Manual No: **577013-800** • Revision: **H**

In-Station Diagnostics (ISD)

Install, Setup, & Operation Manual

VEEDER-ROOT

Notice

Veeder-Root makes no warranty of any kind with regard to this publication, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Veeder-Root shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this publication.

Veeder-Root reserves the right to change system options or features, or the information contained in this publication.

This publication contains proprietary information which is protected by copyright. All rights reserved. No part of this publication may be photocopied, reproduced, or translated to another language without the prior written consent of Veeder-Root.

DAMAGE CLAIMS

1. Thoroughly examine all components and units as soon as they are received. If damaged, write a complete and detailed description of the damage on the face of the freight bill. The carrier's agent *must* verify the inspection and sign the description.
2. Immediately notify the delivering carrier of damage or loss. This notification may be given either in person or by telephone. Written confirmation must be mailed within 48 hours. Railroads and motor carriers are reluctant to make adjustments for damaged merchandise unless inspected and reported promptly.
3. Risk of loss, or damage to merchandise remains with the buyer. It is the buyer's responsibility to file a claim with the carrier involved.

RETURN SHIPPING

For the parts return procedure, please follow the appropriate instructions in the "General Returned Goods Policy" and "Parts Return" pages in the "Policies and Literature" section of the Veeder-Root **North American Environmental Products** price list.

FCC INFORMATION

This equipment complies with the requirements in Part 15 of the FCC rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct the interference.

WARRANTY POLICY

For ISD components (Vapor Flow Sensor, Vapor Pressure Sensor & software), the following warranty applies:

We warrant that this product shall be free from defects in material and workmanship and will comply with the performance standards of California EPA CP-201 section 10 as amended July 22, 2004 for a period of one (1) year from the date of installation or twenty-four (24) months from the date of invoice, whichever occurs first. We will repair or replace the product if the product is returned to us transportation prepaid by user, within the warranty period, and is determined by us to be defective. This warranty will not apply to any product which has been subjected to misuse, negligence, accidents, systems that are misapplied or are not installed per Veeder-Root's specifications as outlined in the ARB Approved Installation, Operation and Maintenance Manuals for the Healy and Veeder-Root Phase II EVR Systems, modified or repaired by unauthorized persons, or damage related to acts of God. We shall not be responsible for any expenses incurred by the user.

©Veeder-Root 2007. All rights reserved.

1 Introduction

Site Requirements 1-1
Supported Vapor Recovery Systems 1-2
Contractor Certification Requirements 1-2
Related Manuals 1-2
Safety Precautions 1-3
Example Site Diagrams 1-3

2 Installation

Air Flow Meter 2-1
Vapor Pressure Sensor 2-1
Installing TLS Console Modules - General Notes 2-1
    Circuit Directory 2-2
Smart Sensor Interface Module 2-3
NVMEM Board 2-3
Site Shut Down Requirements 2-3
Dispenser Interface Module (DIM) 2-3
Probe Interface Module 2-3

3 Setup

Introduction 3-1
    System Setups 3-1
    Alarm Setups 3-1
Smart Sensor Setup 3-2
Hose label/Fueling Point/Air Flow Meter Serial Number Chart 3-3
EVR/ISD Setup 3-3
Alarm Setup 3-8
    Introduction 3-8
    Programming ISD Shut Down Alarms 3-9

4 ISD Operability Test Procedure

Vapor Pressure Sensor Ambient Reference Test 4-1
Vapor Flow Meter Operability Test 4-3
Site Shutdown Test 4-3

5 Operation

Alarms 5-1
    Overview of TLS console Interface 5-1
    Warning Posting 5-1
    Alarm Posting 5-2
    Site Reenable 5-2
    Alarm Logs 5-3
    Alarm Sequence 5-4
    ISD Alarm Summary 5-4
    Other Alarms 5-5
Reports 5-5
Viewing ISD Reports via RS-232 Connection 5-11
    Connecting Laptop to Console 5-11
    Connecting Laptop to Console 5-12
    Sending Console Commands 5-14

6 Maintenance

TLS Console 6-1
Vapor Flow Meter 6-1
Vapor Pressure Sensor 6-1

7 Diagnostic Menus 7-1

A Appendix A: Site EVR/ISD Equipment Location Worksheet

Single-Hose Fueling Position Dispensers A-1
Multi-Hose Fueling Position Dispensers A-4

B Appendix B: ISD Operability Test Procedure Data Forms

Vapor Pressure Sensor Ambient Reference Test Data Form B-1
Vapor Flow Meter Operability Test Procedure Data Form B-2
Site Shutdown Test Data Form B-4

Figures

Figure 1-1. Example Site Diagram 1-4
Figure 2-2. TLS console Interface Module Bays 2-2
Figure 3-1. Smart Sensor Setup 3-2
Figure 3-2. Smart Sensor Setup Printout Example 3-3
Figure 3-3. EVR/ISD Setup 1 3-4
Figure 3-4. EVR/ISD Setup 2 3-5
Figure 3-5. EVR/ISD Setup 3 3-6
Figure 3-6. Example Healy Setup Printout 3-7
Figure 3-7. Site Tank Control Examples 3-8
Figure 3-8. Assigning ISD Shut Down Alarms in Line Leak Disable Setup 3-9
Figure 3-9. Example Line leak Disable Setup Printout 3-10
Figure 3-10. Assigning ISD Shut Down Alarms in Output Relay Setup 3-11
Figure 3-11. Example printout - ISD Alarms Assignments - Output Relay Setup.....3-12
Figure 4-1. Vapor pressure sensor valve positions 4-2
Figure 4-2. Accessing Calibrate SmartSensor diagnostic menu 4-2
Figure 5-1. TLS console alarm interface 5-1
Figure 5-2. Example Warning posting 5-2
Figure 5-3. Example Alarm posting 5-2
Figure 5-4. ISD Alarm Override Procedure 5-3
Figure 5-5. Printing ISD Reports on Console Printer 5-7
Figure 5-6. ISD Status Report Example - TLS console printout 5-8
Figure 5-7. ISD Daily Report Example - TLS console printout 5-9
Figure 5-8. ISD Monthly Report Example - TLS console printout 5-10
Figure 5-9. Connecting laptop to TLS console for serial communication 5-11
Figure 5-10. Connection Description window 5-12
Figure 5-11. Connect To window 5-12
Figure 5-12. Console comm port settings prinout example 5-13
Figure 5-13. HyperTerminal main window 5-14
Figure 5-14. ISD Daily Report Details - Serial to PC Format 5-16
Figure 5-15. ISD Monthly Status Report - Serial to PC Format 5-17
Figure 5-16. ISD Alarm Status Report - Serial to PC Format 5-18

1 Introduction

In-Station Diagnostic (ISD) equipment is designed to monitor the collection and containment of vapors by vapor recovery equipment. Using the existing Veeder-Root (V-R) TLS console platform, sensor inputs an dispenser fuel meter inputs, the ISD software continuously monitors the vapor recovery equipment, maintains test records, provides test reports, generates alarms following test/equipment failures, and finally, shuts down the site upon the occurrence of designated alarms.

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

WARNING! Revision or reprogramming of the TLS may require notification of the local Certified Unified Program Agency (CUPA).

Site Requirements

Below are the requirements for all vapor recovery systems except where noted.

- V-R TLS-350R/EMC w/BIR, TLS-350 Plus/EMC Enhanced, TLS-350/EMC and Red Jacket ProMax consoles with ECPUII - install as per TLS-3XX Site Prep manual, setup following instructions in TLS-3XX System Setup Manual.
- A flash memory board (NVMEM2) for ISD software storage - installed on the ECPUII 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 module is required for RS-232 access to ISD reports - install as per instructions shipped with module, setup following instructions in this manual.
- An output relay is required (either 4-Output Relay module, I/O Combination module) to shut down each Submersible Turbine Pump (STP) upon activation of certain ISD alarms (these alarms can also be assigned in Line Leak Disable setup to shut down the STP if Line Leak detection feature is installed) - install as per instructions shipped with module or line leak system, setup ISD shut down alarms either using output relays or line leak system following instructions in this manual.
- Dispenser Interface module (DIM) for the type of dispensers installed - install as per installation manual shipped with device, setup following instructions in DIM manual and TLS-3XX Setup Manual. Note: the DIM supplies flow meter event inputs needed for ISD analysis.
- 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 Air Flow Meters and Vapor Pressure Sensor (up to 8 devices per module, or 7 if customer is using SmartSensor module / embedded pressure). Install and connect following instructions in the Air Flow Meter and Vapor Pressure Sensor installation Guides.
- Air Flow Meters (one for each dispenser) - install as per ISD Flow Meter installation manual shipped with meter, setup following instructions in this manual.
- Vapor Pressure Sensor (one per site) - install as per ISD Pressure Sensor installation manual shipped with sensor, setup following instructions in this manual.
- To achieve CP-201 false alarm performance standards for ISD reporting, the vapor recovery system leak rate should be at or below 2.88 CFH at 2 inches water column.

Supported Vapor Recovery Systems

Table 1-1 lists V-R supported vapor recovery systems.

Table 1-1

Name	CARB Executive Order
Healy Assist EVR	VR-202

Contractor Certification Requirements

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

Level 1 Contractors holding valid Level 1 Certification are approved to perform wiring and conduit routing, equipment mounting, probe and sensor installation, tank and line preparation, and line leak detector installation.

Level 2/3 or 4 Contractors holding valid Level 2, 3 or 4 Certifications are approved to perform installation checkout, startup, programming and operations training, troubleshooting and servicing for all Veeder-Root Tank Monitoring Systems, including Line Leak Detection and associated accessories.

In-Station Diagnostics This course of training includes In-Stations Diagnostics installation checkout, startup, programming, and operations training. It also includes troubleshooting and service techniques for the Veeder-Root In-Station Diagnostics system. A current level 2/3 or 4 certification is a prerequisite for the In-Station Diagnostics course. After successful completion of this course the contractor will receive a certificate as well as a Veeder-Root In-Station Diagnostics contractor certification card.

Warranty Registrations may only be submitted by selected Distributors.

Related Manuals

The manuals in Table 1-2 below are shipped with the equipment on the V-R Tech Docs CD-ROM and will be needed to install non-ISD specific equipment.

Table 1-2.- Related Manuals

V-R Manual	Part Number
TLS-3XX Site Prep Manual	576013-879
ISD Flow Meter Installation Guide	577013-796
ISD 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
ISD Troubleshooting Manual	577013-819
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.

	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	
	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.** **Touching a live circuit can cause electrical shock that may result in serious injury or death.**

Example Site Diagrams

Figure 1-1 shows an example site diagram. The diagram show setups unique to ISD which are discussed in this manual (marked with a star), and those setups performed following instructions in the appropriate sections of the TLS-3XX System Setup manual, such as In-Tank setup (marked with a hexagon).

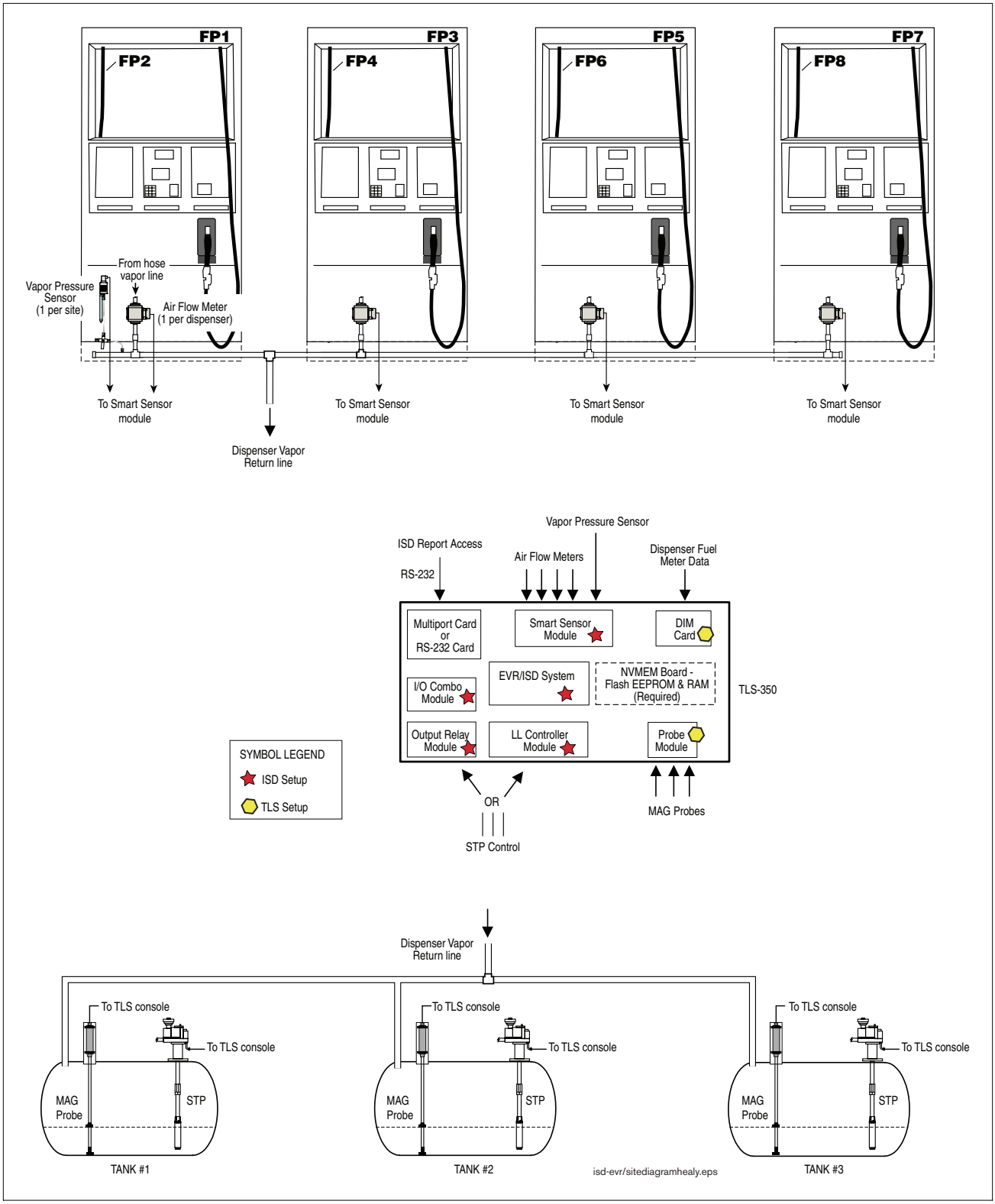


Figure 1-1. Example Site Diagram

2 Installation

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

- Air Flow Meter
- Vapor Pressure Sensor
- Smart Sensor Interface Module (8 input and 7 input w/embedded pressure versions)
- NVMEM board - required
- 4-Relay Output Module
- Line Leak Detection
- Dispenser Interface 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).

Air Flow Meter

Install one Air Flow Meter in the vapor return piping of each gasoline dispenser following the instructions in the ISD Flow Meter Installation guide (P/N 577013-796). Program the meter following instructions in this manual.

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 ISD Pressure Sensor Installation guide (P/N 577013-797). Program the meter following instructions in this manual.

Installing TLS Console Modules - General Notes

TLS 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 2-2).

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.

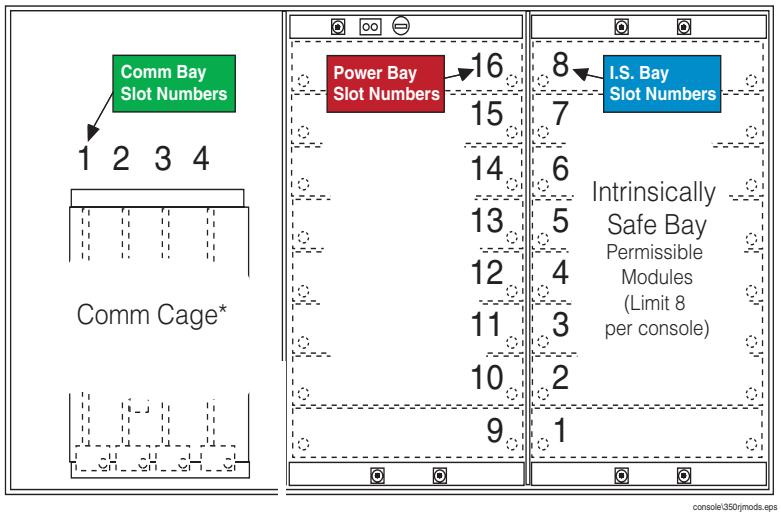


Figure 2-2. TLS console Interface Module Bays

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., AFM1.

