# Pressure Management Control

TLS-350 Consoles for VST Processors

## Install, Setup, & Operation Manual

**VEEDER-ROOT**

ARB Approved IOM 12 - Pressure Management Control Install, Setup & Operation Manual - Executive Order VR-203

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# Introduction

# Installation

# Setup

# Operation

# Diagnostics

# 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 TLS-3XX supplied literature. Do not use this manual when PMC is installed with ISD. Use the ISD Setup & Operation Manual, 577021-800.

## 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.
- Smart Sensor Module and Vapor Pressure Sensor. Install and connect following instructions in the Vapor Pressure Sensor installation Guide.
- Multiport card connected to a hydrocarbon sensor module installed according to processor manufacturers specifications.
- A 4-Relay or I/O Combination Module to control the vapor processor motor and setup as instructed in this manual.
- An RS-232 Port will be available for use by contractor or government inspectors.

## Contractor Certification Requirements

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

**Warranty Registrations** may only be submitted by selected Distributors. Certified installers are required to provide the GDF operator with the completed Equipment Warranty Notice, form 577013-868, for their records.

## 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 For Vent Stacks Installation Guide (For Sensor P/N 861190-X0X) | IOM 27 VR-203 & VR-204 |
| Pressure Sensor Installation Guide (For Sensor P/N 331946-001) | IOM 13 VR-203 & VR-204 |
| 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 |

## 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 processor equipment:

- Vapor Pressure Sensor
- Smart Sensor Interface Module
- NVMEM203 board
- Multiport Card
- 4-Relay or I/O Combination 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) and to additional field wiring requirements specified in related connected components, such as for Pressure Sensors.

## 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.
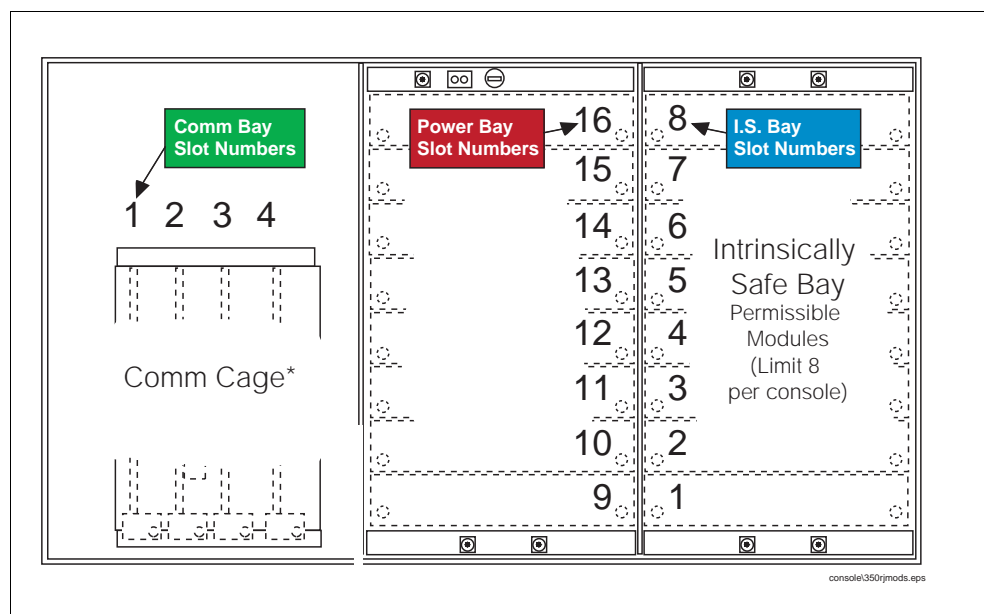


**Figure 1.    TLS console Interface Module Bays**

⚠ 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&2.

# Vapor Pressure Sensor

Install one vapor pressure sensor as detailed in the applicable Pressure Sensor Installation Guide shown in Table 1.

# Smart Sensor Interface Module

The Smart Sensor Interface Module 8 input or 7 input w/embedded pressure versions monitor the 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 the sensor following instructions in the Vapor Pressure Sensor manual. Setup the Smart Sensor module(s) following instructions in this manual.

## NVMEM203 Board

Verify that a NVMEM203 board is installed in the TLS console (ref. Figure 2-7 in the V-R TLS-3XX Series Consoles Troubleshooting Manual P/N 576013-818, Rev Q or later). This board contains flash EEPROM and RAM needed to run PMC software. 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.

## I/O Combination or 4-Relay Module

Connect the vapor processor motor control relay to two relays on either the 4-Relay or I/O Combination module as shown in Figure 2.

## Multiport Card for Vapor Processor Communication

A Multiport card is needed for RS-485 communication with the TLS console and is required with VST ECS membrane processor installations. Verify that a Multiport card is installed in slot 4 of the card cage in the communications bay of the TLS console (ref. Figure 2). When installing this card, refer to the V-R Serial Comm Modules Installation Guide (577013-528) for instructions. Connect this card to the vapor processor as shown in Figure 2. Program the card as instructed in this manual.

## TLS Console with VST ECS Membrane Processor

Figure 2 shows the interconnection wiring between a TLS console and a VST ECS Membrane Processor.

**TLS Console**

**COMMUNICATION BAY**                     **POWER BAY**                          **I.S. BAY**

Multiport
Card

*Not Used*

INPUT ➡ ┌─1─┬─2─┬    ┌─3─3─┬─4─4─┐ ◄ RELAY
              │ − + │ − + │    │NC NO C│NC NO C│
                                              **RELAY RATINGS**
                                              **Form C Contacts**
                                              **120 VAC, 2A Max; or**
                                              **24 VDC, 2A Max.**

**I/O COMBINATION MODULE**

*Use either
module*

*Wire as shown
on 4-Relay module*

RELAY ➡ ┌─1─1─┬─2─2─┬─3─3─┬─4─4─┐
              │NC NO C│NC NO C│NC NO C│NC NO C│
                                              **RELAY RATINGS**
                                              **Form C Contacts**
                                              **120 VAC, 2A Max; or**
                                              **24 VDC, 2A Max.**

**4-RELAY OUTPUT MODULE**

RJ-45
Connector

Rigid Conduit (enters
Console through a
Power Bay knockout)

