In-Station Diagnostics (ISD)

Install, Setup, & Operation Manual

For Healy Assist EVR
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WARRANTY - Please see next page, iii.

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ISD
WARRANTY POLICY
For ISD components (Vapor Flow Sensor, Vapor Pressure Sensor, and NVMEM board), 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 ISD start-up or twenty-four (24) months from the date of invoice, whichever occurs first. During the warranty period, we and or our representative will repair or replace the product, if determined by us to be defective, at the location where the product is in use, at no charge to the purchaser.

For ISD components installed after the initial ISD start-up, we warrant that these products shall be free from defects in material and workmanship for a period of fifteen (15) months from date of invoice. We will repair or replace the product if the product is returned to us, transportation prepaid, within the warranty period, and is determined by us to be defective.

This warranty applies only when the product is installed in accordance with Veeder-Root’s specifications, and that a Warranty Registration and Checkout Form has been filed with Veeder-Root by an authorized Veeder-Root Distributor. 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 specifications, modified or repaired by unauthorized persons, or damage related to acts of God.

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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 or dispenser relay board is required (either 4-Output Relay module, I/O Combination module) to shut down each Submersible Turbine Pump (STP) or dispenser upon activation of certain ISD alarms (these alarms can also be assigned in Line Leak Disable setup to shut down the STP or dispenser 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>Name</th>
<th>CARB Executive Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healy Assist EVR</td>
<td>VR-202</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>V-R Manual</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLS-3XX Site Prep Manual</td>
<td>576013-879</td>
</tr>
<tr>
<td>ISD Flow Meter Installation Guide</td>
<td>577013-796</td>
</tr>
<tr>
<td>ISD Vapor Pressure Sensor Installation Guide</td>
<td>577013-797</td>
</tr>
<tr>
<td>TLS-3XX Series Consoles System Setup Manual</td>
<td>576013-623</td>
</tr>
<tr>
<td>TLS-3XX Series Consoles Operator’s Manual</td>
<td>576013-610</td>
</tr>
<tr>
<td>Serial Comm Modules Installation Guide</td>
<td>577013-528</td>
</tr>
<tr>
<td>ISD Troubleshooting Manual</td>
<td>577013-819</td>
</tr>
<tr>
<td>TLS-350 Series Board and Software Replacement Manual</td>
<td>576013-637</td>
</tr>
<tr>
<td>TLS-350R Point-of-Sale (POS) Application Guide</td>
<td>577013-401</td>
</tr>
</tbody>
</table>
Table 1-2.- Related Manuals

<table>
<thead>
<tr>
<th>V-R Manual</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input/Output Modules Installation</td>
<td>576013-614</td>
</tr>
</tbody>
</table>

### Safety Precautions

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

- **ELECTRICITY**
  - High voltage exists in, and is supplied to, the device. A potential shock hazard exists.

- **TURN POWER OFF**
  - Live power to a device creates a potential shock hazard. Turn Off power to the device and associated accessories when servicing the unit.

- **READ ALL RELATED MANUALS**
  - Knowledge of all related procedures before you begin work is important. Read and understand all manuals thoroughly. If you do not understand a procedure, ask someone who does.

- **WARNING**
  - Heed the adjacent instructions to avoid damage to equipment, property, environment or personal injury.

- **WARNING**
  - The console contains high voltages which can be lethal. It is also connected to low power devices that must be kept intrinsically safe.
  - Turn power Off at the circuit breaker. Do not connect the console AC power supply until all devices are installed.
  - 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
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 or Dispenser Relay 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 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. Alternately, you can install Dispenser Relay Modules to control dispensing.

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.
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 more TLS setup functions must be programmed to shut down the tank or the dispenser if certain ISD alarms occur:

- **XLLD Line Disable Setup** - For ISD sites with line leak detection - Figure 3-9
  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 3-11
  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.