Smart Sensor Interface Module

The Smart Sensor Interface Module 8 input or 7 input w/embedded pressure versions monitor Air Flow Meter (AFM) and 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 Air Flow Meter and Vapor Pressure Sensor manuals. 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 ISD software and store ISD reports. No setup is required.

Site Shut Down Requirements

Normal ISD operation requires TLS console control of the STP in each of the gasoline tanks. If the site has Wireless Pressure Line Leak Detection (WPLLD), Pressure Line Leak Detection (PLLD) or Volumetric Line Leak Detection (VLLD) for each tank, you can use the line leak disable setup to control the vapor recovery tanks (diesel tanks do not require shutdown). If the site does not have line leak detection for all vapor recovery tanks, you can use output relay setup to control each tank. In lieu of line leak detection, install the necessary modules (output relay) to control each gasoline tank.

Dispenser Interface Module (DIM)

Verify that a dispenser interface module (DIM) is installed in the TLS console communication bay (ref. Figure 2-2) and that it is designed to communicate with the type of gasoline dispensers installed at the site. The ISD software requires dispenser fuel flow meter data inputs. Reference TLS-350R Point-of-Sale (POS) Application Guide to select correct DIM card. Refer to the manual shipped with the DIM for installation instructions, refer to the TLS-3XX System Setup manual to program the DIM.

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 ISD 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 ISD-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 ISD sites - Figure 3-1

  This setup mode function programs the Smart Sensor Interface module to monitor the Air Flow Meters and the Vapor Pressure Sensor.

- EVR/ISD Setup - All ISD sites - Figure 3-3, Figure 3-4, Figure 3-5

  This setup mode function programs the TLS console for EVR/ISD vapor recovery 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).

ALARM SETUPS

One or both of two standard TLS setup functions must be programmed to shut down the tank if certain ISD alarms occur:

- XLLD Line Disable Setup - For ISD sites with line leak detection - Figure 3-8

  This setup mode function lets you assign ISD alarms to a line leak detector that will shut down the tank's STP.

- Output Relay Setup - For ISD sites without line leak detection - Figure 3-10

  This setup mode function lets you assign ISD alarms to a relay on the 4-Relay output module or I/O Combination module that will shut down the tank's STP.

Smart Sensor Setup

The Smart Sensor Interface Module is installed in the Intrinsically-Safe bay of the TLS console. This module monitors Air Flow Meters and the Vapor Pressure Sensor. Figure 3-1 diagrams the Smart Sensor setup procedure. Figure 3-2 shows a printout of the Smart Sensor setup.

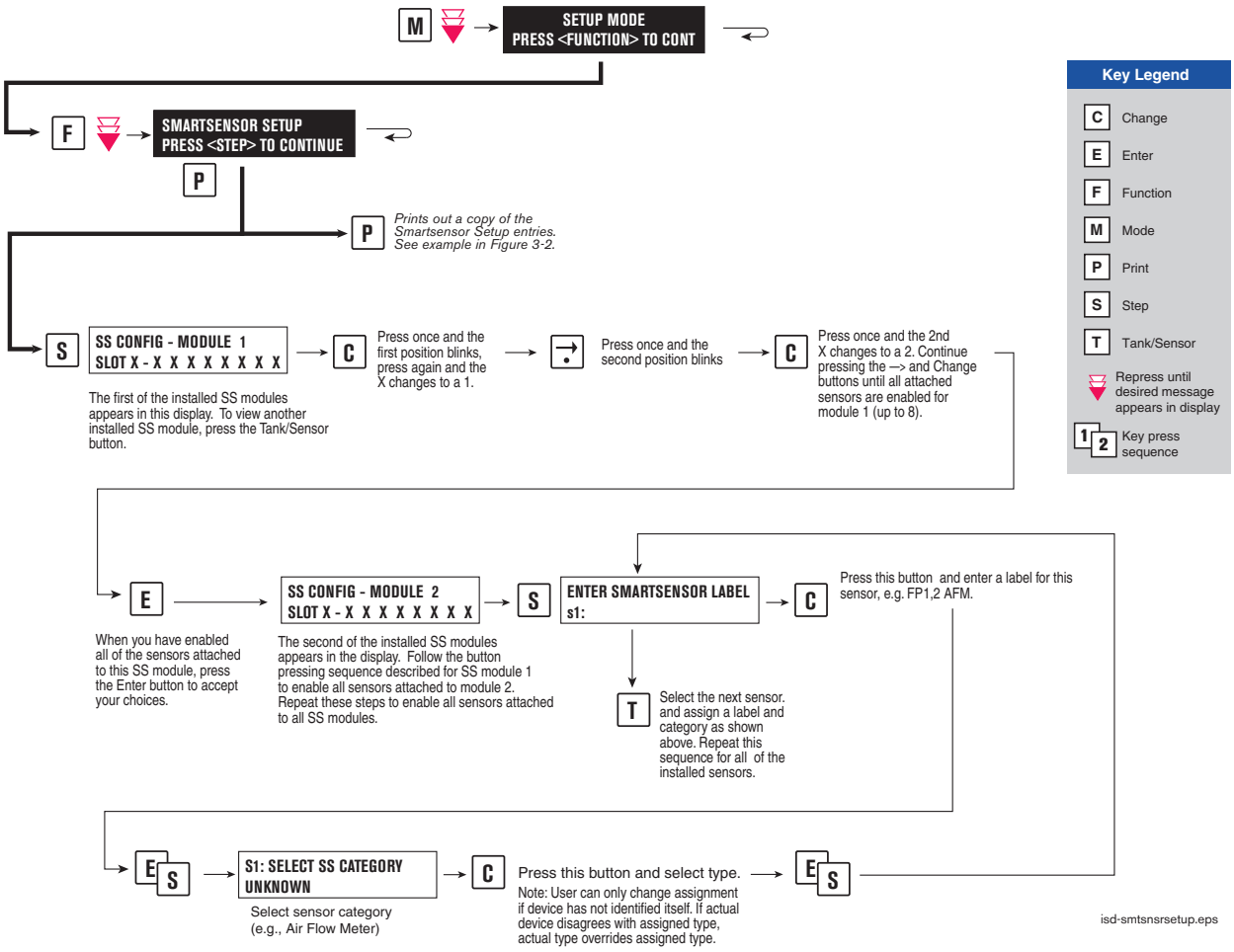


Figure 3-1. Smart Sensor Setup

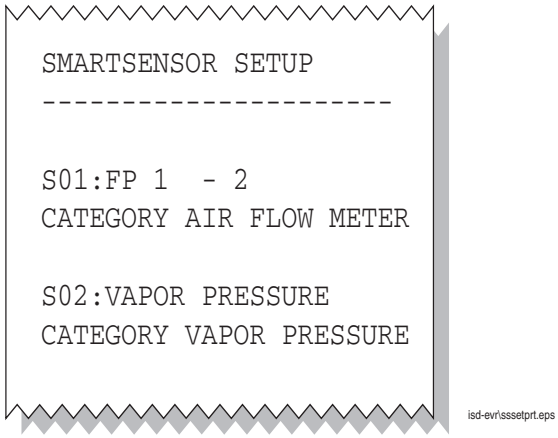


Figure 3-2. Smart Sensor Setup Printout Example

Hose label/Fueling Point/Air Flow Meter Serial Number Chart

The next step in programming your system requires documentation of information from the ISD equipment installed at the facility. Choose the appropriate data sheet from Appendix A for the vapor recovery system installed at your facility. Record the unique information from the sensors prior to attampting the TLS EVR/ISD set up described in Figure 3-4. After you complete the TLS EVR/ISD you must perform the Product Meter ID set up procedure to complete the set up

EVR/ISD Setup

Figure 3-3, Figure 3-4, and Figure 3-5 diagram the EVR/ISD setup programming. Start with the first figure, continue to the second, and finish in the third. Figure 3-6 shows an example printout of the EVR/ISD setup.

