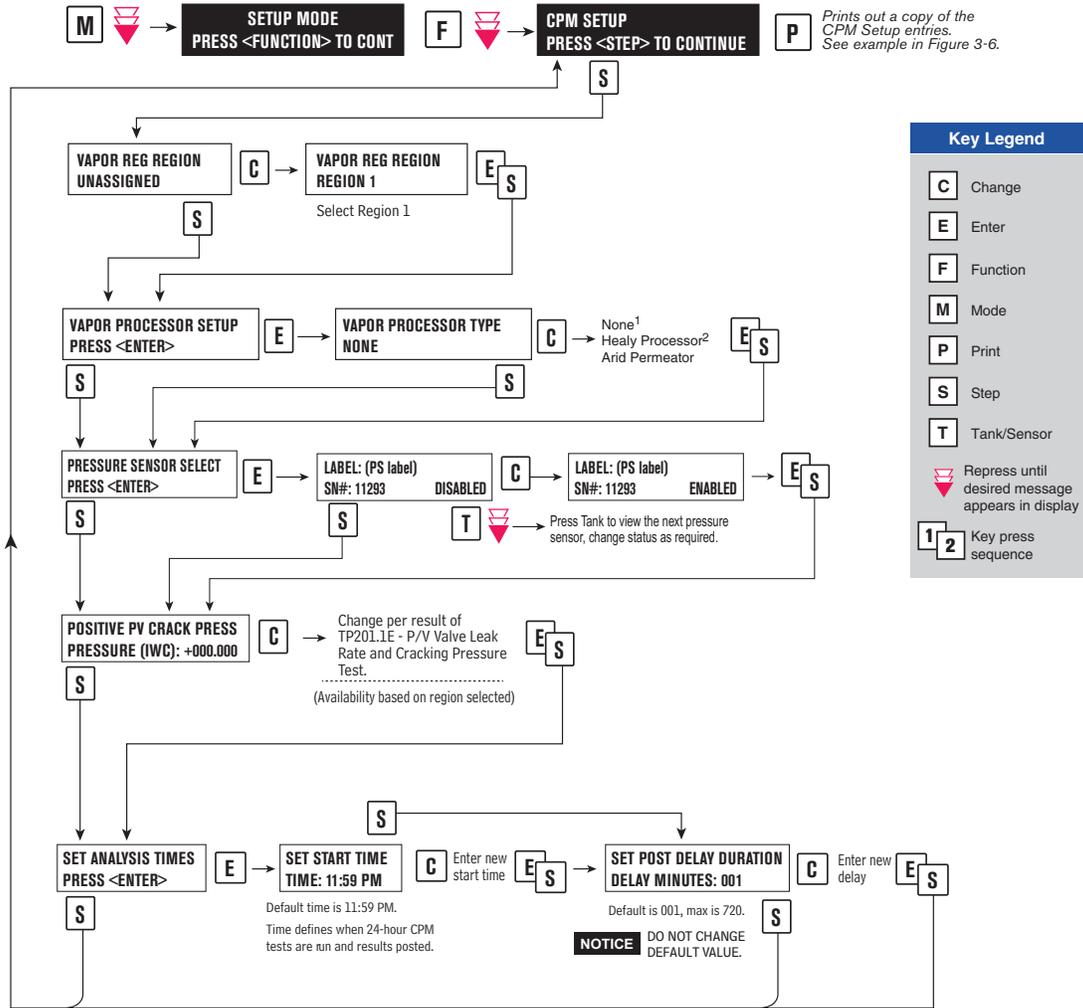


Figure 3-2. Smart Sensor Setup Printout Example



¹Select NONE when no vapor processor is installed.
²Select HEALY PROCESSOR when FFS CAS is installed.