- **Dispenser Relay Setup** (go to Figure 3-13)
  This setup assigns ISD alarms to a relay that will shut down the dispenser.
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 2

Continue from previous page

**AIRFLOW METER SELECT**
Press <ENTER>

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

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

**PRESSURE SENSOR SELECT**
Press <ENTER>

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

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

**FUEL HOSE TABLE SETUP**
Press <ENTER>

**EDIT FUEL HOSE LABELS**
Press <ENTER>

**HOSE LABEL 1**
(Name)

Enter hose label

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

**ADD NEW FUEL HOSE**
Press <ENTER>

**CLEAR FUEL HOSE 1**
Press <ENTER>

**CLEAR HOSE 1 SETUP**
Press <ENTER> TO CONFIRM

**HOSE 1 SETUP CLEARED**
Press <STEP> TO CONTINUE

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

**AUTO MAP GRADE - HOSE**
Press <ENTER>

Continued on next page

**Key Legend**

- **C** Change
- **E** Enter
- **F** Function
- **M** Mode
- **P** Print
- **S** Step
- **T** Tank/Sensor

Repress until desired message appears in display

**Key press sequence**
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.

You have dispensed from a hose that has already been mapped.

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/gate.

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

Press button until you see this display. Go to Edit Fuel Hose X display (see previous page) and reassign correct AFM for this hose.

Enter new start time

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

Note: This step appears only after completing Fuel Hose Table Setup (see previous page).

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.

3 possible error displays

Insufficient Data. Retry?

AFM No Space for FP

Press Tank/Sensor until the correct FP/hose/label appears in the display.

NOTE: if the hose dispensed from is a non-vapor recovery hose, select NON VAPOR RECO V R Y HOSE

Press Tank/Sensor to scroll through product table and find desired product.

Press Tank/Sensor to scroll through fuel hose table and find desired label.

Assign hose

H: hose number

L: mapped fuel position index

B: bus identification

S: slot number

FP: fuel position reported by DIM

M: meter assigned to product

P: product for this fuel position index

Press button until you see this display. Go to Edit Fuel Hose X display (see previous page) and reassign correct AFM for this hose.
**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

<table>
<thead>
<tr>
<th>ID</th>
<th>FP</th>
<th>FL</th>
<th>HL</th>
<th>AA</th>
<th>RR</th>
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### ISD Airflow Meter Map

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<td>03001401</td>
<td>AFM1 FP1</td>
</tr>
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<td>03001402</td>
<td>AFM2 FP3</td>
</tr>
<tr>
<td>3</td>
<td>03001403</td>
<td>AFM3 FP5</td>
</tr>
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<td>AFM4 FP7</td>
</tr>
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<td>5</td>
<td>03001405</td>
<td>AFM5 FP9</td>
</tr>
<tr>
<td>6</td>
<td>03001406</td>
<td>AFM6 FP11</td>
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</table>

### ISD Fuel Grade Hose Map

<table>
<thead>
<tr>
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</tr>
<tr>
<td>12</td>
<td>112</td>
<td>312</td>
<td>912</td>
</tr>
</tbody>
</table>

### Label Table

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

**Legend:**
- 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

**Example Healy Setup Printout**

![Image of Healy Setup Printout](image-url)
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) or the gasoline dispensers 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 or dispensers 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 or assign ISD alarms to Dispenser Relays which can be used to shut down the dispenser. Figure 3-7 illustrates two examples of tank pump control, one using a line leak/output relay combination and one using output relays.

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.

Figure 3-7. Site Tank Control Examples
Figure 3-8 illustrates two examples of dispenser control using Dispenser Relay modules.

**EXAMPLE 1 - Dispenser Relay 1**
controls fueling position 1 and 2

**EXAMPLE 2 - Dispenser Relay 2**
controls fueling position 3 and 4

You can assign ISD containment shut down alarms to the submersible pump output relays and assign ISD collection alarms to the dispenser relay as shown above.
PROGRAMMING ISD SHUT DOWN ALARMS

Figure 3-9 illustrates the setup steps required to assign ISD Shut Down Alarms to a tank having a line leak detection system installed.

If dispenser relay shutdown is used for hose alarms, do not assign hose alarms to Line Leak Detection relay.

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.

XLLD will be replaced by the type of Line Leak Detection System at the site: PLLD, WPLLD, or VLLD

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 assigned to submersible turbine pumps or to dispenser relays.

