

Automatic Pressure Monitoring

Install, Setup, & Operation Manual



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Modules, Kits, Other components (parts purchased separate of a complete console, including TLSRF Wireless Systems)

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Introduction

This manual provides instructions to install, setup, and operate the components of Veeder-Root Automatic Pressure Monitoring (APM) equipment. The APM feature is an option for the TLS console platform, and as such, many of the installation/setup/operation instructions for non-APM specific tasks are covered in TLS-3XX supplied literature.

Site Requirements

Below are the requirements for all Automatic Pressure Monitoring (APM) 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 APM 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.
- ISD/APM SEM to enable APM parameters
- Vapor Monitoring Controller Interface (VMCI) Board used to connect the Vapor Monitoring Controller (VMC) from the dispensers (optional)

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

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	577014-011
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
Vapor Monitor Interface Module Installation Guide	577013-951
TLS-3XX Series Consoles Troubleshooting Guide	576013-818

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 equipment damage 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>FAILURE TO COMPLY WITH THE FOLLOWING WARNINGS AND SAFETY PRECAUTIONS COULD CAUSE DAMAGE TO PROPERTY, ENVIRONMENT, RESULTING IN SERIOUS INJURY OR DEATH.</p> <p>Turn power Off at the circuit breaker. Do not connect the console AC power supply until all devices are installed.</p> <p>Touching a live circuit can cause electrical shock that may result in serious injury or death.</p>

Installation

This section discusses the installation and wiring of the hardware required to enable the TLS console to perform Automatic Pressure Monitoring of the site's gasoline containment Stage I equipment:

- Vapor Pressure Sensor
- APM SEM & Smart Sensor Interface Module
- NVMEM203 board



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).

Install Vapor Pressure Sensor

Install one Vapor Pressure Sensor in the vapor return piping of the gasoline dispenser closest to the tanks or in the vent stack following the instructions in the Vapor Pressure Sensor Installation Guide (P/N 577014-011).

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.

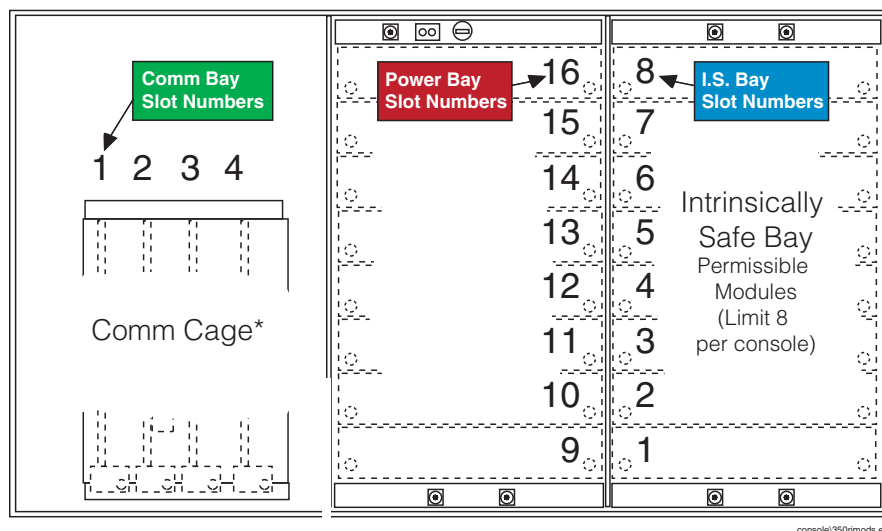


Figure 1. TLS Console Interface Module Bays



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., Vent Stack VPS or FP1&2 VPS.

Smart Sensor Interface Module



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

Connect the field wiring from the Vapor Pressure Sensor (VPS) to the Smart Sensor Interface Module as instructed in the VPS Installation 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 APM software and store APM reports. No setup is required.

Setup

Introduction

This section describes how to perform APM 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 APM-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 2 diagrams the Smart Sensor setup procedure.

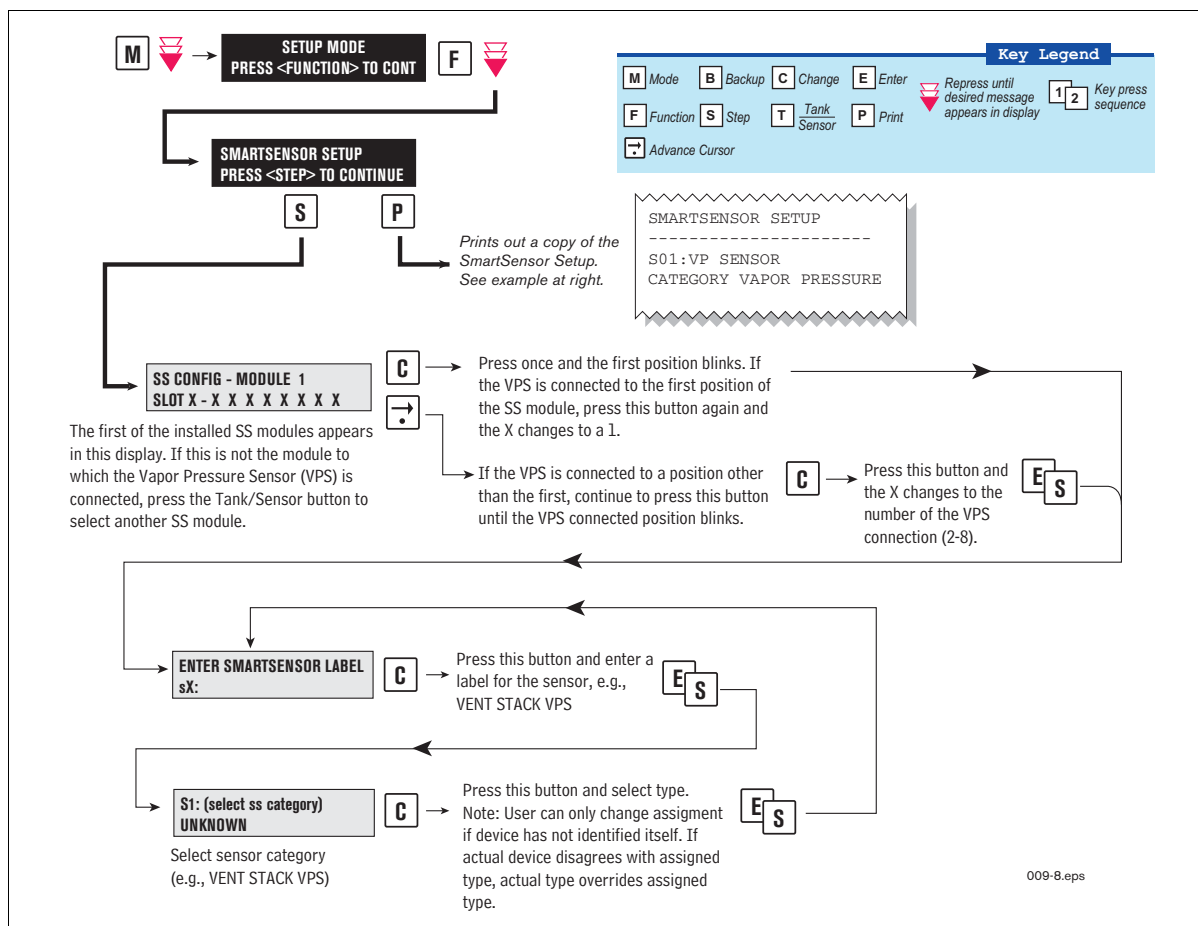


Figure 2. Smart Sensor Setup

Vapor Monitoring Setup - System Setup

Figure 3 shows the Vapor Monitoring setup sequence.