Figure 3-3. CPM Setup

```

CPM SETUP

VAPOR REGULATORY REGION
REGION 1

VAPOR PROCESSOR TYPE
NO VAPOR PROCESSOR

PRESSURE SENSOR SELECTED
LABEL: VPS
SN#: 11293      ENABLED

POSITIVE PV CRACK PRESS
PRESSURE (IWC) : +2.500

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

Figure 3-4. Example CPM Setup Printout

4 Operability Testing

The following procedures can be used at field sites to determine the operability of the Veeder-Root CPM 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 CPM 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 CPM 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 CPM monitoring tests are evidence that:

- All necessary CPM sensors were setup and connected.
- All necessary CPM sensors were operating within specification.
- All internal components including TLS console modules were properly setup and operating within specification.

Veeder-Root recommends printing, periodically, a copy of the CPM ALARM STATUS and CPM DAILY report (ref. Section 5) to ensure that compliance tests are being completed in accordance with local and state regulations.

Vapor Pressure Sensor Ambient Reference Test

The following procedure can be used at field sites to determine if the Vapor Pressure Sensor is reading properly in accordance with Veeder-Root specifications.

1. Access the Vapor Pressure Sensor in its enclosure on the vent stack. Record the pressure sensor serial number to aid in selecting the correct pressure sensor at the console.
2. Remove the cap from the ambient reference port of the Vapor Pressure Sensor valve and open the valve to atmosphere by turning it 90 degrees so that the flow arrows point to both the vapor pressure sensor sensing port and the ambient reference port (see Figure 4-1).
3. Access the 'DIAG MODE' menu at the TLS front panel and enter the sensor under test's 'Calibrate SmartSensor' menu to view the non-calibrated pressure value (Step 6 in Figure 4-2).
4. Verify that the pressure value is between +0.2 and -0.2 inches water column (IWC). If the pressure value is not within this range, the pressure sensor is not in compliance with the pressure sensor requirements of Exhibit 2.
5. Replace cap on the ambient reference port of the Vapor Pressure Sensor valve. Turn the Vapor Pressure Sensor valve handle back 90 degrees so that the flow arrows point to both the Vapor Pressure Sensor sensing port and the UST vapor space sensing line (ref. Figure 4-1).
6. Press the <MODE> key to leave the 'Calibrate SmartSensor' menu. Note: Do not calibrate the sensor!

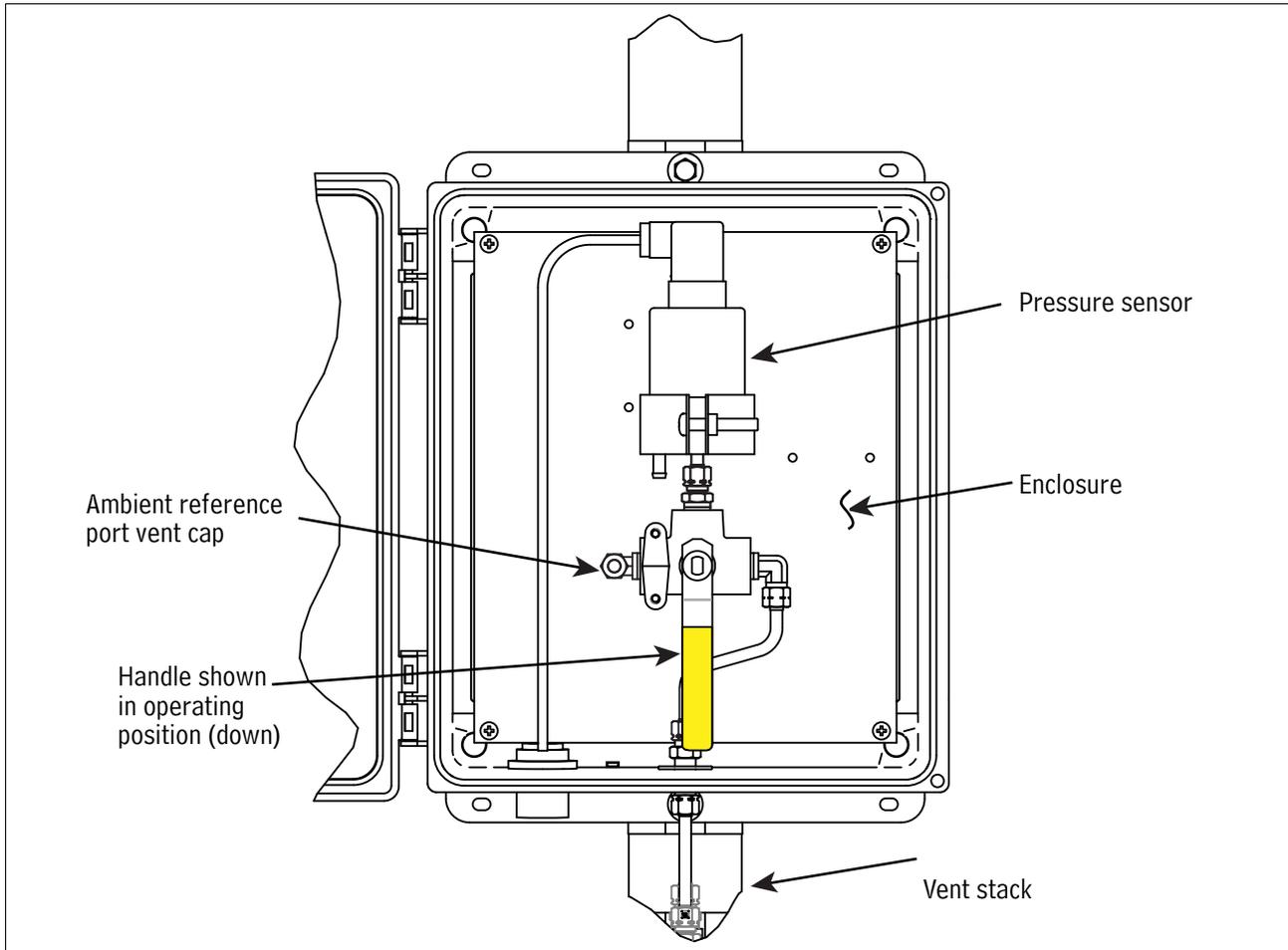


Figure 4-1. Vapor Pressure Sensor Valve Positions

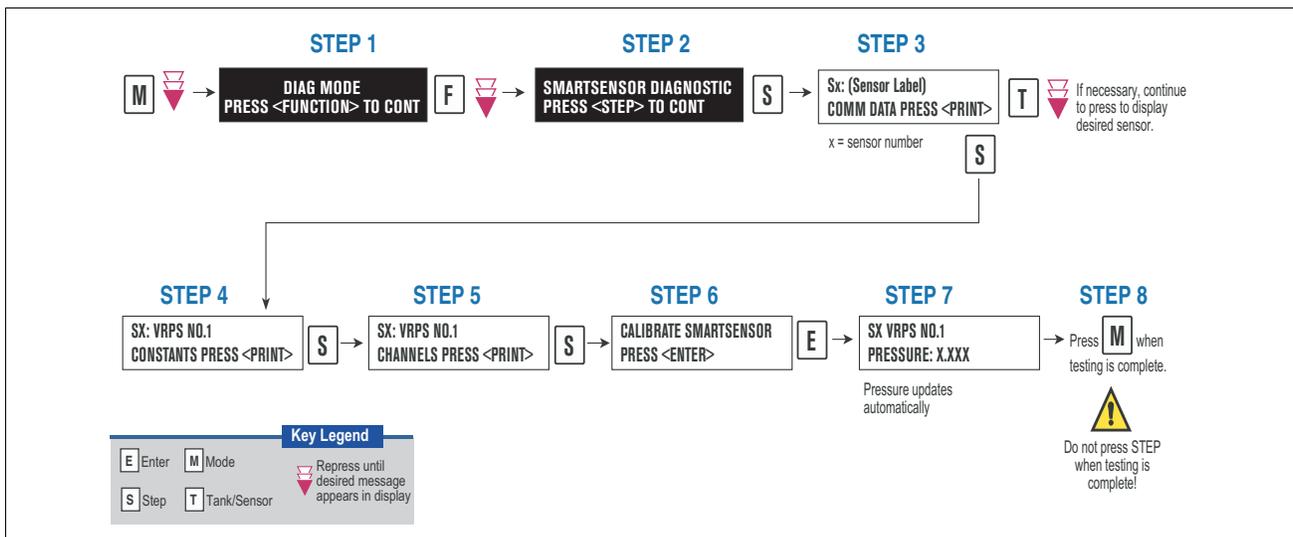


Figure 4-2. Accessing Calibrate SmartSensor Diagnostic Menu

5 Operation

Alarms

OVERVIEW OF TLS CONSOLE INTERFACE

The TLS console is continuously monitoring the CPM sensors for containment system vapor leakage and equipment problems.

During normal operation when the TLS console and monitored CPM System is functioning properly and no alarm conditions exist, the "ALL FUNCTIONS NORMAL" message will appear in the system status (bottom) line of the console display, and the green Power light will be On (see Figure 5-1).

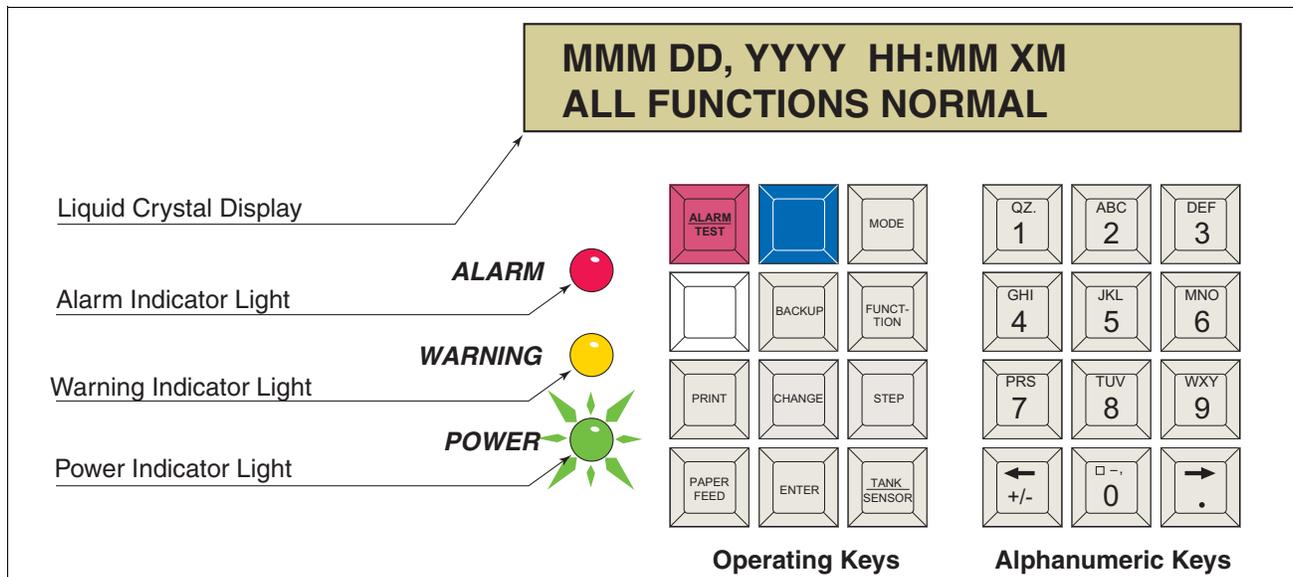


Figure 5-1. TLS Console Alarm Interface

If an alarm condition occurs the system displays the condition type and its location. If more than one condition exists, the display will continuously cycle through the appropriate alarm messages. The system automatically prints an alarm report showing the alarm type, its location and the date and time the alarm condition occurred.

Warning and alarm posting causes the TLS console-based system to activate warning or failure indicator lights, an audible alarm, and an automatic strip paper printout documenting the warning or alarm. Historical reports of warning and alarm events are available for up to one year.

WARNING POSTING

Displayed messages alert you to the source and type of alarm. Printed messages show the type and location of the alarm. In the Warning example in Figure 5-2, the display's second line and printed message indicates that the containment system's vapor leak rate has increased above the allowed standard generating a warning.

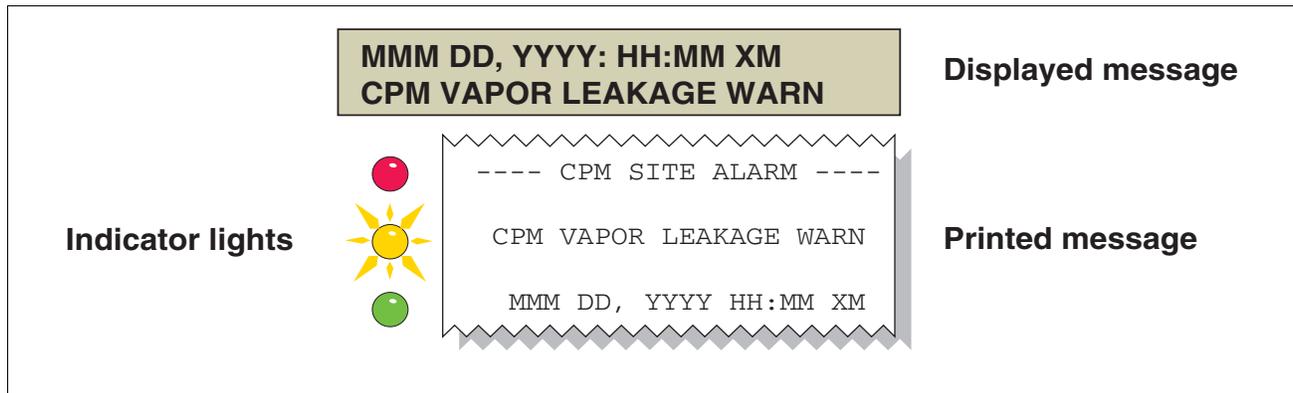


Figure 5-2. Example Warning Posting