**Power Panel**

115 Vac Breaker

Modbus
Protocol
RS-485

HC Sentry
Interface
Module

L1

N

**VST ECS Membrane Processor**

HC
Sensor

Motor Control
Relay

801-5.eps

**Figure 2.       VST ECS Membrane Processor Connections to TLS Console**

# 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

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 diagrams the Smart Sensor setup procedure.
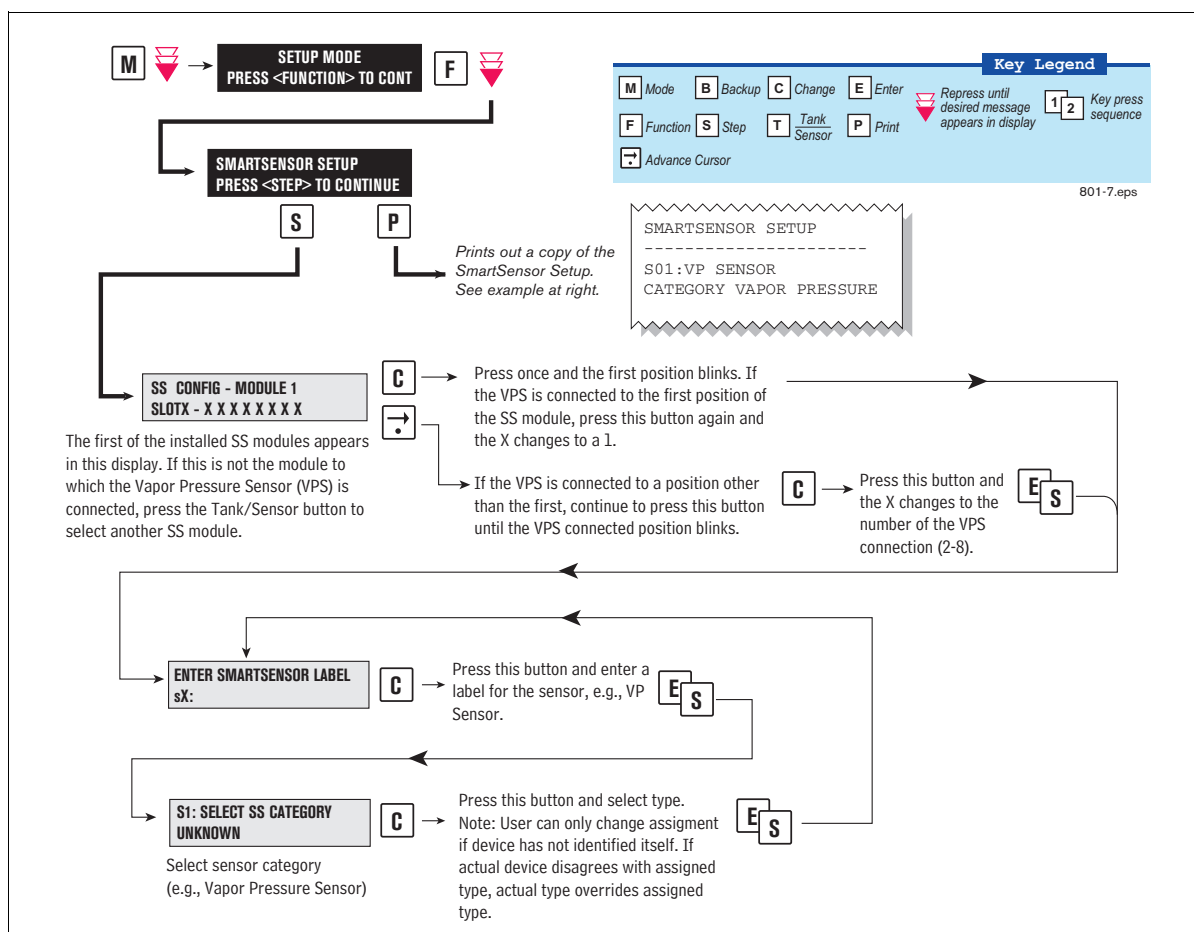


**Figure 3.   Smart Sensor Setup**

# Output Relay Setup - VST ECS Membrane Processor & VST Green Machine

The Output Relay setup programs an output relay so that the TLS console can switch a controlled vapor processor on and off as shown in Figure 4.
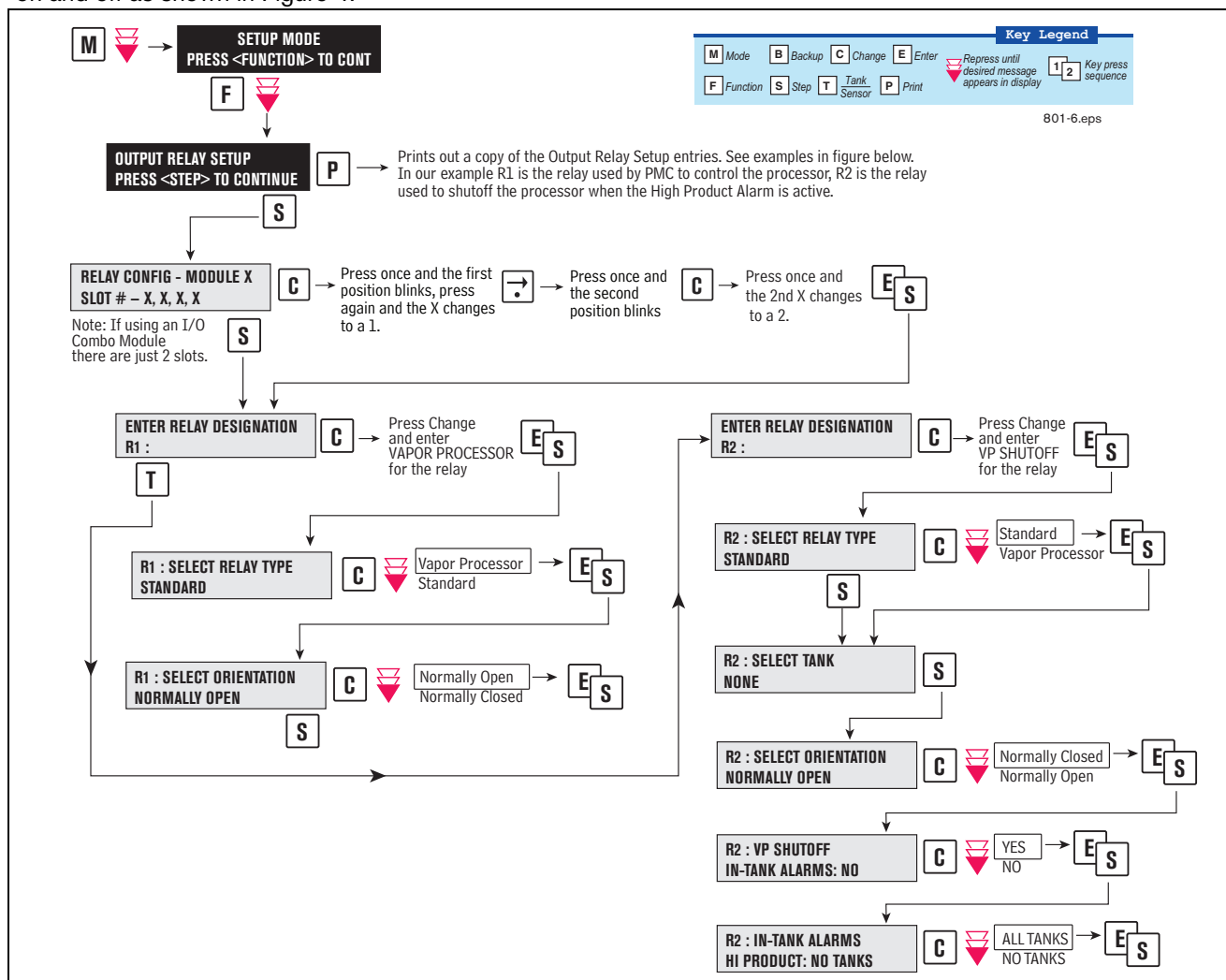