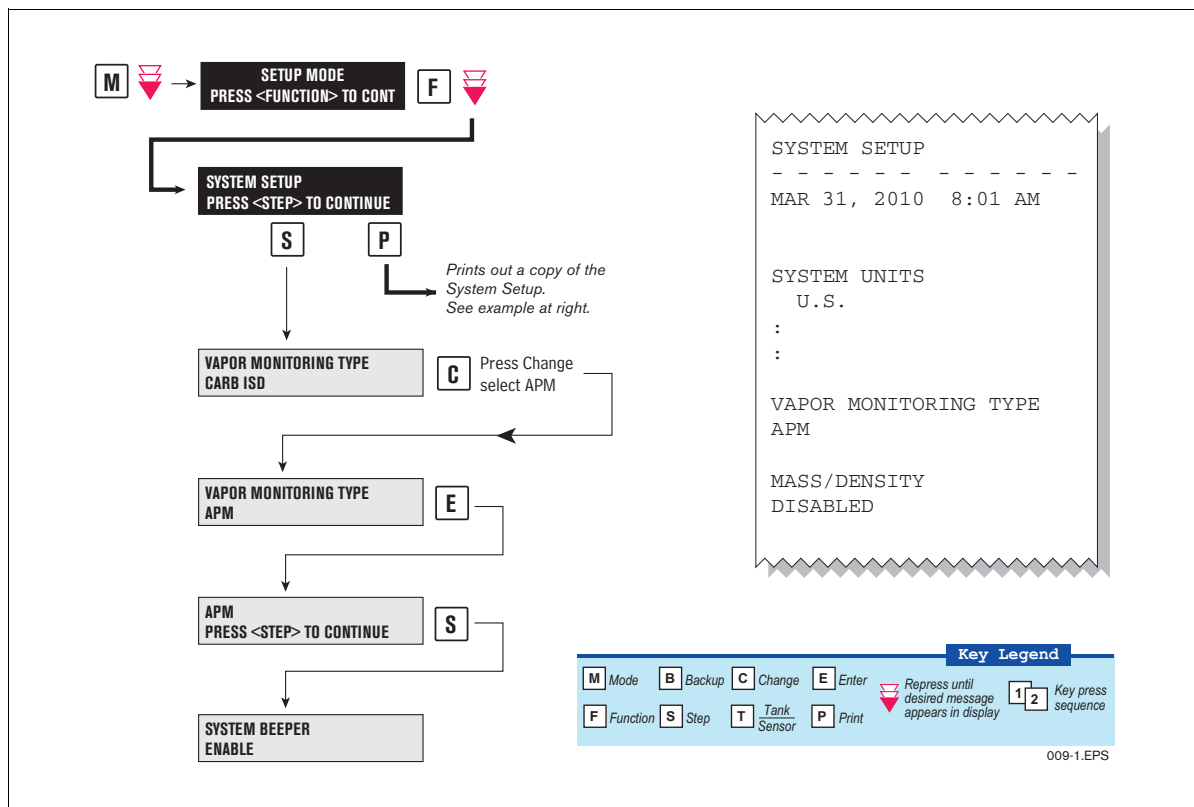


Figure 3. Vapor Monitoring Setup - System Setup

The TLS will alert the operator if the selected Vapor Monitoring Type is not properly set up. If ISD SETUP WARN appears on the TLS, ensure that the Vapor Monitoring Type is set to APM.

APM Setup

Figure 4 shows the Automatic Pressure Monitoring setup sequence.