The TLS console also logs an entry to the Warning Log upon posting a warning.

ALARM POSTING

Displayed messages alert you to the source/number and type of alarm. Printed messages show the type and location of the alarm (Figure 5-3).

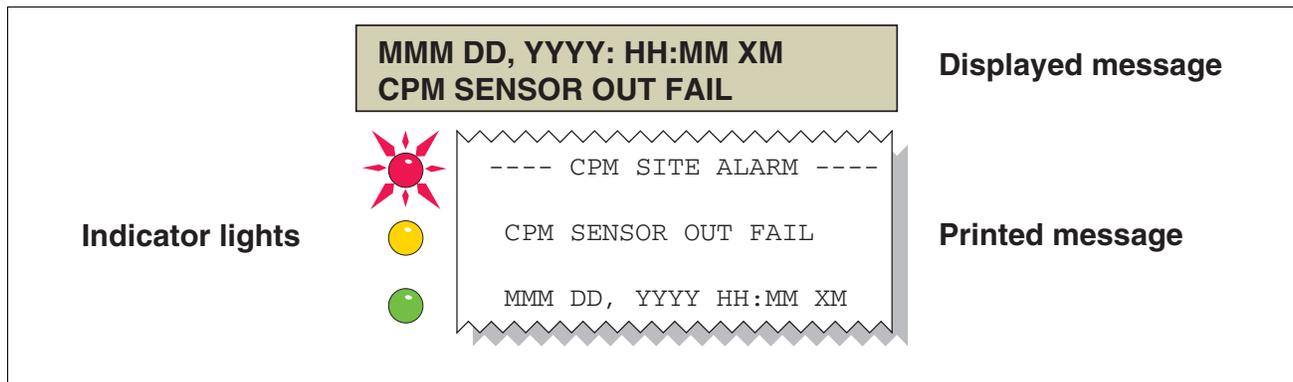


Figure 5-3. Example Alarm Posting

Upon posting a failure alarm, the TLS console logs an entry to the Failure Log.

SITE REENABLE

If you have chosen to shut down on CPM alarms, the TLS console ALARM/TEST button allows you to perform a logged shutdown override and resume dispensing. Figure 5-4 illustrates the CPM alarm override procedure.

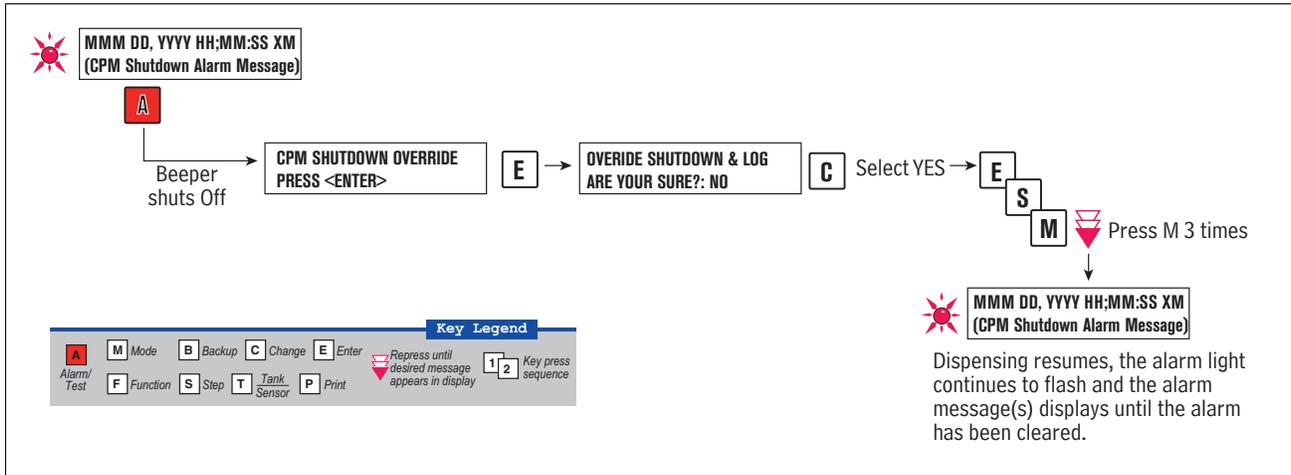


Figure 5-4. CPM Alarm Override Procedure

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.

Monthly Report Warning & Failure Log Examples:

Warning Alarms

<u>Date</u>	<u>Time</u>	<u>Description</u>	<u>Reading</u>	<u>Value</u>
2003/01/01	23:59	VAPOR CONTAINMENT LEAKAGE	CFH@2"WC	14
2002/12/31	23:59	VAPOR CONTAINMENT LEAKAGE	CFH@2"WC	13

Failure Alarms

<u>Date</u>	<u>Time</u>	<u>Description</u>	<u>Reading</u>	<u>Value</u>
2003/01/01	23:59	VAPOR CONTAINMENT LEAKAGE	CFH@2"WC	15

ALARM SEQUENCE

Each CPM monitoring test operates once each 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 Vapor Leakage test requires seven calendar days of data. 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 you have chosen to shut down on CPM alarms). If the condition continues, additional failure events are logged and the site will continue to be shutdown each day.

CPM ALARM SUMMARY

Table 5-1 summarizes the CPM Alarms - Alarms with footnote 1 will result in a site shutdown if set up to do so.

Table 5-1. CPM Alarm Summary

Displayed Message	CPM Monitoring Category	Light Indicator	Cause	Suggested Troubleshooting
CPM GROSS PRESSURE WARN ¹	Containment	Yellow	95th percentile of 7 days's ullage pressure exceeds 1.31 WC	Depends on region.
CPM GROSS PRESSURE FAIL ¹	Containment	Red	8th consecutive failure of Gross Containment Pressure test.	
CPM VAPOR LEAKAGE WARN ¹	Containment	Yellow	Vapor Leakage Detection test warning	TP-201.3
CPM VAPOR LEAKAGE FAIL ¹	Containment	Red	Vapor Leakage Detection test - 8th consecutive failure	
CPM SENSOR OUT WARN	Self-Test	Yellow	CPM Sensor Out Self-Test warning	Confirm CPM sensor & module installation / communication per Section 2..
CPM SENSOR OUT FAIL	Self-Test	Red	CPM Sensor Out Self-Test - 8th consecutive failure	
CPM SETUP WARN	Self-Test	Yellow	System Setup Self-Test warning	Confirm CPM programing per Section 3.
CPM SETUP FAIL	Self-Test	Red	System Setup Self-Test failure - 8th consecutive failure	

¹ CPM Shutdown Alarms - see "Site Reenable" on page 5-2.

Table 5-2 summarizes additional alarms that may be posted by CPM related equipment.

Table 5-2. Other Alarms

Displayed Message	Light Indicator	Set Condition	Clear Condition
MISSING TANK SETUP	Red	There are no vapor recovery (gasoline) tanks defined or a gasoline pump has not been assigned to a control (shut down) device in at least one tank.	Complete gasoline tank setup.
MISSING VAPOR PRES SEN	Red	There is no Vapor Pressure Sensor setup or detected.	Complete Vapor Pressure Sensor setup.
MISSING REGION SETUP	Red	CPM region has not been selected.	Set 'VAPOR REG REGION' to 'REGION 1' (see Figure 3-3 on page 3-3).

Reports

There are two main reports (CP-201 required) that are stored by the CPM system: the Monthly Status Report, stored for 12-months, and the Daily Status Report, stored for 365 days. A third report discussed in this section is the CPM Status Report. You can print out CPM reports from the TLS console front panel as shown in Figure 5-5.

- The Monthly Report includes:
 - CPM operational up-time (as a percentage)
 - CPM system pass time (as a percentage)
 - The Warning Log

- The Failure Log
- The Misc. Event Log
- The Daily Report includes:
 - CPM operational up-time (as a percentage)
 - Time (as a percentage) that pressure is above zero and above PV Limit (PV Crack -0.5" WC)
 - Maximum and minimum ullage pressures
 - Results of the Vapor Containment Monitoring Gross (95th percentile) Over-Pressure test and Vapor Leakage Detection (CVLD) tests according to Regulatory Region.
- CPM Status Report
 - Last test report results

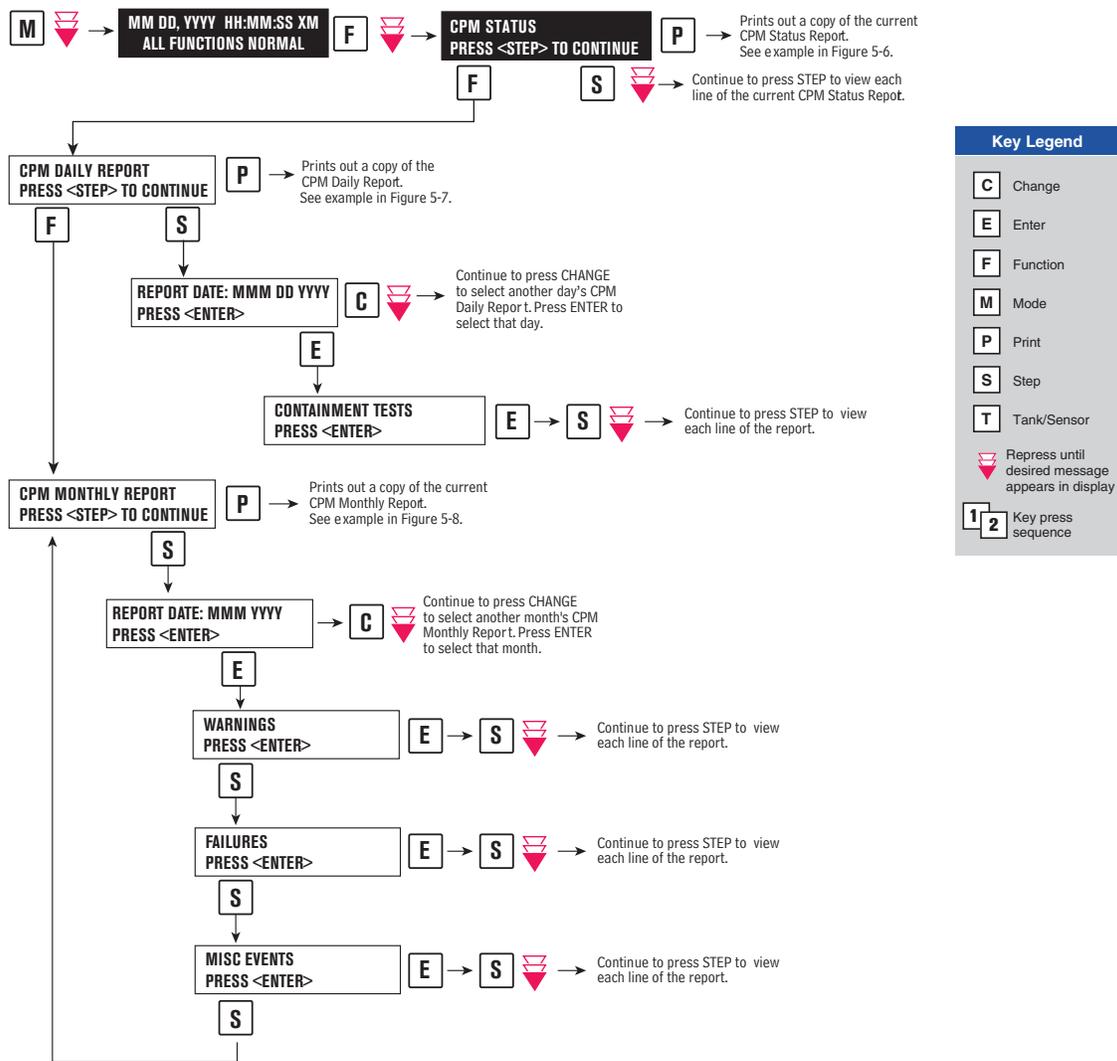


Figure 5-5. Printing CPM Reports on Console Printer