IMPORTANT! Failure for shut down of submersible turbine pumps or dispensers will result in an ISD Setup Self-Test Alarm.

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

If dispenser relay shutdown is used for hose alarms, do not assign hose alarms to Line Leak Detection relay.
Figure 3-10 shows a resulting printout of the Line Leak Disable setup with ISD alarms assigned when Dispenser Relay modules are not used.

![Example Line Leak Disable Setup Printout](isd-evr/healylldsetprt.eps)
Figure 3-11 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.

**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 an I/O Combination module - 2 relays only.

At either display above, move the cursor to an unassigned relay (X), 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)**

This display shows 2 Relays and indicates a I/O Combination module - 2 relays only.

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

**R1 : SELECT ORIENTATION**

**NORMALLY CLOSED**

If necessary, press Change until the recommended orientation (closed) displays then press Enter.

**RX : (Name)**

**ISO SITE ALARMS: NO**

**ISO SITE ALARMS: YES**

Press <STEP> to continue.

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

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.

**ISO HOSE ALARMS: NO**

**ISO HOSE ALARMS: YES**

Press <STEP> to continue.

If necessary, you need to repeat the above ISD SITE/HOSE Shutdown Alarm setups for each of the remaining tanks.

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

Do not assign hose alarms when Dispenser Relay Shutdown is used for hose alarms.

IMPORTANT! Failure to assign hose alarms for shut down of submersible turbine pumps or dispensers will result in an ISD Setup Self-Test Alarm.

**GRAVEL PL**

**DRAIN CUL FL**

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 assigned to submersible turbine pumps or to dispenser relays.

IMPORTANT! Failure to assign hose alarms for shut down of submersible turbine pumps or dispensers will result in an ISD Setup Self-Test Alarm.
Figure 3-12 shows a resulting printout of the Output Relay setup with ISD alarms assigned when Dispenser Relay modules are not used.

![Figure 3-12. Example printout - ISD Alarms Assignments - Output Relay Setup](isd-evr-healyorsetprt.png)
ALARM SETUP FOR SITES WITH DISPENSER RELAYS

Figure 3-13 illustrates the setup steps required to assign ISD Shut Down Alarms to a tank using Dispenser Relay Module.

**Figure 3-13. Assigning ISD Shut Down Alarms in Dispenser Relay Setup**
Figure 3-14 shows a resulting printout of the Dispenser Relay setup with ISD hose alarms assigned.

Figure 3-14. Example printout - ISDHose Alarm Assignments - Dispenser 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 Verification Test

#### PRINCIPLE AND SUMMARY OF TEST PROCEDURE

**Determining UST Pressure**

The pressure of the USTs is determined at the Phase I vapor recovery adaptor (dry break assembly) with a vapor coupler test assembly as shown in Figures 2 and 3 of TP-201.3 (Determination of 2 Inch WC Static Pressure Performance of Vapor Recovery Systems of Dispensing Facilities) or a modified dust cap test assembly as shown in Figure 4-1 and Figure 4-2. The test assembly is equipped with a center probe, which opens the dry break, and a quick connect fitting that is connected to an electronic pressure measuring device or digital manometer. The test assembly should open the dry break with minimal venting of the USTs. This test can be performed while product is being dispensed into motor vehicles.

**Determining Ambient Pressure**

The Vapor Pressure Sensor is subjected to ambient pressure by turning the Vapor Pressure Sensor valve, which is located in the dispenser closest to the tanks, to the Atmospheric Valve Position as shown in Figure 4-3. This test can be performed while product is being dispensed into motor vehicles.

#### BIASES AND INTERFERENCES

1. This test shall not be conducted within 30 minutes following gasoline transfer from a cargo tank.
RANGE AND ACCURACY

Electronic Pressure Measuring Device such as a digital manometer

Minimum readability shall be 0.01 inches WC with measurement range(s) to include at least up to positive and negative ten (±10) inches WC with a minimum accuracy of plus or minus 0.05 inches WC of full scale.

