In-Station Diagnostics (ISD)

Install, Setup, & Operation Manual
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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.

- 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>
<thead>
<tr>
<th>Table 1-1</th>
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<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Healy Assist EVR</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th>Table 1-2.- Related Manuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>V-R Manual</td>
</tr>
<tr>
<td>TLS-3XX Site Prep Manual</td>
</tr>
<tr>
<td>ISD Flow Meter Installation Guide</td>
</tr>
<tr>
<td>ISD Vapor Pressure Sensor Installation Guide</td>
</tr>
<tr>
<td>TLS-3XX Series Consoles System Setup Manual</td>
</tr>
<tr>
<td>TLS-3XX Series Consoles Operator’s Manual</td>
</tr>
<tr>
<td>Serial Comm Modules Installation Guide</td>
</tr>
<tr>
<td>ISD Troubleshooting Manual</td>
</tr>
<tr>
<td>TLS-350 Series Board and Software Replacement Manual</td>
</tr>
<tr>
<td>TLS-350R Point-of-Sale (POS) Application Guide</td>
</tr>
</tbody>
</table>
Safety Precautions

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

<table>
<thead>
<tr>
<th>ELECTRICITY</th>
<th>TURN POWER OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>High voltage exists in, and is supplied to, the device. A potential shock hazard exists.</td>
<td>Live power to a device creates a potential shock hazard. Turn Off power to the device and associated accessories when servicing the unit.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>READ ALL RELATED MANUALS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

**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.
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.

NVME Board

Verify that a NVME 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**
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 attempting 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
Setup

Figure 3-4. EVR/ISD Setup

Press Tank to view the next airflow meter, change status as required.

Enter hose label

Continued from previous page

EAIRFLOW METER SELECT
PRESS <ENTER>

LABEL: (AFM label)
SN#: (10 char) DISABLED

PRESS <ENTER>

LABEL: (AFM label)
SN#: (10 char) ENABLED

PRESS <ENTER>

LABEL: (PS label)
SN#: (10 char) DISABLED

Press Tank to view the next pressure sensor, change status as required.

PRESSURE SENSOR SELECT
PRESS <ENTER>

LABEL: (PS label)
SN#: (10 char) DISABLED

PRESS <ENTER>

LABEL: (PS label)
SN#: (10 char) ENABLED

PRESS <ENTER>

LABEL: (AFM label)
SN#: (10 char) ENABLED

Press Tank to view the next hose label, change label as required. Repeat for all labels (1 - 9).

PRESS <ENTER>

Select one of the previously entered hose labels for this hose, e.g., Unleaded.

Select the serial number of the previously entered airflow meter installed in the dispenser for this hose position.

Enter fuel position label - this should be the visible number on the outside of a dispenser. Only vapor recovery hoses dispensing gasoline apply.

Press Tank to view the next hose. Repeat for additional hoses.

Clear hose 1 setup? Press <ENTER> to confirm

Hose 1 setup cleared Press <STEP> to continue

Continue on next page
3 Setup

EVR/ISD Setup

Figure 3-5. EVR/ISD Setup 3

Go to a fueling point and dispense into an approved container, a couple of gallons of product from the first hose you want to auto map. NOTE: you must dispense from all product meters at the site, including at least 1 blended product, if available.

Note: This step appears only after completing Fuel Hose Table Setup (see previous page). You must repeat this procedure for each product meter.

Pressing Enter starts a 10 minute timer for one auto map dispense.

The system will display a fueling point number, hose number, and a hose label. If this identifies the correct hose (i.e., the one used to dispense product) press ENTER, otherwise press Tank/Sensor. NOTE: you are looking to identify the selected hose, not the product dispensed.

You cannot map more than 2 fueling points (and related hoses) to one AFM (only one AFM is installed per dispenser).

The system will display a fueling point number, hose number, and a hose label. If this identifies the correct hose (i.e., the one used to dispense product) press ENTER, otherwise press Tank/Sensor. NOTE: you are looking to identify the selected hose, not the product dispensed.