```

CPM STATUS

(LINE 1)
(LINE 2)
(LINE 3)
(LINE 4)

OCT 28, 2015 9:30 AM

CPM VERSION 01.05.10
VAPOR REGULATORY REGION:
REGION 1
VAPOR PROCESSOR TYPE
VEEDER-ROOT POLISHER

REPORT DATE: OCT 27, 2015

CONTAINMENT TEST CVLD
STATUS: 0.00FH NOTEST

CPM SENSOR SELF TEST
STATUS: PASS

CPM SETUP SELF TEST
STATUS: PASS
    
```

Figure 5-6. CPM Status Report Example - TLS Console Printout

```

CPM DAILY REPORT

(LINE 1)
(LINE 2)
(LINE 3)
(LINE 4)

OCT 28, 2015 9:30 AM

CPM VERSION 01.05.10
VAPOR REGULATORY REGION:
REGION 1
VAPOR PROCESSOR TYPE
VEEDER-ROOT POLISHER

REPORT DATE:OCT 27, 2015
CPM VERSION 01.05.10

OVERALL STATUS PASS
EVR CONTAINMENT NOTEST
TIME > 0 0%
TIME >=PVLIMIT 0%
PV LIMIT 2.000 IWC
SELF TEST PASS
CPM MONITOR UP-TIME 100%

-----
CONTAINMENT TESTS

VAPOR LEAK ON CFH
MAX -0.0 "WC
MIN -0.0 "WC

-----
SELF TEST

SETUP TEST PASS
SENSOR OUT TEST PASS
    
```

Figure 5-7. CPM Daily Report Example - TLS Console Printout

```

CPM MONTHLY REPORT

(LINE 1)
(LINE 2)
(LINE 3)
(LINE 4)