**Figure 4.    Output Relay Setup for VST ECS Membrane Processor**

Figure 5 shows example setup printouts of the Output Relays setup.

```
OUTPUT RELAY SETUP                    OUTPUT RELAY SETUP
----------------------                ----------------------

R 1: VAPOR PROCESSOR                  R 2: VP SHUTOFF
TYPE:                                 TYPE:
 VAPOR PROCESSOR                       STANDARD
NORMALLY OPEN                         NORMALLY CLOSED
- NO ALARM ASSIGNMENTS -             IN-TANK ALARMS
                                     ALL HIGH PRODUCT ALARMS

        isd-evr\orltscntrlvpsetprt.eps
```

**Figure 5.    Output Relay Setup Printout Examples for TLS Console Controlled Processor**
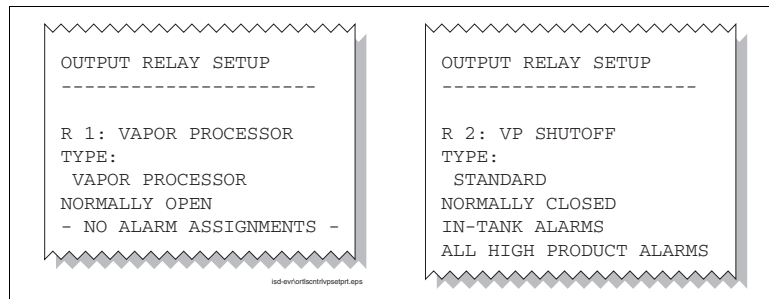
# PMC Setup

Figure 6 diagrams the PMC setup programming.
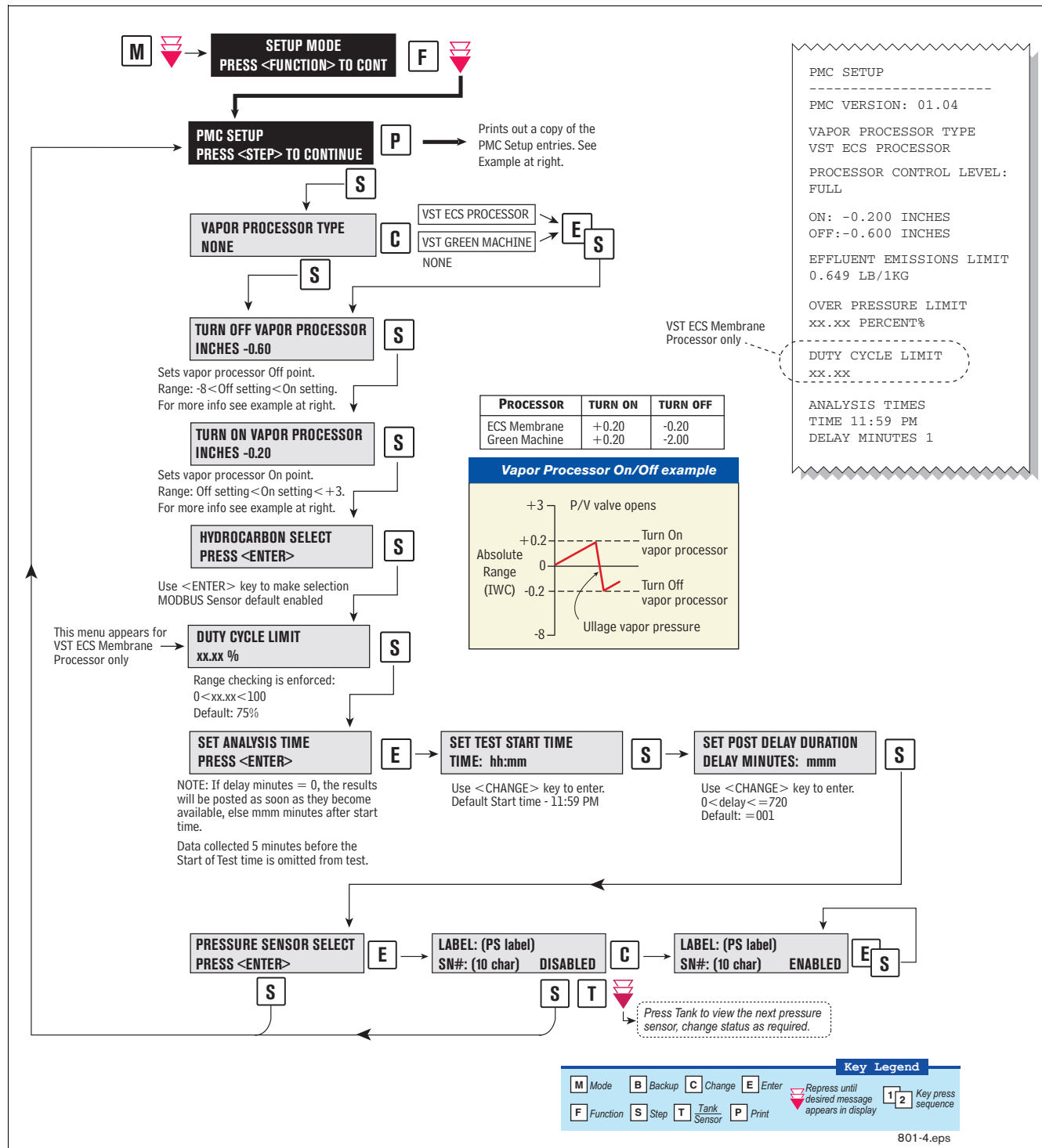