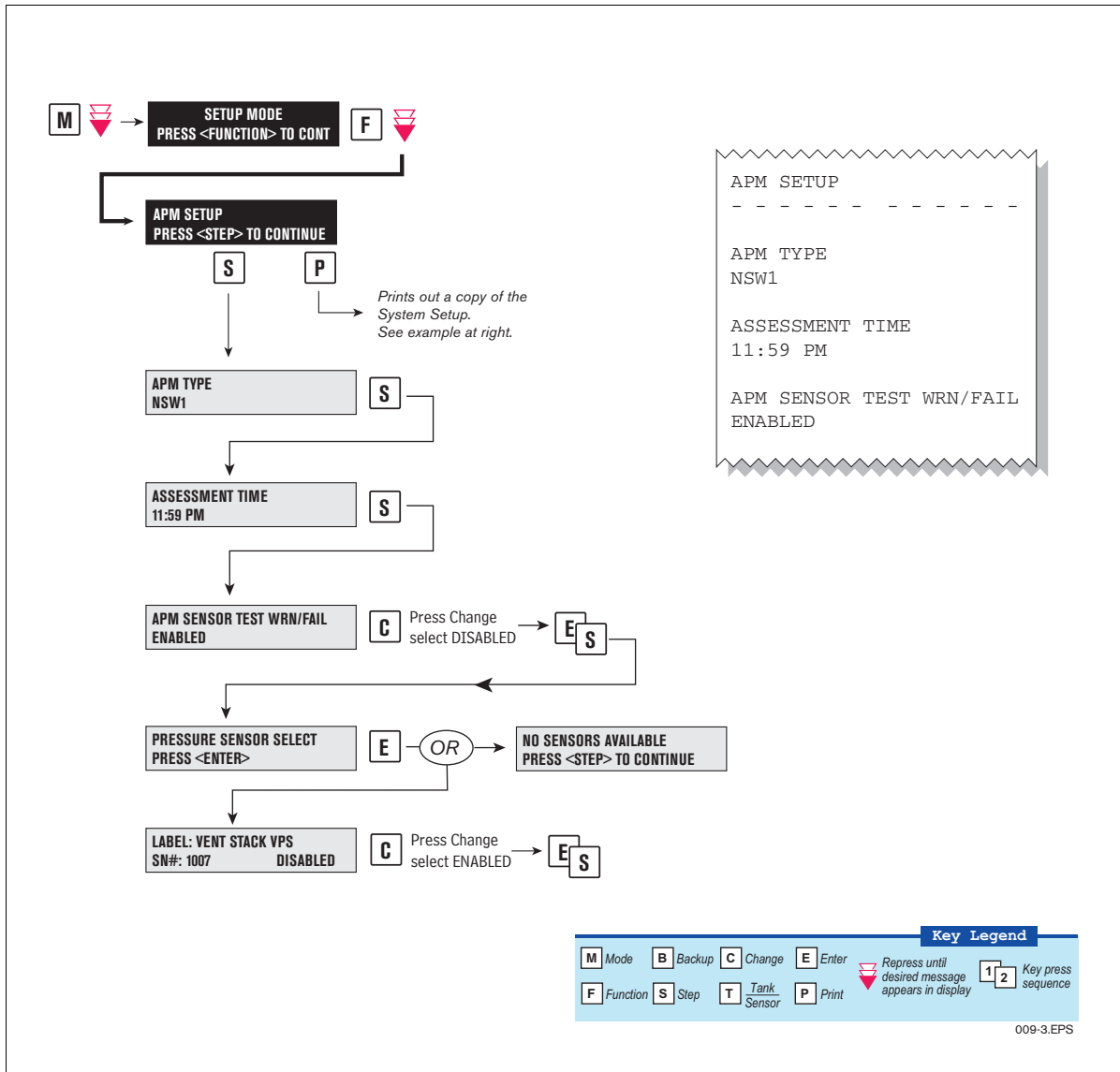


Figure 4. APM Setup

Output Relay Set-up Menus (APM Alarms)

APM Alarms will be displayed in the Output Relay Setup menus when there is a ISD/APM SEM and Vapor Monitoring Type is set to APM (see Figure 5).

APM Alarms will be displayed in PLLD Line Disable/WPLLD Line Disable/VLLD Line Disable/Autodial and Custom Alarms menus in a similar way.

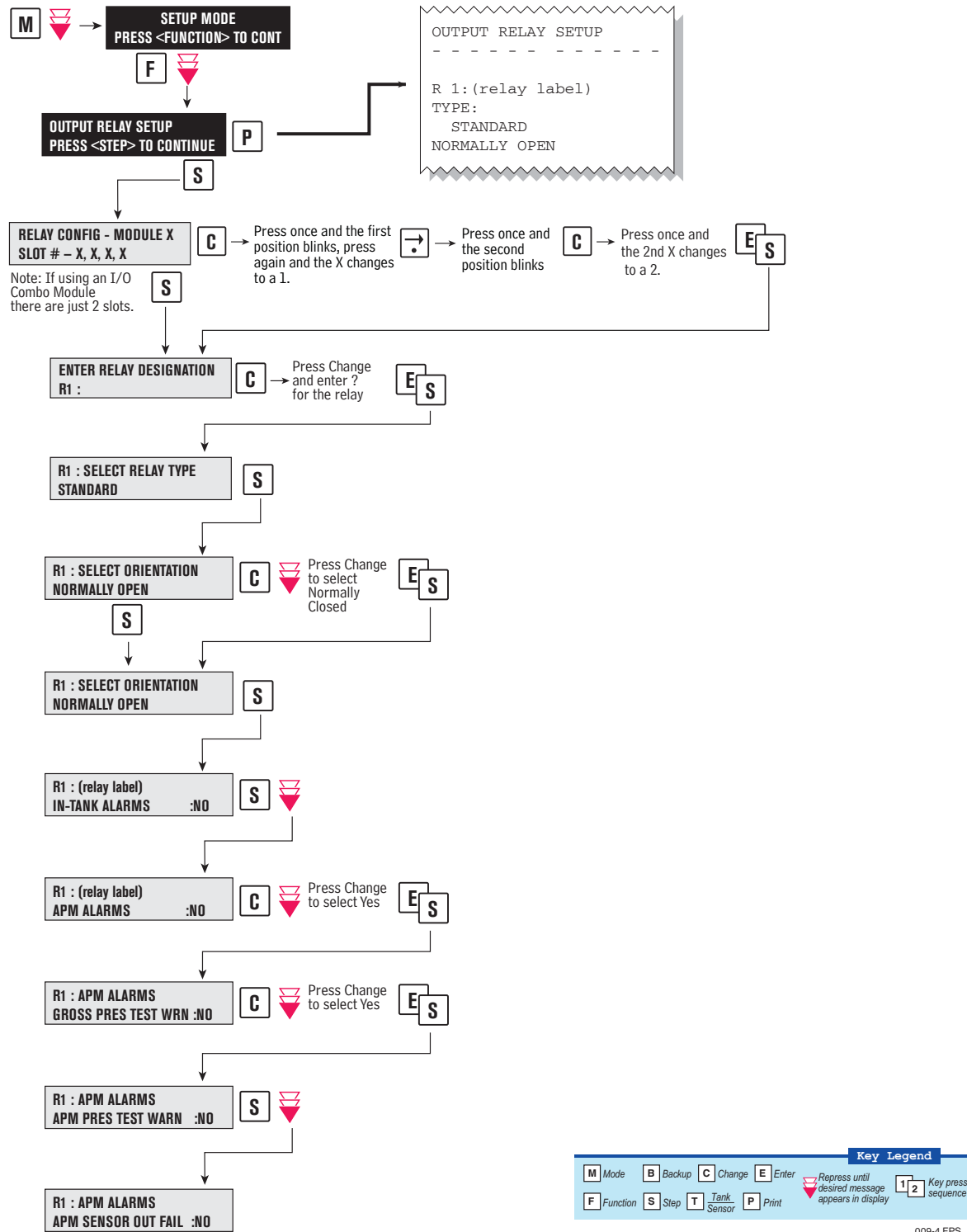


Figure 5. Output Relay Setup

Operation

Alarms

OVERVIEW OF TLS CONSOLE INTERFACE

The TLS console is continuously monitoring the APM sensors for alarm conditions.

During normal operation when the TLS console and monitored APM 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 6).