OCT 28, 2015 9:36 AM )

CPM VERSION 01.05.10
VAPOR REGULATORY REGION:
REGION 1
VAPOR PROCESSOR TYPE
VEEDER-ROOT POLISHER

REPORT DATE: OCT 2015

OVERALL STATUS WARN
EVR CONTAINMENT WARN
TIME > 0 0%
TIME >=PVLIMIT 0%
PV LIMIT 2.000 IWC
SELF TEST PASS
CPM MONITOR UP-TIME:100%

-----
DATE TIME DEVICE VALUE
DESCRIPTION VALUE

-----
LAST 10 WARNINGS

10-27 0:00
CPM VAPOR LEAK WARN

-----
LAST 10 FAILURES

-----
LAST 10 MISC EVENTS

10-28-15 12:00AM
READINESS CPM
CPM:PP EVR:-N- PENDING

10-27-15 5:35PM
TIME CHANGE AT:
10-27-15 8:10AM

10-27-15 8:12AM
PROCESSOR MODE
MANUAL

10-27-15 12:00AM
READINESS CPM
CPM:PP EVR:-F- CHECK EVR

10-26-15 12:00AM
READINESS CPM
CPM:PP EVR:-N- PENDING

10-25-15 12:00AM
READINESS CPM
CPM:PP EVR:-N- PENDING

10-24-15 12:00AM
READINESS CPM
CPM:PP EVR:-N- PENDING

10-23-15 12:00AM
READINESS CPM
CPM:PP EVR:-N- PENDING

10-22-15 12:00AM
READINESS CPM
CPM:PP EVR:-N- PENDING
    
```

Figure 5-8. CPM Monthly Report Example - TLS Console Printout

Viewing CPM Reports Via RS-232 Connection

CONNECTING LAPTOP TO CONSOLE

Connect your laptop to the TLS console's RS-232 or Multiport card using one of the methods shown in the examples in Figure 5-9 below.

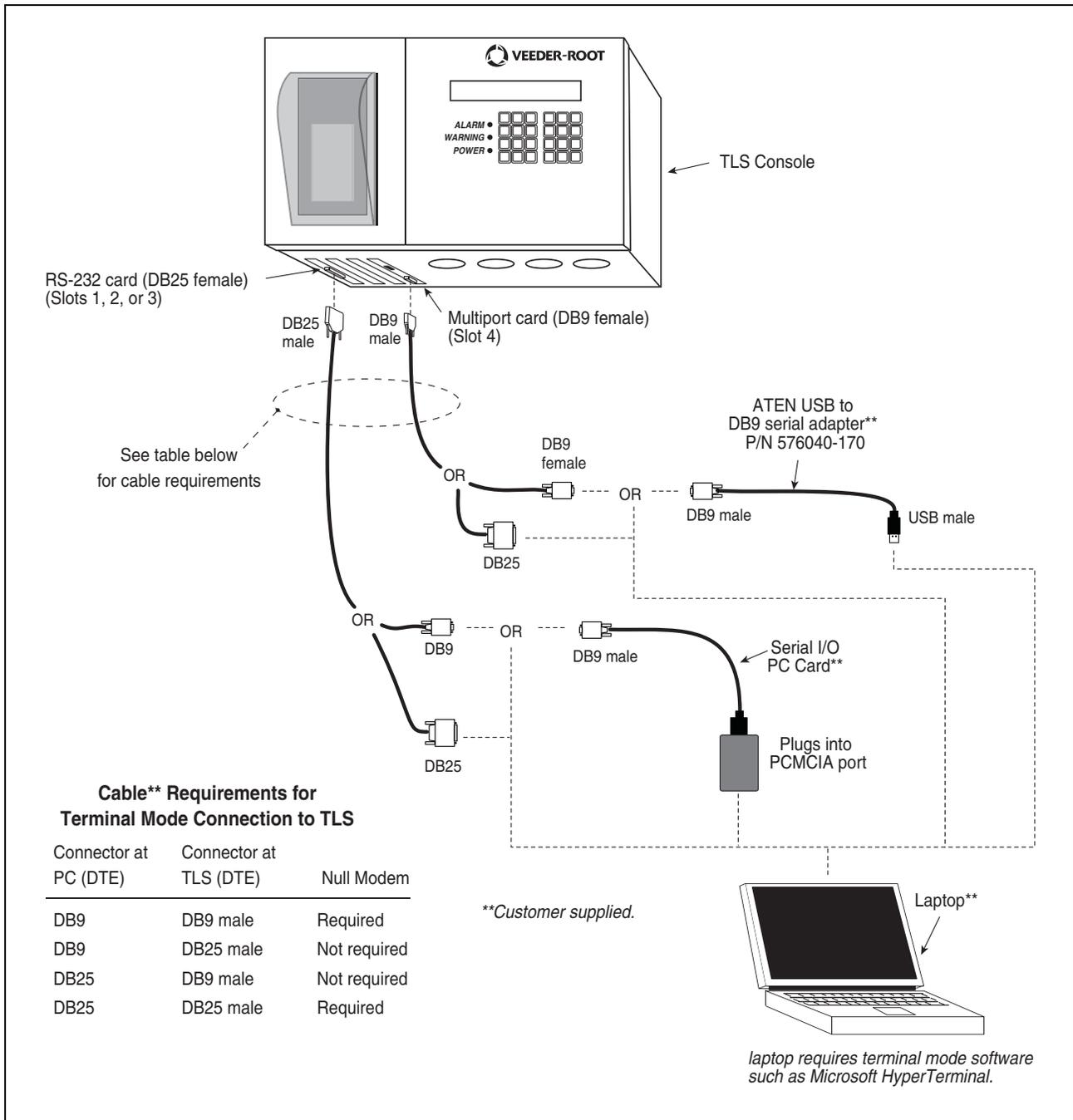


Figure 5-9. Connecting Laptop to TLS Console for Serial Communication

CONNECTING LAPTOP TO CONSOLE

1. Open your laptop's serial communication program, e.g., HyperTerminal. You can typically find HyperTerminal under: Start/Programs/Accessories/Communications.
2. After opening the terminal software program, ignore (cancel) any modem/dialing related request windows since you will be directly connecting to the console via serial communications. When the Connection Description window appears (Figure 5-10), enter a connection name, e.g., TLSDIRECT, and click the OK button.



Figure 5-10. Connection Description Window

3. After clicking the OK button, you may see a repeat of the modem/dialing windows, in which case ignore (cancel) them all.
4. When the Connect To window appears (Figure 5-11), depending on your connection method, select either COM1 (If RS-232 port on laptop), USB-Serial Controller (if using USB port on laptop), or Serial I/O PC Card (if using PCMCIA port on laptop) in the 'Connect using' drop down box, then click OK button.



Figure 5-11. Connect To Window



5. Next you should see the 'Port Settings' window.

IMPORTANT! The settings of the laptop's com port must match those of the console's com port to which you are connected.

- a. Go to the console front panel press the MODE key until you see:

```

SETUP MODE
PRESS <FUNCTION> TO CONT
  
```

- b. Press the FUNCTION key until you see the message:

```

COMMUNICATIONS SETUP
PRESS <STEP> TO CONTINUE
  
```

- c. Press the STEP key until you see the message:

```

PORT SETTINGS
PRESS <ENTER>
  
```

- d. Press the PRINT key to printout the port settings for all communication modules installed in the console. Figure 5-12 shows an example port settings printout with the RS-232 module installed. Using the console port settings in the example below, your HyperTerminal 'Port Settings' window entries would be Bits per second - 2400, Data bits - 7, Parity - Odd, Stop Bits - 1. For the 'Flow Control' entry select None. Click OK.