You dispensed less than 1/2 gallon (single product minimum), or 1 gallon (blended product minimum). NOTE: if mapping dispensing equipment that uses cumulative numbers, it may require 2 dispenses from each hose/grade.

Default time is 11:59 PM. Time defines when 24-hour ISD tests are run and results posted.

Do not change default value.

Key Legend

- C: Change
- E: Enter
- F: Function
- M: Mode
- P: Print
- S: Step
- T: Tank/Sensor
- L: Key legend

Repress until desired message appears in display
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 OBVR:
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: PREM10N
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

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.

EXAMPLE 1 - Line Leak Detector controls T1 and T3, Output Relay controls T2

EXAMPLE 2 - Output Relay 1 controls T1, Output Relay 2 controls T2, etc.

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.

Press STEP until you see

| Device indicator (X) will be replaced by one of the device codes below, depending on type of Line Leak Detection System: |
| Q = PLLD |
| W = WPLLD |
| P = VLLD |

After assigning all alarms to XLLD #1, repeat the same steps for XLLD #2, #3, etc., as required.

Press C/E/S buttons to change the status of each of the alarms shown to YES. These alarms are REQUIRED by CARB to be set to YES.

IMPORTANT! Failure to set these alarms to YES will result in an ISD Setup Self-Test Alarm.

*These alarms are recommended by CARB to be set to YES.

Press C/E/S buttons to change the status of each of the alarms shown to YES. These alarms are REQUIRED by CARB to be set to YES.

IMPORTANT! Failure to set these alarms to YES will result in an ISD Setup Self-Test Alarm.

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

**PRESS <STEP> TO CONTINUE**

**SETUP MODE**

**PRESS <FUNCTION> TO CONT**

**RELAY CONFIG - MODULE X**

**SLOT #: X X X X**

This display shows 4 Relays and indicates a 4-Relay Output module.

**RELAY CONFIG - MODULE X**

**SLOT #: X X**

This display shows 2 Relays and indicates a 2-Relay Output module. At either display above, move the cursor to an unassigned relay (X) and press Change twice then press Enter to assign the first relay.

**ENTER RELAY DESIGNATION R1:**

Press Change and enter a name for the relay. Press Enter to accept your entry.

**R1: SELECT RELAY TYPE STANDARD**

Press Change until the above Relay Type displays then press Enter.

**R1: SELECT TANK T1: (Grade)**

Press STEP until you see T1: (Grade). If necessary, press Change until the recommended orientation (closed) displays then press Enter.

**RX: (Name)**

**ISD SITE ALARMS: NO**

**ISD SITE ALARMS: YES**

**PRESS <STEP> TO CONTINUE**

**ISD HOSE ALARMS: NO**

**ISD HOSE ALARMS: YES**

**PRESS <STEP> TO CONTINUE**

**ISD SENSOR OUT FAIL**

**ISD SETUP FAIL**

**ISD GROSS PRES FAIL**

**ISD DEGRD PRES FAIL**

**ISD VAPOR LEAK FAIL**

**ENTER RELAY DESIGNATION RX:**

If necessary, you need to repeat the above ISD SITE/HOSE Shut Down Alarm setups for each of the remaining tanks. Press Change and enter a name for the second relay. Press Enter to accept your entry.

**Key Legend**

- C: Change
- E: Enter
- F: Function
- M: Mode
- P: Print
- S: Step
- T: Tank/Sensor
- Key press sequence

This display shows 4 Relays and indicates a 4-Relay Output module. Press C/E/S buttons to change the status of each of the alarms shown to YES. These alarms are REQUIRED by CARB to be set to YES.

**IMPORTANT!** Failure to set these alarms to YES will result in an ISD Setup Self-Test Alarm.

**ISD SITE/HOSE Shut Down Alarm setups**

See required alarms below:

- ISD SITE/HOSE Shut Down Alarm setups are recommended by CARB to be set to YES.