**Figure 6.    PMC Setup**

# Operation

## 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 7).
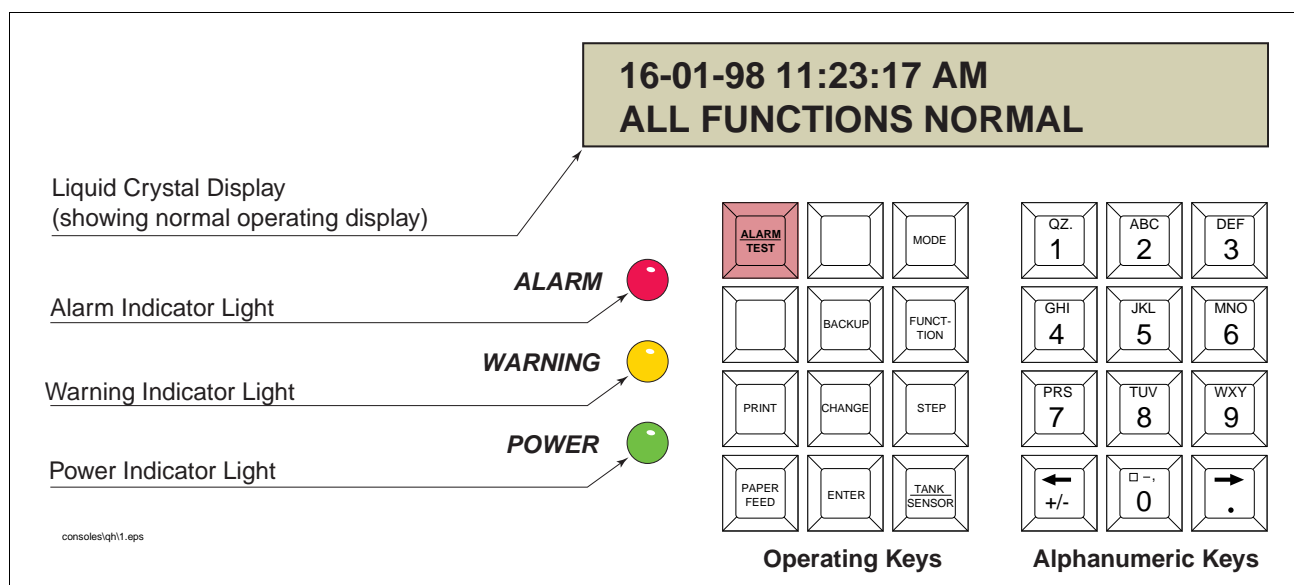


**Figure 7.     TLS console alarm interface**

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.

## WARNING POSTING

Displayed messages alert you to the type of warning. Printed messages show the type of warning and the time the warning was posted (see Figure 8). Warnings are logged into the Non-Priority Alarm History in the TLS.

```
MMM DD, YYYY  HH:MM XM
VP EMISSIONS WARN
```
*← TLS console display message*

```
---- PMC ALARM ----
 VP EMISSIONS WARN

 MMM DD, YYYY HH:MM XM
```
*← TLS console printout message*

*TLS console warning light flashes →*

isd-evr\pmc\fig5.eps
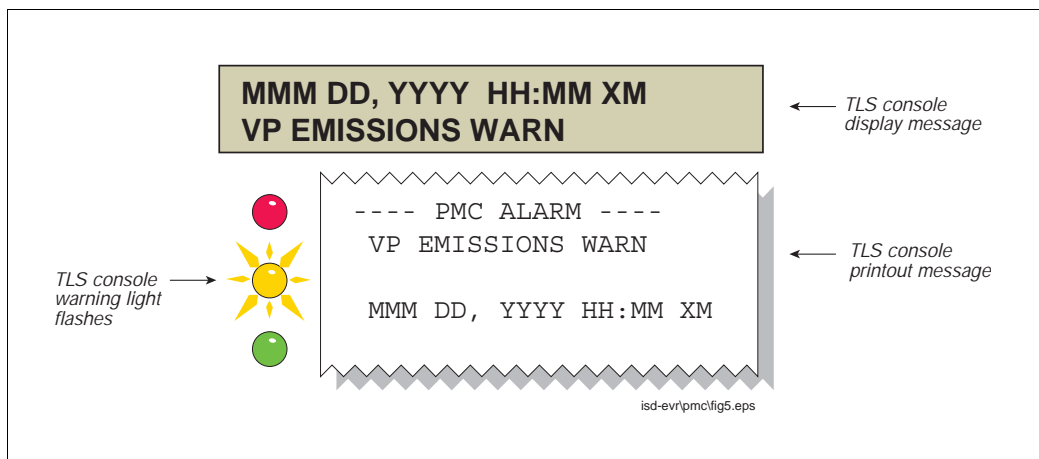
**Figure 8.      TLS console warning example**

## ALARM POSTING

Displayed Messages alert you to the type of alarm. Printed messages show the type of alarm and the time the alarm was posted. Alarm example in Figure 9. PMC Alarms are logged into the Priority Alarm History in the TLS.

```
MMM DD, YYYY  HH:MM XM
VP EMISSIONS FAIL
```
*← TLS console display message*

```
---- PMC ALARM ----
 VP EMISSIONS FAIL

 MMM DD, YYYY HH:MM XM
```
*← TLS console printout message*