```

PORT SETTINGS

COMM BOARD: 1 (RS-232)
BAUD RATE: 2400
PARITY: ODD
STOP BIT: 1 STOP
DATA LENGTH: 1 DATA
RS-232 SECURITY
CODE: DISABLED
  
```

This number is the assigned by the console and indicates the slot in which the RS-232 module is installed. It could be 1, 2, or 3. However, for the RS-232 port of a Multiport module, which is installed in slot 4, this number would be 6.

If no RS-232 Security Code has been entered, you will see disabled. If a code has been entered, e.g., 000016, that 6-digit number would appear here. If a code appears, you will need to enter this code with each command you send to the console.

Figure 5-12. Console Comm Port Settings Printout Example

In the example port settings printout above, the RS-232 Security Code is disabled. If the code was enabled you would see a 6-digit number which you will need to enter to access the console (refer to the 'Sending Console Commands' paragraph below for more information).

6. After entering your port settings, the program's main window appears (Figure 5-13).

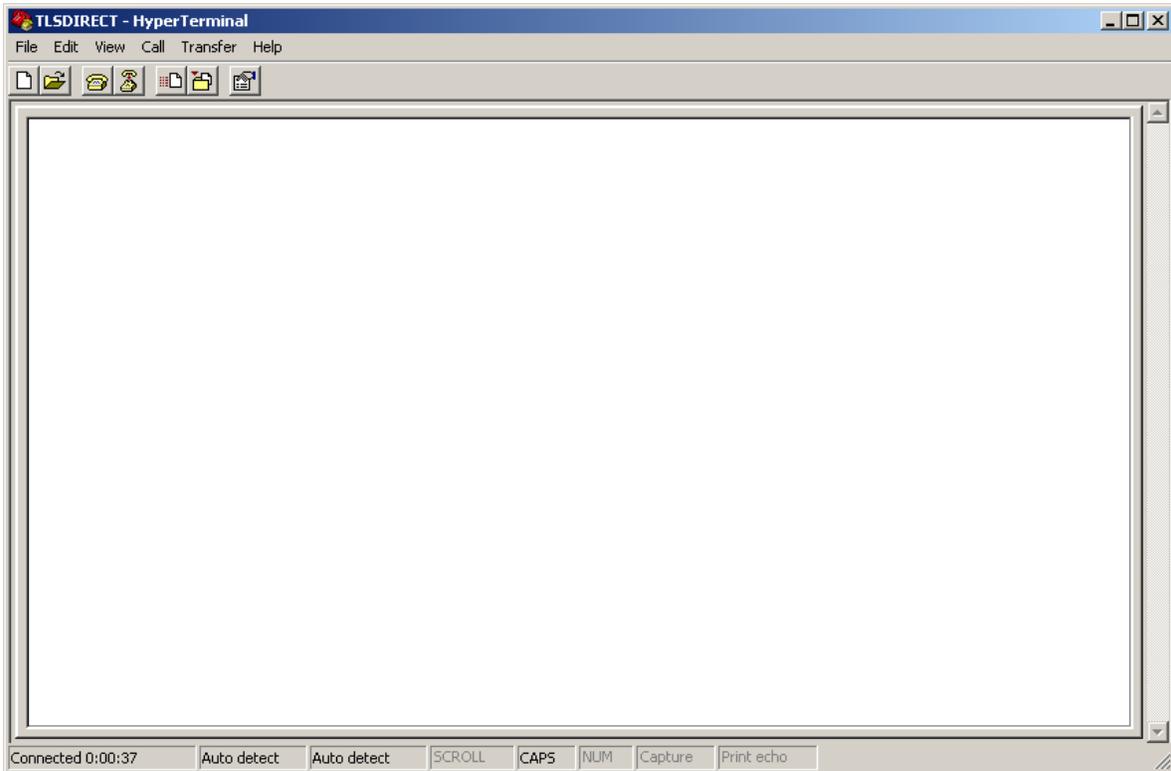


Figure 5-13. HyperTerminal Main Window

SENDING CONSOLE COMMANDS

Table 5-3 shows three important CPM console commands: IV2500, IV2200, and IV2100. The <SOH> shown in the table means that you must press and hold the **Ctrl** key while you press the **A** key.

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



Note: If you want to see the characters of the command as you type them in, click on File menu, then select Properties/Settings (tab)/ASCII Setup and click the check box for 'Echo typed characters locally', then click OK to close the window(s) and return to the main screen.

If the RS-232 Security Code is disabled - press and hold the Ctrl key while you press the A key, then type in IV2500010. 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 000016IV2500010.

You will see the typed command on the screen: `␣IV2500010` followed by the response (report) from the console. The `␣` symbol indicates CtrlA 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 `␣IV2500010␣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 5-3. Serial Commands for CPM Alarm, Monthly, and Daily Reports

Report Type	Serial Command (PC to Console)*
Daily Report Details (See example Figure 5-14)	<SOH>IV2500ddd Where ddd = number of days, 001 = yesterday and today, 002 = two days ago, etc.
Monthly Status Report (See example Figure 5-15)	<SOH>IV2200yyyymm Where yyyy = year number, e.g. 2003, mm = month number, 01 = January, 02 = February, etc.
Alarm Status (See example Figure 5-16)	<SOH>IV2100

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

```

IV2100
NOV  5, 2015  7:57 AM

<Line 1>
<Line 2>
<Line 3>
<Line 4>

CPM ALARM STATUS REPORT

CPM TYPE: 01.05.10
VAPOR REGULATORY REGION: REGION 1
VAPOR PROCESSOR TYPE: NONE

OVERALL STATUS           :PASS
EVR VAPOR CONTAINMENT   :PASS
TIME > 0                 : 5%
TIME >=PVLIMIT          : 0%   (PV LIMIT: 2.500 IWC)
CPM MONITOR UP-TIME     :100%

WARNING ALARMS
DATE      TIME      DESCRIPTION          READING      VALUE

FAILURE ALARMS
DATE      TIME      DESCRIPTION          READING      VALUE

SHUTDOWN & MISCELLANEOUS EVENTS
DATE      TIME      DESCRIPTION          ACTION/NAME
15-11-04  15:02:05  READINESS CPM:PP EVR:-P-  CPM & EVR READY
15-11-03  15:03:38  READINESS CPM:PP EVR:-N-  EVR READINESS PENDING
15-11-02  15:03:07  READINESS CPM:PP EVR:-N-  EVR READINESS PENDING
15-11-01  15:02:42  READINESS CPM:PP EVR:-N-  EVR READINESS PENDING
15-11-01  01:10:00  TIME CHANGE DETECTED AT:  15-11-01 02:09:40
15-10-31  15:01:33  READINESS CPM:PP EVR:-N-  EVR READINESS PENDING
15-10-30  15:01:09  READINESS CPM:PP EVR:-N-  EVR READINESS PENDING
15-10-29  22:40:00  TIME CHANGE DETECTED AT:  15-10-29 08:14:44
15-10-29  08:14:28  TIME CHANGE DETECTED AT:  15-10-09 08:14:27
15-10-09  08:00:18  TIME CHANGE DETECTED AT:  96-01-01 08:00:00
    
```

Figure 5-14. CPM Daily Report Details - Serial to PC Format

```

IV2200
NOV  5, 2015  7:58 AM

<Line 1>
<Line 2>
<Line 3>
<Line 4>

CPM MONTHLY STATUS REPORT

REPORT DATE: NOV 2015

CPM TYPE: 01.05.10
VAPOR REGULATORY REGION: REGION 1
VAPOR PROCESSOR TYPE: NONE

OVERALL STATUS           :PASS
EVR VAPOR CONTAINMENT   :PASS
TIME > 0                 :  9%
TIME >=PVLIMIT          :  0%      (PV LIMIT: 2.500 IWC)
CPM MONITOR UP-TIME     :100%