**R1: ISD SITE ALARMS**

See required alarms below:

- ISD SITE/HOSE Shut Down Alarm setups

**R1: ISD HOSE ALARMS**

See required alarms below:

- ISD SITE/HOSE Shut Down Alarm setups

**GRS COLL FL**

**DGRD COL FL**

**IMPORTANT!** Failure to set these alarms to YES will result in an ISD Setup Self-Test Alarm.

* These alarms are recommended by CARB to be set to YES.
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

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

- **Ambient reference port cap**
- **Normal valve position**
- **Atmospheric valve position**

**Figure 4-2. Accessing Calibrate SmartSensor diagnostic menu**

1. Press **M** to enter **Diag Mode** and press **<FUNCTION>** to continue.
2. Press **S** to access SmartSensor Diagnostic and press **<STEP>** to continue.
3. Press **S** to access Comm Data and press **<PRINT>**.
4. Press **S** to access Sensor No.1 and press **<PRINT>**.
5. Press **S** to access Channels and press **<PRINT>**.
6. Press **E** to access Calibrate SmartSensor and press **<ENTER>**.
7. Press **E** to access Sensor No.1 and press **<PRINT>**.
8. Press **M** when testing is complete.

**Key Legend**

- **M**: Main menu
- **F**: Function menu
- **S**: SmartSensor menu
- **T**: Diag menu
- **E**: Error menu

Pressure updates automatically.

Do not press **STEP** when testing is completed.
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.
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).

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.
5 Operation

Alarms

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.)

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.
**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**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Description</th>
<th>Reading</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003/01/01</td>
<td>23:59</td>
<td>VAPOR VAPOR CONTAINMENT LEAKAGE</td>
<td>CFH@2&quot;WC</td>
<td>14</td>
</tr>
<tr>
<td>2003/01/01</td>
<td>23:59</td>
<td>A/L RATIO DEGRADATION</td>
<td>FP2 MID</td>
<td>0.69</td>
</tr>
<tr>
<td>2002/12/31</td>
<td>23:59</td>
<td>VAPOR VAPOR CONTAINMENT LEAKAGE</td>
<td>CFH@2&quot;WC</td>
<td>13</td>
</tr>
<tr>
<td>2002/12/31</td>
<td>23:59</td>
<td>A/L RATIO DEGRADATION</td>
<td>FP2 MID</td>
<td>0.67</td>
</tr>
</tbody>
</table>

