Pressure Management Control

Install, Setup, & Operation Manual

For Veeder-Root Vapor Polishers

VEEDER-ROOT

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Please see next page.

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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 TLS-3XX supplied literature. Do not use this manual when PMC is installed with ISD. Use the ISD Setup & Operation Manual, VR204 Section 12.

Site Requirements

Below are the requirements for all PMC installations:

- V-R TLS-350R/EMC w/BIR, TLS-350 Plus/EMC Enhanced, TLS-350/EMC and ProMax consoles with ECPU2 - install as per TLS-3XX Site Prep manual, setup following instructions in TLS-3XX System Setup Manual.
- A flash memory board (NVMEM203) for PMC 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.
- Vapor Pressure Sensor and Smart Sensor Module- install and connect following instructions in the Vapor Pressure Sensor Installation Guide.
- Carbon Canister Vapor Polisher - install and connect following instructions in the Carbon Canister Vapor Polisher Installation and Maintenance Guide.
- An RS-232 Port will be available for use by contractor or government inspectors.

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.

- Wireless 2
- Tall Tank

VR Vapor Products Certification: Contractors holding a certification with the following designations are approved to perform installation checkout, startup, programming, system tests, troubleshooting, service techniques and operations training on the designated system.

- ISD – In Station Diagnostics
- PMC – Pressure Management Control
- CCVP - Veeder-Root Vapor Polisher
- Wireless – ISD/PMC Wireless

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 below are shipped with the equipment on the V-R Tech Docs CD-ROM and will be needed to install specific equipment.

Table 1. Related Manuals

V-R Manual	Part Number
TLS-3XX Site Prep Manual	576013-879
Vapor 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
Carbon Canister Vapor Polisher Installation and Maintenance Guide	577013-920
In-Station Diagnostics and PMC Troubleshooting Guide	577013-819
TLS RF Wireless 2 System (W2) Installation and Maintenance Guide	577013-964

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.
	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.		**WARNING** Heed the adjacent instructions to avoid equipment damage or personal 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.

Installation

This section discusses the installation and wiring of the hardware required to enable the TLS console to perform pressure management of the site's gasoline vapor polisher equipment:

- Vapor Pressure Sensor
- Carbon Canister Vapor Polisher
- Smart Sensor Interface Module
- NVMEM203 board
- Multiport Card - only required for sites with TLS console controlled vapor processor
- I/O Combination Module - only required for sites with non-TLS console controlled vapor processor

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 return piping of the gasoline dispenser closest to the tanks following the instructions in the Vapor Pressure Sensor Installation guide (P/N 577013-797).

Carbon Canister Vapor Polisher

Install one Carbon Canister Vapor Polisher following the instructions in the Carbon Canister Vapor Polisher Installation and Maintenance Guide (P/N 577013-920).

Installing TLS Console Modules - General Notes

TLS consoles have three bays in which interface modules can be installed; Comm bay, Power bay and Intrinsically-Safe bay (ref. Figure 1). Probe Interface modules and Smart Sensor modules are installed in the Intrinsically-Safe bay and the Mod Bus module is installed in the Comm bay.

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.

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

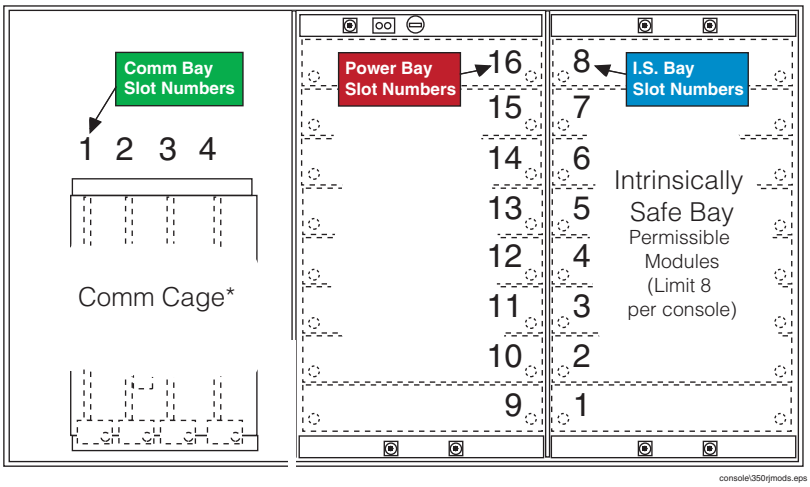


Figure 1. TLS console Interface Module Bays

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 TLS console will not identify correctly 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., VPS: FP1.

Smart Sensor Interface Module

Verify that a Smart Sensor Interface Module with Atmospheric Sensor (P/N 332250-001) is installed in the TLS console. Connect the field wiring from the Vapor Pressure Sensor (VPS) to the Smart Sensor Interface Module as instructed in the VPS installation manual. The Carbon Canister Vapor Polisher will also be connected to the Smart Sensor Interface Module.

NVMEM203 Board

Verify that a NVMEM203 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 PMC software and store PMC reports. No setup is required.

Setup

Introduction

This section describes how to perform PMC setup 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 PMC-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 console may not operate properly. 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.

Smart Sensor Setup - Vapor Pressure Sensor

The Smart Sensor Interface Module is installed in the Intrinsically-Safe bay of the TLS console. This module monitors the Vapor Pressure Sensor. Figure 2 diagrams the Smart Sensor setup procedure.