*TLS console alarm light flashes →*

isd-evr\pmc\fig6.eps
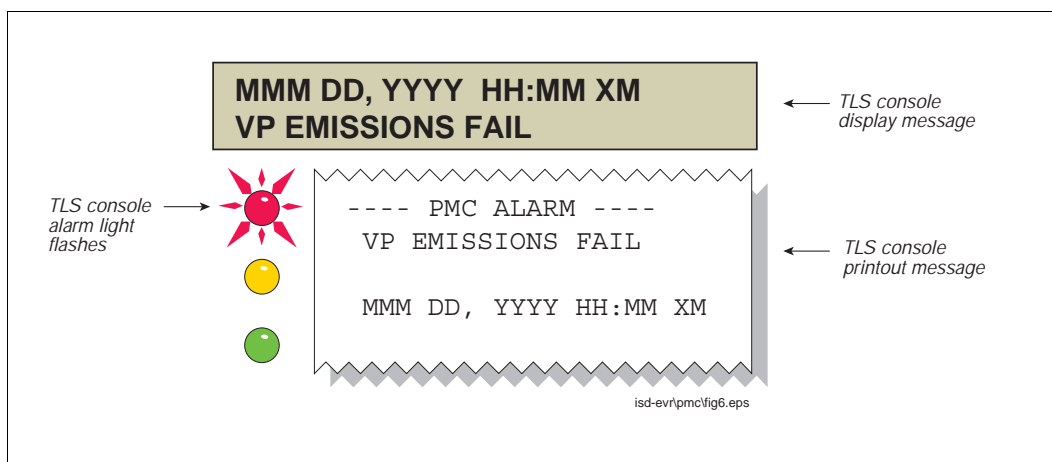
**Figure 9.      TLS console alarm example**

# PMC Alarm Summary

Table 2 contains a listing of the PMC generated alarms including their displayed message and cause. TLS Console PMC alarms may be interspersed amongst non-PMC alarms, please see TLS-350 Series manuals for more information.

**Table 2.** **TLS-350 (PMC) Alarm Troubleshooting Summary**

| Displayed Message | Description | Light Indicator | Suggested Troubleshooting |
|---|---|---|---|
| VP EMISSION WARN | Mass emission exceeded the certified daily threshold | Yellow | • Troubleshooting Guide www.vsthose.com. |
| VP EMISSION FAIL | 2nd Consecutive mass emission failure | Red | • Exhibit 8<br>• Exhibit 9 |
| PMC SETUP FAIL | PMC is not configured or missing components. | Red | • Troubleshooting Guide www.vsthose.com<br>• See ISD Troubleshooting Guide, P/N 577013-819<br>• Exhibit 8<br>• Exhibit 9 |
| VP DUTY CYCLE WARN[1] | Duty cycle exceeds 18 hours per day 0r 75% of 24 hours | Yellow | • Troubleshooting Guide www.vsthose.com. |
| VP DUTY CYCLE FAIL[1] | 2nd Consecutive Duty Cycle Failure | Red | • TLS-350 PMC Setup Procedure<br>• Exhibit 4<br>• Exhibit 9<br>• Exhibit 10 |
| 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]VST ECS Membrane Processor Only

# PMC Status Report



**Figure 10.    PMC Status Report**
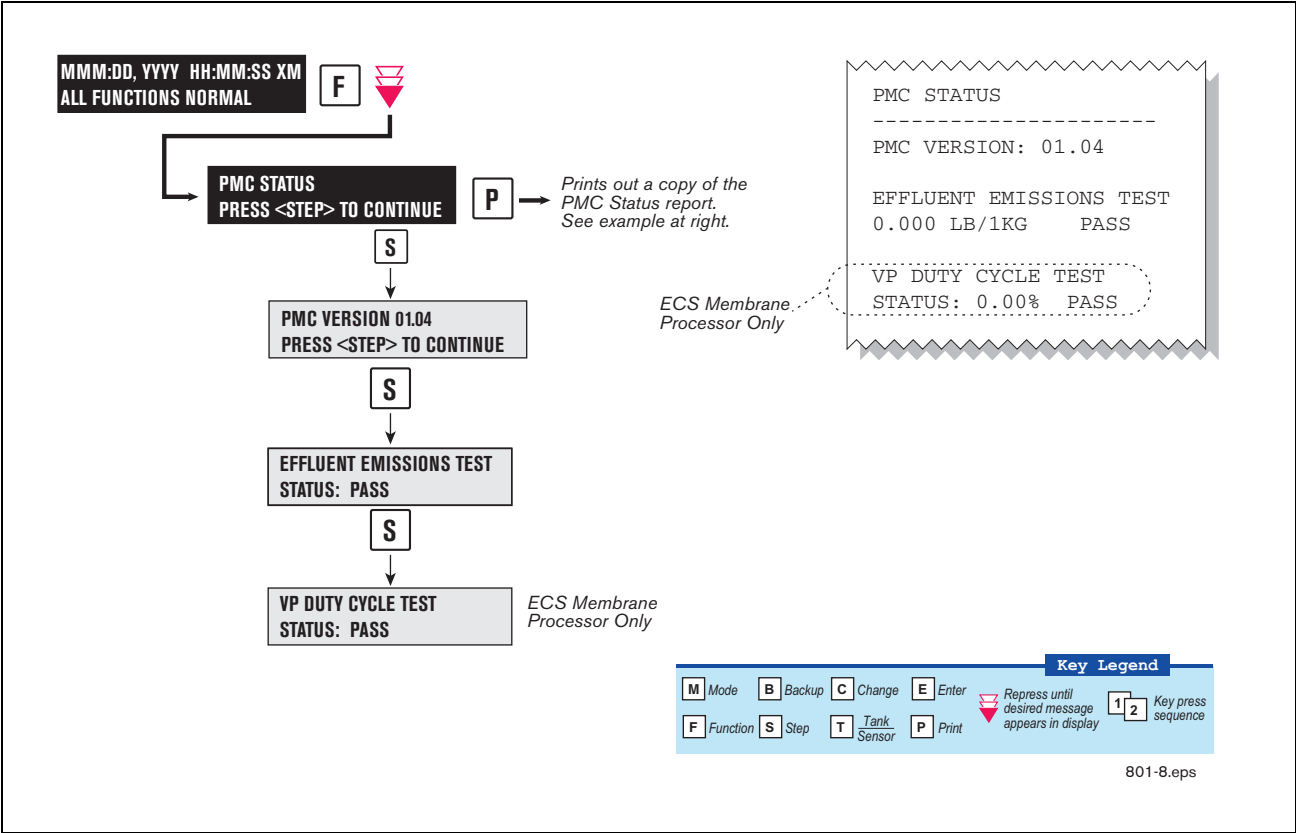
# Viewing PMC Reports Via RS-232 Connection

## SET UP CONSOLE COM PORT

1.  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.

```
PORT SETTINGS


COMM BOARD: 1 (RS-232)
BAUD RATE: 2400
PARITY: ODD
STOP BIT: 1 STOP
DATA LENGTH: 7 DATA
RS-232 SECURITY
CODE: DISABLED
```

isd\801-1.eps

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.