CPM MONITORING TEST PASS/FAIL THRESHOLDS

                                PERIOD   BELOW  ABOVE
VAPOR CONTAINMENT LEAK DETECTION FAIL @2"WCG      7DAYS   ----  8.00cfh

WARNING ALARMS
DATE      TIME      DESCRIPTION          READING      VALUE
FAILURE ALARMS
DATE      TIME      DESCRIPTION          READING      VALUE

SHUTDOWN & MISCELLANEOUS EVENTS
DATE      TIME      DESCRIPTION          ACTION/NAME
15-11-04  15:02:05  READINESS CPM:PP EVR:-P-  CPM & EVR READY
15-11-03  15:03:38  READINESS CPM:PP EVR:-N-  EVR READINESS PENDING
15-11-02  15:03:07  READINESS CPM:PP EVR:-N-  EVR READINESS PENDING
15-11-01  15:02:42  READINESS CPM:PP EVR:-N-  EVR READINESS PENDING
15-11-01  01:10:00  TIME CHANGE DETECTED AT:  15-11-01 02:09:40

```

Figure 5-15. CPM Monthly Status Report - Serial to PC Format

```

IV2100
NOV 5, 2015 7:55 AM

<LINE 1>
<LINE 2>
<Line 3>
<LINE 4>

CPM ALARM STATUS REPORT

CPM TYPE: 01.05.10
VAPOR REGULATORY REGION: REGION 1
VAPOR PROCESSOR TYPE: NONE

OVERALL STATUS           :PASS
EVR VAPOR CONTAINMENT   :PASS
TIME > 0                 : 22%
TIME >=PVLIMIT          : 0%   (PV LIMIT: 2.700 IWC)
CPM MONITOR UP-TIME     :100%

WARNING ALARMS
DATE      TIME      DESCRIPTION              READING      VALUE

FAILURE ALARMS
DATE      TIME      DESCRIPTION              READING      VALUE

SHUTDOWN & MISCELLANEOUS EVENTS
DATE      TIME      DESCRIPTION              ACTION/NAME
15-11-02 15:02:32 READINESS CPM:PP EVR:-P-   CPM & EVR READY
15-11-01 15:05:11 READINESS CPM:PP EVR:-N-   EVR READINESS PENDING
15-11-01 01:00:00 TIME CHANGE DETECTED AT: 15-11-01 02:00:13
15-10-31 15:03:19 READINESS CPM:PP EVR:-N-   EVR READINESS PENDING
15-10-30 15:02:01 READINESS CPM:PP EVR:-N-   EVR READINESS PENDING
15-10-29 15:01:23 READINESS CPM:PP EVR:-N-   EVR READINESS PENDING
15-10-29 00:00:09 READINESS CPM:PP EVR:-N-   EVR READINESS PENDING
15-10-28 00:00:09 READINESS CPM:PP EVR:-N-   EVR READINESS PENDING
15-10-27 21:39:00 TIME CHANGE DETECTED AT: 15-10-27 08:03:48
15-10-27 08:03:38 TIME CHANGE DETECTED AT: 15-10-09 08:03:37

```

Figure 5-16. CPM Alarm Status Report - Serial to PC Format

6 Maintenance

TLS Console

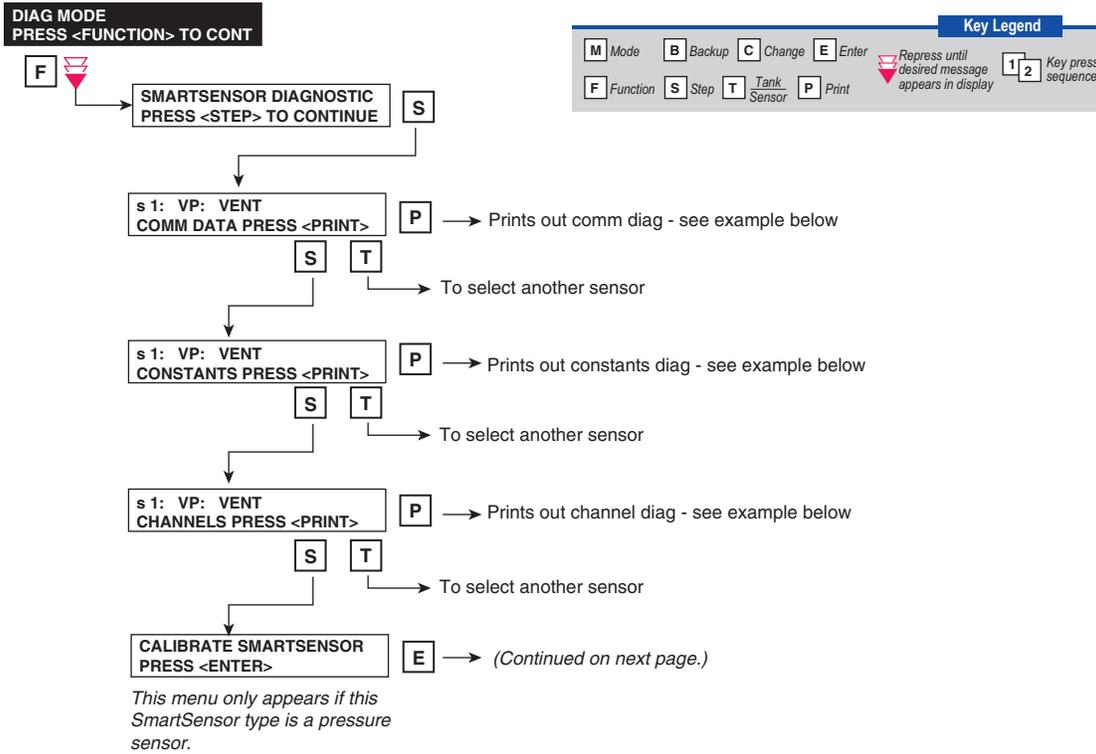
The TLS console, including interface modules, do not require scheduled maintenance, but the station operator is responsible to ensure printer paper is properly loaded and front panel indicator lights are operational. CPM System Self-Test Monitoring algorithms are designed to verify proper selection, setup and operation of the TLS console and sensors.

Vapor Pressure Sensor

There is no recommended maintenance, inspection nor calibration for the Vapor Pressure Sensor.

7 Diagnostic Menus

The diagnostic menus below are accessed and viewed from the TLS console front panel.



```

SS COMM DIAG
-----
s 1: VPS
SAMPLES READ    51182
SAMPLES USED    51150
PARITY ERR      0
PARTIAL READ    14
COMM ERR        14
RESTARTS        0
    
```

```

SS CONSTANTS DIAG
-----
s 1: VPS

VAPOR PRESSURE
SERIAL NUMBER    11293
PROTOCOL VERSION 0
    
```

```

SS CHANNEL DIAG
-----
s 1: VPS
15-11-02 16:19:31
C00 B50B 3D07 B5FF 0001
C04 0B4C 2C1D 0000 0004
C08 0A3C 3D68 6EEF 0084
C12 80C4 80A4 0104 1A9B
C16 12D0 0F42 0F42 3D68
C20 7094 0032 0400 E8D0
    