**Failure Alarms**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Description</th>
<th>Reading</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003/01/01</td>
<td>23:59</td>
<td>A/L RATIO GROSS BLOCKAGE</td>
<td>FP1 REG</td>
<td>0.06</td>
</tr>
<tr>
<td>2003/01/01</td>
<td>23:59</td>
<td>A/L RATIO DEGRADATION</td>
<td>FP1 REG</td>
<td>0.14</td>
</tr>
<tr>
<td>2003/01/01</td>
<td>23:59</td>
<td>A/L RATIO GROSS BLOCKAGE</td>
<td>FP1 MID</td>
<td>0.13</td>
</tr>
<tr>
<td>2003/01/01</td>
<td>23:59</td>
<td>A/L RATIO DEGRADATION</td>
<td>FP1 MID</td>
<td>0.15</td>
</tr>
</tbody>
</table>
**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>
<thead>
<tr>
<th>Displayed Message</th>
<th>ISD Monitoring Category</th>
<th>Indicator Light</th>
<th>Cause</th>
<th>Suggested Troubleshooting¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISD VAPOR LEAKAGE WARN</td>
<td>Containment</td>
<td>Yellow</td>
<td>Vapor Leakage Detection test warning</td>
<td>TP-201.3</td>
</tr>
<tr>
<td>ISD VAPOR LEAKAGE FAIL²</td>
<td>Containment</td>
<td>Red</td>
<td>Vapor Leakage Detection test - 8th consecutive failure</td>
<td></td>
</tr>
<tr>
<td>ISD GROSS PRESSURE WARN</td>
<td>Containment</td>
<td>Yellow</td>
<td>Gross Over Pressure test warning</td>
<td></td>
</tr>
<tr>
<td>ISD GROSS PRESSURE FAIL²</td>
<td>Containment</td>
<td>Red</td>
<td>Gross Over Pressure test - 8th consecutive failure</td>
<td></td>
</tr>
<tr>
<td>ISD DEGRD PRESSURE WARN</td>
<td>Containment</td>
<td>Yellow</td>
<td>Degradation Over-Pressure test warning</td>
<td></td>
</tr>
<tr>
<td>ISD DEGRD PRESSURE FAIL²</td>
<td>Containment</td>
<td>Red</td>
<td>Degradation Over-Pressure test - 30th consecutive failure</td>
<td></td>
</tr>
<tr>
<td>Hnn: GROSS COLLECT WARN</td>
<td>Collection</td>
<td>Yellow</td>
<td>1-Day Gross A/L Test warning</td>
<td></td>
</tr>
<tr>
<td>Hnn: GROSS COLLECT FAIL²</td>
<td>Collection</td>
<td>Red</td>
<td>1-Day Gross A/L Test failure - 2nd consecutive failure</td>
<td>VR-202 Exhibit 5</td>
</tr>
<tr>
<td>Hnn: DEGRD COLLECT WARN</td>
<td>Collection</td>
<td>Yellow</td>
<td>7-Day Degradation A/L Test warning</td>
<td></td>
</tr>
<tr>
<td>Hnn: DEGRD COLLECT FAIL²</td>
<td>Collection</td>
<td>Red</td>
<td>7-Day Degradation A/L Test - consecutive failure</td>
<td></td>
</tr>
<tr>
<td>ISD SENSOR OUT WARN</td>
<td>Self-Test</td>
<td>Yellow</td>
<td>ISD Sensor Out Self-Test warning</td>
<td>Confirm ISD sensor &amp; module installation / communication per section 2.</td>
</tr>
<tr>
<td>ISD SENSOR OUT FAIL²</td>
<td>Self-Test</td>
<td>Red</td>
<td>ISD Sensor Out Self-Test - 8th consecutive failure</td>
<td></td>
</tr>
<tr>
<td>ISD SETUP WARN</td>
<td>Self-Test</td>
<td>Yellow</td>
<td>System Setup Self-Test warning</td>
<td>Confirm EVR / ISD programming per section 3.</td>
</tr>
<tr>
<td>ISD SETUP FAIL²</td>
<td>Self-Test</td>
<td>Red</td>
<td>System Setup Self-Test failure - 8th consecutive failure</td>
<td></td>
</tr>
</tbody>
</table>

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

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

(SITE NAME)
(SITE STREET)
(CITY, ST)
(PHONE)
(MM 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 CPH
MAX    -0.8 "WC
MIN    -5.0 "WC

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

COLLECTION TESTS

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 MONTHLY REPORT

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

<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
<th>DEVICE</th>
<th>HOSE</th>
<th>DESCRIPTION</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

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.

**Customer supplied.**

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.

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.
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

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

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

Figure 5-12. Console comm port settings printout example

In the example port settings printout above, the RS-232 Security Code is disabled. If the code was enabled you would see a 6-digit number which you will need to enter to access the console (refer to the ‘Sending Console Commands’ paragraph below for more information).
6. After entering your port settings, the program's main window appears (Figure 5-13).

![HyperTerminal main window](image)

**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 `Ctrl` key while you press the `A` key.

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

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

If the RS-232 Security Code is disabled - press and hold the Ctrl key while you press the A key, then type in 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 CtrlA and the ♥ symbol indicates the end of the response.

If the console recognizes the command the response displays as soon as the command is typed in.