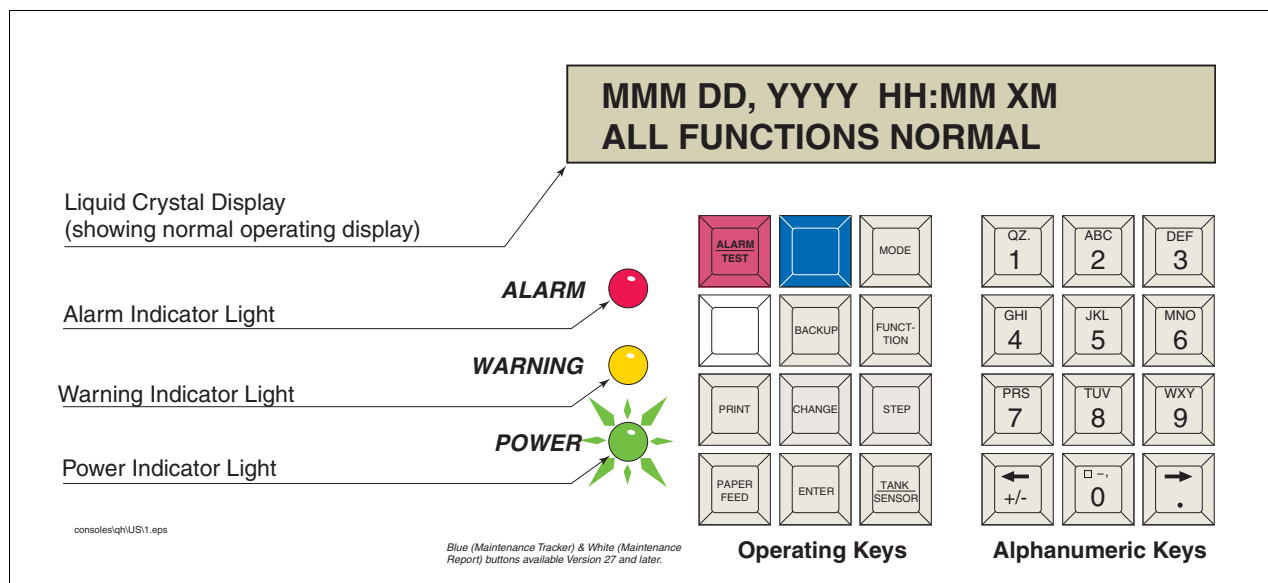


Figure 6. TLS Console Alarm Interface

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 7). Warnings are logged into the Non-Priority Alarm History in the TLS.

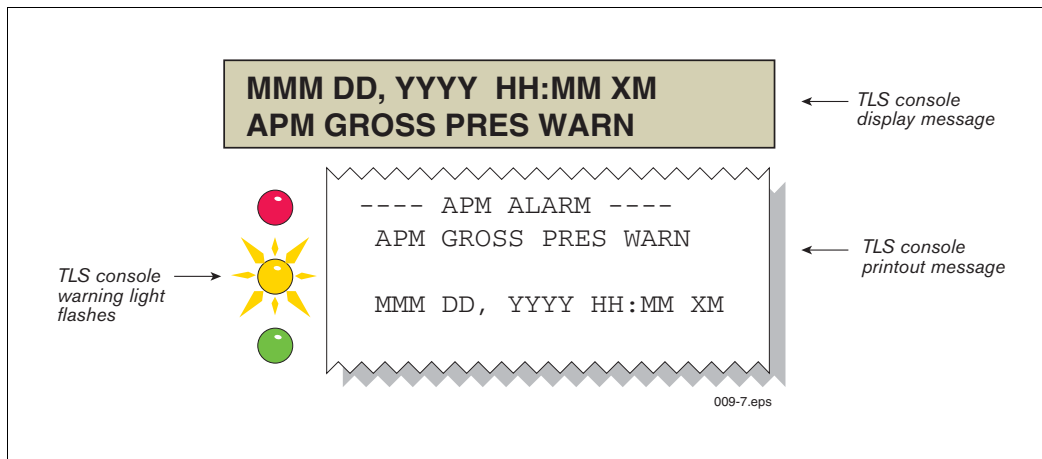


Figure 7. TLS Console Warning Example

APM Alarm Summary

Table 2 contains a listing of the APM generated warnings including a brief description of the warning and associated front panel indicator.

Table 2. TLS-350 (APM) Alarm Troubleshooting Summary

Warning Type	Indicator Light	Cause	Post Time	Suggested Troubleshooting
GROSS PRES TEST WRN	Yellow	Vapor pressure, over a continuously moving 1-hour test period exceeds 1.25 kPa above ambient atmospheric pressure or 2.5 kPa below ambient atmospheric pressure for at least three minutes.	Immediate	Test and verify PV valve is working correctly. Check for blocked orifice. If GROSS PRES TEST WRN occurs during delivery check vapor return to delivery truck.
APM GROSS PRES WARN	Yellow	Assessment warning when GROSS PRES TEST WRN occurred during assessment period.	Assessment	
APM GROSS PRES FAIL	Red	7th Consecutive Failure of APM GROSS PRES WARN	Assessment	
APM DEGRD PRES WARN	Yellow	Vapor pressure, over a continuously moving 1-hour test period exceeds 0.75 kPa above ambient atmospheric pressure or 2.0 kPa below ambient atmospheric pressure for at least 30 minutes.	Assessment	Check for blocked orifice.
APM DEGRD PRES FAIL	Red	30th Consecutive Failure of APM DEGRD PRES WARN	Assessment	
APM SETUP WARN	Yellow	A sensor used by APM is missing or not configured	Immediate	Confirm APM setup programming.
APM SENSOR WARN	Yellow	Vapor pressure, over a continuously moving one-hour test period remains within ± 0.05 kPa relative to ambient atmospheric pressure.	Assessment	Perform a pressure sensor test. See Diagnostic section. If sensor is OK, check if pressure valve is stuck open.
APM SENSOR FAIL	Red	7th Consecutive Failure of APM SENSOR WARN	Assessment	
APM SENSOR OUT WARN	Yellow	Failure of an APM sensor self-test	Assessment	Confirm APM sensor and module installation communication.
APM SENSOR OUT FAIL	Red	7th Consecutive Failure of APM SENSOR OUT WARN	Assessment	

APM Daily Report Menus

Figure 8 shows the procedure to view the APM Daily Report.