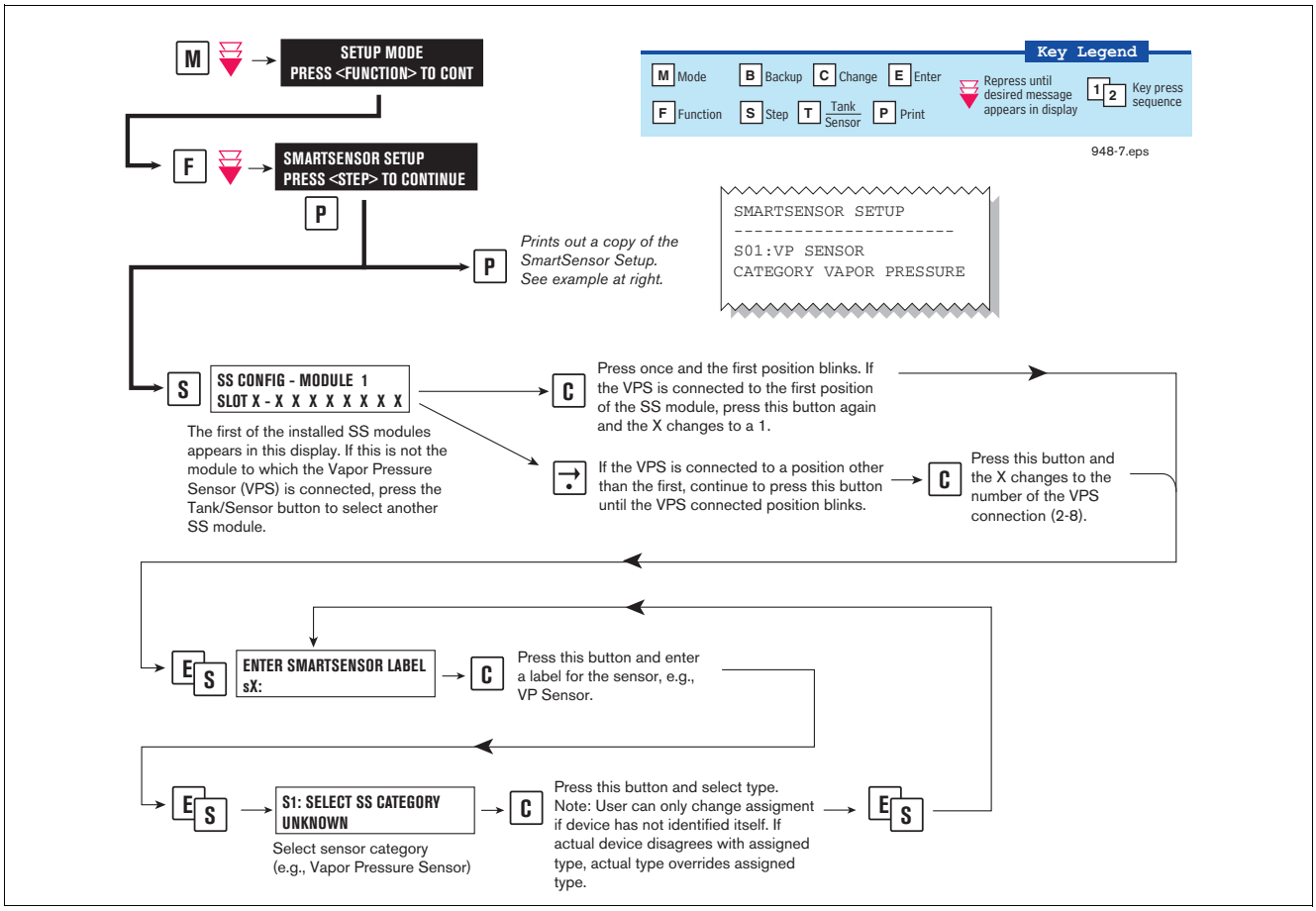


Figure 2. Smart Sensor Setup - Vapor Pressure Sensor

Smart Sensor Setup - Vapor Polisher

The Smart Sensor Interface Module is installed in the Intrinsically-Safe bay of the TLS console. This module monitors the Vapor Polisher. Figure 3 diagrams the Smart Sensor setup procedure.

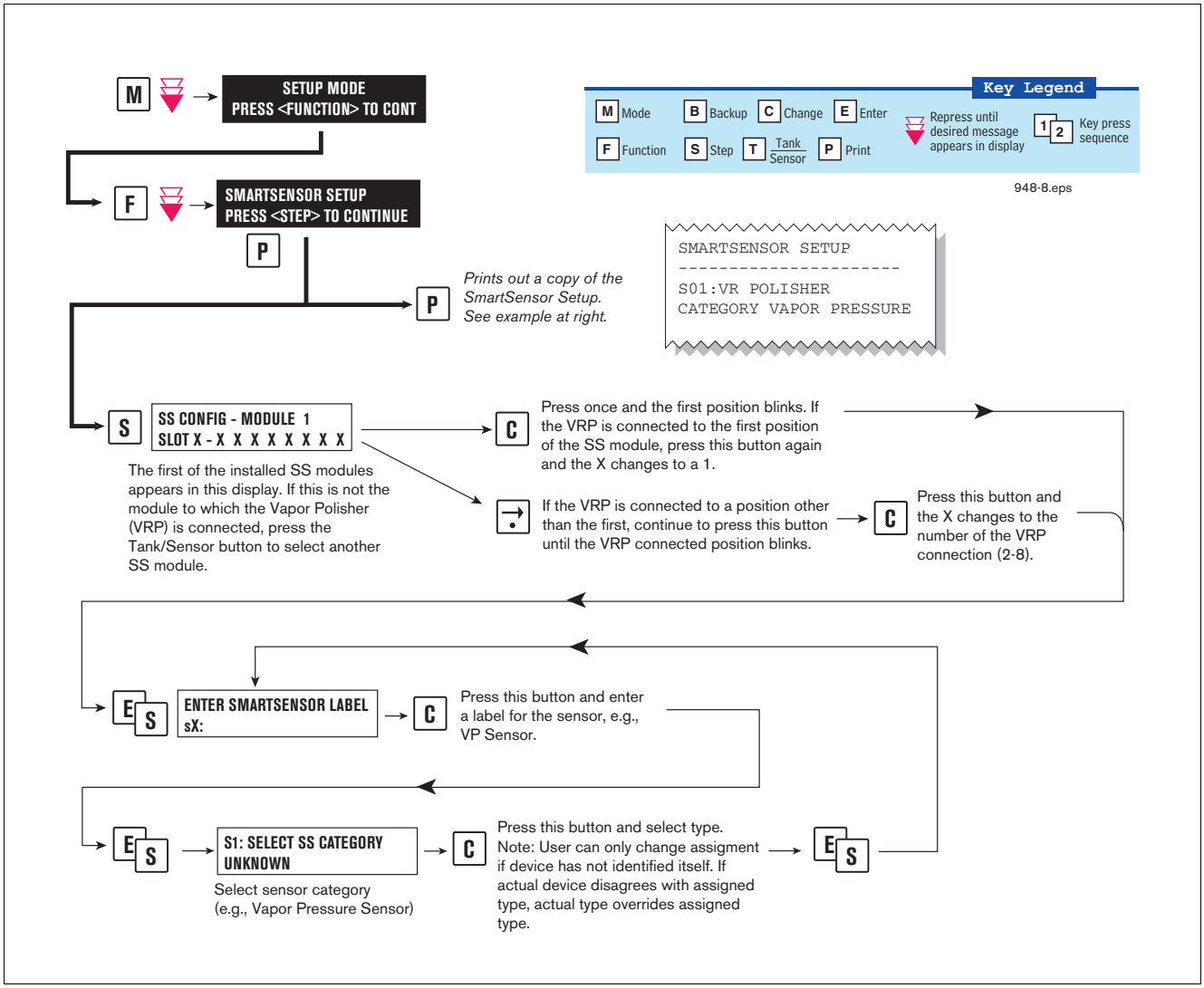


Figure 3. Smart Sensor Setup - Vapor Polisher

ATM Pressure Sensor Setup

The ATM Pressure Sensor is factory installed in the SmartSensor / Press module and preassigned to channel 8. At least one SmartSensor / Press module, which contains the ATM Pressure Sensor, must be installed in the console. You must configure at least one ATM Pressure Sensor for use by the Vapor Polisher or a PMC Set-up Fail will occur. NOTE: if more than one SmartSensor / Press module is installed, only one ATM Pressure Sensor needs to be configured.