If the console does not recognize the command you would see something like ©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

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

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

<table>
<thead>
<tr>
<th></th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAPOR COLLECTION ASSIST SYSTEM A/L RANGE</td>
<td>0.95</td>
<td>1.15</td>
</tr>
</tbody>
</table>

ISD MONITORING TEST PASS/FAIL THRESHOLDS

<table>
<thead>
<tr>
<th></th>
<th>PERIOD</th>
<th>BELOW</th>
<th>ABOVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAPOR COLLECTION ASSIST SYSTEM A/L GROSS FAIL</td>
<td>1DAYS</td>
<td>0.33</td>
<td>1.90</td>
</tr>
<tr>
<td>VAPOR COLLECTION ASSIST SYSTEM A/L DEGRADATION FAIL</td>
<td>7DAYS</td>
<td>0.81</td>
<td>1.32</td>
</tr>
<tr>
<td>VAPOR CONTAINMENT GROSS FAIL, 95th PERCENTILE</td>
<td>7DAYS</td>
<td>----</td>
<td>1.30“wcg</td>
</tr>
<tr>
<td>VAPOR CONTAINMENT DEGRADATION, 75th PERCENTILE</td>
<td>3DAYS</td>
<td>----</td>
<td>0.30“wcg</td>
</tr>
<tr>
<td>VAPOR CONTAINMENT LEAK DETECTION FAIL 82“wcg</td>
<td>7DAYS</td>
<td>----</td>
<td>8.50cfh</td>
</tr>
<tr>
<td>STAGE I VAPOR TRANSFER FAIL, 50th PERCENTILE</td>
<td>20MINS</td>
<td>----</td>
<td>2.50“wcg</td>
</tr>
</tbody>
</table>

WARNING ALARMS

<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
<th>DESCRIPTION</th>
<th>READING</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>04-02-27</td>
<td>23:59:00</td>
<td>A/L RATIO DEGRADATION</td>
<td>FP 6 BLEND</td>
<td>0.00</td>
</tr>
<tr>
<td>04-02-27</td>
<td>23:59:00</td>
<td>A/L RATIO DEGRADATION</td>
<td>FP 5 BLEND</td>
<td>0.00</td>
</tr>
<tr>
<td>04-02-26</td>
<td>23:59:00</td>
<td>A/L RATIO DEGRADATION</td>
<td>FP 5 BLEND</td>
<td>0.00</td>
</tr>
<tr>
<td>04-02-25</td>
<td>23:59:00</td>
<td>A/L RATIO GROSS BLOCKAGE</td>
<td>FP 6 BLEND</td>
<td>BLKD</td>
</tr>
<tr>
<td>04-02-25</td>
<td>23:59:00</td>
<td>A/L RATIO GROSS BLOCKAGE</td>
<td>FP 5 BLEND</td>
<td>BLKD</td>
</tr>
</tbody>
</table>

FAILURE ALARMS

<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
<th>DESCRIPTION</th>
<th>READING</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>04-02-27</td>
<td>23:59:00</td>
<td>A/L RATIO GROSS BLOCKAGE</td>
<td>FP 6 BLEND</td>
<td>BLKD</td>
</tr>
<tr>
<td>04-02-27</td>
<td>23:59:00</td>
<td>A/L RATIO GROSS BLOCKAGE</td>
<td>FP 5 BLEND</td>
<td>BLKD</td>
</tr>
<tr>
<td>04-02-26</td>
<td>23:59:00</td>
<td>A/L RATIO GROSS BLOCKAGE</td>
<td>FP 6 BLEND</td>
<td>BLKD</td>
</tr>
<tr>
<td>04-02-26</td>
<td>23:59:00</td>
<td>A/L RATIO GROSS BLOCKAGE</td>
<td>FP 5 BLEND</td>
<td>BLKD</td>
</tr>
</tbody>
</table>