Bits per second

Data Bits

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 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).

## CONNECTING LAPTOP TO CONSOLE

1. Connect your laptop to the TLS console's RS-232 or Multiport card using one of the methods shown in the examples in Figure 12 below.
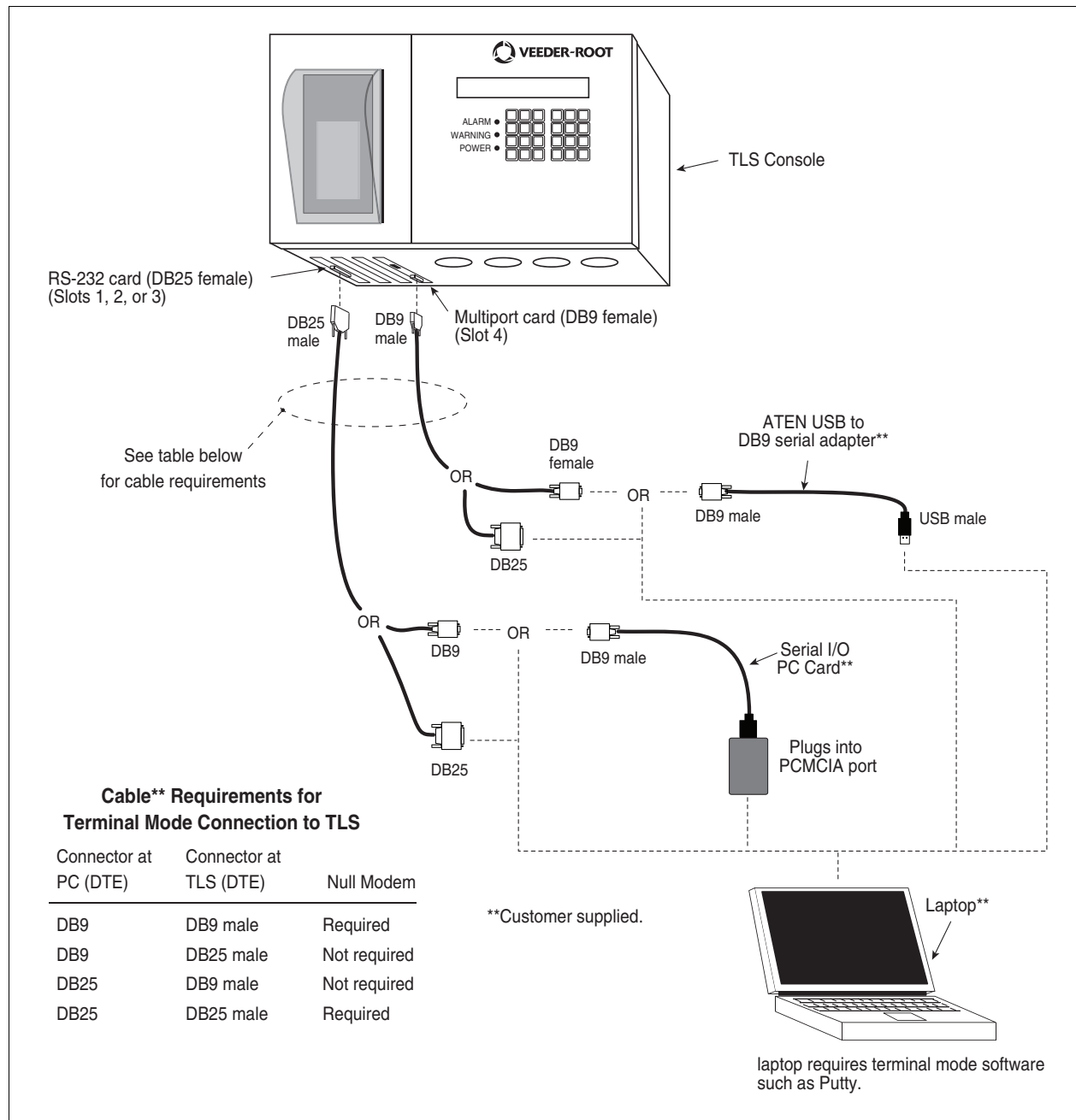


**Figure 12. Connecting laptop to TLS console for serial communication**

2. 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

3.  Determine which laptop COM port you will use to connect to the TLS-350.

    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 13).
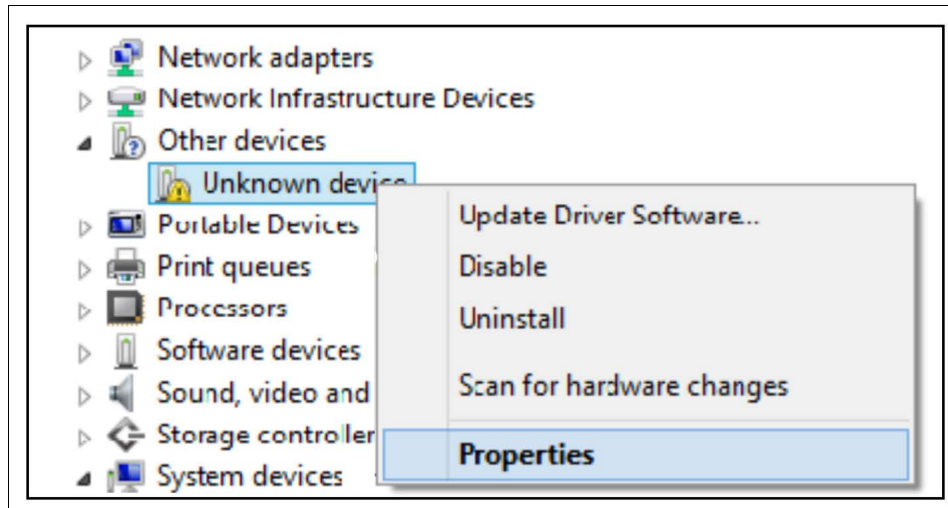


**Figure 13.        Laptop Device Manager**

   - Right click choose uninstall this device.

   - Scan for new devices.