Look in console and note the slot position of the SmartSensor / Press module. Enter the Setup Mode and press the FUNCTION key until you see the message:

SMARTSENSOR SETUP
PRESS <STEP> TO CONTINUE

Press STEP until you see the message:

SS CONFIG - MODULE *n*
SLOT *x* - X X X X X X X X

Where *x* is the slot number containing the SmartSensor / Press module. Press the → key to move the cursor to the last (8th) X. Press CHANGE and the message below should appear:

SLOT *x* - X X X X X X X 8
PRESS <STEP> TO CONTINUE

Press STEP:

ENTER SMARTSENSOR LABEL
s 8:

NOTE: In the example above, the ATM P sensor position is 8 but it could be16, 32, or 40 depending on the SmartSensor's module number.

Press CHANGE and enter a label:

ENTER SMARTSENSOR LABEL
s 8: (ATMP Sensor Label)

Press ENTER to accept your label:

s 8: (ATMP Sensor Label)
PRESS <STEP> TO CONTINUE

Press STEP:

s 8: SELECT SS CATEGORY
UKNOWN

Press CHANGE until you see the message:

s 8: SELECT SS CATEGORY
ATM P SENSOR

Press ENTER to accept the category. Press STEP, then BACKUP to return to the configuration display for Smart Sensor module 1:

SS CONFIG - MODULE 1
SLOT *x* - X X X X X X X X

This completes the ATM Pressure Sensor configuration.

PMC Setup

Figure 4 diagrams the PMC setup programming.

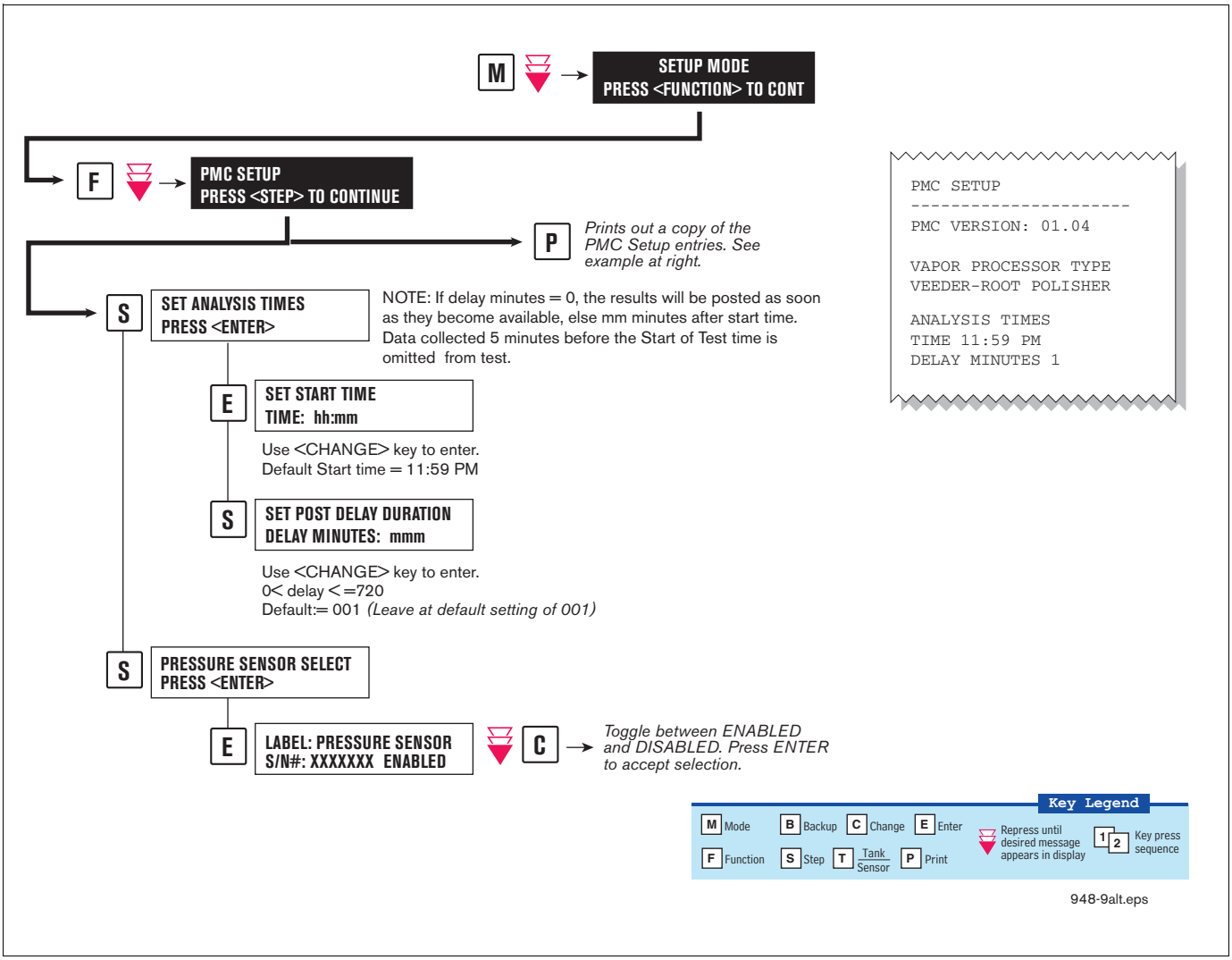


Figure 4. PMC Setup

Alarms

OVERVIEW OF TLS CONSOLE INTERFACE

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

During normal operation when the TLS console and monitored PMC equipment 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).