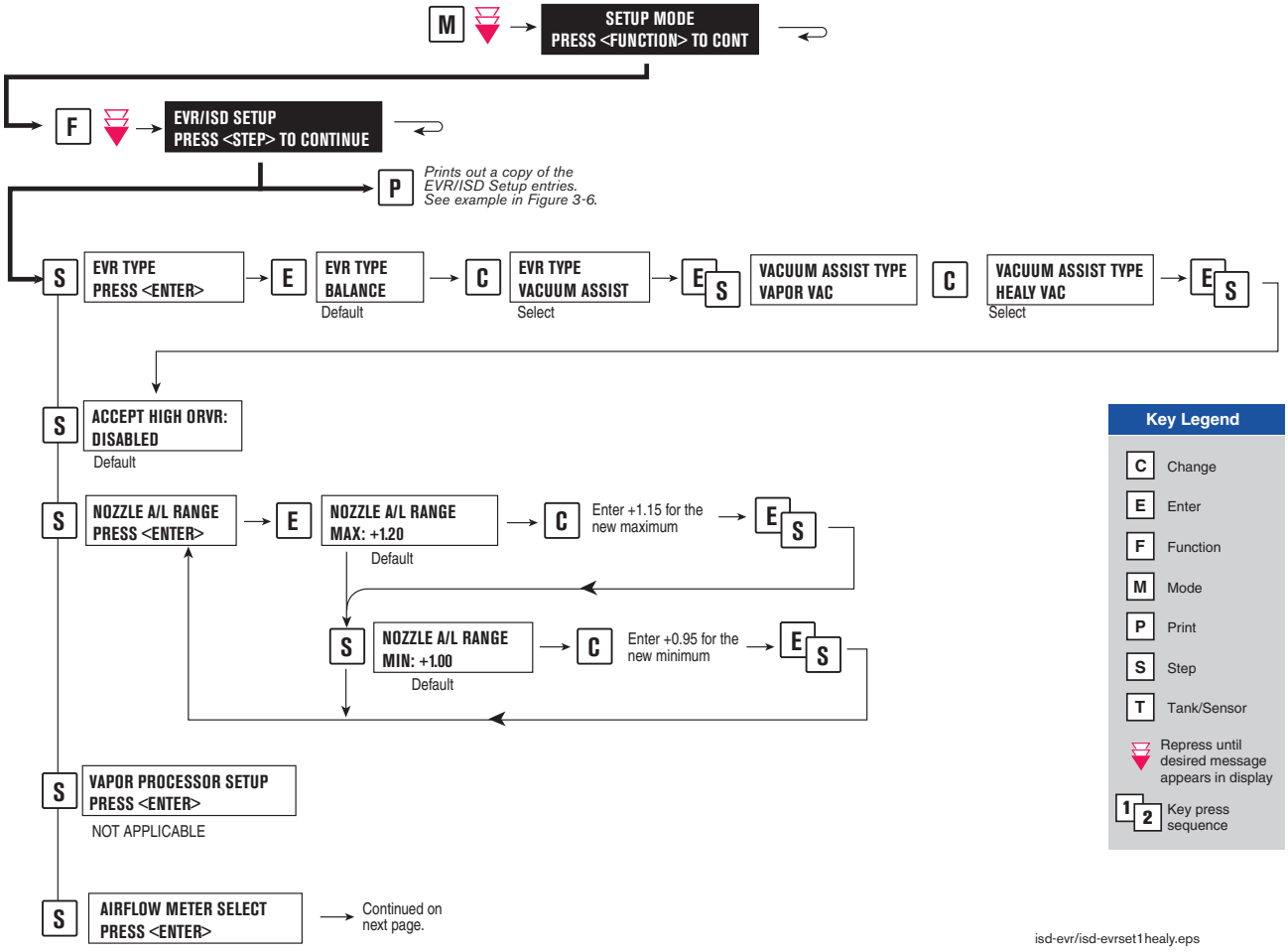


Figure 3-3. EVR/ISD Setup 1

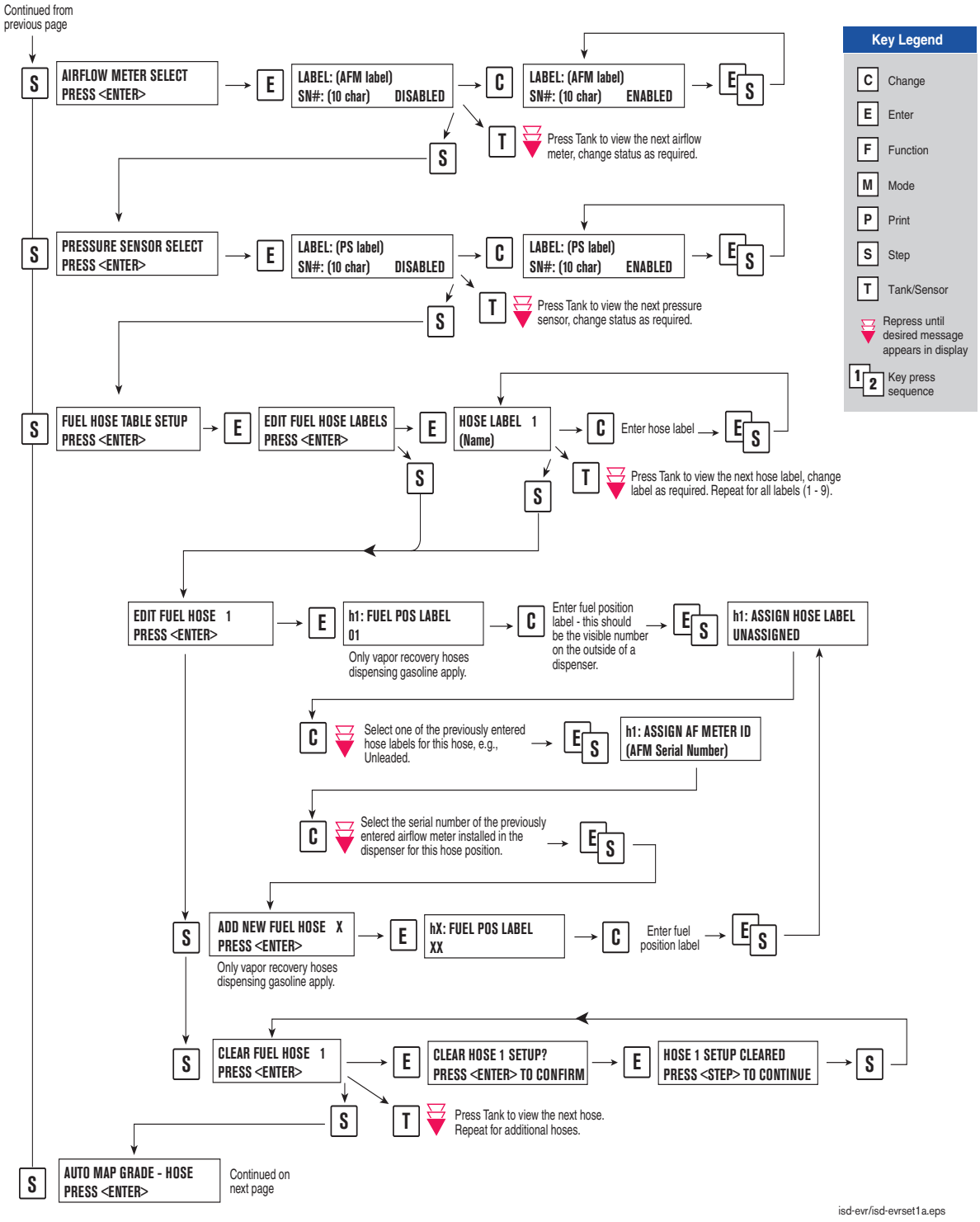


Figure 3-4. EVR/ISD Setup 2

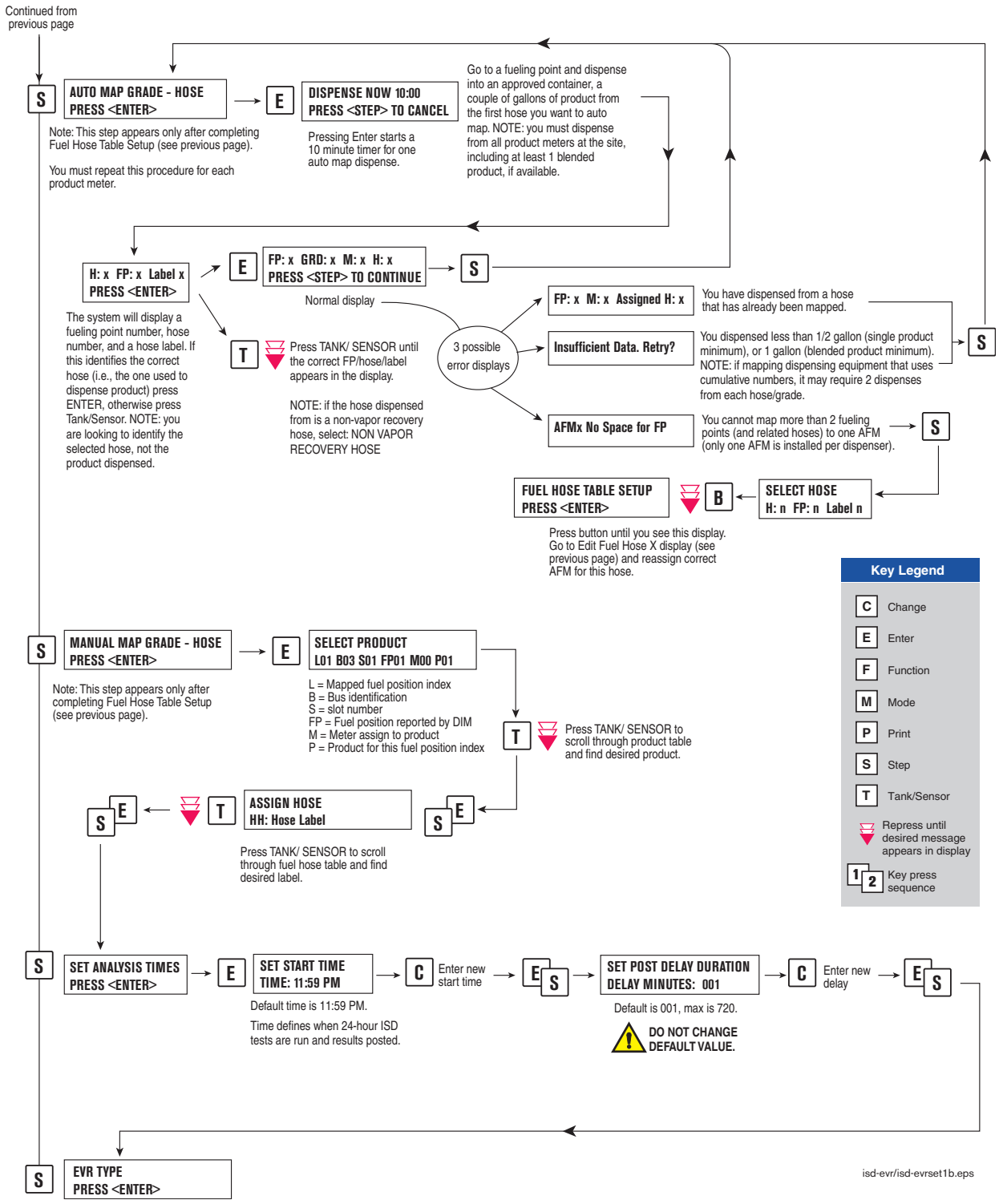


Figure 3-5. EVR/ISD Setup 3

```
EVR/ISD SETUP

EVR TYPE: VACUUM ASSIST
VACUUM ASSIST TYPE
HEALY VAC

NOZZLE A/L RANGE
MAX: 1.15 MIN: 0.95

VAPOR PROCESSOR TYPE
NO VAPOR PROCESSOR

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

ACCEPT HIGH ORVR:
DISABLED

ISD HOSE TABLE
ID  FP  FL  HL  AA  RR
------------------------
01  01  01  02  01  UU
02  02  02  02  01  UU
03  03  03  02  02  UU
04  04  04  02  02  UU
05  05  05  02  03  UU
06  06  06  02  03  UU
07  07  07  02  04  UU
08  08  08  02  04  UU
09  09  09  02  05  UU
10  10  10  02  05  UU
11  11  11  02  06  UU
12  12  12  02  06  UU

ISD AIRFLOW METER MAP
ID SERIAL NUM LABEL
------------------------
 1 03001401   AFM1 FP1 -
 2 03001402   AFM2 FP3 -
 3 03001403   AFM3 FP5 -
 4 03001404   AFM4 FP7 -
 5 03001405   AFM5 FP9 -
 6 03001406   AFM6 FP11

ISD FUEL GRADE HOSE MAP
    1   2   3   4
FP MHH MHH MHH MHH AA
------------------------
01 101 301 901 U U  1
02 102 302 902 U U  1
03 103 303 903 U U  2
04 104 304 904 U U  2
05 105 305 905 U U  3
06 106 306 906 U U  3
07 107 307 907 U U  4
08 108 308 908 U U  4
09 109 309 909 U U  5
10 110 310 910 U U  5
11 111 311 911 U U  6
12 112 312 912 U U  6

LABEL TABLE
------------------------
 1: UNASSIGNED
 2: BLEND3
 3: REGULAR
 4: MID GRADE
 5: PREMIUM
 6: GOLD
 7: BRONZE
 8: SILVER
 9: BLEND2
10: BLEND4
```

ID = Hose ID
FP = Mapped fuel position as TLS Console recognizes it
(-1 = unassigned)
FL = Fuel position label as written on dispenser
HL = Hose label
AA = Airflow meter ID assigned
RR = Relay ID
UU = unassigned

ID = Airflow meter ID assigned
Serial Number = Airflow meter's serial number

FP = Mapped fuel position
M/H = Meter and hose for product X
AA = Airflow meter assigned to first (lowest X) product with meter and hose assigned (usually same for entire dispenser)
U = Unassigned
N = Not used by ISD

ID = Label ID
Label = User definable
00 = reserved, non-ISD

isdhealysetprtout.eps

Figure 3-6. Example Healy Setup Printout

Alarm Setup

INTRODUCTION

California regulations (VAPOR RECOVERY CERTIFICATION PROCEDURE, CP-201, CERTIFICATION PROCEDURE FOR VAPOR RECOVERY SYSTEMS AT GASOLINE DISPENSING FACILITIES, Section 10.1.2) require shut down of dispensing systems that generate specific alarm conditions. To accomplish this, the TLS must be configured to control the gasoline tank's pump (diesel tanks are not monitored) in order to disable them when ISD shutdown alarm conditions occur. Prior to setting up ISD shut down alarms, you will need to determine how the site's tank pumps are controlled. If the site has line leak detection, you can shut down the line (tank) by assigning the ISD alarms in Line Leak Disable setup. In the absence of line leak detection, you can assign the ISD alarms to Output Relays which in turn can be wired to shut down the tank. Figure 3-7 illustrates two examples of tank pump control, one using a line leak/output relay combination and one using output relays.

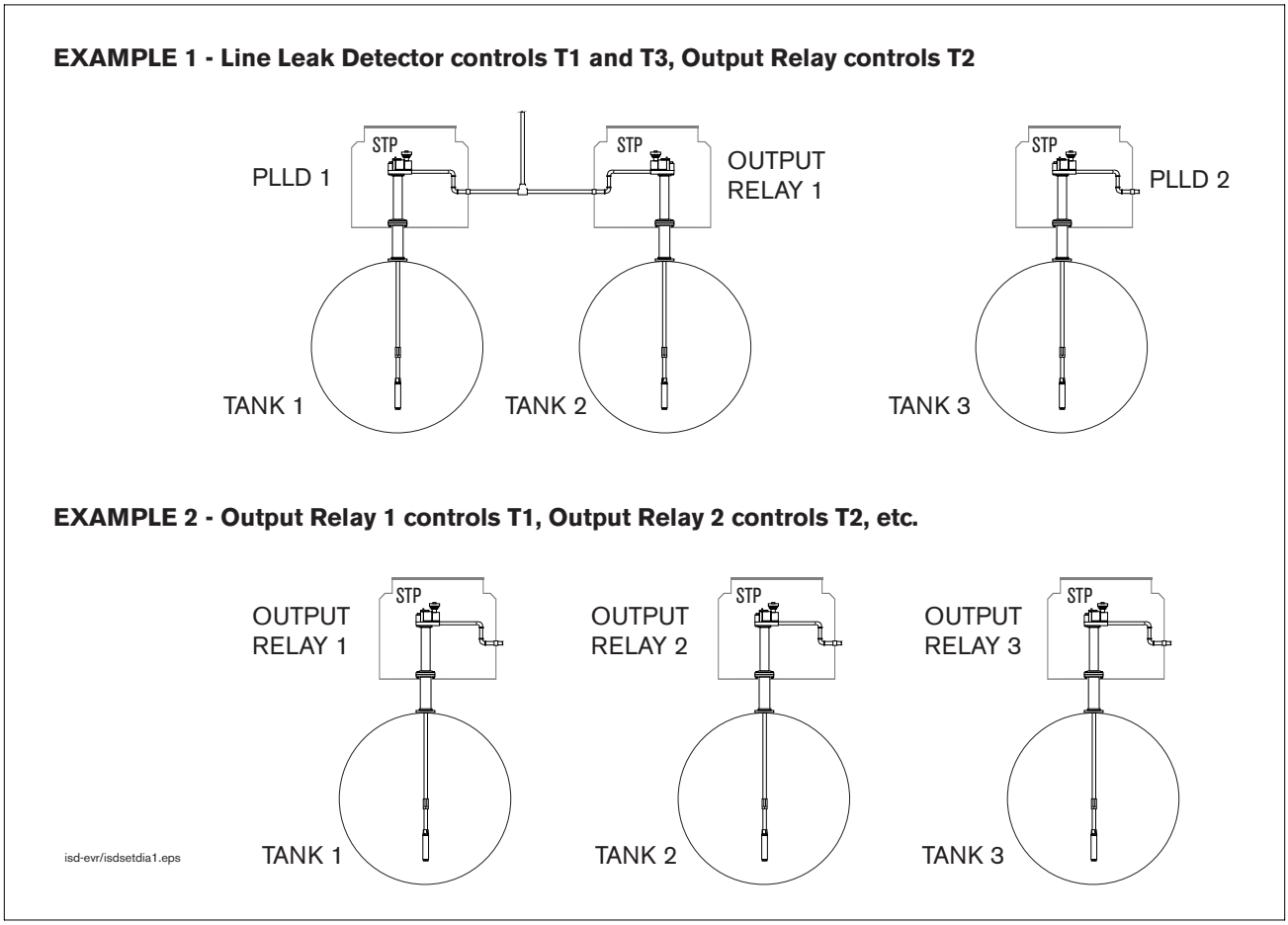


Figure 3-7. Site Tank Control Examples

Referencing the figure above, in example 1, you would assign the ISD shut down alarms for tank 1 to PLLD 1 in PLLD Line Leak Disable setup, for tank 2 to a relay in Output Relay Setup, and for tank 3 to PLLD 2 in PLLD Line Leak Disable setup. In example 2, you would assign the ISD shut down alarms for tank 1 to output relay 1, tank 2 to output relay 2, and tank 3 to output relay 3.

PROGRAMMING ISD SHUT DOWN ALARMS

Figure 3-8 illustrates the setup steps required to assign ISD Shut Down Alarms to a tank having a line leak detection system installed. Figure 3-9 shows a printout of the Line Leak Disable setup.

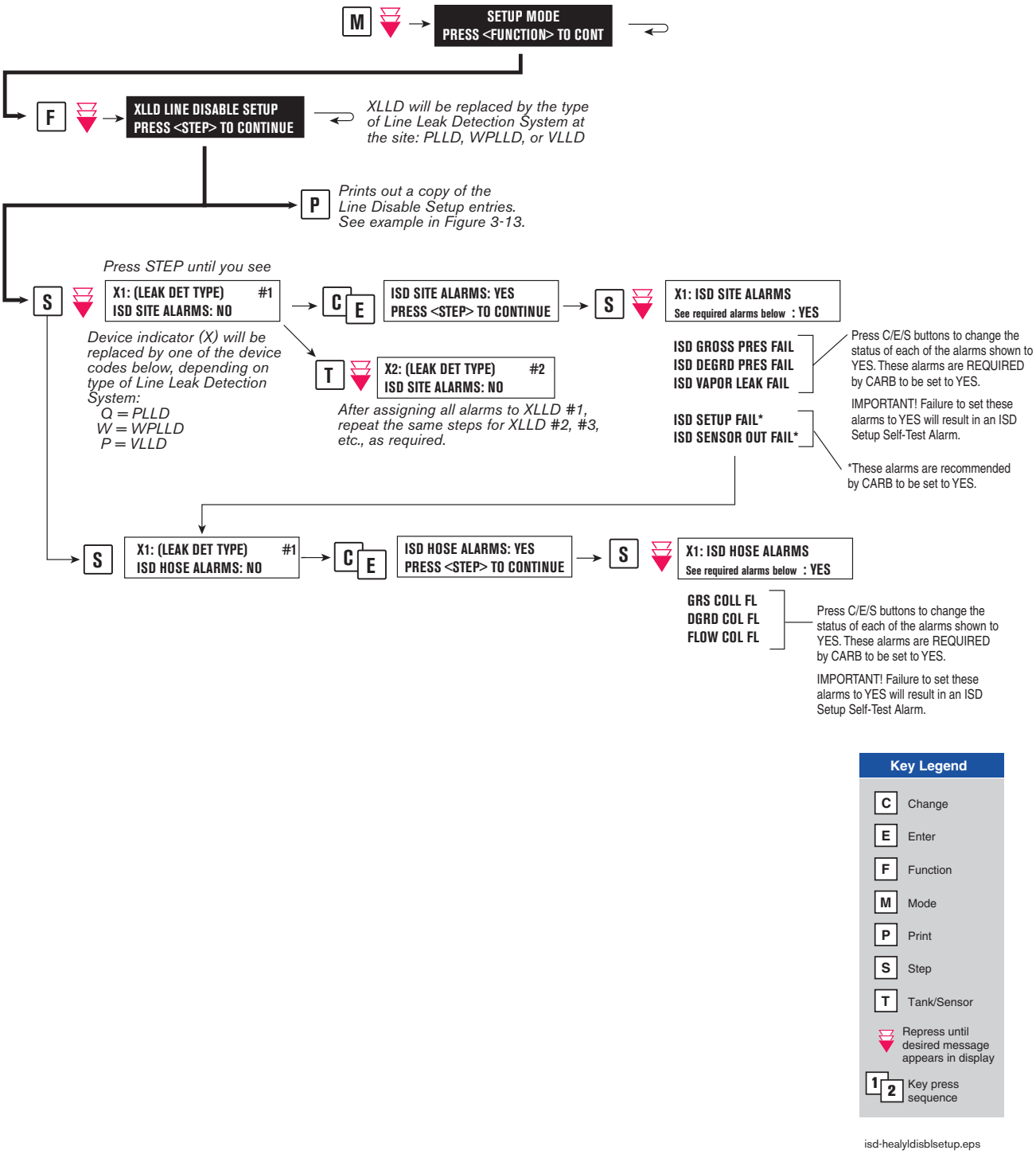


Figure 3-8. Assigning ISD Shut Down Alarms in Line Leak Disable Setup

```
PLLD LINE DISABLE SETUP
-----------------------

Q 1:UNLEADED

ISD SITE ALARMS
 ISD GROSS PRESSURE FAIL
 ISD DEGRD PRESSURE FAIL
 ISD VAPOR LEAKAGE FAIL
 ISD SETUP FAIL
 ISD SENSOR OUT FAIL

ISD HOSE ALARMS
 h1: GROSS COLLECT FAIL
 h1: DEGRD COLLECT FAIL
 h1: FLOW COLLECT FAIL
```

isd-evr\healylldsetprt.eps

Figure 3-9. Example Line leak Disable Setup Printout

Figure 3-10 illustrates the setup steps required to assign ISD Shut Down Alarms to a tank using either a Four Relay Output Module or an I/O Combination Module. Figure 3-11 shows a printout of the Output Relay setup.