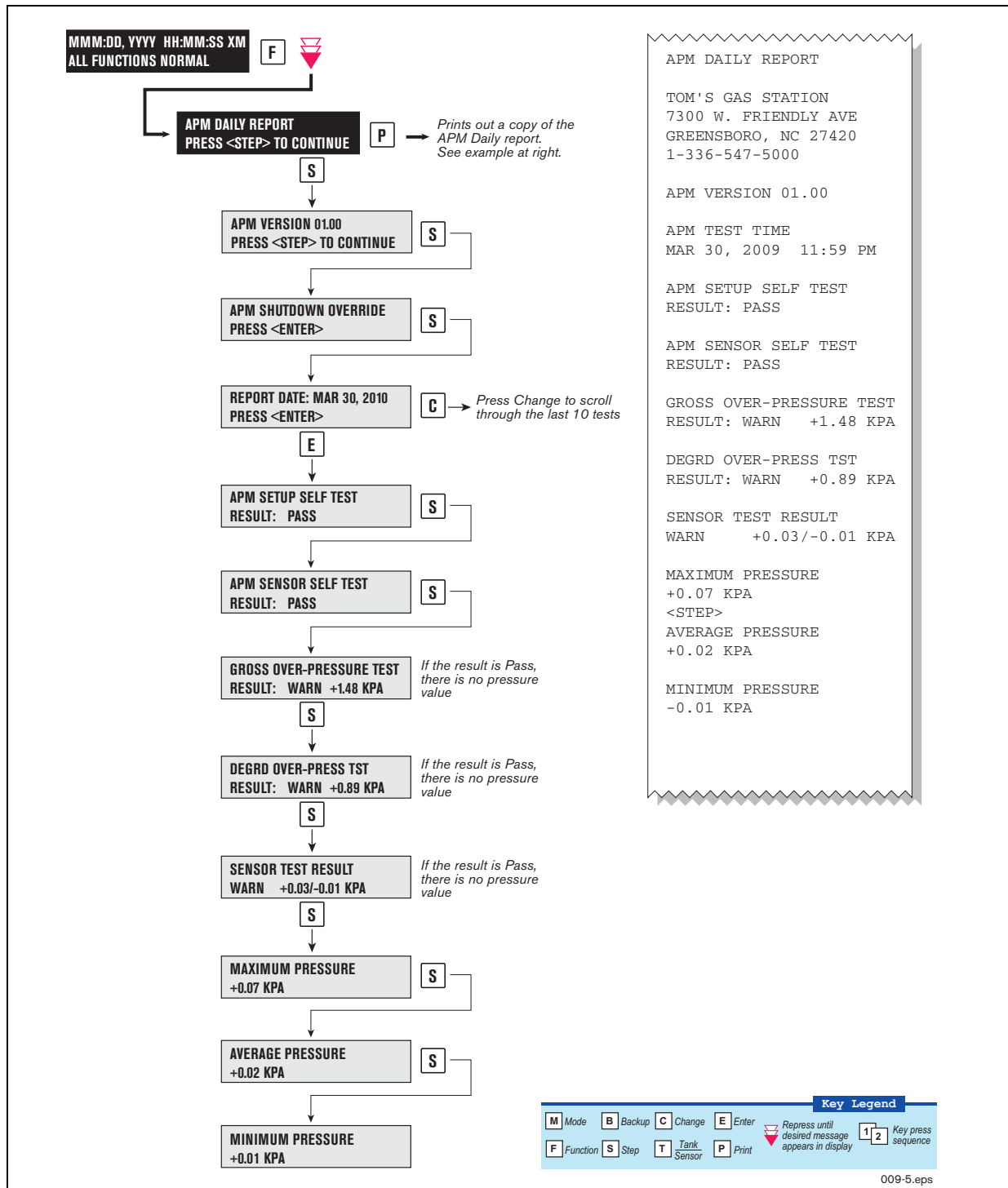


Figure 8. APM Daily Report Menus

APM Monthly Report Menus

Figure 9 shows the procedure to view the APM Monthly Report.

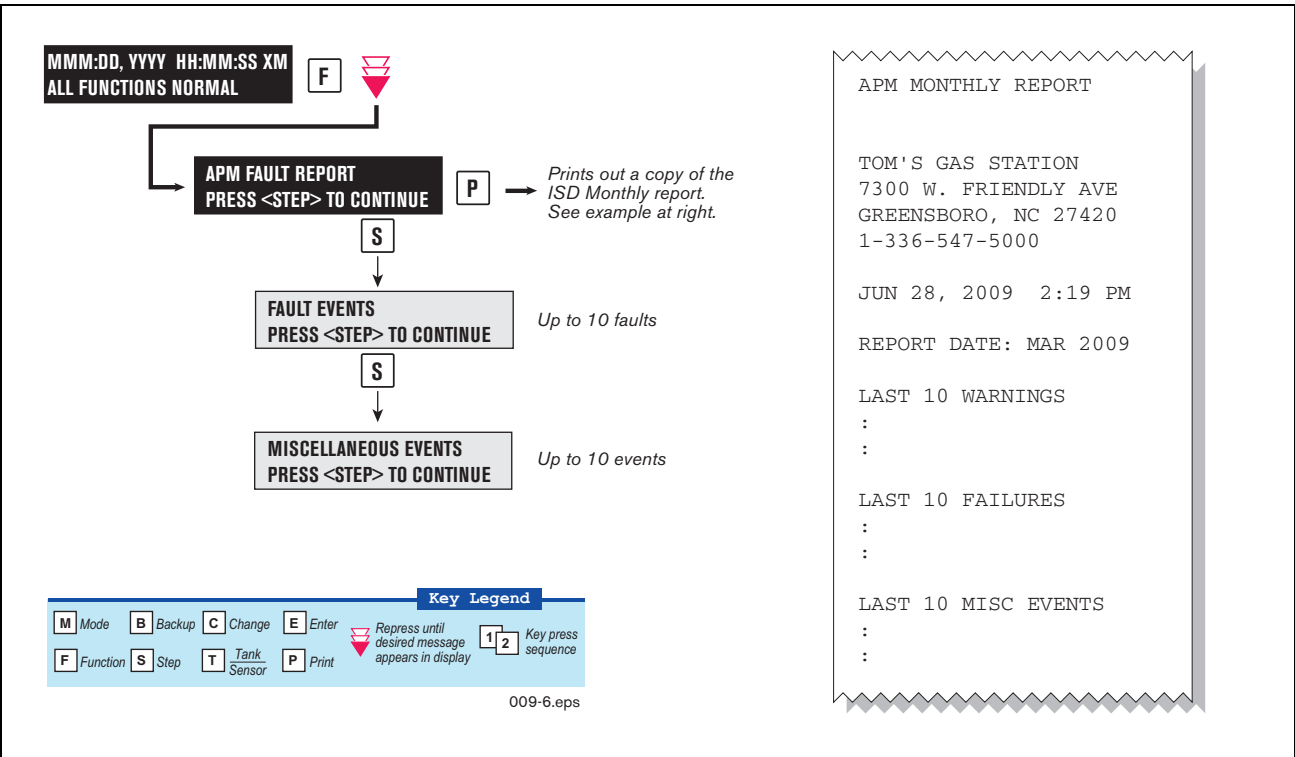


Figure 9. APM Monthly Report Menus

Viewing APM 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 10 below.