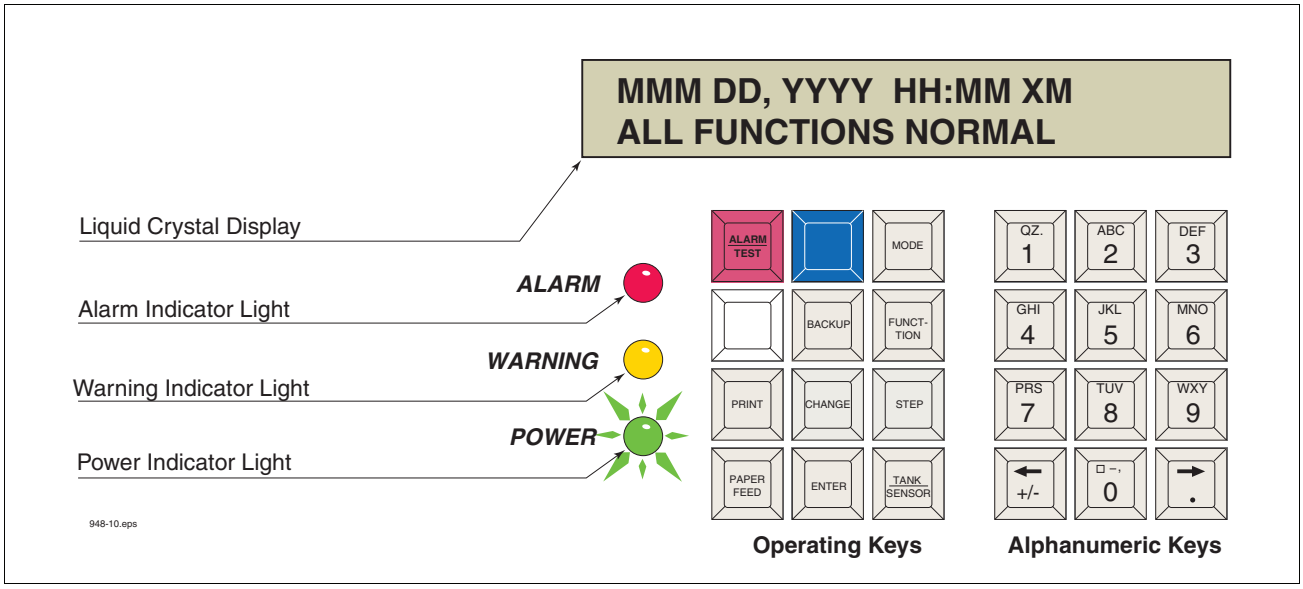


Figure 5. TLS console alarm interface

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.

Alarm posting causes the TLS console-based system to activate indicator lights, an audible alarm, and an automatic strip paper printout documenting the alarm.

ALARM POSTING

Displayed messages alert you to the type of alarm. Printed messages show the type of alarm and the time it was was posted (see Figure 6). Alarms are logged into the Priority Alarm History and warnings are logged in the Non-Priority Alarm History in the TLS.

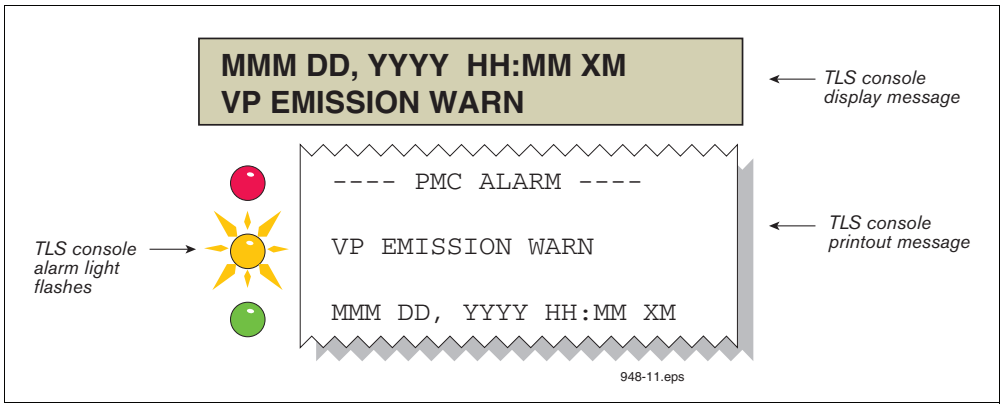


Figure 6. TLS console alarm example

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 Smart Sensor Device Alarm or Fault.

[1]Refer to the Troubleshooting Section of this manual and the ISD/PMC Troubleshooting Guide 577013-819.

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.

PMC Status Report

Figure 7 below shows the procedure to view the PMC Status Report.