SHUTDOWN & MISCELLANEOUS EVENTS

<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
<th>DESCRIPTION</th>
<th>ACTION/NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>04-02-27</td>
<td>23:59:00</td>
<td>A/L RATIO GROSS BLOCKAGE</td>
<td>DISABLED FP 06 BLEND</td>
</tr>
<tr>
<td>04-02-27</td>
<td>23:59:00</td>
<td>A/L RATIO GROSS BLOCKAGE</td>
<td>DISABLED FP 05 BLEND</td>
</tr>
<tr>
<td>04-02-26</td>
<td>23:59:00</td>
<td>A/L RATIO GROSS BLOCKAGE</td>
<td>DISABLED FP 06 BLEND</td>
</tr>
<tr>
<td>04-02-26</td>
<td>23:59:00</td>
<td>A/L RATIO GROSS BLOCKAGE</td>
<td>DISABLED FP 05 BLEND</td>
</tr>
<tr>
<td>04-02-15</td>
<td>23:59:00</td>
<td>READINESS ISD:PP EVR:PP</td>
<td>ISD &amp; EVR READY</td>
</tr>
<tr>
<td>04-02-14</td>
<td>23:59:00</td>
<td>READINESS ISD:PP EVR:PN</td>
<td>EVR READINESS PENDING</td>
</tr>
<tr>
<td>04-02-13</td>
<td>23:59:00</td>
<td>READINESS ISD:PP EVR:PN</td>
<td>EVR READINESS PENDING</td>
</tr>
<tr>
<td>04-02-12</td>
<td>23:59:00</td>
<td>READINESS ISD:PP EVR:PN</td>
<td>EVR READINESS PENDING</td>
</tr>
<tr>
<td>04-02-11</td>
<td>23:59:00</td>
<td>READINESS ISD:PP EVR:PN</td>
<td>EVR READINESS PENDING</td>
</tr>
<tr>
<td>04-02-10</td>
<td>23:59:00</td>
<td>READINESS ISD:PP EVR:PN</td>
<td>EVR READINESS PENDING</td>
</tr>
</tbody>
</table>

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)
(MM DD, YYYY HH:MM XX)

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
04-02-15 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

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

**Diagnostic Menus**

DIAG MODE
PRESS <FUNCTION> TO CONT

**Key Legend**

- **E**: Enter
- **F**: Function
- **P**: Print
- **S**: Step
- **T**: Tank/Sensor
- **Press once**: Press once
- **Repeat key presses**: Repeat key presses

**System Diagnostic**
PRESS <STEP> TO CONTINUE

**SmartSensor Diagnostic**
PRESS <STEP> TO CONTINUE

**Comm Data**
P <PRINT>
To select another sensor

**Constants**
P <PRINT>
To select another sensor

**Channels**
P <PRINT>
To select another sensor

**Calibrate SmartSensor**
PRESS <ENTER>

**This menu only appears if this smartsensor type is a pressure sensor**

Continued on next page

**SS Comm Diag**

s 1: APML FP1-2
SAMPLES READ 58
SAMPLES USED 54
PARITY ERR 0
PARTIAL READ 0
COMM ERR 0
RESTARTS 0

**SS Constants Diag**

s 1: APML FP1-2
VAPOR PRESSURE
SERIAL NUMBER 1007
PROTOCOL VERSION 0

**SS Channel Diag**

s 1: APML FP1-2
YY-MM-DD HH:MM:SS
C00 B5B 3D68 00E0 0000
C04 0000 03EF 0000 0004
C08 0A3C 3D68 5693 0081
C12 00C0 00A4 0104 2579
C16 0000 0000 0043 03D6
C20 0709 0032 04C9 880F

ISD-EVR/kg2.eps
This menu only appears if this smartsensor type is a pressure sensor.

CALIBRATE SMARTSENSOR
PRESS <ENTER>

Enter reference pressure value from calibrated test device at pressure sensor via TLS Console front panel, e.g., ambient pressure (0.0). This is the first point of the calibration slope.

READ ZERO VALUE
PRESSURE:   -XX.XXX

Wait until the read zero pressure value stabilizes and no longer changes, then press STEP.

READ SPAN VALUE
PRESSURE:   -XX.XXX

Enter span reference pressure value from calibrated test device at pressure sensor via TLS Console front panel, e.g., 2 psi. This is the second point of the calibration slope.

Wait until the read span pressure value stabilizes and no longer changes, then press STEP.

This message will only appear after all 4 values have been successfully obtained and the calibrated slope and offset are within acceptable limits.