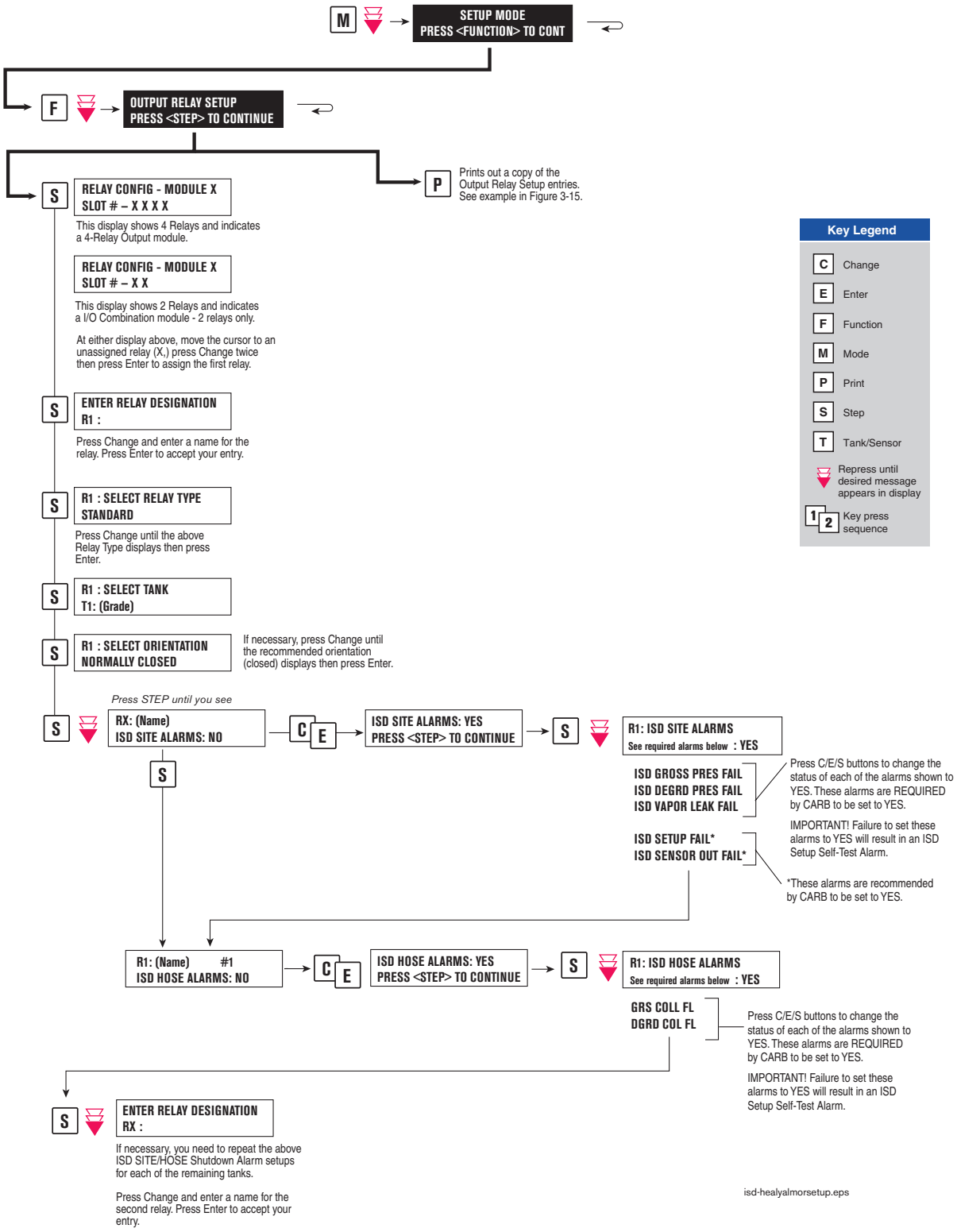


Figure 3-10. Assigning ISD Shut Down Alarms in Output Relay Setup

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

R 1:(Input Name)
TYPE:
  STANDARD
NORMALLY CLOSED

ISD SITE ALARMS
 ISD GROSS PRESSURE FAIL
 ISD DEGRD PRESSURE FAIL
 ISD VAPOR LEAKAGE FAIL
 ISD SETUP FAIL
 ISD SENSOR OUT FAIL