   - If the yellow exclamation point reappears install the manufacturer's driver for the device.

   - If there are no unknown devices and the port is a USB device unplug and plug the device back in.

   - If no change try another port if available.

   - If still no change reboot the machine.

4.  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. (Figure 14).

.
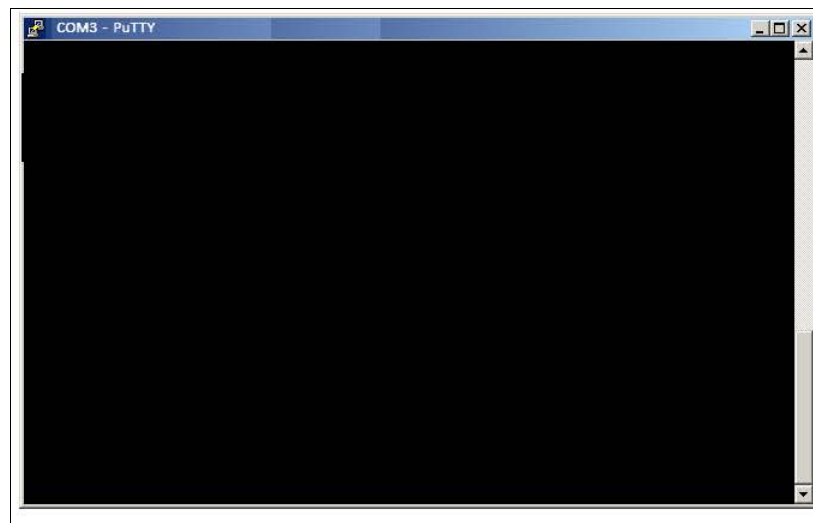


**Figure 14.        PuTTY Terminal Window**

## SENDING CONSOLE COMMANDS

Table 3 shows four important PMC console commands: IV8200, IV8000, IV8100 and I11100. 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 Processor Status 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 IV8200. 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 000016IV8200.

You will see the typed command on the screen: ☺IV8200 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  ☺IV8200☺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 Processor Status Report (See example Figure 15) | `<SOH>IV8200` |
| Vapor Processor Runtime Diagnostic Report (See example Figure 16) | `<SOH>IV8000` |
| Percent Hydrocarbon Diagnostic Report (See example Figure 17) | `<SOH>IV8100` |
| Priority Alarm History Report (See example Figure 18) | `<SOH>I11100` |
| Non-Priority Alarm History Report (See example Figure 19) | `<SOH>I11200` |

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

```
            <SOH>
               IV8200
               JUN  1, 2002  8:07 AM

               (SITE NAME)
               (SITE STREET)
               (CITY, STATE)
               (PHONE NUMBER)


            VAPOR PROCESSOR STATUS REPORT


            PMC VERSION: 01.04
            VAPOR PROCESSOR TYPE: VST ECS PROCESSOR


            PMC MONITORING TEST PASS/FAIL THRESHOLDS
                                                        PERIOD    BELOW  ABOVE
            H2O
            VAPOR PROCESSOR MASS EMISSION FAIL          1DAYS     ----   0.32 LBS/1KG
            VAPOR PROCESSOR DUTY CYCLE FAIL             1DAYS     ----  75.00 %


            EFFLUENT EMISSIONS TEST : PASS     (0.15 LBS/1KG)
            VP DUTY CYCLE TEST      : PASS     (17.54%)
            VP INPUT STATUS         : NOTEST


            RUN TIME HOURS    :    4.2
            DAILY THROUGHPUT  :   8421 GALS
            AVG HC PERCENT    :   8.85 %
```

*VST ECS Membrane Processor Only* ⟶ (VAPOR PROCESSOR DUTY CYCLE FAIL)

*VST ECS Membrane Processor Only* ⟶ (VP DUTY CYCLE TEST)

**Figure 15.    Vapor Processor Status Report Details - Serial to PC Format**

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```
    IV8000
    AUG 30, 2007 11:52 AM

    (SITE NAME)
    (SITE STREET)
    (CITY, STATE)
    (PHONE NUMBER)

    VAPOR PROCESSOR
                     ELAPSED    PRESSURE INCHES H2O    RUNTIME
    DATE-TIME ON     MINUTES      ON       OFF         FAULT
     3-08-07  8:52PM  5.53       0.209    -0.211        NO
     3-08-07  8:58PM  0.98       0.303    -0.203        NO
     3-09-07  5:03AM 26.60       0.221    -0.205        NO
     3-09-07  1:15PM 17.92       0.278    -0.268        NO
     3-10-07  3:01AM  7.70       0.200    -0.223        NO
     3-10-07  4:30AM  4.02       0.202    -0.224        NO
     3-10-07  7:54PM 23.62       0.306    -0.245        NO
     3-11-07 11:24PM  6.55       0.256    -0.213        NO
     3-12-07 11:31PM 21.23       0.228    -0.203        NO
     3-13-07  3:44PM 23.95       0.926    -0.230        NO
     3-15-07  1:35AM 30.00       0.202     0.154        YES
     3-15-07  2:36AM  6.87       0.200    -0.205        NO
     3-15-07  3:24AM 30.00       0.201     0.442        YES
     3-16-07  3:10AM  4.33       0.202    -0.205        NO
     3-16-07  1:28PM 20.78       0.234    -0.264        NO
     3-16-07  2:38PM  1.30       0.220    -0.219        NO
     3-17-07 12:44AM  6.52       0.206    -0.200        NO
     3-17-07  2:00PM 27.47       0.254    -.210         NO
```

**Figure 16.    Vapor Processor Runtime Diagnostic Report - Serial to PC Format**

```
                IV800
                SEP 21, 2010 8:52 AM
                HYDROCARBON SENSOR DIAGNOSTIC
                DATE/TIME      READING%
                9-25-10 8:57 AM 1.174
                9-25-10 8:57 AM 1.188
                9-25-10 8:57 AM 1.168
                9-25-10 8:57 AM 1.182
                9-25-10 8:57 AM 1.182
                9-25-10 8:57 AM 1.182
                9-25-10 8:57 AM 1.174
                9-25-10 8:57 AM 1.188
                9-25-10 8:57 AM 1.182
                9-25-10 8:57 AM 1.194
                9-25-10 8:57 AM 1.188
                9-25-10 8:57 AM 1.200
                9-25-10 8:56 AM 1.188
```

**Figure 17.     Percent Hydrocarbon Diagnostic Report - Serial to PC Format**