EQUIPMENT

1. The dust cap test assembly shall be modified in the following manner:
   a. Install a probe in the center of the dust cap as shown in Figure 4-1 (one method is to tap and thread probe). The probe shall be of sufficient length to open approximately ½ inch of the dry break while allowing the cap to maintain a leak tight seal on the adaptor.
   b. Install female quick connect fitting on the top of the dust cap, offset from the center probe as shown in Figure 4-1. A Swagelok, part number SS-QC4-B-4-PM, quick connect fitting or equivalent can be used.
   c. Use “Tygon tubing” or equivalent to connect the manometer to the dust cap (Figure 4-2). Install a male quick connect fitting (Swagelok part number SS QC4-5-400 or equivalent can be used) on one end of a ferrule stainless steel tube (or equivalent material). Connect one end of the “Tygon tubing” to the stainless steel tube and connect the other end to the digital manometer (Figure 4-2).

2. Alternatively, the vapor coupler test assembly, Figures 2 and 3 of TP 201.3 may be used in lieu of the dust cap test assembly.

3. Digital Manometer (Electronic Pressure Measuring Device)

   Use a minimum range ±10.00 inches WC digital manometer to monitor the UST pressure with a minimum readability of 0.01 inches of WC. Dwyer Series 475 Mark III Digital manometer or equivalent can be used. A copy of the manufacturer’s operating instructions shall be kept with the equipment.

CALIBRATION REQUIREMENTS

1. A copy of the most current calibration of the electronic pressure measuring device shall be kept with the equipment.

2. All electronic pressure measuring devices shall be bench tested for accuracy using a reference gauge, incline manometer or National Institute of Standards and Technology (NIST) traceable standard at least once every twelve (12) consecutive months. Accuracy checks shall be performed at a minimum of five (5) points (e.g., 10, 25, 50, 75 and 90 percent of full scale) each for both positive and negative pressure readings. Accuracy shall meet the requirements in the Range and Accuracy section above.

DETERMINING UST PRESSURE

Pre-Test Procedure

1. Turn on digital manometer and allow instrument to warm up for five minutes.

2. Zero out digital manometer using adjustment pod on top of instrument in accordance with manufacturer’s instructions. Drift may be minimized by rezeroing immediately after use by venting both pressure ports to atmosphere and adjusting the knob until the display reads exactly zero.

3. Attach the male quick connect fitting to the female quick connect fitting on the modified vapor dust cap.

4. Attach digital manometer to open end of Tygon tubing.
Test Procedure

1. Attach the dust cap or vapor coupler test assembly to the vapor adaptor (Figure 4-2).

2. Start at the ‘DIAG MODE’ menu at the TLS Console front panel to enter the ‘Calibrate SmartSensor’ menu as shown in Figure 4-4 to view the non-calibrated pressure value.

3. Simultaneously record the ullage pressure from the digital manometer (connected to the vapor coupler test assembly) and the TLS Console. Record the above information on Appendix B, Form 1 “Data Form for Vapor Pressure Sensor UST Pressure Test.” Districts may require the use of an alternate form, provided it includes the same minimum parameters as identified in the Data Form.

4. Verify that the pressure reading from the TLS Console is within ±0.2 inches WC from the digital manometer reading. If difference is not within ±0.2 inches WC, the pressure sensor is not in compliance with the pressure sensor requirements.

5. Press the <MODE> key to leave the ‘Calibrate SmartSensor’ menu. Note: Do not calibrate the sensor!

DETERMINING AMBIENT PRESSURE

Test Procedure for Testing Sensor Under Ambient Pressure

1. Access the Vapor Pressure Sensor, which is located in the dispenser closest to the tanks. 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 4-3).

3. Start at the ‘DIAG MODE’ menu at the TLS Console front panel to enter the ‘Calibrate SmartSensor’ menu as shown in Figure 4-4 to view the non-calibrated pressure value.

4. Verify that the pressure value is between +0.2 and -0.2 inches WC. If the pressure value is not within this range, the pressure sensor is not in compliance with the pressure sensor requirements.

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 4-3).

6. Press the <MODE> key to leave the ‘Calibrate SmartSensor’ menu. Note: Do not calibrate the sensor!

7. Record the above information on Appendix B, Form 2 “Data Form for Vapor Pressure Sensor Ambient Reference Test.” Districts may require the use of an alternate form, provided it includes the same minimum parameters as identified in the Data Form.