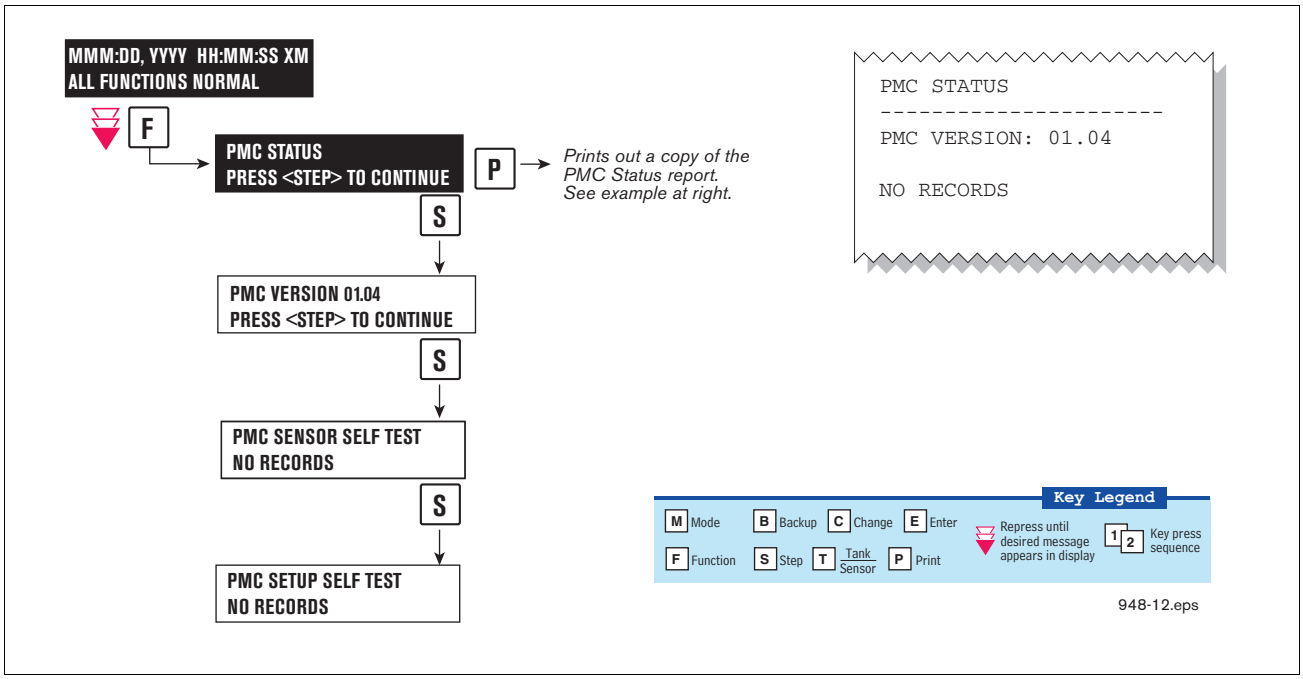
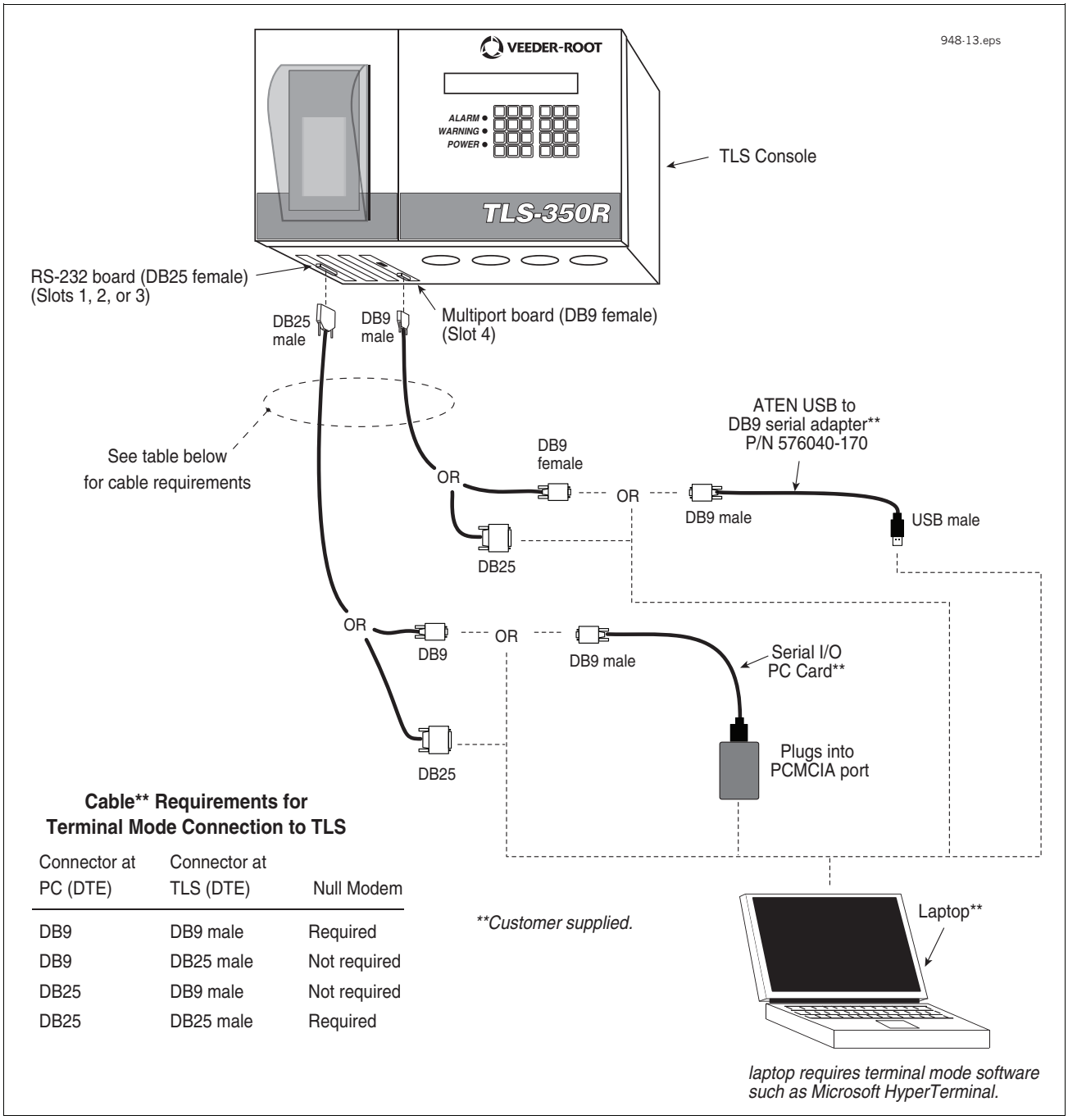


Figure 7. PMC Status Report

Viewing PMC Reports Via RS-232 Connection

CONNECTING LAPTOP TO CONSOLE

Connect your laptop to the TLS console's RS-232 or Multiport module using one of the methods shown in the examples in Figure 8 below.



Cable Requirements for Terminal Mode Connection to TLS**

Connector at PC (DTE)	Connector at TLS (DTE)	Null Modem
DB9	DB9 male	Required
DB9	DB25 male	Not required
DB25	DB9 male	Not required
DB25	DB25 male	Required

***Customer supplied.*

Figure 8. 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 9), enter a connection name, e.g., TLSDIRECT, and click the OK button.

Figure 9. 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 10), 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 10. 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 11 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.