```

Figure 7-1. SmartSensor Diagnostic Menu

7 Diagnostic Menus

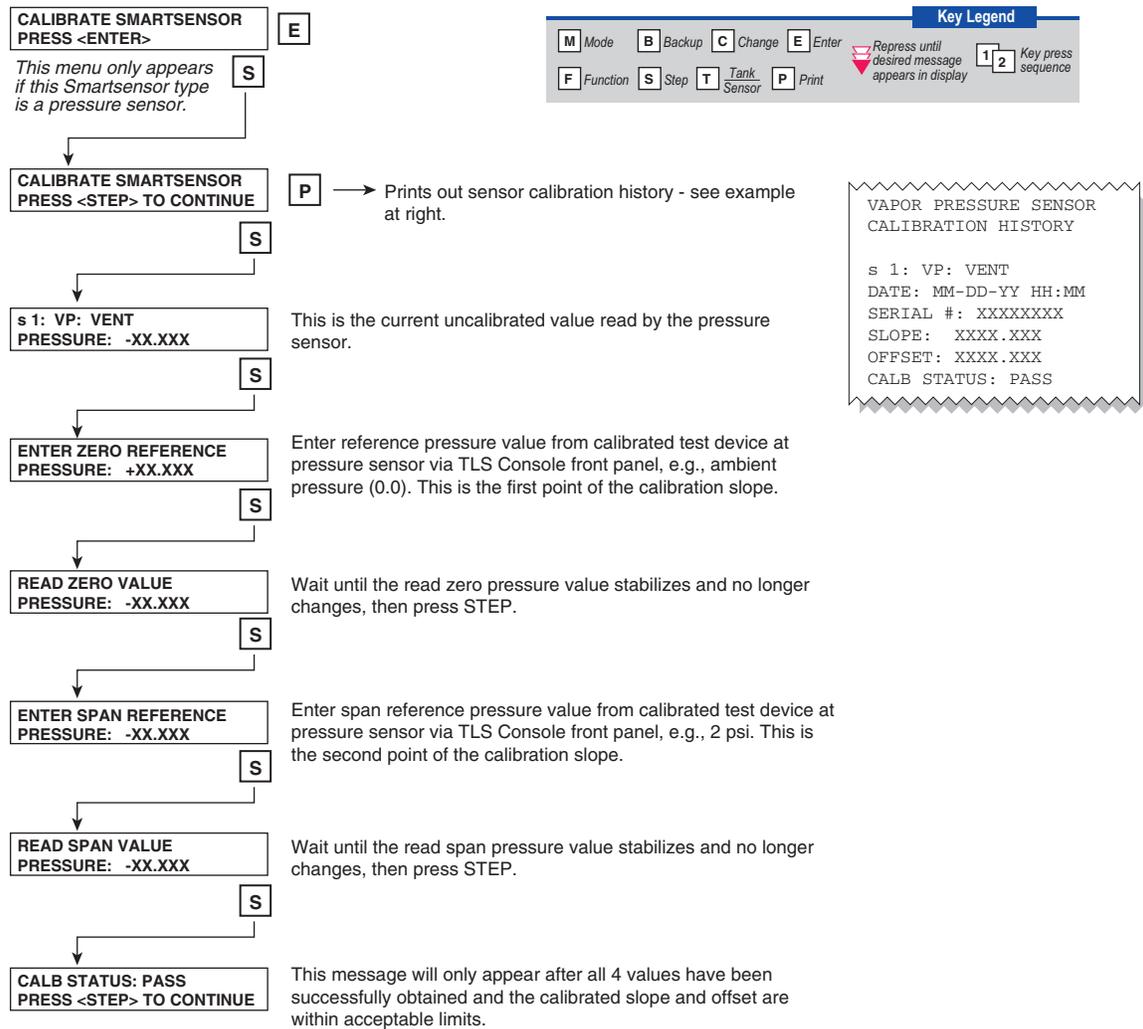
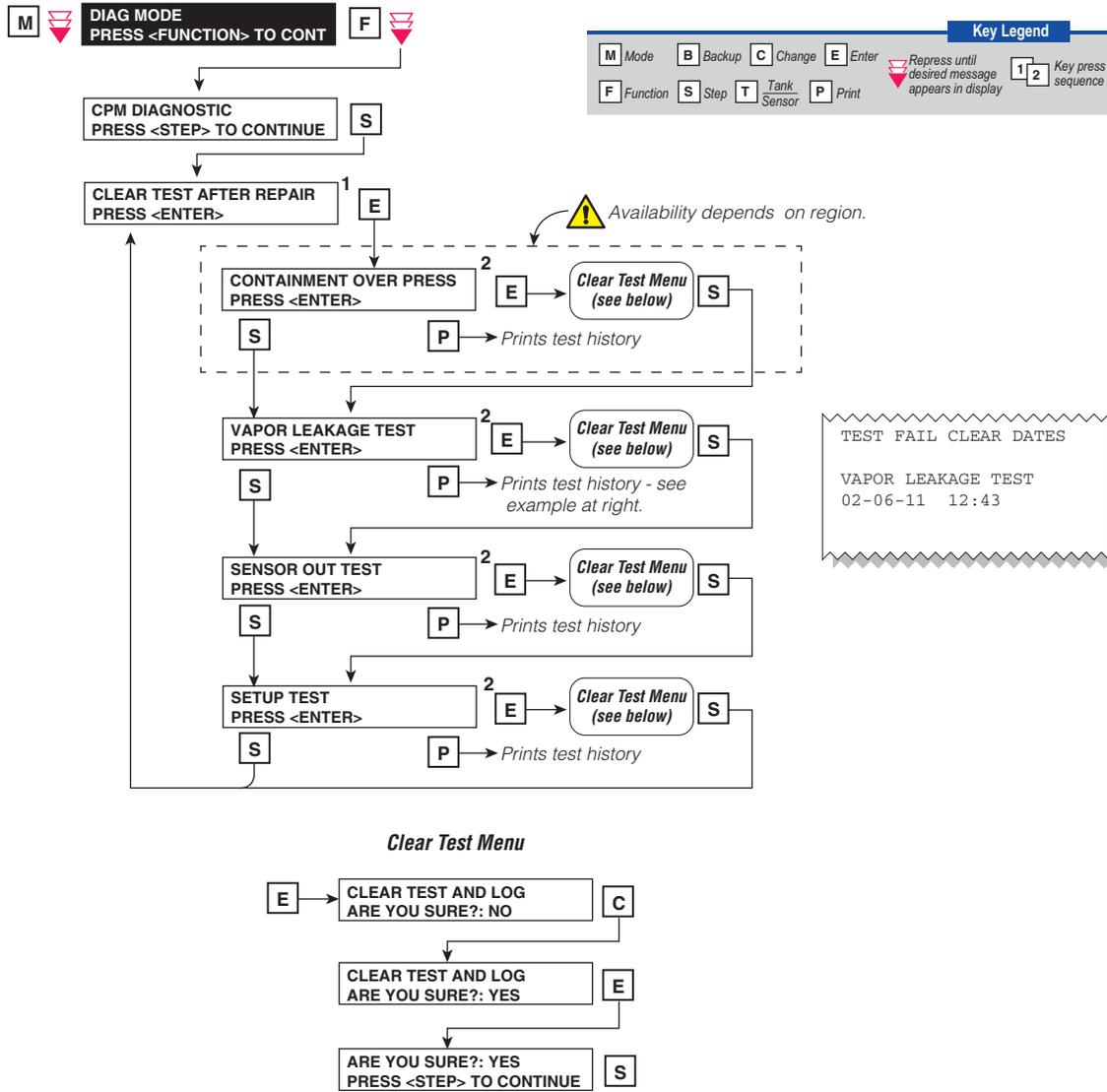


Figure 7-2. SmartSensor Diagnostic Menu concluded



Notes:

1. All repair dates are saved in the Miscellaneous Event Log.
2. Reference the Clear Test Repair Menu in Table 7-1 on the next page.

Figure 7-3. Clear Test After Repair Diagnostic Menu

Table 7-1. Clear Test Repair Menu

Menu Selection	Clears Alarms	Reset Dates
Containment Over Press ¹	CPM GROSS PRESSURE WARN CPM GROSS PRESSURE FAIL	Containment Test Time
Vapor Leakage Test	CPM VAPOR LEAKAGE WARN CPM VAPOR LEAKAGE FAIL	Vapor Leak Test Time
Sensor Out Test	CPM SENSOR OUT WARN CPM SENSOR OUT FAIL	Sensor Out Test Time
Setup Test	CPM SETUP WARN CPM SETUP FAIL	Setup Self Test Time

¹Depends on region.