ISD HOSE ALARMS
 h1: GROSS COLLECT FAIL
 h1: DEGRD COLLECT FAIL
```

isd-evr\healyorsetprt.eps

Figure 3-11. Example printout - ISD Alarms Assignments - Output Relay Setup

4 ISD Operability Test Procedure

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

- The system was properly powered for data collection
- All necessary ISD sensors were setup and connected
- All necessary ISD sensors were operating within specification
- All internal components including TLS console modules were properly setup and operating within specification

Veeder-Root recommends printing a copy of the ISD ALARM STATUS and ISD DAILY report (REF. Section 5, Operation of the ISD Install, Setup & Operation Manual) periodically to determine that compliance tests are being completed in accordance with local and state regulations.

A step-by-step worksheet for recording data from the following operability tests is provided in Appendix B.

Vapor Pressure Sensor Ambient Reference Test

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

1. Access the Vapor Pressure Sensor in the dispenser. Record which dispenser contains the pressure sensor and the pressure sensor serial number on the data form.
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. Start at the 'DIAG MODE' menu at the TLS Console front panel to enter the 'Calibrate SmartSensor' menu as shown in Figure 4-2 to view the non-calibrated pressure value.
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 the cap on the ambient reference port of the Vapor Pressure Sensor valve. Restore the Vapor Pressure Sensor valve by turning it 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!

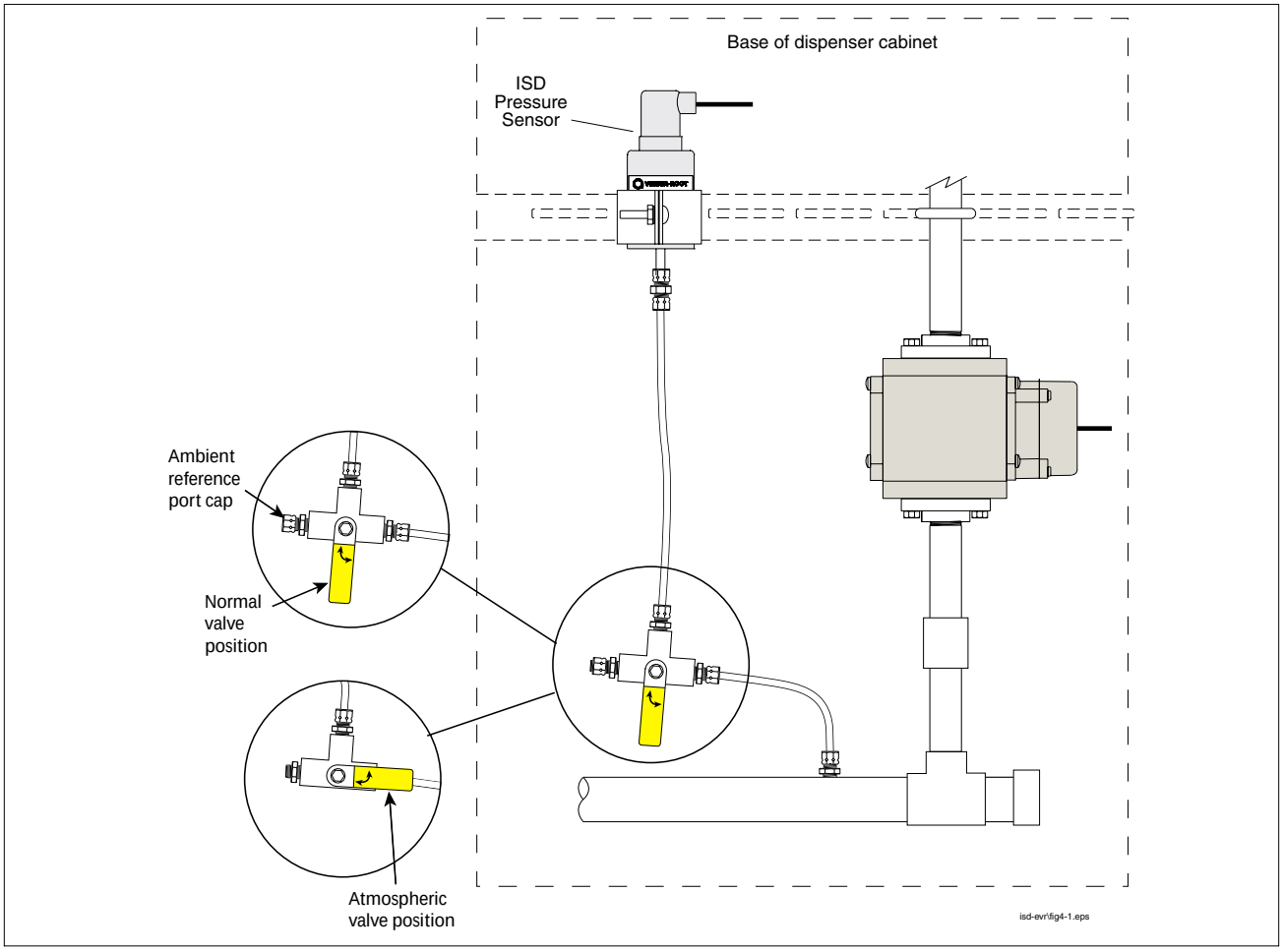


Figure 4-1. Vapor pressure sensor valve positions

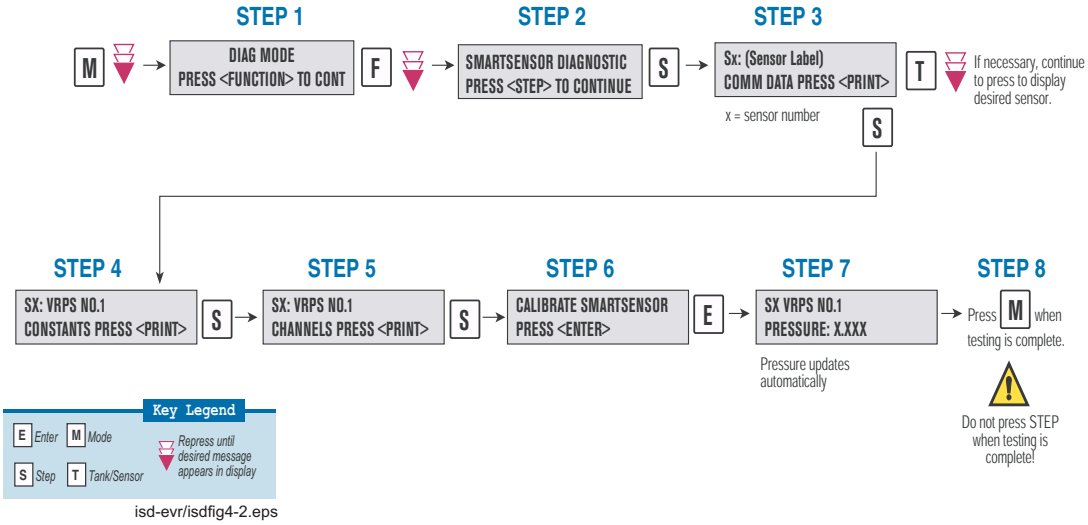


Figure 4-2. Accessing Calibrate SmartSensor diagnostic menu

Vapor Flow Meter Operability Test

1. Verify ISD Analysis Time - See figure 3-1 of the ISD Install, Setup & Operation Manual. The ISD analysis time verification should be performed before conducting Exhibit 5 to ensure the previous days assessment values are being compared.
2. Connect a notebook PC running Veeder-Root's "ISD PC Setup Tool", v1.03 or higher, to the dedicated TLS serial port that is required for ISD reports access. Using the tool, access the individual fueling point "dispensing event ISD A/L" results as needed in this test procedure. These results are compared to the manually measured V/L's in the procedure. Training on use of the tool is provided as part of the Veeder-Root training program for ISD. A trained service technician must be present when performing this operation.
3. Select a dispenser and note the fueling point numbers on the data form. Obtain the vapor flow meter serial number (available from the EVR/ISD Setup Printout – see Figure 3-6 in the ISD Install, Setup & Operation Manual). Record the serial number on the data form.
4. Conduct a Healy EVR Phase II system V/L test per Exhibit 5 of VR-202-D with lowest grade fuel available on that dispenser to obtain a V/L result.
5. Obtain the corresponding ISD A/L value for that V/L test obtained from the TLS using the "ISD PC Setup Tool".
6. Compare the ISD A/L value for that dispenser hose to the V/L result (subtract V/L result from A/L value and note difference on the form).

   Pass: If the difference is between -0.15 and +0.15, then the ISD A/L value is within +/- 0.15 of the V/L result. Circle "Pass" to document that the ISD flow meter in that dispenser passes and repeat the procedure beginning at Step 3 for the next dispenser.

   Continue: If the ISD A/L value is NOT within +/- 0.15 of the V/L result, then go to Step 7.
7. Run two more V/L tests per Exhibit 5 with lowest grade fuel on the same hose and average the two results with the first V/L result from Step 4.
8. Obtain the corresponding two ISD A/L values from the TLS and average the two values with the first ISD A/L value from Step 5.
9. Compare the average of the 3 ISD values for that hose to the average of the 3 V/L results (subtract V/L average from A/L average and note difference on the form).

   Pass: If the ISD A/L average is within +/- 0.15 of the average of the 3 V/L results, the ISD flow meter in that dispenser passes the operability test. Go to the next dispenser and repeat the procedure beginning at Step 3.

   Continue: If the ISD A/L average is NOT within +/- 0.15 of the average of the 3 V/L test results, then go to Step 10.
10. If a second fueling position is available on the dispenser, repeat the tests beginning at Step 4 for the second fueling position. If the second fueling position tests do not pass Steps 4 through 9, then the flow meter is not in compliance with the requirements of Exhibit 2.

Site Shutdown Test

This test must be performed by a certified Veeder-Root contractor.

1. Remove power from TLS console.
2. Confirm power to submersible pumps is off by verifying that gasoline dispensing has been disabled.
3. Restore power to TLS console.

5 Operation

Alarms

OVERVIEW OF TLS CONSOLE INTERFACE

The TLS console is continuously monitoring the vapor recovery system and ISD sensors for alarm conditions such as excessively high or low vapor collection, containment system vapor leakage and equipment problems.

During normal operation when the TLS console and monitored EVR/ISD 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).

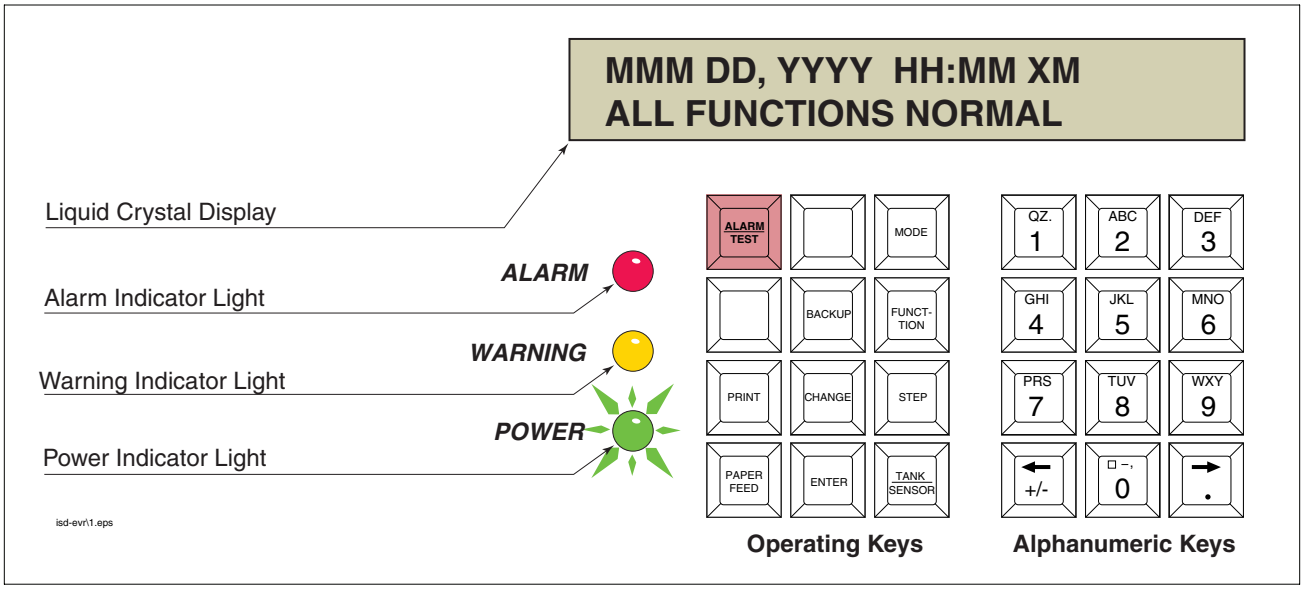


Figure 5-1. TLS console alarm interface

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.

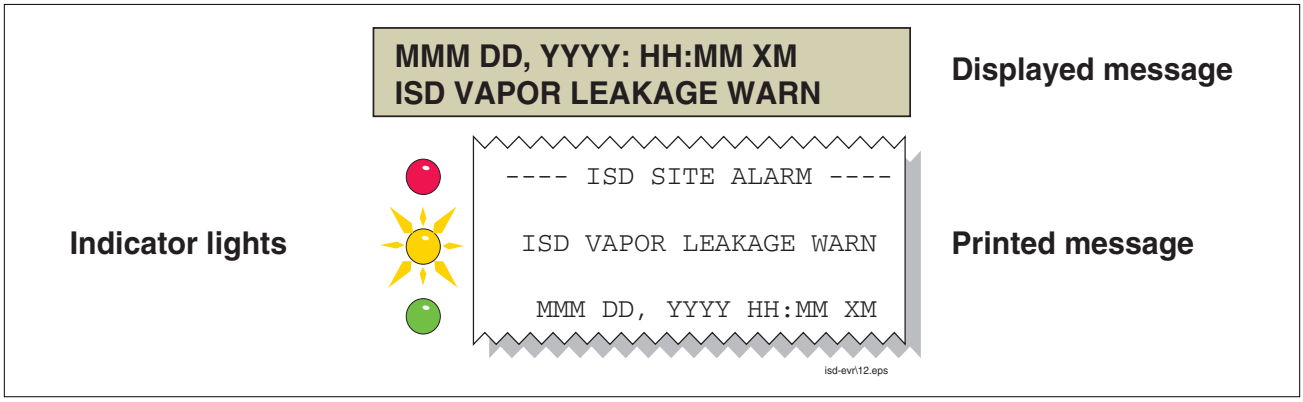


Figure 5-2. Example Warning posting

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. In the alarm example in Figure 5-3 the display's second line and printed message indicates that vapor collection on hose 1, FP1 Super has dropped below the allowed standard resulting in a failure alarm. (By default, for unihose dispensers, FP1 BLEND3 will be displayed rather than FP1SUPER as shown below.)

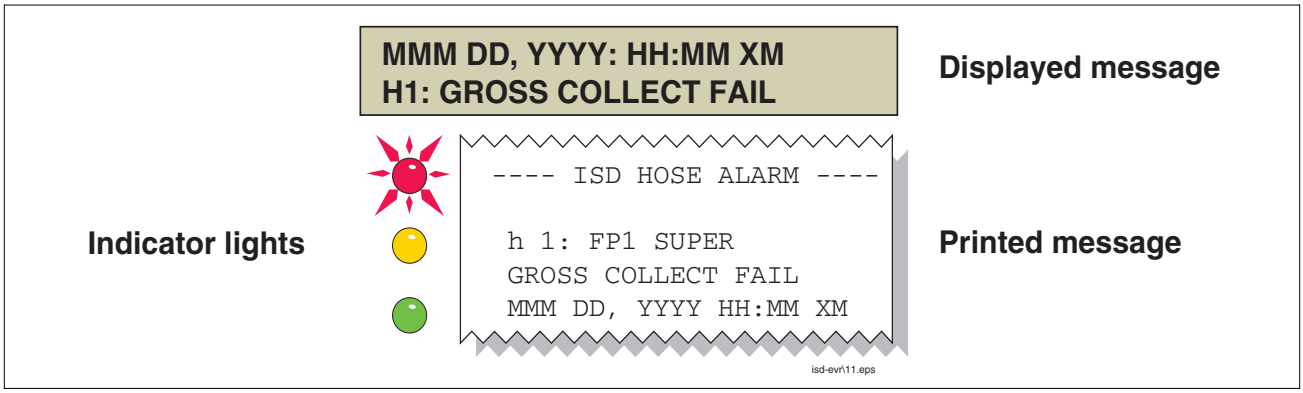


Figure 5-3. Example Alarm posting

Upon posting a failure alarm, the TLS console logs an entry to the Failure Log, prohibits fuel dispensing from all ISD gasoline fueling point(s) and logs a shutdown event to the Shutdown & Misc. Event Log.

The initial release of ISD will prohibit fuel dispensing from all gasoline fueling points by shutting down the submersible pumps in all gasoline tanks. The method of overriding an ISD Alarm shutdown is discussed in the “Site Reenable” section.

SITE REENABLE

The TLS console ALARM/TEST button allows you to perform a logged shutdown override and resume dispensing. Figure 5-4 illustrates the ISD alarm override procedure.

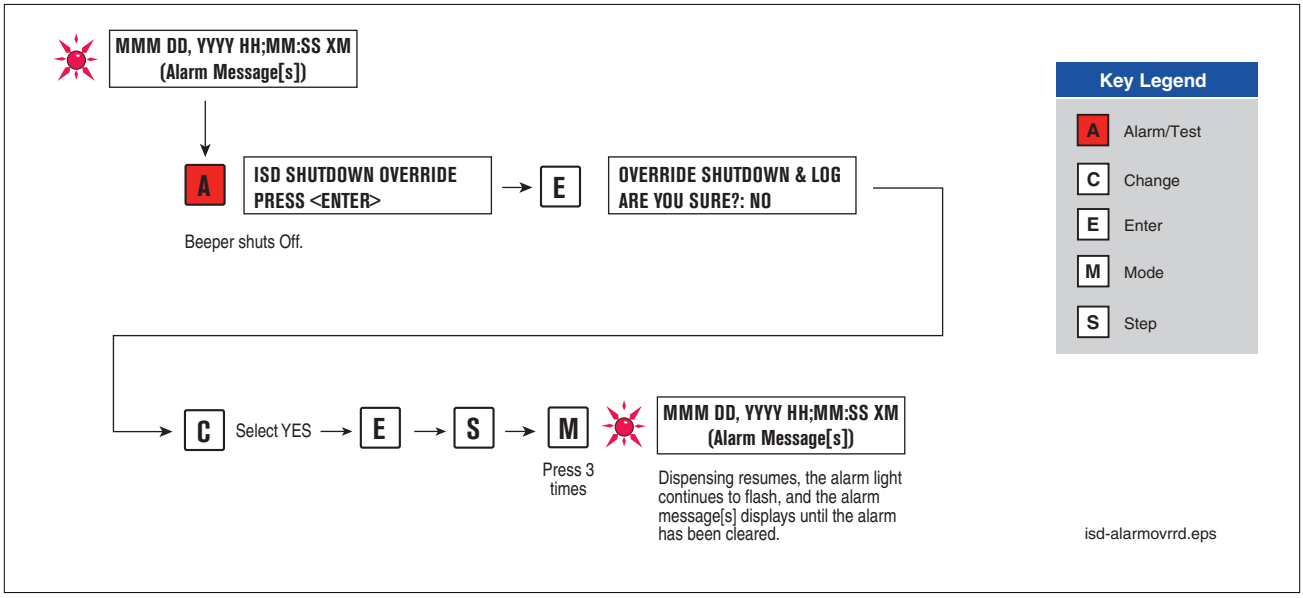


Figure 5-4. ISD Alarm Override Procedure

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

Date	Time	Description	Reading	Value
2003/01/01	23:59	VAPOR VAPOR CONTAINMENT LEAKAGE	CFH@2"WC	14
2003/01/01	23:59	A/L RATIO DEGRADATION	FP2 MID	0.69
2002/12/31	23:59	VAPOR VAPOR CONTAINMENT LEAKAGE	CFH@2"WC	13
2002/12/31	23:59	A/L RATIO DEGRADATION	FP2 MID	0.67

Failure Alarms

Date	Time	Description	Reading	Value
2003/01/01	23:59	A/L RATIO GROSS BLOCKAGE	FP1 REG	0.06
2003/01/01	23:59	A/L RATIO DEGRADATION	FP1 REG	0.14
2003/01/01	23:59	A/L RATIO GROSS BLOCKAGE	FP1 MID	0.13
2003/01/01	23:59	A/L RATIO DEGRADATION	FP1 MID	0.15

ALARM SEQUENCE

Each ISD 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 A/L degradation Vapor Collection Monitoring test requires seven calendar days of data and at least 30 fueling events. 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 the condition continues, additional failure events are logged and the site will continue to be shutdown each day.

ISD ALARM SUMMARY

Table 5-1 summarizes the ISD Alarms - Alarms with footnote 2 will result in a site shutdown.

Table 5-1.- ISD Alarm Summary

Displayed Message	ISD Monitoring Category	Indicator Light	Cause	Suggested Troubleshooting[1]
ISD VAPOR LEAKAGE WARN	Containment	Yellow	Vapor Leakage Detection test warning	TP-201.3
ISD VAPOR LEAKAGE FAIL[2]	Containment	Red	Vapor Leakage Detection test - 8th consecutive failure	
ISD GROSS PRESSURE WARN	Containment	Yellow	Gross Over Pressure test warning	Look for problems using one or more of the following VR-202 procedures/tests: Dispenser Integrity Test B-3 (i.e. 'Pumbing Tightness' test), Exhibit 4, Exhibit 5, Exhibit 9 (pressure sensor only) or Flow Rate Verification per section 1.2.3.
ISD GROSS PRESSURE FAIL[2]	Containment	Red	Gross Over Pressure test - 8th consecutive failure	
ISD DEGRD PRESSURE WARN	Containment	Yellow	Degradation Over-Pressure test warning	
ISD DEGRD PRESSURE FAIL[2]	Containment	Red	Degradation Over-Pressure test - 30th consecutive failure	
Hnn: GROSS COLLECT WARN	Collection	Yellow	1-Day Gross A/L Test warning	VR-202 Exhibit 5
Hnn: GROSS COLLECT FAIL[2]	Collection	Red	1-Day Gross A/L Test failure - 2nd consecutive failure	
Hnn: DEGRD COLLECT WARN	Collection	Yellow	7-Day Degradation A/L Test warning	
Hnn: DEGRD COLLECT FAIL[2]	Collection	Red	7-Day Degradation A/L Test - consecutive failure	
ISD SENSOR OUT WARN	Self-Test	Yellow	ISD Sensor Out Self-Test warning	Confirm ISD sensor & module installation / communication per section 2.
ISD SENSOR OUT FAIL[2]	Self-Test	Red	ISD Sensor Out Self-Test - 8th consecutive failure	
ISD SETUP WARN	Self-Test	Yellow	System Setup Self-Test warning	Confirm EVR / ISD programing per section 3.
ISD SETUP FAIL[2]	Self-Test	Red	System Setup Self-Test failure - 8th consecutive failure	

[1] See ISD Troubleshooting Manual P/N 577013-819 for a complete list of suggestions.

[2] ISD Shutdown Alarms - see “Site Reenable” on page 5-2

OTHER ALARMS

Table 5-2 summarizes additional alarms that may be posted by ISD related equipment. These alarms are not critical to vapor recovery functionality, but could indicate erroneous setup or equipment malfunction. NOTE: Additional TLS console alarms listed in the TLS-3XX Operator's manual may be posted and may lead to an ISD shutdown alarm if persistent (see ISD Troubleshooting Manual for details).

Table 5-2.- Other Alarms

Displayed Message	Indicator Light	Set Condition	Clear Condition
MISSING RELAY SETUP	Red	One or more required shutdown alarms have not been assigned to a relay.	Setup required shutdown alarms.
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 HOSE SETUP	Red	There are no product meters assigned to a hose.	Assign at least 1 product meter to a hose.
hnn: VPRFLOW MTR SETUP	Red	Incoming transaction from a hose with an unavailable Vapor Flow Meter.	Configure Vapor Flow Meter (Smart Sensor) and enable it in ISD.
MISSING VAPOR PRES SEN	Red	There is no Vapor Pressure Sensor setup or detected.	Complete Vapor Pressure Sensor setup.
MISSING VAPOR FLOW MTR	Red	There is no Vapor Flow Meter setup or detected.	Complete Vapor Flow Meter setup.
fnn: CHK VAPOR FLOW MTR	Red	Failure of volume measure test - possible problem vapor flow meter.	Volume measure test passes or vapor flow meter deconfigured, or test cleared.

Reports

There are two main reports (CP-201 required) that are stored by the ISD 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 ISD Status Report. You can print out ISD reports from the TLS console front panel as shown in Figure 5-5.

- The monthly report includes:
  - ISD operational up-time (as a percentage)
  - EVR/ISD system pass time (as a percentage)
  - The Warning Log
  - The Failure Log
  - The Misc. Event Log

- The daily report includes:
  - Maximum and minimum ullage pressures
  - Results of the Vapor Containment Monitoring Gross (75th percentile), Degradation (95th percentile) ullage pressure test and Vapor Leakage Detection (CVLD) tests
  - Vapor Collection Monitoring test results for each fueling position
- ISD Status Report
  - Last test report results

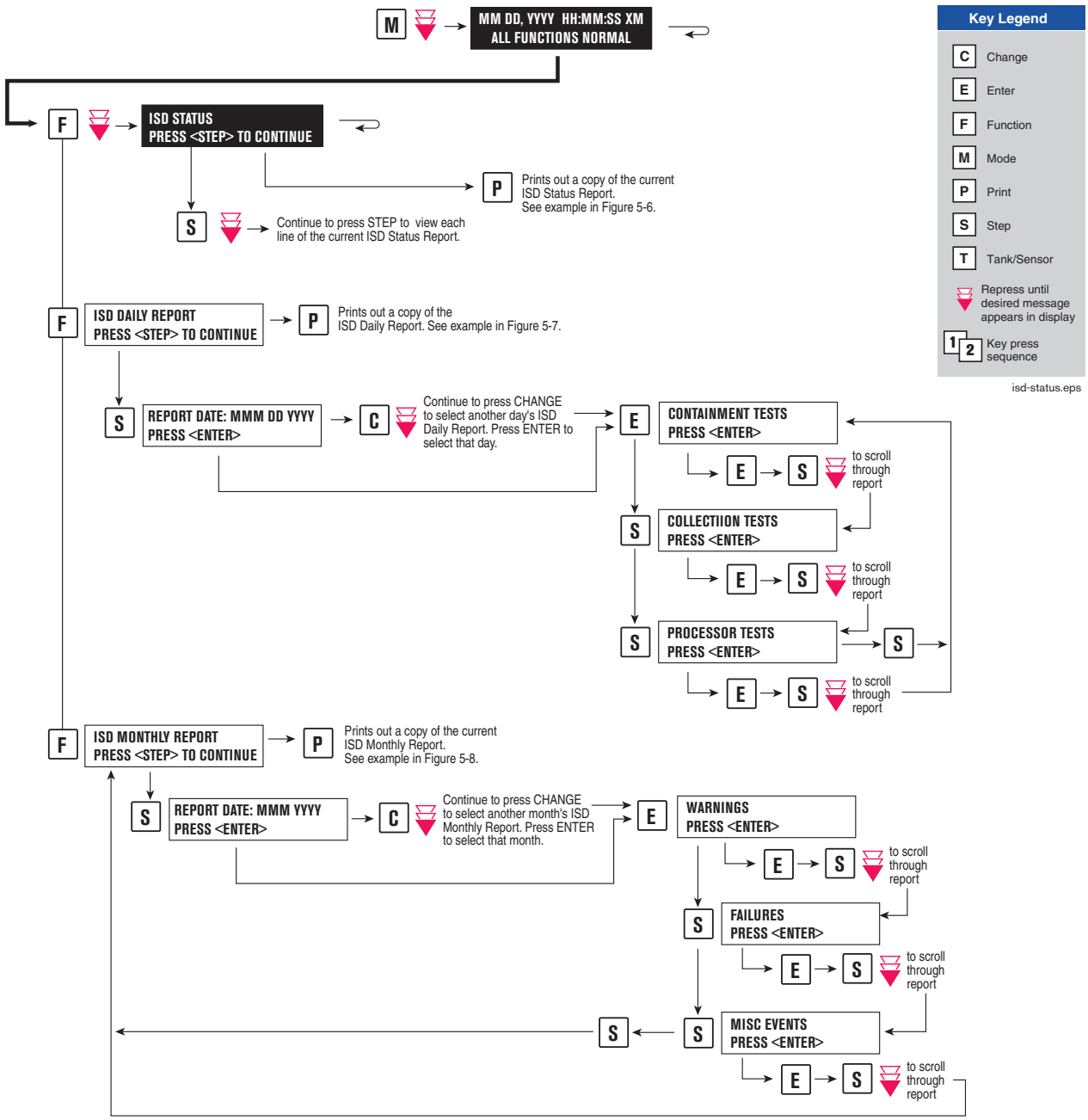


Figure 5-5. Printing ISD Reports on Console Printer

```
ISD STATUS

(SITE NAME)
(SITE STREET)
(CITY,ST)
(PHONE)

(MMM DD, YYYY HH:MM XM)