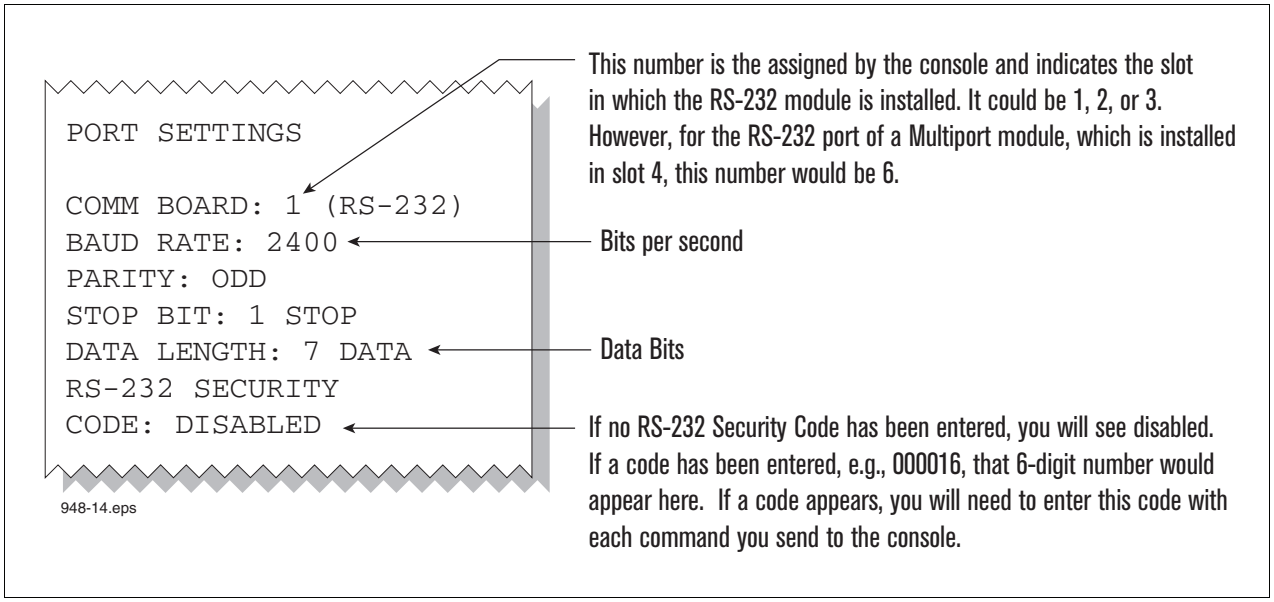


Figure 11. Console comm port settings printout example

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 12).

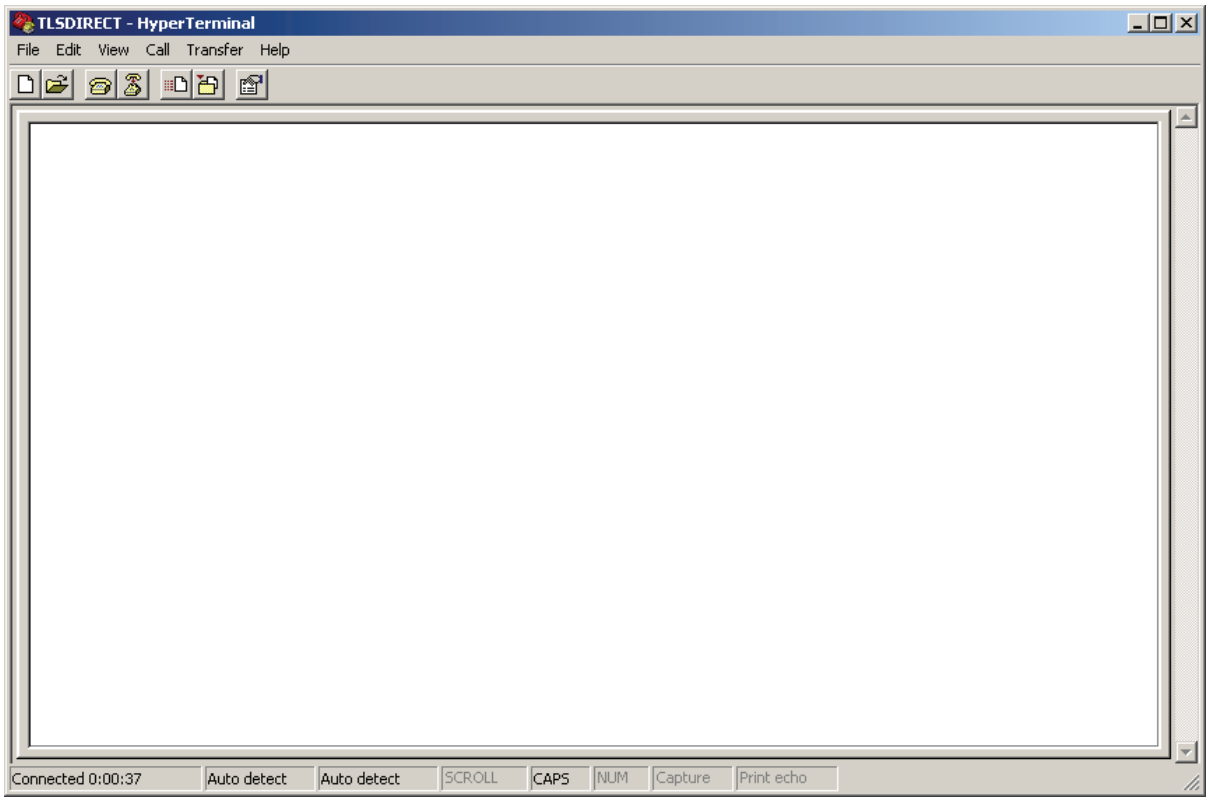


Figure 12. HyperTerminal main window

SENDING CONSOLE COMMANDS

Table 3 shows important PMC console commands. 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 Vapor Polisher Runtime Diagnostic Report.

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 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.

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 ☺IV80000☺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 3. Serial Commands for PMC Diagnostic Reports

Report Type	Serial Command (PC to Console)*
Vapor Valve Status Report (See example Figure 13)	<SOH>IB6100
Smart Sensor Sub Alarm History Report (See example Figure 14)	<SOH>IB6200
Vapor Processor Status Report (See example Figure 15)	<SOH>IV8200
Priority Alarm History Report (See example Figure 16)	<SOH>I11200
Non-Priority Alarm History Report (See example Figure 17)	<SOH>I11100
Vapor Polisher Runtime Diagnostic Report (See example Figure 18)	<SOH>IV8000
Daily Vapor Polisher Diagnostic Report (See example Figure 19)	<SOH>IV8800yyyymmddnnnn Where yyyy=year number, mm=month number (01=January, 02=February, etc.), dd=day of the month; nnnn=number of records after the date entered (9999=all).

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

Figure 13 shows an example Vapor Valve Status report.

```
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 TEMP:      65.08 F
OUTLET TMP:      75.05 F
SENSOR FAULTS:
 NONE
```

Figure 13. Vapor Valve Status Report - Serial to PC Format

The IB6100 command reports the current state of the Vapor Valve Components. The current position of the valve is reported as Open or Closed. The Capacitors are used to move the valve and are reported as Charged or Discharged. Outlet Temperature is the Canister thermal probe temperature. Ambient Temperature is the temperature at the Vapor Valve ambient temperature sensor. Sensor Faults are the active faults reported by the Vapor Valve. The IB6100 (Figure 13) command only provides active Sensor Fault conditions. Use the IB6200 command to see archived fault conditions (Figure 14).

```
IB6200
SEP 19, 2008  1:05 PM

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

SMART SENSOR SUB ALARM HISTORY

ID  TYPE  ALARM TYPE           SUB ALARM                STATE    DATE    TIME

 9   14   SENSOR FAULT ALARM   TEMPERATURE RANGE FAULT  CLEAR  9-19-08  11:50AM

 9   14   SENSOR FAULT ALARM   TEMPERATURE RANGE FAULT  ALARM  9-19-08  11:46AM
```

Figure 14. Smart Sensor Sub Alarm History Report - Serial to PC Format

Figure 15 shows an example Vapor Processor Status Report.