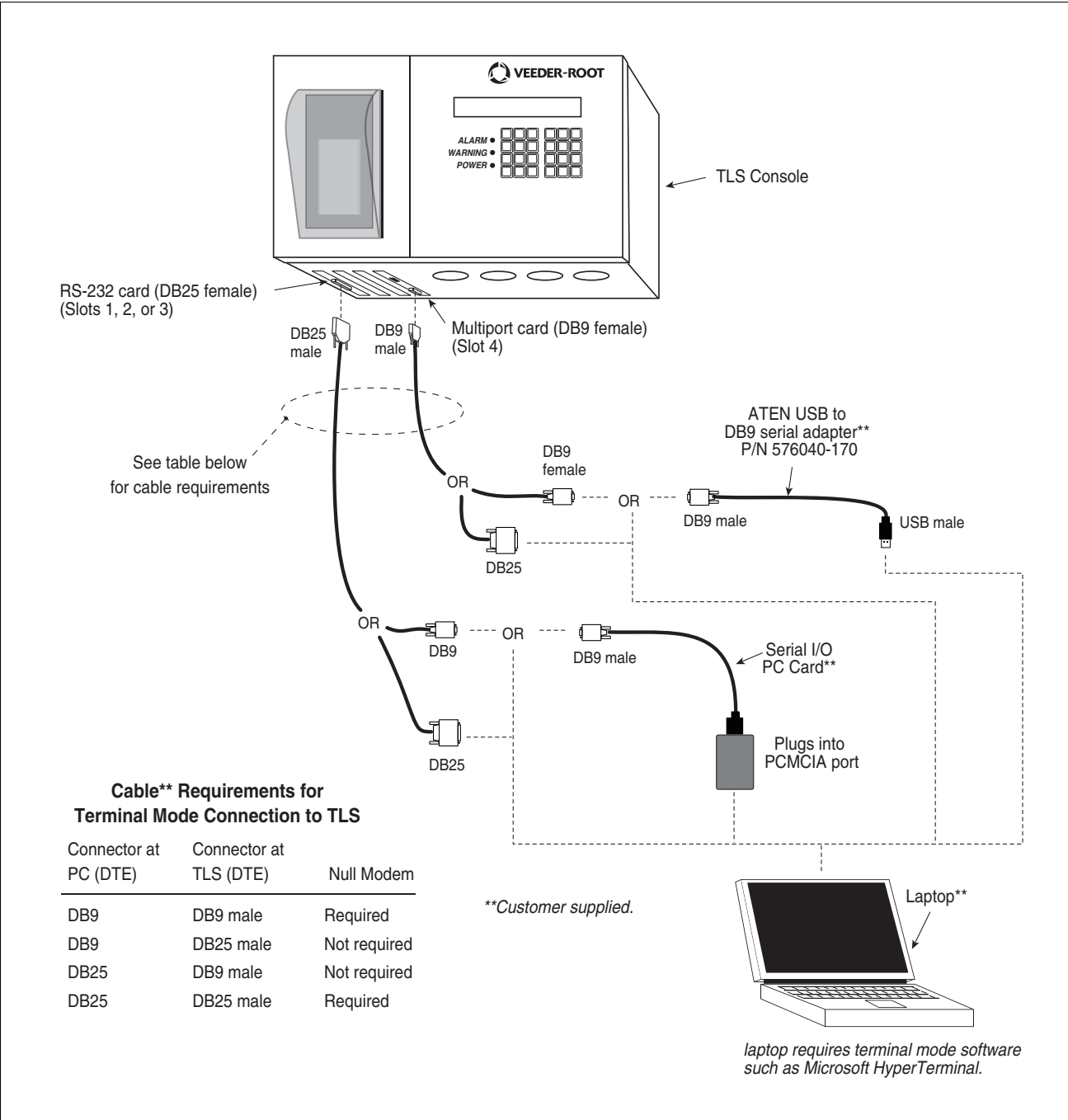


Figure 10. Connecting Laptop To TLS Console For Serial Communication

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 11), enter a connection name, e.g., TLSDIRECT, and click the OK button.



Figure 11. 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 12), 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 12. 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 13 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.

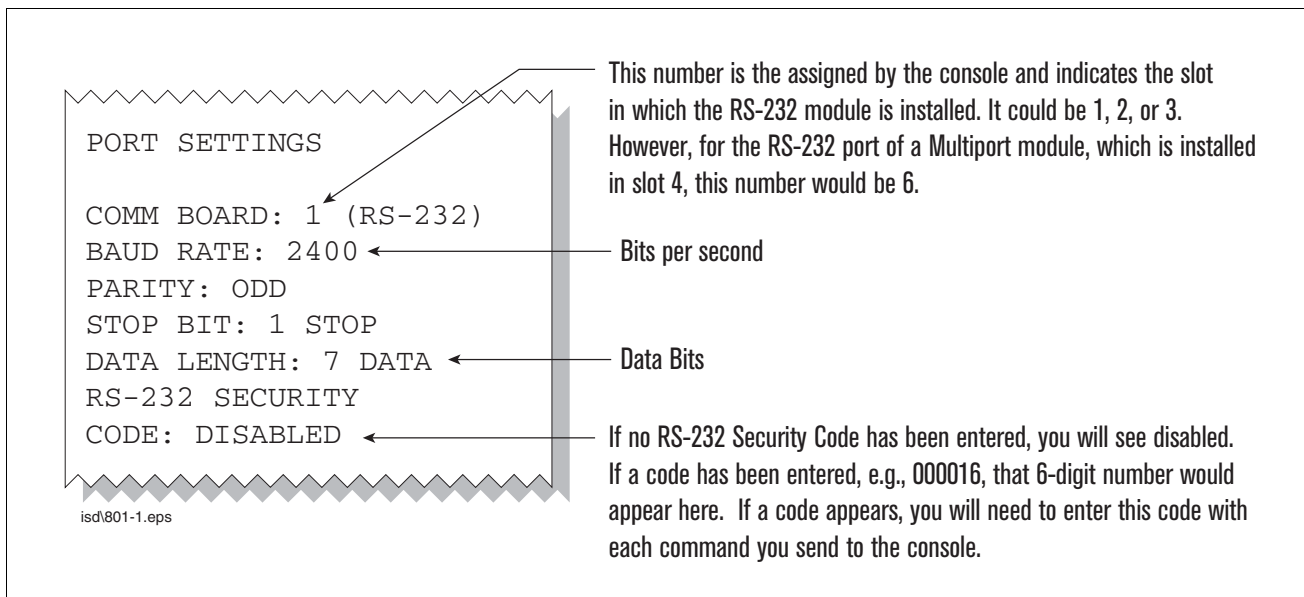


Figure 13. Console Comm Port Settings Printout Example

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 14).