EVR TYPE: VACUUM ASSIST
ISD VERSION 01.01

REPORT DATE:SEP 22, 2004


CONTAINMENT TEST GROSS
STATUS: 0.1"WC PASS

CONTAINMENT TEST DEGRADE
STATUS: -1.1"WC PASS

CONTAINMENT TEST CVLD
STATUS: 3.26CFH PASS

COLLECTION GROSS TEST
STATUS: PASS

COLLECTION DEGRADE TEST
STATUS: PASS

ISD SENSOR SELF TEST
STATUS: PASS

ISD SETUP SELF TEST
STATUS: PASS

STAGE 1 TRANSFER TEST
STATUS:  4 of 4  PASS
```

NOTE: values are for last tests performed

isd-evr\healy5-6.eps

Figure 5-6. ISD Status Report Example - TLS console printout

```
ISD DAILY REPORT

(SITE NAME)
(SITE STREET)
(CITY,ST)
(PHONE)
(MMM DD, YYYY HH:MM XM)

EVR TYPE: VACUUM ASSIST
ISD VERSION 01.01

REPORT DATE: JAN 20
ISD VERSION 01.01

OVERALL STATUS   PASS
EVR CONTAINMENT  PASS
EVR COLLECTION   PASS
STAGE1   1 of   1 PASS
SELF TEST        PASS
ISD MONITOR UP-TIME 100%

    ----------------

CONTAINMENT TESTS
GROSS    95%   -0.0  "WC
DGRD     75%   -1.0N "WC
VAPOR LEAK        2  CFH
MAX            -0.8  "WC
MIN            -5.0  "WC

    ----------------

COLLECTION TESTS
GROSS       DGRD
A/L(#)      A/L(#)

FP 1: BLEND
1.04( 51)  1.06(297)
FP 2: BLEND
1.12( 36)  1.10(285)
FP 3: BLEND
1.05( 28)  1.07(231)
FP 4: BLEND
1.03( 45)  1.07(211)
FP 5: BLEND
1.09( 31)  1.08(249)
FP 6: BLEND
0.99( 50)  1.01(417)
FP 7: BLEND
1.04( 52)  1.04(293)
FP 8: BLEND
1.10( 75)  1.09(457)
FP 9: BLEND
1.13( 31)  1.08(281)
FP10: BLEND
1.13( 74)  1.13(463)
FP11: BLEND
1.02( 36)  1.08(233)
FP12: BLEND
1.09( 70)  1.06(488)

    ----------------
SELF TEST

SETUP TEST       PASS
SENSOR OUT TEST  PASS
```

(#) Count max number 999

isd-evr\healyfig5-7.eps

Figure 5-7. ISD Daily Report Example - TLS console printout

```
ISD MONTHLY REPORT

(SITE NAME)
(SITE STREET)
(CITY,ST)
(PHONE)
(MMM DD, YYYY HH:MM XM)

EVR TYPE: VACUUM ASSIST
ISD VERSION 01.01

REPORT DATE: FEB 2004

OVERALL STATUS   FAIL
EVR CONTAINMENT  PASS
EVR COLLECTION   FAIL
STAGE1  39 of  39 NOTEST
SELF TEST        PASS
ISD MONITOR UP-TIME:100%
EVR/ISD PASS TIME:  85%

    ----------------
DATE  TIME  DEVICE  HOSE
DESCRIPTION        VALUE

    ----------------
LAST 10 WARNINGS

 2-27 23:59 FP06   BLEND
DEGRD COLLECT WARN 0.00

 2-27 23:59 FP05   BLEND
DEGRD COLLECT WARN 0.00

 2-26 23:59 FP05   BLEND
DEGRD COLLECT WARN 0.00

 2-25 23:59 FP06   BLEND
GROSS COLLECT WARN BLKD

 2-25 23:59 FP05   BLEND
GROSS COLLECT WARN BLKD

    ----------------
LAST 10 FAILURES

 2-27 23:59 FP06   BLEND
GROSS COLLECT FAIL BLKD

 2-27 23:59 FP05   BLEND
GROSS COLLECT FAIL BLKD

 2-26 23:59 FP06   BLEND
GROSS COLLECT FAIL BLKD

 2-26 23:59 FP05   BLEND
GROSS COLLECT FAIL BLKD

    ----------------
LAST 10 MISC EVENTS

 2-27-04 11:59PM
DISABLED FP06 BLEND
A/L RATIO GROSS BLOCKAGE

 2-27-04 11:59PM
DISABLED FP05 BLEND
A/L RATIO GROSS BLOCKAGE

 2-26-04 11:59PM
DISABLED FP06 BLEND
```

Note: Warning & Failures lists include monitoring results from:
- Containment
- Stage 1
- Collection
- Processor

Up to 10 failures and 10 warnings

FP is fueling position number
BLEND is a hose label
BLKD refers to blocked condition

Note: Events
At least 1 action event for every failure listed above.

Description is truncated to include action. Up to 10 shut down and misc. events.

isd-evr\healyfig5-8.eps

Figure 5-8. ISD Monthly Report Example - TLS console printout

Viewing ISD 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 5-9 below.

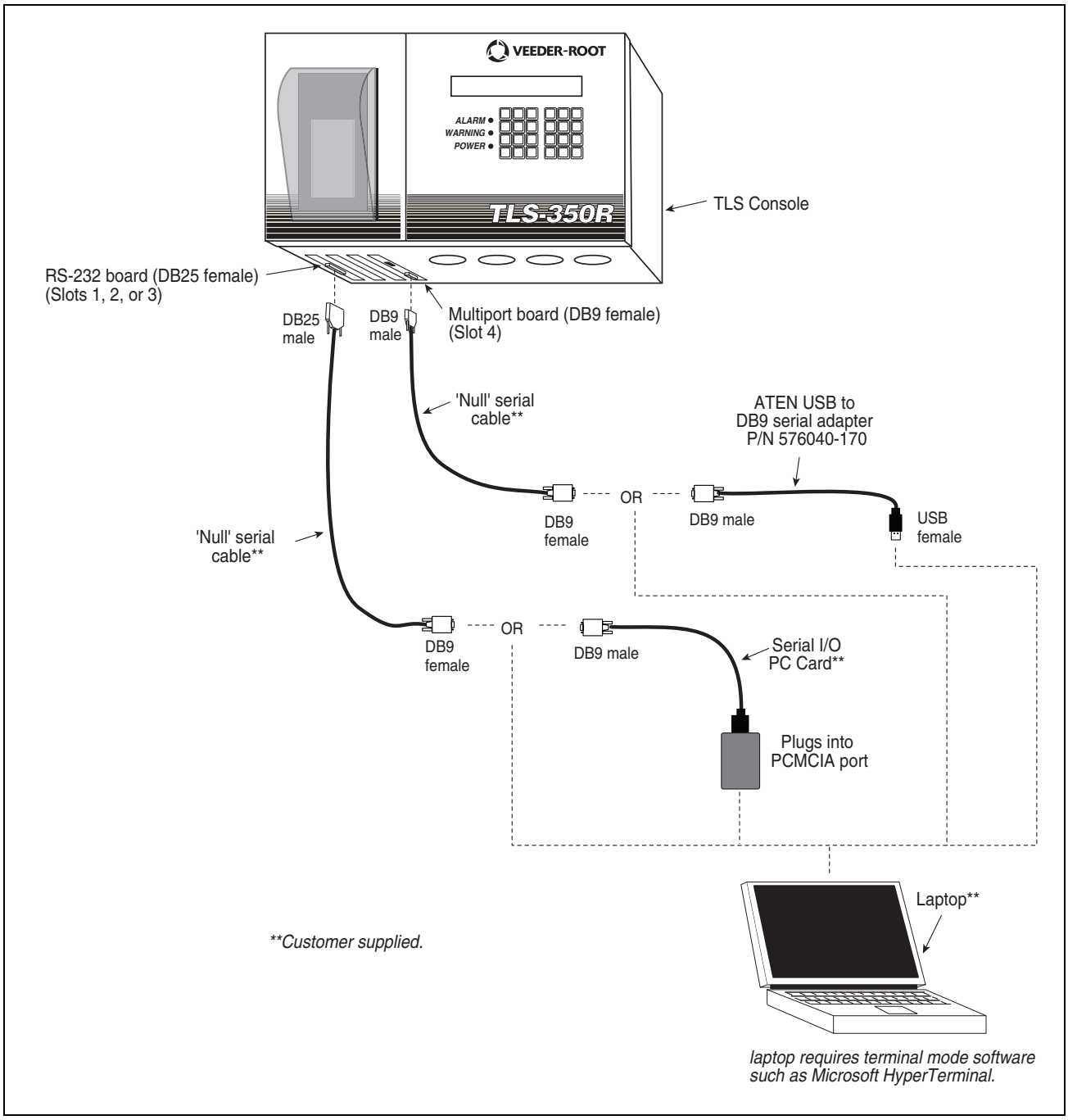


Figure 5-9. Connecting laptop to TLS console for serial communication

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.

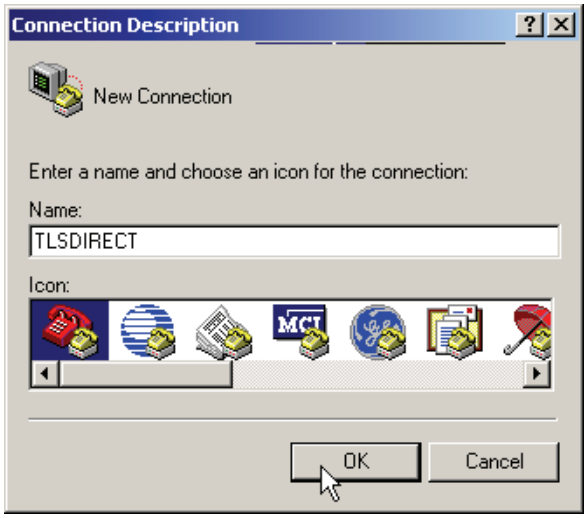


Figure 5-10. Connection Description window

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 - None, Stop Bits - 1. For the 'Flow Control' entry select None. Click OK

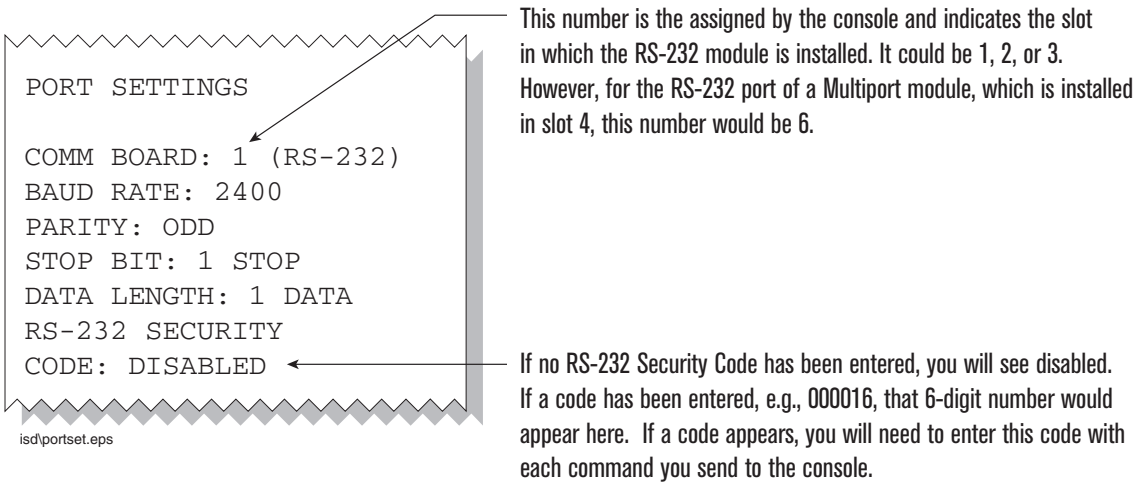


Figure 5-12. Console comm port settings prinout example

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).

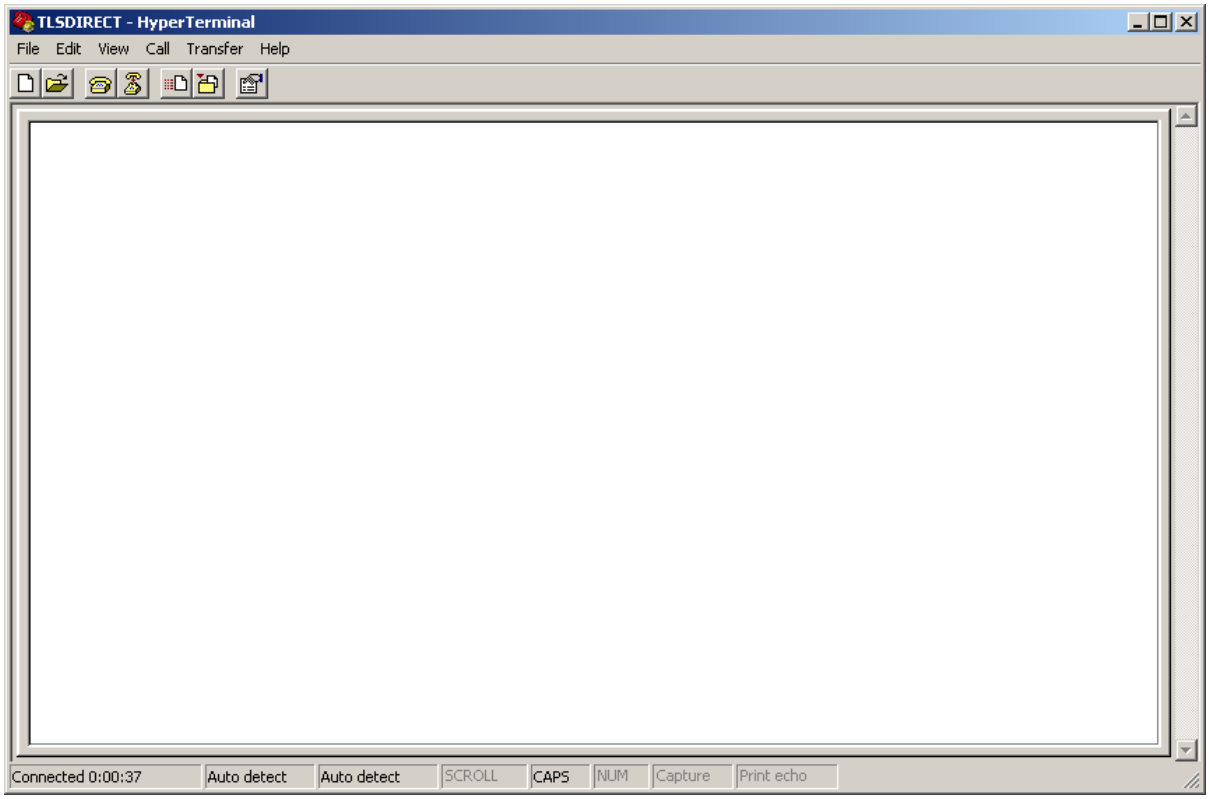


Figure 5-13. HyperTerminal main window

SENDING CONSOLE COMMANDS

Table 5-3 shows three important ISD console commands: IV0500, IV0200, and IV0100. The <SOH> shown in the table means that you must press and hold the **Cntrl** 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 IV0500010. 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 000016IV0500010.

You will see the typed command on the screen: ☺IV0500010 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 ☺IV0500010☺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 ISD Alarm, Monthly, and Daily Reports

Report Type	Serial Command (PC to Console)*
Daily Report Details (See example Figure 5-16)	`<SOH>IV0500ddd` Where ddd = number of days, 001 = yesterday and today, 002 = two days ago, etc.
Monthly Status Report (See example Figure 5-15)	`<SOH>IV0200yyyymm` Where yyyy = year number, e.g. 2003, mm = month number, 01 = January, 02 = February, etc.
Alarm Status (See example Figure 5-14)	`<SOH>IV0100`

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

```
IV0500
MAR  1, 2004 12:20 AM

(SITE NAME)
(SITE STREET)
(CITY,ST)
(PHONE)
(MMM DD, YYYY HH:MM XM)

ISD DAILY REPORT DETAILS

EVR TYPE: VACUUM ASSIST
ISD TYPE: 01.01
VAPOR PROCESSOR TYPE: NO VAPOR PROCESSOR

OVERALL STATUS             :FAIL            EVR VAPOR COLLECTION :FAIL
EVR VAPOR CONTAINMENT      :PASS
ISD MONITOR UP-TIME        :100%            STAGE I TRANSFERS: 39 of 39 PASS
EVR/ISD PASS TIME          : 85%

Status Codes: (W)Warn (F)Fail (D)Degradation Fail (G)Gross Fail
(ISD-W)ISD Self-Test Warning (ISD-F)ISD Self-Test Fail (N)No Test