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

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

VAPOR PROCESSOR STATUS REPORT

PMC VERSION: 01.04

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 15. Vapor Processor Status Report - Serial to PC Format

Figure 16 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 16. Priority Alarm History Report - Serial to PC Format

Figure 17 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 17. Non-Priority Alarm History Report - Serial to PC Format

Figure 18 shows an example Vapor Polisher Runtime Diagnostic Report and Table 4 explains the `IV8000` report's event codes.

```
IV8000                                        948-16.eps
FEB  4, 2008  1:01 PM

TLS_350 UST
VEEDER-ROOT TEST LAB
125 POWDER FOREST DR
SIMSBURY, CT 06070

VAPOR POLISHER
VALVE EVENT          PRESSURE
DATE-TIME              "WC      EVENT CODE
 1-31-08  3:44PM      -0.700    OPEN PURGE
 1-31-08  3:47PM       0.038    CLOSE FORCE PURGE
 1-31-08  3:51PM      -0.255    OPEN PURGE
 1-31-08  8:08PM      -0.300    CLOSE PURGE Hi P
 2-01-08  1:59PM      -0.300    OPEN PURGE
 2-01-08  2:18PM      -0.263    OPEN PURGE
 2-01-08  2:33PM      -0.289    OPEN PURGE
 2-04-08 11:22AM      -0.560    NO EVENT
 2-04-08 11:28AM      -0.560    OPEN PURGE
 2-04-08 11:48AM      -0.300    OPEN PURGE
 2-04-08 12:28PM      -0.263    OPEN PURGE
 2-04-08 12:42PM      -0.299    OPEN PURGE
```

Figure 18. Vapor Polisher Runtime Diagnostic Report - Serial to PC Format

Table 4. Vapor Polisher 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	CLOSE EMPTY	Excess purging is complete.
OPEN TEST	Manual operation of the valve	OPEN PURGE	Canister load is >0% and pressure <-0.25
CLOSE PURGE HI P	The canister state is in excess purge and the pressure is >-0.5.	OPEN EXCESS PURGE	Canister load is 0%, Excess purge is incomplete, pressure <-1.5, time is between 6AM and 4PM.
CLOSE PURGE TIME	The canister state is in excess purge and the time is outside 6AM to 4PM.	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% and below emission limit.
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 load equals 0% after having loaded to more than 1%. No valve state change.	CLOSE CVLD TEST	Valve closed to collect data for ISD containment leak test.
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.		

Figure 19 shows an example PMC Daily Vapor Polisher Diagnostic Report.

```
IV8800
OCT 2, 2008 2:53 PM

PMC DAILY VAPOR POLISHER DIAGNOSTIC

                    LOAD  PRGE  MIN%  MAX%  SELF  EMISSION
DATE/TIME           HRS   HRS   LOAD  LOAD  TEST  TEST
08-10-02 13:58:58   3.1   2.5    15    69   WARN  FAIL
```

Figure 19. PMC Daily Vapor Polisher Diagnostic Report - Serial to PC Format

Diagnostics

Automatic Control

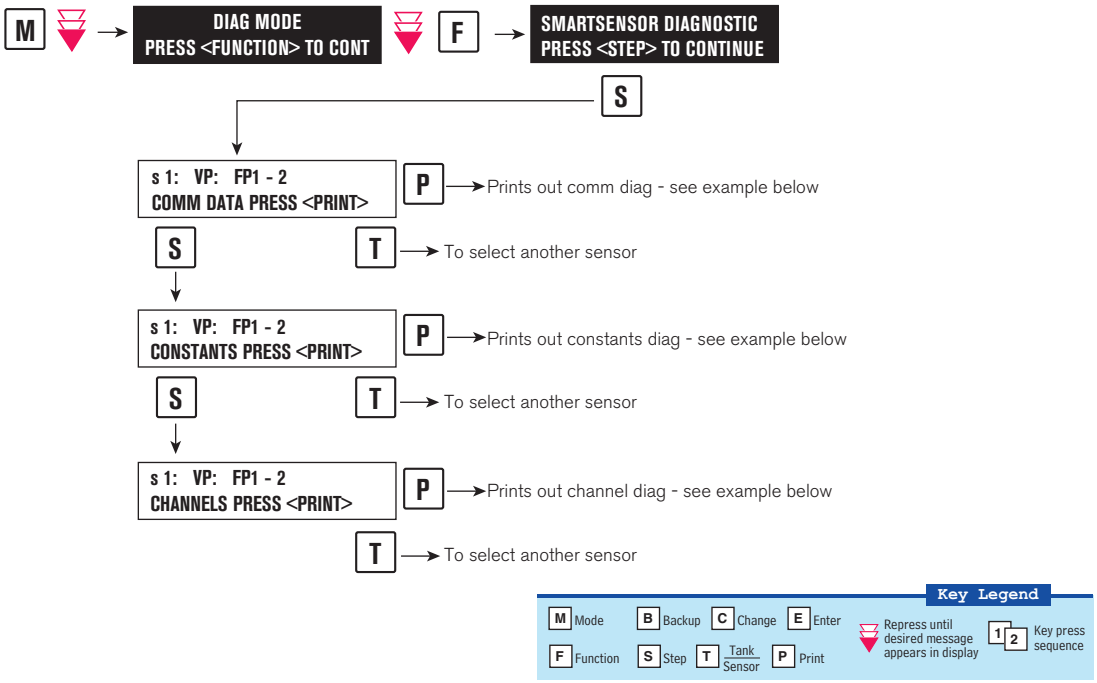
If PMC mode is in AUTOMATIC, PMC will control flow through the canister using a vapor control valve. The control algorithms will monitor tank pressure, atmospheric pressure, vapor temperature and carbon temperature to monitor carbon canister loading. When the pressure is positive, the valve is opened to relieve the pressure and begin loading the canister. Purging occurs when the valve is open and the UST pressure is negative. The valve will close when the canister has either reached capacity or the canister is empty after purging.

Manual control

If PMC mode is in MANUAL, the diagnostic menu allows the valve to be opened (ON) or closed (OFF) manually. This feature is to support testing operation (see Exhibit 11 of VR 203) of the valve without waiting for canister to reach loading or purging thresholds. When set to Manual mode, the system will reset to Automatic mode after 4 hours. The current UST ullage space vapor pressure will also be available through the diagnostic menu.