```
   I11100
   APR 17, 2008 12:30 AM

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

   PRIORITY ALARM HISTORY
   ID  CATEGORY   DESCRIPTION        ALARM TYPE          STATE   DATE     TIME
   T 2 TANK       Premium 91         PROBE OUT           CLEAR   4-04-08 12:14PM
   T 2 TANK       Premium 91         PROBE OUT           ALARM   4-04-08 12:14PM
   T 2 TANK       Premium 91         LOW PRODUCT ALARM   CLEAR   4-04-08 12:04PM
   T 2 TANK       Premium 91         PROBE OUT           CLEAR   4-04-08 12:04PM
   T 1 TANK       Unlead 87          PROBE OUT           CLEAR   4-04-08 11:37AM
   T 1 TANK       Unlead 87          PROBE OUT           ALARM   4-04-08 10:51AM
   T 2 TANK       Premium 91         PROBE OUT           ALARM   4-04-08 10:42AM
   T 2 TANK       Premium 91         LOW PRODUCT ALARM   ALARM   4-04-08 10:42AM
   s 8 OTHER      PRES SEN 2 DISP 1-2 COMMUNICATION ALARM CLEAR  3-26-08  1:39PM
   s 8 OTHER      PRES SEN 2 DISP 1-2 COMMUNICATION ALARM ALARM  3-26-08  1:37PM
       SYSTEM                        BATTERY IS OFF      CLEAR   3-10-08  8:00AM
       SYSTEM                        BATTERY IS OFF      ALARM   3-10-08  8:00AM
```

**Figure 18.     Priority Alarm History Report - Serial to PC Format**

```
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 19.    Non-Priority Alarm History Report - Serial to PC Format**

## Diagnostics

## Automatic Control

Under Automatic control, vapor pressure readings are compared to user programmable thresholds to determine the appropriate Pressure Management Device (PMD) state. When the PMD is off and the TURN ON VAPOR PROCESSOR is exceeded, an internal relay is enabled and remains so until the pressure drops below the TURN OFF VAPOR PROCESSOR threshold. Automatic control is the default mode.

## Manual control

If PMC mode is Manual, the diagnostic menu allows the PMD to be directly turned on/off through the relay. This feature is to support unit operational testing without waiting for the pressure to hit limits. The current UST ullage space vapor pressure will also be available through the diagnostic menu. The VC1 RS232 command allows for remote control of the PMD when the PMD control is manual. Note: If the PMD is on and the PMC mode is Automatic, changing the control mode to Manual mode will turn the PMD off.

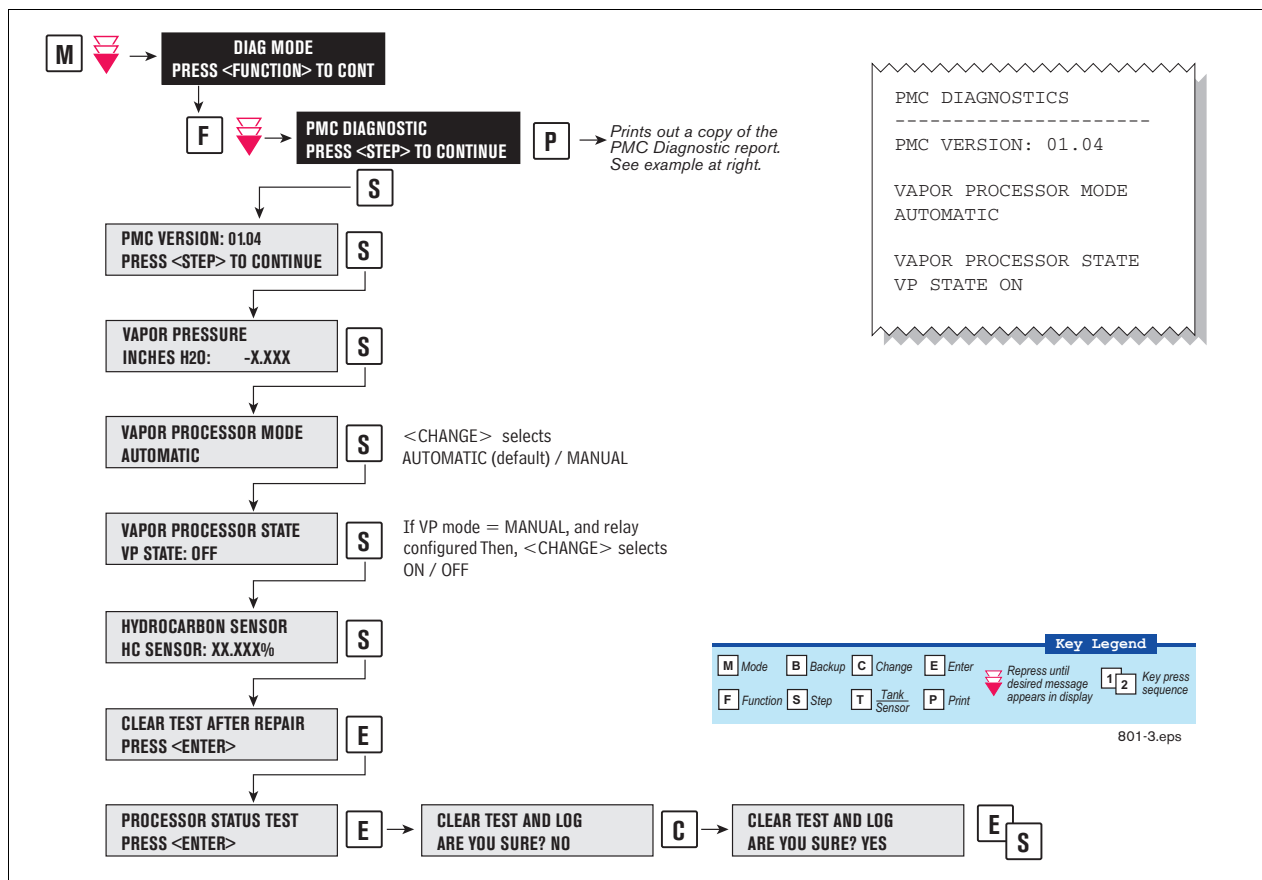When set to Manual mode, the system will revert to Automatic mode after 4 hours.

## PMC Diagnostic Menu



**Figure 20.   PMC Diagnostic Menus**

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