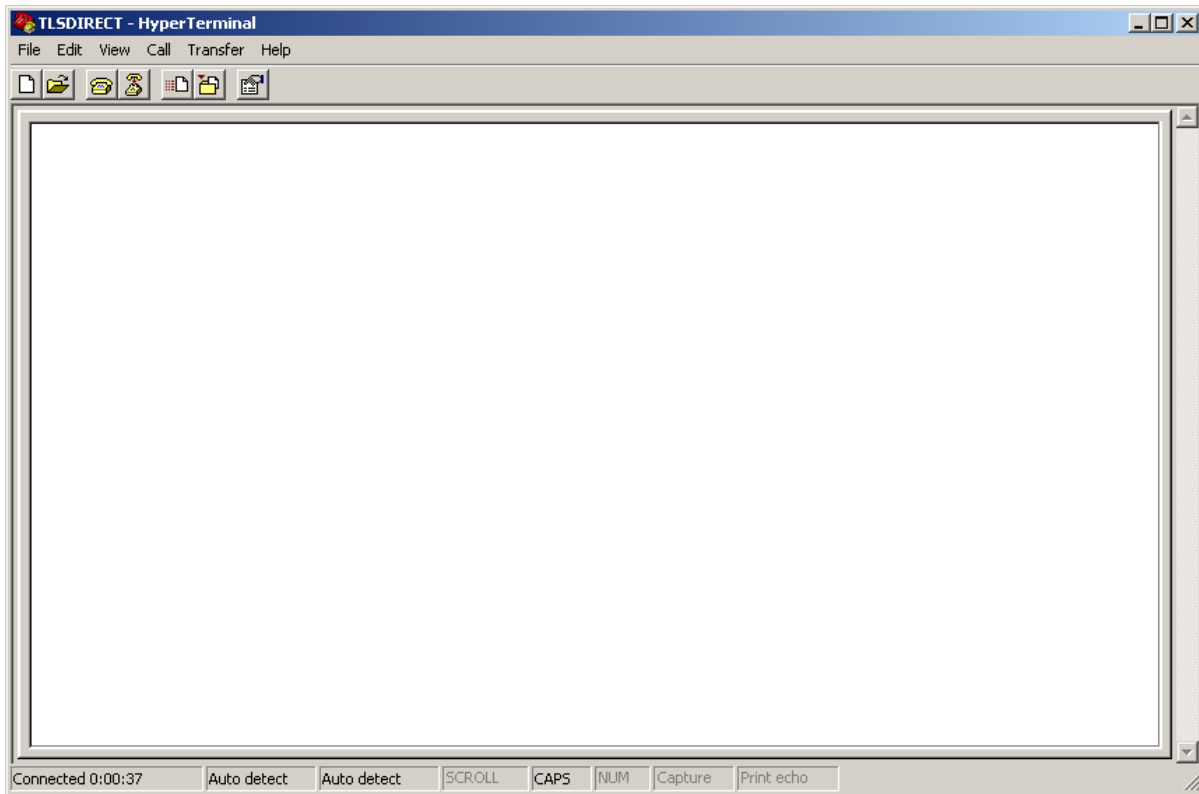


Figure 14. HyperTerminal Main Window

SENDING CONSOLE COMMANDS



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 IVAB00. 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 000016IVAB00.

You will see the typed command on the screen: ☹IVAB00 followed by the response (report) from the console. The ☹ symbol indicates Ctrl+A 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 ☹IVAB00☹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 APM Reports

Report Type	Serial Command (PC to Console)*
APM Daily Summary Report (See example Figure 15)	<SOH>IVAB00YYYYMMDDYYYYMMDD 1. YYYYMMDD - Start Date. (optional) 2. YYYYMMDD - End Date. (optional)
APM Fault History Report (See example Figure 16)	<SOH>IVAC00YYYYMMDDYYYYMMIII 1. YYYYMMDD - Start Date stamp. (optional) 2. YYYYMMDD - End Date stamp. (optional) 3. III - Limit number of record. (optional)

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

```

IVAB00
  14-06-11  3:57

TOM'S GAS STATION
GREENSBORO, NC 27420

Automatic Pressure Monitoring Daily Summary Report

ASSESSMENT TIME OF DAY = 11:59 PM

Status Codes: (W)Warn (F)Fail/Shutdown (ST-W/F)Self Test-Warn/Fail (N)No Test

Date      System  -----Test Results (KPA)-----  ---- Pressure KPA ----
Status    Gross    Degrd    Sensor Test    Max    Avg    Min
-----
2011/04/06  PASS    PASS    PASS    PASS    +1.18  +0.03  -0.93
2011/04/07  PASS    PASS    PASS    PASS    +1.19  +0.04  -0.00
2011/04/08   W    PASS    PASS    W(+0.07/+0.02)  +0.07  +0.04  +0.02
2011/04/09   W    W(+1.31)  PASS    PASS    +1.31  +0.04  +0.02
2011/04/10   W    PASS    PASS    W(+0.06/+0.02)  +0.06  +0.03  +0.02
2011/04/11  PASS    PASS    PASS    PASS    +0.89  +0.03  +0.00
2011/04/12   W    W(+1.25)  PASS    PASS    +1.25  +0.04  -0.33
2011/04/13   W    PASS    PASS    W(+0.05/+0.02)  +0.05  +0.03  +0.02
2011/04/14   W    W(+1.40)  PASS    PASS    +1.40  +0.03  -1.62
2011/04/15   W    W(+1.43)  PASS    PASS    +1.43  +0.04  -0.97
2011/04/16   W    PASS    PASS    W(+0.08/+0.02)  +0.08  +0.04  +0.02
2011/04/17   W    PASS    PASS    W(+0.07/+0.02)  +0.07  +0.03  +0.02
2011/04/18   W    W(+1.56)  PASS    PASS    +1.56  +0.03  -0.38
2011/04/19   W    PASS    PASS    W(+0.07/+0.02)  +0.07  +0.04  +0.02
♥

```

Figure 15. IVAB00 - APM Daily Summary Report - Serial to PC Format

```
IVAC00
      14-06-11   3:59

TOM'S GAS STATION
GREENSBORO, NC 27420

AUTOMATIC PRESSURE MONITORING FAULT HISTORY REPORT

      DATE      TIME      FAULT      STATE
-----
11-04-30 23:59:00 APM SENSOR WARN  CLEAR
11-04-29 23:59:00 APM SENSOR WARN  ALARM
11-03-23 23:59:00 APM SENSOR WARN  CLEAR
11-03-22 23:59:00 APM GROSS PRES WARN  CLEAR
11-03-22 23:59:00 APM SENSOR WARN  ALARM
11-03-21 23:59:00 APM GROSS PRES WARN  ALARM
11-03-21 14:04:50 GROSS PRES TEST WRN  CLEAR
11-03-21 13:04:10 GROSS PRES TEST WRN  ALARM
♥
```

Figure 16. IVAC00 - APM Fault History Report - Serial to PC Format

Diagnostics

Pressure Sensor Test

1. Access the Vapor Pressure Sensor, which is located on the vent stack or in the dispenser closest to the tanks.
2. Remove the cap from the ambient reference port of the Vapor Pressure Sensor valve and open the valve to atmosphere by turning the handle up 90 degrees so that the flow arrows point to both the Vapor Pressure Sensor sensing port and the ambient reference port (position B in Figure 17).
3. On the TLS Console front panel, use the 'MODE key' to scroll to "DIAG MODE" then use the function and step keys, as shown in Figure 18 to view the current pressure value. Verify that the pressure value is between +0.05 and -0.05 kPa.
4. Apply 1.0 kPa \pm 0.2 kPa of pressure to the atmospheric port. **Do not exceed 1.3 kPa!** Using the DIAG MODE on the TLS Console view the current pressure to verify that the pressure value is between +0.05 and -0.05 kPa of the applied pressure. Wait at least 1 minute for the display to update with the latest pressure value.
5. Replace the cap on the ambient reference port of the Vapor Pressure Sensor valve. Turn the Vapor Pressure Sensor valve handle down 90 degrees so that the flow arrows point to both the Vapor Pressure Sensor sensing port and the UST vapor return line (position A in Figure 17).