PMC Diagnostic Menus

The Smart Sensor (see Figure 20) and PMC (see Figure 21) diagnostic menus below are viewed from the TLS Console front panel.




```
SS COMM DIAG
-----------------------
s 1: AFM1   FP1-2
SAMPLES READ    58
SAMPLES USED    54
PARITY ERR       0
PARTIAL READ     0
COMM ERR         0
RESTARTS         0
```

```
SS CONSTANTS DIAG
-----------------------
s 1: AFM1   FP1-2

VAPOR PRESSURE
SERIAL NUMBER     1007
PROTOCOL VERSION     0
```

```
SS CHANNEL DIAG
-----------------------
s 1: AFM1   FP1-2
YY-MM-DD  HH:MM:SS
C00 B50B 3D68 00E0 0000
C04 0000 03EF 0000 0004
C08 0A3C 3D68 5693 0081
C12 80C4 80A4 0104 2579
C16 0000 0000 00A3 03D6
C20 0709 0032 04C9 880F
```

948-1.eps

Figure 20. SmartSensor Diagostic Menus

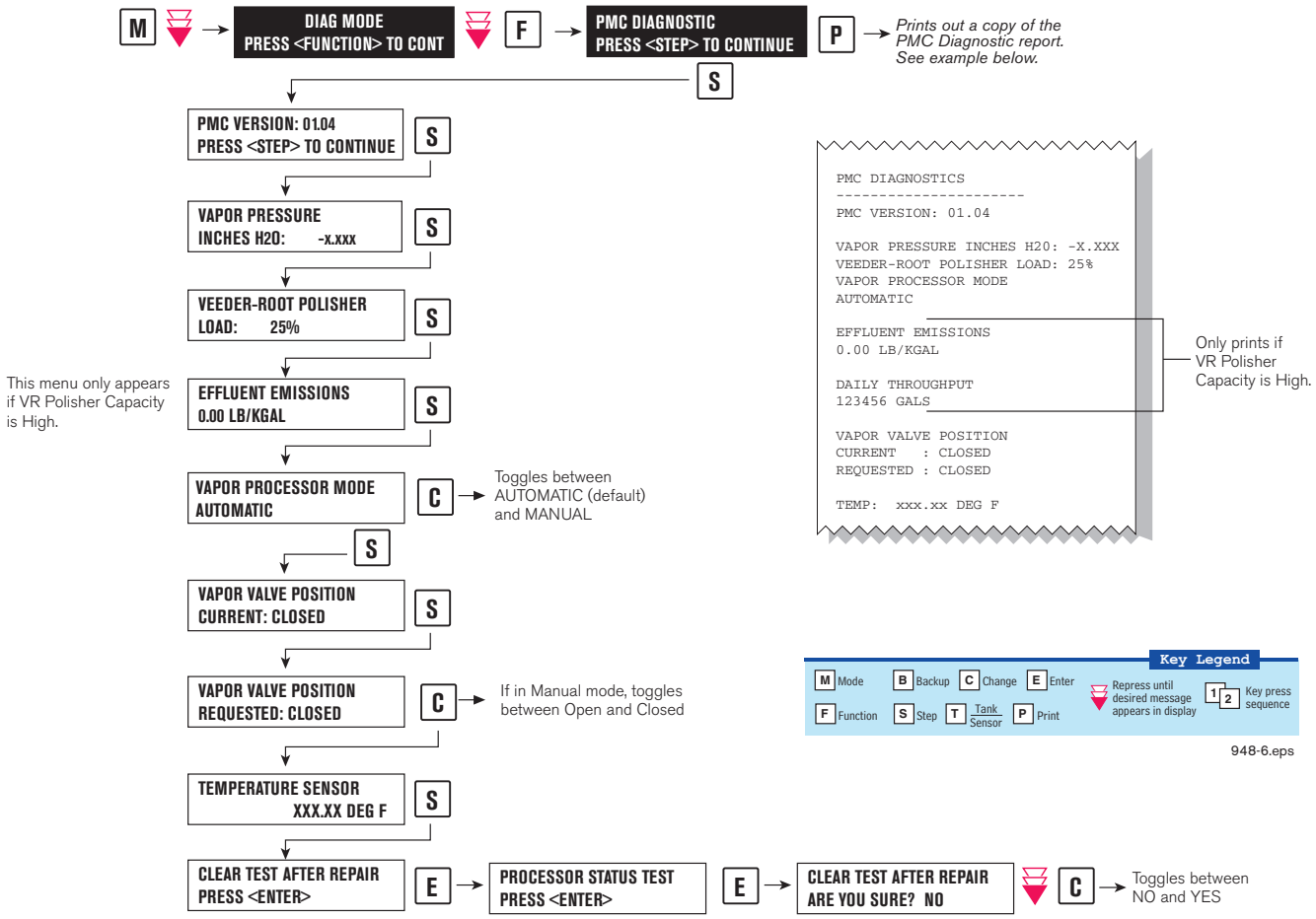


Figure 21. PMC Diagnostic Menus

Troubleshooting

PMC Setup

This warning occurs when the PMC setup is not complete.

DIAGNOSTIC CHECKLIST

Procedure		
STEP 1.	**Gasoline tanks configured?**	☐
STEP 2.	**ATM sensor configured and enabled?**	☐
STEP 3.	**Vapor valve installed and configured?**	☐
STEP 4.	**On the TLS press the MODE key until the DIAGNOSTIC MODE menu is displayed (this will cause a TLS console System Self-Test).**	☐
STEP 5.	**If alarm does not clear, contact Veeder-Root Technical Support at (800) 323-1799.**	

PMC Sensor Faults

Table 5 contains a listing of the Smart Sensor 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 5. Smart Sensor Device Fault Summary

Fault Message	Devices	Cause	Suggested Troubleshooting
Communication Alarm	Vapor Valve, Pressure Sensor, Tank Probe	Device not communicating with Smart Sensor Module	Check wiring and connections from the Smart Sensor board to the device in alarm.
Smart Sensor Fault Valve Command Fault	Vapor Valve	Valve will not move when commanded	Check installation of all Vapor Valve components including Thermal Probe and Vapor Sensor Assembly. Refer to manual 577013-920.
Smart Sensor Faullt Cap Not Holding		Capacitor not holding charge	
Smart Sensor Fault Cap Not Charging		Capacitor not charging	
Smart Sensor Fault Temperature Range		Temperature out of range	

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 Smart Sensor 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
OPEN CAP:           CHARGED
CLOSE CAP:          CHARGED
AMBNT TMP:          65.08 F
OUTLET TMP:         75.05 F
SENSOR FAULTS:
TEMPERATURE RANGE
```

'Wireless' vapor valve example

Operability Test Procedures

Refer to Exhibit 11 and Exhibit 12 of VR 203 and VR 204 for applicable operability test requirements for the Vapor Polisher.

VEEDER-ROOT

For technical support, sales or other assistance, please visit:
www.veeder.com