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

Prints out sensor calibration history - see example below.

Enter Function
Print Step Tank/Sensor Repeat key presses

Key Legend
Diagnostic Menus

Maintenance menus for resetting tests and clearing alarm conditions.

Key Legend

- E: Enter
- F: Function
- P: Print
- S: Step
- T: Tank/Sensor

Notes:
1. All repair dates are saved in the Miscellaneous Event Log.
2. Reference the Clear Test Repair Menu table on the next page.
## Table 7-6.- Clear Test Repair Menu

<table>
<thead>
<tr>
<th>Menu Selection</th>
<th>Clears Alarms</th>
<th>Reset Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Containment Over Press</td>
<td>ISD GROSS PRESSURE WARN ISD GROSS PRESSURE FAIL ISD DEGRD PRESSURE WARN ISD DEGRD PRESSURE FAIL</td>
<td>Containment Test Time</td>
</tr>
<tr>
<td>Vapor Leakage Test</td>
<td>ISD VAPOR LEAKAGE WARN ISD VAPOR LEAKAGE FAIL</td>
<td>Vapor Leak Test Time</td>
</tr>
<tr>
<td>Vapor Collection Test</td>
<td>GROSS COLLECT WARN GROSS COLLECT FAIL DEGRD COLLECT WARN DEGRD COLLECT FAIL AIRFLOW MTR SETUP</td>
<td>Hose Test Time</td>
</tr>
<tr>
<td>Sensor Out Test</td>
<td>ISD SENSOR OUT WARN ISD SENSOR OUT FAIL</td>
<td>Sensor Out Test Time</td>
</tr>
<tr>
<td>Setup Test</td>
<td>ISD SETUP WARN ISD SETUP FAIL</td>
<td>Setup Self Test Time</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Hose ID&lt;sup&gt;3&lt;/sup&gt;</th>
<th>FP&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Hose Label&lt;sup&gt;3&lt;/sup&gt;</th>
<th>AFM Serial Number&lt;sup&gt;4&lt;/sup&gt;</th>
<th>AFM Label&lt;sup&gt;5&lt;/sup&gt;</th>
<th>Product Dispense(s)&lt;sup&gt;6&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Blend</td>
<td></td>
<td>AFM FP__&amp;__</td>
<td></td>
<td>1st 2nd 3rd 4th</td>
</tr>
<tr>
<td>2</td>
<td>Blend</td>
<td></td>
<td>AFM FP__&amp;__</td>
<td></td>
<td></td>
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<sup>1</sup>Each hose must have a unique number (1 - 99).

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

<sup>3</sup>The hose label is always Blend for single-hose dispensers.

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

<sup>5</sup>This 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).

<sup>6</sup>After 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.
<table>
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<th>Hose ID</th>
<th>FP</th>
<th>Hose Label</th>
<th>AFM Serial Number</th>
<th>AFM Label</th>
<th>Product Dispense(s)</th>
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## Appendix A: Site EVR/ISD Equipment Location Worksheet

### Single-Hose Fueling Position Dispensers

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<th>AFM Label</th>
<th>Product Dispense(s)</th>
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Multi-Hose Fueling Position Dispensers

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<th>AFM Label</th>
<th>Product Dispense</th>
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</table>

1. Each hose must have a unique number (1 - 99).
2. This is the Fuel Position Label which is the visible number on the outside of the dispenser (1 - 2 digits).
3. The hose label is the grade.
4. This is the serial number on the Air Flow Meter (1 per dispenser).
5. This 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).
6. After 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.
### Appendix A: Site EVR/ISD Equipment Location Worksheet

#### Multi-Hose Fueling Position Dispensers

**FILL OUT - USE TO SETUP HOSE TABLE**

<table>
<thead>
<tr>
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<th>FP&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Hose Label&lt;sup&gt;3&lt;/sup&gt;</th>
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<th>Product Dispense&lt;sup&gt;6&lt;/sup&gt;</th>
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<td>FP&lt;sup&gt;2&lt;/sup&gt;</td>
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## Appendix A: Site EVR/ISD Equipment Location Worksheet