       ISD   ISD  ---CONTAINMENT TESTS---     STAGE        ---COLLECTION TESTS
       EVR   %UP  GROSS  DGRD  MAX  MIN  LEAK   I   VAPOR  FP1   FP2   FP3
DATE  STATUS TIME  95%    75%  "WC  "WC  CFH   XFR  PRCSR  BLEND BLEND BLEND
02/10   PASS 100% -1.4N -3.1N -1.1 -5.0    0N PASS         1.09  1.10  1.11
02/11   PASS 100% -1.7N -3.5N  0.4 -5.0    0N PASS         1.05  1.14  1.06
02/12   PASS 100% -1.7N -3.4N -1.2 -5.0    0N              1.06  1.07  1.05
02/13   PASS 100% -1.8N -3.4N -1.0 -5.0    2N PASS         1.08  1.10  1.00
02/14   PASS 100% -1.6N -3.3N -0.3 -5.0    2N PASS         1.05  1.09  1.08
02/15   PASS 100% -1.5N -3.3N  1.3 -5.0    2  PASS         1.07  1.11  1.05
02/16   PASS 100% -1.2  -3.0N -0.3 -5.0    3  PASS         1.06  1.10  1.14
02/17   PASS 100% -1.2  -2.9N  0.0 -5.0    3  PASS         1.06N 1.10N 1.14
02/18   PASS 100% -1.0  -2.9N  1.0 -5.0    3  PASS         1.06N 1.10N 1.06
02/19   PASS 100% -0.9  -2.9N  1.6 -5.0    4  PASS         1.06N 1.10N 1.09
02/20   PASS 100% -0.6  -2.7N  2.9 -5.0    4  PASS         1.06N 1.10N 1.03
02/21   PASS 100% -0.6  -2.7N  1.1 -5.0    1  PASS         1.06N 1.10N 1.13
02/22   PASS 100%  0.1  -2.5N  3.1 -5.0    0  PASS         1.06N 1.10N 1.03
02/23   PASS 100%  0.1  -2.6N  0.9 -5.0    0  PASS         1.06N 1.10N 1.04
02/24   PASS 100%  0.2  -2.6N  0.9 -5.0    0  PASS         1.08  1.09  1.07
02/25   W    100%  0.8  -2.3N  2.8 -5.0    0  PASS         1.10  1.11  1.08
02/26   F    100%  1.1  -2.2N  5.0 -5.0    0  PASS         1.10  1.12  1.11
02/27   F    100%  1.0  -2.4N -0.8 -5.0    0  PASS         1.11  1.13  1.11
02/28   PASS 100%  1.0  -2.4N  0.3 -5.0    0  PASS         1.09  1.16  1.08
02/29   PASS 100%  0.9  -2.3N  1.6 -5.0    0  PASS         1.01  1.14  1.08N

---COLLECTION TESTS-DAILY AVERAGE HOSE A/L RATIO-----------------------------
      FP4   FP5   FP6   FP7   FP8   FP9   FP10  FP11  FP12
DATE  BLEND BLEND BLEND BLEND BLEND BLEND BLEND BLEND BLEND
02/10 1.12  1.03  0.97  1.04  1.07  1.05  1.09  1.08  1.06
02/11 1.09  1.04  1.04  0.98  1.03  1.06  1.06  1.14  1.07
02/12 1.10  1.09  1.04  1.04  1.06  1.09  1.10  1.03  1.04
02/13 1.06  1.11  1.04  1.07  1.09  1.08  1.09  1.13  1.08
02/14 1.05  1.07  1.05  1.07  1.02  1.07  1.08  1.13  1.06
02/15 1.07  1.04  1.04  0.94  1.09  1.05  1.08  1.13  1.07
02/16 1.09  1.08  1.06  1.05  1.10  1.06  1.13  1.03  1.04
02/17 1.08  1.05  1.05  1.06  1.08  1.13  1.10  1.10  1.07
02/18 1.08  1.06  1.05  1.03  1.08  1.00  1.09  1.05  1.09
02/19 1.09  1.11  1.04  1.01  1.08  1.06  1.08  1.06  1.05
02/20 1.07  1.07  1.05  1.05  1.10  1.12  1.10  1.11  1.07
02/21 1.08  1.10  1.06  1.00  1.07  1.13  1.16  1.09  1.09
02/22 1.08  1.04  1.09  1.05  1.09  1.06  1.10  1.11  1.10
02/23 1.06  1.17  1.09  1.06  1.12  1.09  1.14  1.12  1.08
02/24 1.10  1.12  1.08  0.98  1.08  1.11  1.15  1.11  1.02
02/25 1.10  BLKDW BLKDW 1.07  1.06  1.09  1.16  1.03  1.05
02/26 1.11  BLKDF BLKDF 1.05  1.10  1.11  1.10  1.08  1.05
02/27 1.12  BLKDF BLKDF 1.08  1.08  1.06  1.15  1.13  1.09
02/28 1.08  1.11  1.08  1.07  1.07  1.10  1.18  1.05  1.08
02/29 1.09  1.14  1.08  1.03  1.10  1.06  1.19  1.09  1.09
```

isd-evr\healyfig5-9.eps

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

```
IV0200
MAR  1, 2004 12:20 AM

(SITE NAME)
(SITE STREET)
(CITY,ST)
(PHONE)
(MMM DD, YYYY HH:MM XM)

ISD MONTHLY STATUS REPORT

EVR TYPE: VACUUM ASSIST
ISD TYPE: 01.01
VAPOR PROCESSOR TYPE: NO VAPOR PROCESSOR

OVERALL STATUS             :FAIL            EVR VAPOR COLLECTION :FAIL
EVR VAPOR CONTAINMENT      :PASS
ISD MONITOR UP-TIME        :100%            STAGE I TRANSFERS: 39 of 39 PASS
EVR/ISD PASS TIME          : 85%

CARB EVR CERTIFIED OPERATING REQUIREMENTS
                                                MIN      MAX
VAPOR COLLECTION ASSIST SYSTEM A/L RANGE        0.95     1.15

ISD MONITORING TEST PASS/FAIL THRESHOLDS
                                                  PERIOD    BELOW  ABOVE

VAPOR COLLECTION ASSIST SYSTEM A/L GROSS FAIL      1DAYS     0.33  1.90
VAPOR COLLECTION ASSIST SYSTEM A/L DEGRADATION FAIL  7DAYS   0.81  1.32

VAPOR CONTAINMENT GROSS FAIL, 95th PERCENTILE      7DAYS     ----  1.30"wcg
VAPOR CONTAINMENT DEGRADATION, 75th PERCENTILE    30DAYS     ----  0.30"wcg
VAPOR CONTAINMENT LEAK DETECTION FAIL @2"WCG       7DAYS     ----  8.50cfh
STAGE I VAPOR TRANSFER FAIL, 50th PERCENTILE      20MINS     ----  2.50"wcg


WARNING ALARMS
DATE     TIME     DESCRIPTION                    READING         VALUE
04-02-27 23:59:00 A/L RATIO DEGRADATION          FP 6 BLEND        0.00
04-02-27 23:59:00 A/L RATIO DEGRADATION          FP 5 BLEND        0.00
04-02-26 23:59:00 A/L RATIO DEGRADATION          FP 5 BLEND        0.00
04-02-25 23:59:00 A/L RATIO GROSS BLOCKAGE       FP 6 BLEND       BLKD
04-02-25 23:59:00 A/L RATIO GROSS BLOCKAGE       FP 5 BLEND       BLKD

FAILURE ALARMS
DATE     TIME     DESCRIPTION                    READING         VALUE
04-02-27 23:59:00 A/L RATIO GROSS BLOCKAGE       FP 6 BLEND       BLKD
04-02-27 23:59:00 A/L RATIO GROSS BLOCKAGE       FP 5 BLEND       BLKD
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE       FP 6 BLEND       BLKD
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE       FP 5 BLEND       BLKD

SHUTDOWN & MISCELLANEOUS EVENTS
DATE     TIME     DESCRIPTION                    ACTION/NAME
04-02-27 23:59:00 A/L RATIO GROSS BLOCKAGE      DISABLED FP 06 BLEND
04-02-27 23:59:00 A/L RATIO GROSS BLOCKAGE      DISABLED FP 05 BLEND
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE      DISABLED FP 06 BLEND
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE      DISABLED FP 05 BLEND
04-02-15 23:59:00 READINESS ISD:PP EVR:PP       ISD & EVR READY
04-02-14 23:59:00 READINESS ISD:PP EVR:PN       EVR READINESS PENDING
04-02-13 23:59:00 READINESS ISD:PP EVR:PN       EVR READINESS PENDING
04-02-12 23:59:00 READINESS ISD:PP EVR:PN       EVR READINESS PENDING
04-02-11 23:59:00 READINESS ISD:PP EVR:PN       EVR READINESS PENDING
04-02-10 23:59:00 READINESS ISD:PP EVR:PN       EVR READINESS PENDING
```

isd-evr\healyfig5-10.eps

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

```
IV0100
MAR  1, 2004 12:05 AM

(SITE NAME)
(SITE STREET)
(CITY,ST)
(PHONE)
(MMM DD, YYYY HH:MM XM)

ISD ALARM STATUS REPORT

EVR TYPE: VACUUM ASSIST
ISD TYPE: 01.01
VAPOR PROCESSOR TYPE: NO VAPOR PROCESSOR

OVERALL STATUS             :PASS            EVR VAPOR COLLECTION :PASS
EVR VAPOR CONTAINMENT      :PASS
ISD MONITOR UP-TIME        :100%            STAGE I TRANSFERS:  2 of  2 PASS
EVR/ISD PASS TIME          :100%

WARNING ALARMS
DATE     TIME     DESCRIPTION                     READING         VALUE
04-02-27 23:59:01 A/L RATIO DEGRADATION           FP 6 BLEND        0.00
04-02-27 23:59:01 A/L RATIO DEGRADATION           FP 5 BLEND        0.00
04-02-26 23:59:00 A/L RATIO DEGRADATION           FP 5 BLEND        0.00
04-02-25 23:59:01 A/L RATIO GROSS BLOCKAGE        FP 6 BLEND       BLKD
04-02-25 23:59:01 A/L RATIO GROSS BLOCKAGE        FP 5 BLEND       BLKD

FAILURE ALARMS
DATE     TIME     DESCRIPTION                     READING         VALUE
04-02-27 23:59:01 A/L RATIO GROSS BLOCKAGE        FP 6 BLEND       BLKD
04-02-27 23:59:01 A/L RATIO GROSS BLOCKAGE        FP 5 BLEND       BLKD
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE        FP 6 BLEND       BLKD
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE        FP 5 BLEND       BLKD

SHUTDOWN & MISCELLANEOUS EVENTS
DATE     TIME     DESCRIPTION                     ACTION/NAME
04-02-27 23:59:01 A/L RATIO GROSS BLOCKAGE       DISABLED FP 06 BLEND
04-02-27 23:59:01 A/L RATIO GROSS BLOCKAGE       DISABLED FP 05 BLEND
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE       DISABLED FP 06 BLEND
04-02-26 23:59:00 A/L RATIO GROSS BLOCKAGE       DISABLED FP 05 BLEND
04-02-15 23:59:00 READINESS ISD:PP EVR:PP        ISD & EVR READY
04-02-14 23:59:00 READINESS ISD:PP EVR:PN        EVR READINESS PENDING
04-02-13 23:59:00 READINESS ISD:PP EVR:PN        EVR READINESS PENDING
04-02-12 23:59:00 READINESS ISD:PP EVR:PN        EVR READINESS PENDING
04-02-11 23:59:00 READINESS ISD:PP EVR:PN        EVR READINESS PENDING
04-02-10 23:59:00 READINESS ISD:PP EVR:PN        EVR READINESS PENDING
```

isd-evr\healyfig5-11.eps

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

6 Maintenance

TLS Console

The TLS console, including interface modules, do not require scheduled maintenance. ISD System Self-Test Monitoring algorithms are designed to verify proper selection, setup and operation of the TLS console and sensors. Servicing should be performed in accordance with the In-Station Diagnostic System Troubleshooting Guide, Manual 577013-819 in response to warning or alarm conditions.

Vapor Flow Meter

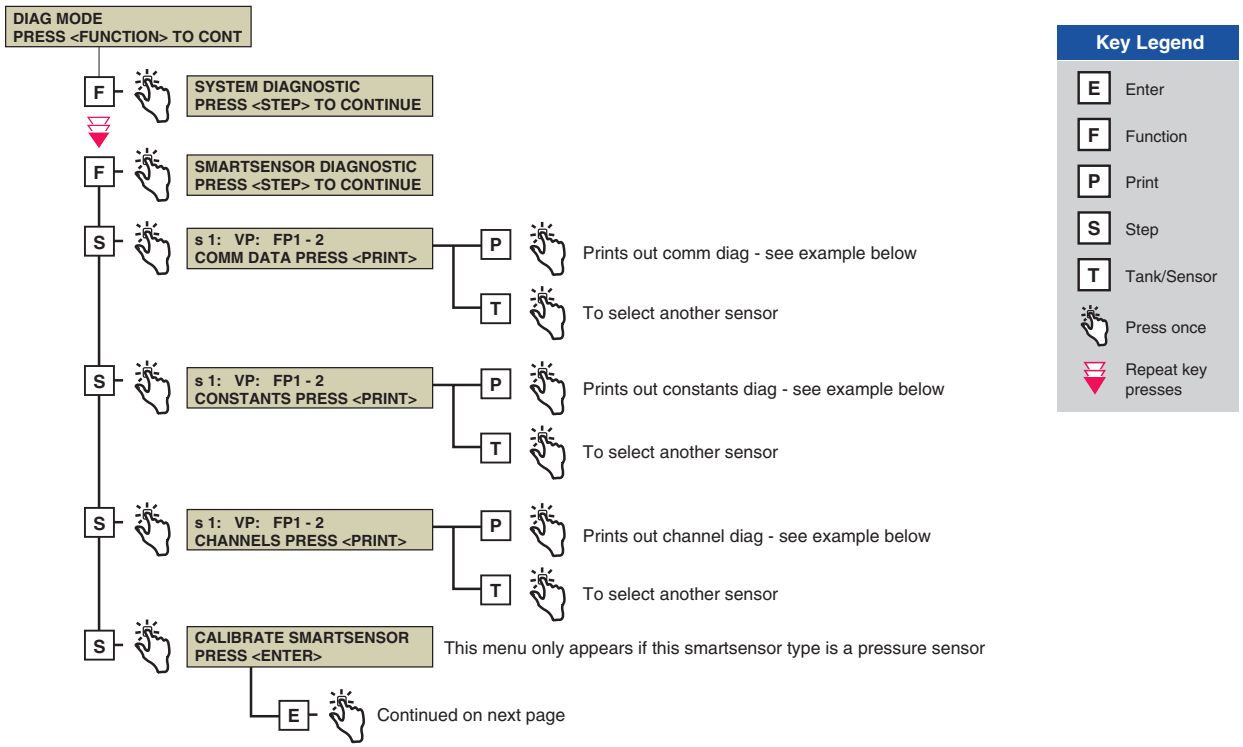
There is no recommended maintenance, inspection nor calibration for the Vapor Flow Meter. Servicing should be performed in accordance with the In-Station Diagnostic System Troubleshooting Guide, Manual 577013-819 in response to warning or alarm conditions.

Vapor Pressure Sensor

There is no recommended maintenance, inspection nor calibration for the Vapor Pressure Sensor. Servicing should be performed in accordance with the In-Station Diagnostic System Troubleshooting Guide, Manual 577013-819 in response to warning or alarm conditions.

7 Diagnostic Menus

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



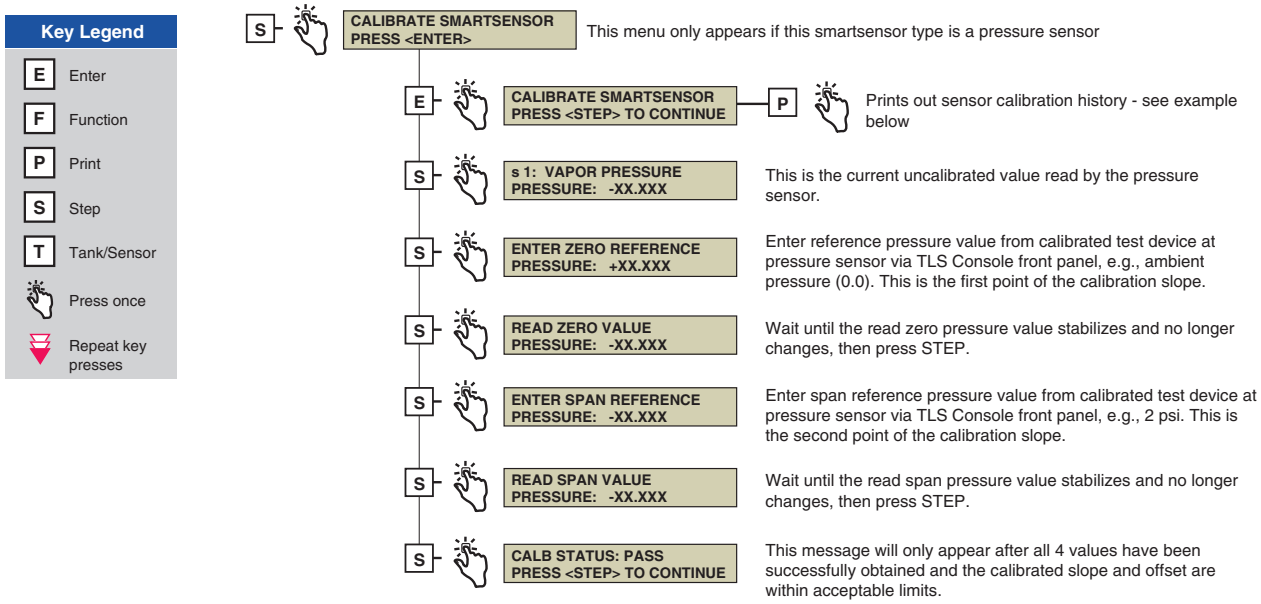