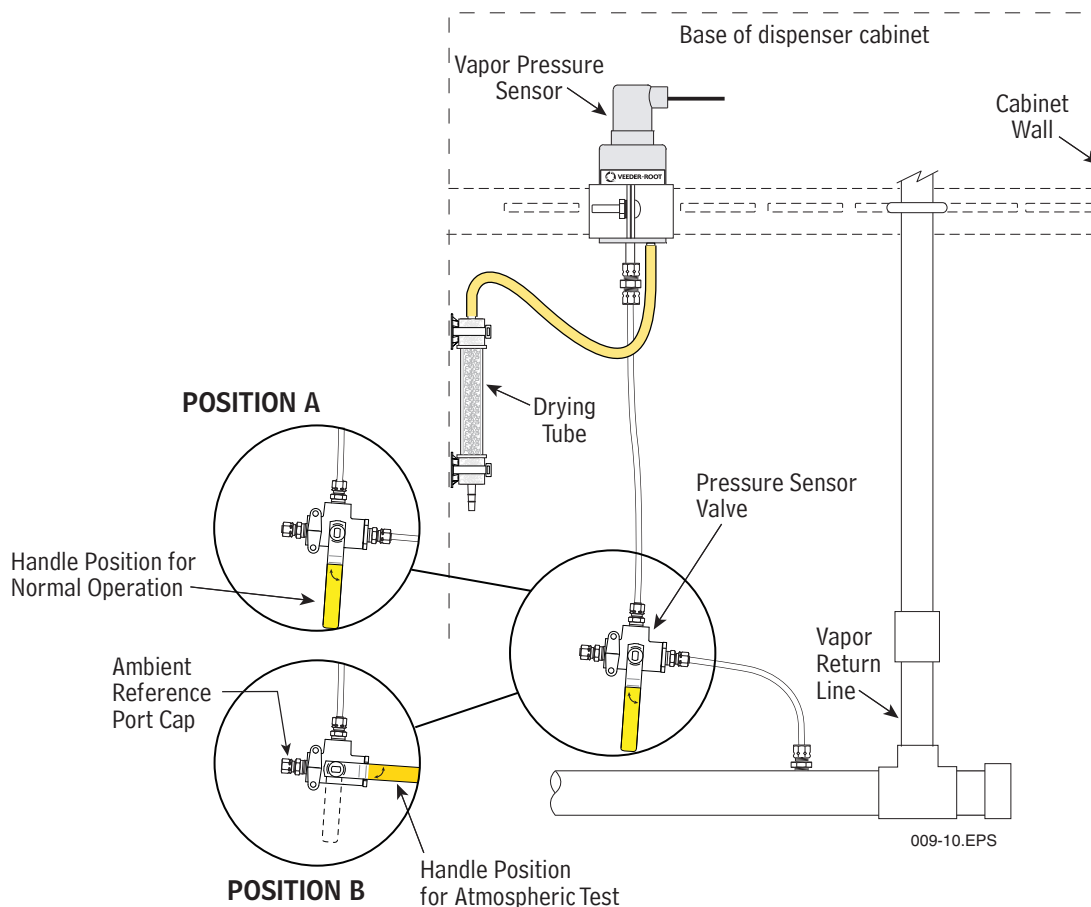


Figure 17. Pressure Sensor Valve Handle Positions

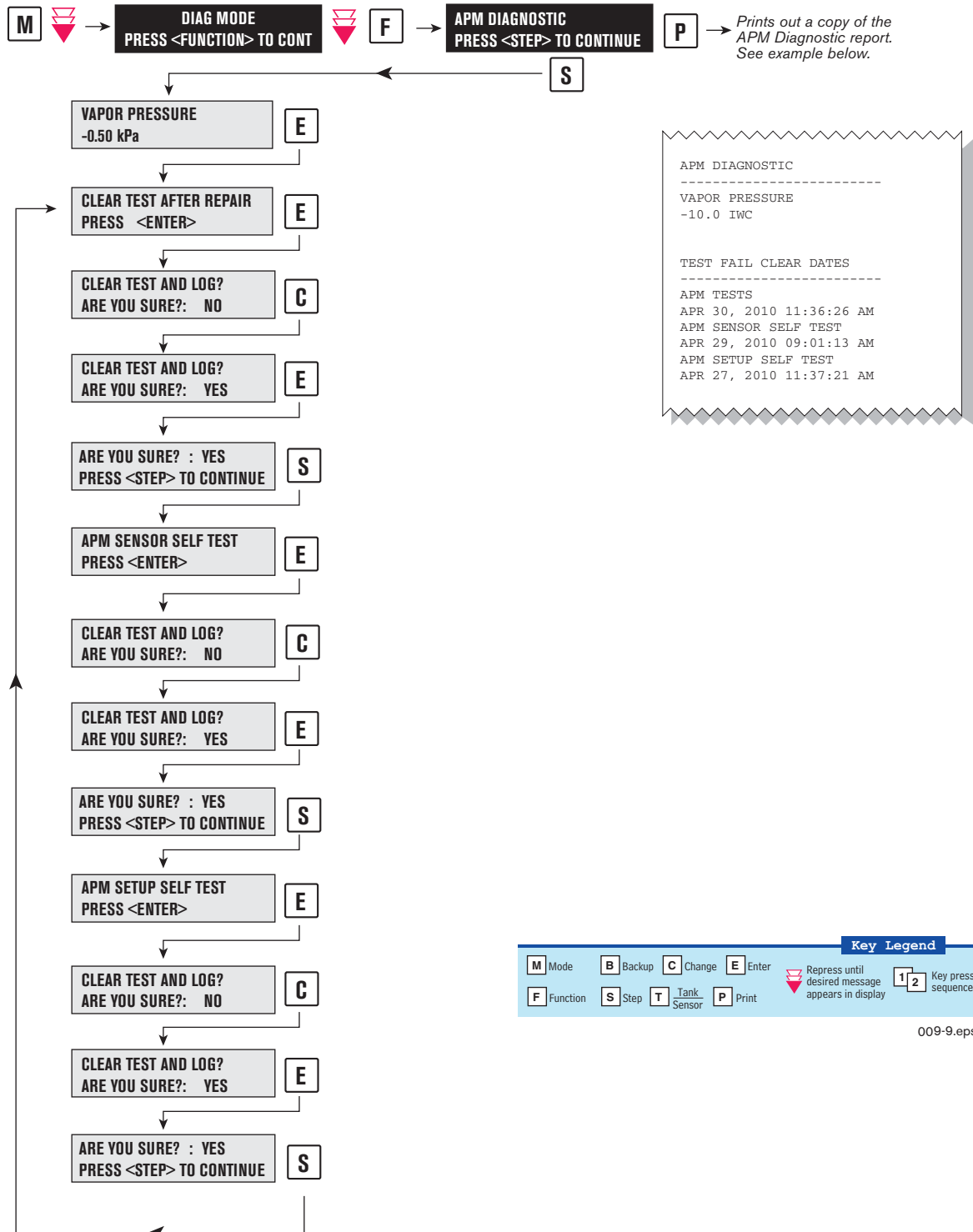


Figure 18. APM Diagnostic Menu