### Multi-Hose Fueling Position Dispensers

**FILL OUT - USE TO SETUP HOSE TABLE**

<table>
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<tr>
<th>Hose ID&lt;sup&gt;1&lt;/sup&gt;</th>
<th>FP&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Hose Label&lt;sup&gt;3&lt;/sup&gt;</th>
<th>AFM Serial Number&lt;sup&gt;4&lt;/sup&gt;</th>
<th>AFM Label&lt;sup&gt;5&lt;/sup&gt;</th>
<th>Product Dispense&lt;sup&gt;6&lt;/sup&gt;</th>
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<sup>1</sup> Hose ID<br><sup>2</sup> FP<br><sup>3</sup> Hose Label<br><sup>4</sup> AFM Serial Number<br><sup>5</sup> AFM Label<br><sup>6</sup> Product Dispense
# 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**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong></td>
<td><strong>Pressure Sensor Location:</strong> Dispenser Fueling Point Numbers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FP/FP</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2.</strong></td>
<td>Reference Port Cap Removed?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Valve Set to Reference Port (Per Fig. 4-1)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3.</strong></td>
<td>Non-Calibrated Sensor Value</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Obtain value using TLS Console Keypad Sequence shown in Fig. 4-2, Step 7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4.</strong></td>
<td>Pressure Between +0.20 &amp; -0.20 (Y/N)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>If No: The Pressure Sensor is not in compliance with the Pressure Sensor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Requirements of Exhibit 2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>5.</strong></td>
<td>Reference Port Cap Replaced?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Valve Set to Vapor Space Port (Per Fig 4-1)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>6.</strong></td>
<td>Mode Key Pressed to Exit Calibrate SmartSensor Menu?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Vapor Flow Meter Operability Test Procedure Data Form

<table>
<thead>
<tr>
<th>DATE OF TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>SERVICE COMPANY NAME</td>
</tr>
<tr>
<td>SERVICE TECHNICIAN</td>
</tr>
<tr>
<td>STATION NAME</td>
</tr>
<tr>
<td>STATION ADDRESS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STEP 3.</th>
<th>VAPOR FLOW METER SERIAL NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISPENSER FUELING POINT NUMBERS</td>
<td>FP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STEP 4.</th>
<th>LOW GRADE FUEL HOSE V/L RESULT #1 (ONE FP ONLY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESULT</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STEP 5.</th>
<th>ISD A/L VALUE #1 CORRESPONDING TO RESULT IN STEP 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>VALUE</td>
<td>DIFF.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STEP 6.</th>
<th>STEP 5 VALUE MINUS STEP 4 VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASS</td>
<td>CONTINUE TO STEP 7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STEP 7</th>
<th>LOW GRADE FUEL HOSE V/L RESULT #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW GRADE FUEL HOSE V/L RESULT #3</td>
<td></td>
</tr>
<tr>
<td>AVERAGE OF 3 V/L RESULTS</td>
<td>AVG.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STEP 8.</th>
<th>ISD A/L VALUE #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISD A/L VALUE #3</td>
<td></td>
</tr>
<tr>
<td>AVERAGE OF 3 A/L VALUES</td>
<td>AVG.</td>
</tr>
</tbody>
</table>
## Vapor Flow Meter Operability Test Procedure Data Form

**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 2<sup>ND</sup> FP USING 2<sup>ND</sup> FP COLUMN, ABOVE. |

*Measure V/L using test procedure in Exhibit 5 of VR-202-D.*
### Site Shutdown Test Data Form

<table>
<thead>
<tr>
<th>Date of Test</th>
<th>Service Company Name</th>
<th>Service Company’s Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service Technician</th>
<th>Veeders-Root Tech Certification #</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Station Name</th>
<th>District Permit #</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Station Address</th>
<th>City</th>
<th>State</th>
<th>Zip</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 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)

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Revised 12/13/2007