```
SS COMM DIAG
-----------------------
s 1: AFM1   FP1-2
SAMPLES READ     58
SAMPLES USED     54
PARITY ERR        0
PARTIAL READ      0
COMM ERR          0
RESTARTS          0
```

```
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
```

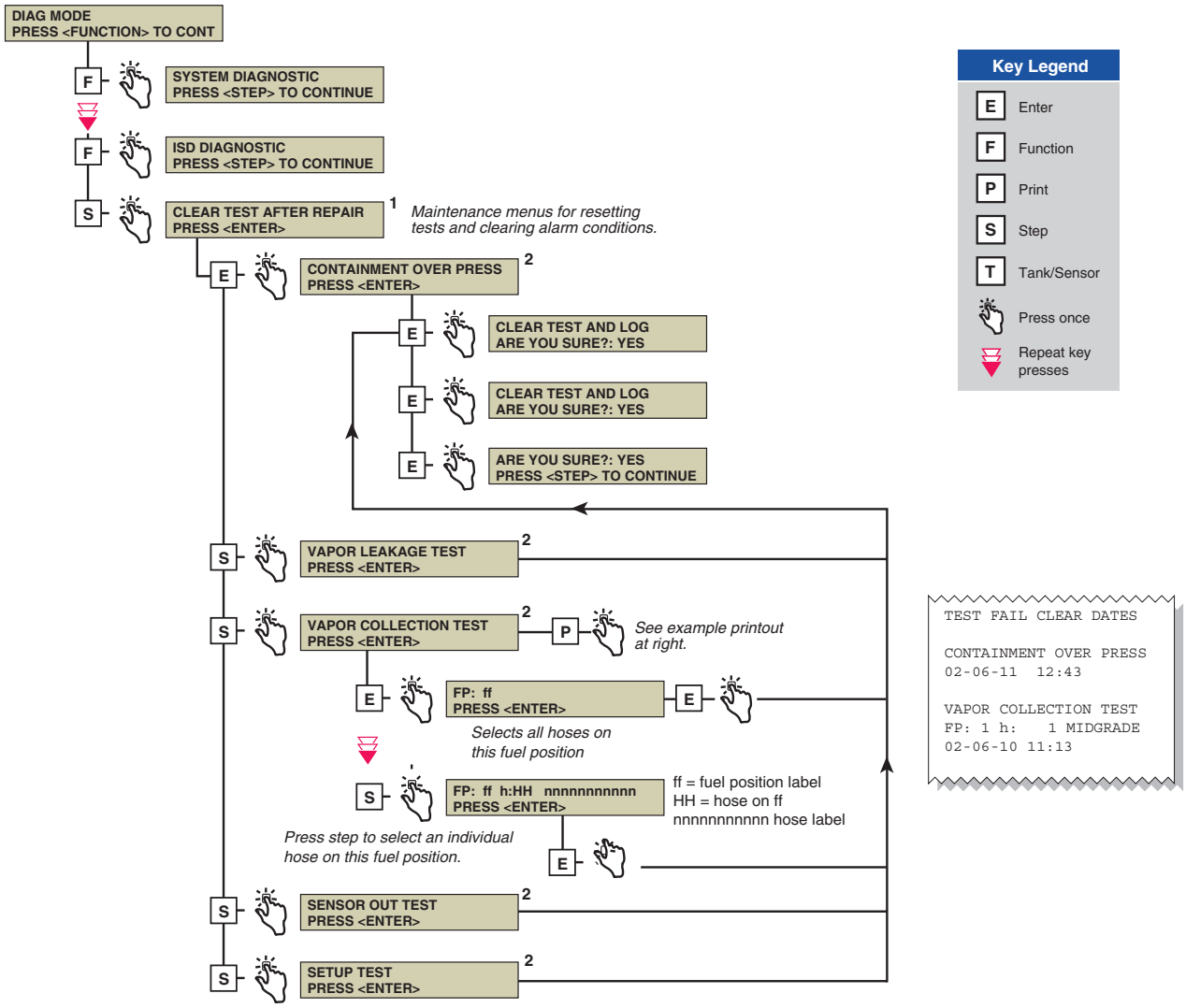
ISD-EVR/fig2.eps




```
VAPOR PRESSURE SENSOR
CALIBRATION HISTORY

s 1: VAPOR PRESSURE
DATE: MM-DD-YY HH:MM
SERIAL #: XXXXXXXX
SLOPE:  XXXX.XXX
OFFSET: XXXX.XXX
CALB STATUS: PASS
```

ISD-EVR/fig3.eps



Notes:

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

ISD-EVR/healyfig4.eps

Table 7-6.- Clear Test Repair Menu

Menu Selection	Clears Alarms	Reset Dates
Containment Over Press	ISD GROSS PRESSURE WARN ISD GROSS PRESSURE FAIL ISD DEGRD PRESSURE WARN ISD DEGRD PRESSURE FAIL	Containment Test Time
Vapor Leakage Test	ISD VAPOR LEAKAGE WARN ISD VAPOR LEAKAGE FAIL	Vapor Leak Test Time
Vapor Collection Test	GROSS COLLECT WARN GROSS COLLECT FAIL DEGRD COLLECT WARN DEGRD COLLECT FAIL AIRFLOW MTR SETUP	Hose Test Time
Sensor Out Test	ISD SENSOR OUT WARN ISD SENSOR OUT FAIL	Sensor Out Test Time
Setup Test	ISD SETUP WARN ISD SETUP FAIL	Setup Self Test Time

Appendix A: Site EVR/ISD Equipment Location Worksheet

You should create a table listing each hose, fueling point, Air Flow Meter's serial number, etc.. This information will be required when you perform the EVR/ISD Setup hose/meter dispenses. This appendix contains blank worksheets for sites with single- and multi-hose dispensers. You are advised to fill in all of the appropriate information about your installed equipment, complete the TLS console's EVR/ISD setup, then perform the Product Meter ID dispensing procedure.

Single-Hose Fueling Position Dispensers

FILL OUT - USE TO SETUP HOSE TABLE					AUTOMAP CHECK LIST			
					Product Dispense(s)⑥			
Hose ID①	FP②	Hose Label③	AFM Serial Number④	AFM Label⑤	1st	2nd	3rd	4th
1		Blend		AFM FP__&__				
2		Blend						
3		Blend		AFM FP__&__				
4		Blend						
5		Blend		AFM FP__&__				
6		Blend						
7		Blend		AFM FP__&__				
8		Blend						
9		Blend		AFM FP__&__				
10		Blend						
11		Blend		AFM FP__&__				
12		Blend						
13		Blend		AFM FP__&__				
14		Blend						
15		Blend		AFM FP__&__				
16		Blend						

①Each hose must have a unique number (1 - 99).

②This is the Fuel Position Label which is the visible number on the outside of the dispenser (1 -2 digits).

③The hose label is always Blend for single-hose dispensers.

④This is the serial number on the Air Flow Meter (1 per dispenser).

⑤This is the AFM label entered in EVR/ISD setup (1 per dispenser and must be in the format shown, e.g., AFM FP1&2 - *where 1 and 2 refer to the one [or two] numbers on the outside of the dispenser*).

⑥After you have entered the contents of columns 1 - 5 into the TLS EVR/ISD hose table setup, you now must follow automap procedure and dispense from each gas meter AND one blend grade that feeds each hose. Enter a check beneath each product following a dispense from the hose.

FILL OUT - USE TO SETUP HOSE TABLE					AUTO MAP CHECK LIST			
					Product Dispense(s)			
Hose ID	FP	Hose Label	AFM Serial Number	AFM Label	1st	2nd	3rd	4th
17		Blend		AFM FP__&__				
18		Blend						
19		Blend		AFM FP__&__				
20		Blend						
21		Blend		AFM FP__&__				
22		Blend						
23		Blend		AFM FP__&__				
24		Blend						
25		Blend		AFM FP__&__				
26		Blend						
27		Blend		AFM FP__&__				
28		Blend						
29		Blend		AFM FP__&__				
30		Blend						
31		Blend		AFM FP__&__				
32		Blend						
33		Blend		AFM FP__&__				
34		Blend						
35		Blend		AFM FP__&__				
36		Blend						

FILL OUT - USE TO SETUP HOSE TABLE					AUTO MAP CHECK LIST			
					Product Dispense(s)			
Hose ID	FP	Hose Label	AFM Serial Number	AFM Label	1st	2nd	3rd	4th
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						
		Blend		AFM FP__&__				
		Blend						

Multi-Hose Fueling Position Dispensers

FILL OUT - USE TO SETUP HOSE TABLE					AUTOMAP CHECK LIST
Hose ID①	FP②	Hose Label③	AFM Serial Number④	AFM Label⑤	Product Dispense⑥
				AFM FP__&__	
				AFM FP__&__	

①Each hose must have a unique number (1 - 99).

②This is the Fuel Position Label which is the visible number on the outside of the dispenser (1 -2 digits).

③The hose label is the grade.

④This is the serial number on the Air Flow Meter (1 per dispenser).

⑤This is the AFM label entered in EVR/ISD setup (1 per dispenser and must be in the format shown, e.g., AFM FP1&2 - *where 1 and 2 refer to the one [or two] numbers on the outside of the dispenser*).

⑥After you have entered the contents of columns 1 - 5 into the TLS EVR/ISD hose table setup, you now must follow automap procedure and dispense from each hose. Enter a check in this column following a dispense from the hose.

FILL OUT - USE TO SETUP HOSE TABLE					AUTOMAP CHECK LIST
Hose ID①	**FP②**	**Hose Label③**	**AFM Serial Number④**	**AFM Label⑤**	**Product Dispense⑥**
				AFM FP__&__	
				AFM FP__&__	
				AFM FP__&__	

FILL OUT - USE TO SETUP HOSE TABLE					AUTOMAP CHECK LIST
Hose ID①	**FP②**	**Hose Label③**	**AFM Serial Number④**	**AFM Label⑤**	**Product Dispense⑥**
				AFM FP__&__	
				AFM FP__&__	
				AFM FP__&__	

FILL OUT - USE TO SETUP HOSE TABLE					AUTOMAP CHECK LIST
Hose ID①	**FP②**	**Hose Label③**	**AFM Serial Number④**	**AFM Label⑤**	**Product Dispense⑥**
				AFM FP__&__	
				AFM FP__&__	
				AFM FP__&__	

FILL OUT - USE TO SETUP HOSE TABLE					AUTOMAP CHECK LIST
Hose ID①	**FP②**	**Hose Label③**	**AFM Serial Number④**	**AFM Label⑤**	**Product Dispense⑥**
				AFM FP__&__	
				AFM FP__&__	
				AFM FP__&__	

Appendix B: ISD Operability Test Procedure Data Forms

Use these forms to check off and record the results from the ISD Operability Testing procedure steps.

Vapor Pressure Sensor Ambient Reference Test Data Form

DATE OF TEST _____

SERVICE COMPANY NAME	SERVICE COMPANY'S TELEPHONE	
SERVICE TECHNICIAN	VEEDER-ROOT TECH CERTIFICATION #	
STATION NAME	DISTRICT PERMIT #	
STATION ADDRESS	CITY	STATE ZIP

STEP 1.	PRESSURE SENSOR LOCATION: DISPENSER FUELING POINT NUMBERS FP___ /FP___	PRESSURE SENSOR SERIAL NUMBER _____
STEP 2.	REFERENCE PORT CAP REMOVED? ☐ VALVE SET TO REFERENCE PORT (PER FIG. 4-1)? ☐	
STEP 3.	NON-CALIBRATED SENSOR VALUE _____ INCHES OF WATER COLUMN (OBTAIN VALUE USING TLS CONSOLE KEYPAD SEQUENCE SHOWN IN FIG. 4-2, STEP 7)	
STEP 4.	PRESSURE BETWEEN +0.20 & -0.20 (Y/N)? ☐ IF NO: THE PRESSURE SENSOR IS NOT IN COMPLIANCE WITH THE PRESSURE SENSOR REQUIREMENTS OF EXHIBIT 2.	
STEP 5.	REFERENCE PORT CAP REPLACED? ☐ VALVE SET TO VAPOR SPACE PORT (PER FIG 4-1)? ☐	
STEP 6.	MODE KEY PRESSED TO EXIT CALIBRATE SMARTSENSOR MENU? ☐	

Vapor Flow Meter Operability Test Procedure Data Form

DATE OF TEST _____

SERVICE COMPANY NAME	SERVICE COMPANY'S TELEPHONE
SERVICE TECHNICIAN	VEEDER-ROOT TECH CERTIFICATION #
STATION NAME	DISTRICT PERMIT #
STATION ADDRESS CITY STATE ZIP	

STEP 3.	VAPOR FLOW METER SERIAL NUMBER _____		
	DISPENSER FUELING POINT NUMBERS	FP_____	FP_____
STEP 4.	LOW GRADE FUEL HOSE *V/L RESULT #1 (ONE FP ONLY)		
STEP 5.	ISD A/L VALUE #1 CORRESPONDING TO RESULT IN STEP 4		
STEP 6.	STEP 5 VALUE MINUS STEP 4 VALUE	DIFF.	DIFF.
	PASS IF DIFFERENCE IS WITHIN +/-0.15, IF LARGER DIFFERENCE, THEN CONTINUE TO STEP 7 (CIRCLE ONE)	PASS CONTINUE TO STEP 7	PASS CONTINUE TO STEP 7
STEP 7	LOW GRADE FUEL HOSE V/L RESULT #2		
	LOW GRADE FUEL HOSE V/L RESULT #3		
	AVERAGE OF 3 V/L RESULTS	AVG.	AVG.
STEP 8.	ISD A/L VALUE #2		
	ISD A/L VALUE #3		
	AVERAGE OF 3 A/L VALUES	AVG.	AVG.

DATE OF TEST _____

STEP 9.	STEP 8. AVG MINUS STEP 7. AVG.	DIFF.	DIFF.
	PASS IF DIFFERENCE IS WITHIN +/-0.15, IF LARGER DIFFERENCE, THEN CONTINUE TO STEP 10.	PASS CONTINUE TO STEP 10	
STEP 10.	IF CONTINUE, REPEAT AT STEP 4. FOR 2ND FP USING 2ND FP COLUMN, ABOVE.		

***Measure V/L using test procedure in Exhibit 5 of VR-202-D.**

Site Shutdown Test Data Form

DATE OF TEST _____

SERVICE COMPANY NAME	SERVICE COMPANY'S TELEPHONE
SERVICE TECHNICIAN	VEEDER-ROOT TECH CERTIFICATION #
STATION NAME	DISTRICT PERMIT #
STATION ADDRESS CITY ST ATE ZIP	

STEP 1.	POWER REMOVED FROM TLS CONSOLE?	☐
STEP 2.	POWER TO SUBMERSIBLE PUMPS REMOVED BY TLS? (VERIFY GASOLINE FUELING DISABLED)	☐
STEP 3.	POWER RESTORED TO TLS CONSOLE?	☐

COMMENTS (INCLUDE DESCRIPTION OF REPAIRS MADE)

VEEDER-ROOT

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