ALTERNATE PROCEDURES

This procedure shall be conducted as specified. Any modifications to this test procedure shall not be used unless prior written approval has been obtained from the ARB Executive Officer, pursuant to Section 14 of CP-201.
Figure 4-1. Typical modified vapor adaptor dust cap (bottom view)

Figure 4-2. Typical field installation of UST Pressure Measurement Assembly
Figure 4-3. Vapor pressure sensor valve positions
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 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).

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.
The TLS console also logs an entry to the Warning Log upon posting a warning.

**ALARMS 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

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

Failure Alarms

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<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 FP1 REG</td>
<td></td>
<td>0.06</td>
</tr>
<tr>
<td>2003/01/01</td>
<td>23:59</td>
<td>A/L RATIO DEGRADATION FP1 REG</td>
<td></td>
<td>0.14</td>
</tr>
<tr>
<td>2003/01/01</td>
<td>23:59</td>
<td>A/L RATIO GROSS BLOCKAGE FP1 MID</td>
<td></td>
<td>0.13</td>
</tr>
<tr>
<td>2003/01/01</td>
<td>23:59</td>
<td>A/L RATIO DEGRADATION FP1 MID</td>
<td></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 Troubleshooting</th>
</tr>
</thead>
</table>
| ISD VAPOR LEAKAGE WARN | Containment | Yellow | Vapor Leakage Detection test warning | • Exhibit 7 Nozzle Bag Test  
• Exhibit 9/10 Operability Test  
• T.P. 201.1E-PVV Test  
• Exhibit 4 Clean Air Separator Test  
• TP-201.3 |
| ISD VAPOR LEAKAGE FAIL | Containment | Red | Vapor Leakage Detection test - 8th consecutive failure | |
| ISD GROSS PRESSURE WARN | Containment | Yellow | Gross Over Pressure test warning | • Are ball valves for the clean air separator in the correct position?  
• Is the ball valve near the pressure sensor in the correct position?  
• Exhibit 7 Bag Test  
• T.P. 201.1E-PVV Test  
• T.P. 201.3 |
| ISD GROSS PRESSURE FAIL | Containment | Red | Gross Over Pressure test - 8th consecutive failure | • Exhibit 7 Bag Test  
• TP. 201.1E-PVV Test  
• TP. 201.3  
• Look for problems using one or more of the following VR-202 procedures/tests: Dispenser Integrity Test B-3 (i.e. ‘Pumping Tightness’ test), Exhibit 4, Exhibit 5, Exhibit 9 (pressure sensor only) or Flow Rate Verification per section 1.2.3. |
| ISD DEGRD PRESSURE WARN | Containment | Yellow | Degradation Over-Pressure test warning | |
| ISD DEGRD PRESSURE FAIL | Containment | Red | Degradation Over-Pressure test - 30th consecutive failure | • Exhibit 7 Nozzle Bag Test  
• Exhibit 9/10 Operability Test  
• T.P. 201.1E-PVV Test  
• TP. 201.3 |
| Hnn: GROSS COLLECT WARN | Collection | Yellow | 1-Day Gross A/L Test warning | • Visually inspect hanging hardware at the affected fueling point  
• Exhibit 7 Nozzle Bag Test  
• VR-202 Exhibit 5 |
| Hnn: GROSS COLLECT FAIL | 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 | 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 | Self-Test | Red | ISD Sensor Out Self-Test - 8th consecutive failure | |
5-5 Operation

Alarms

Table 5-1.- ISD Alarm Summary

<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 SETUP WARN</td>
<td>Self-Test</td>
<td>Yellow</td>
<td>System Setup Self-Test warning</td>
<td>Confirm EVR / ISD program-</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>ing per section 3.</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 5-2.- Other Alarms

<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
ISD STATUS

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

(MMM DD, YYYY HH:MM XM)

EVR TYPE: VACUUM ASSIST
ISD VERSION 01.03

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: 3.26 CFH 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

Figure 5-6. ISD Status Report Example - TLS console printout
Figure 5-7. ISD Daily Report Example - TLS console printout
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 card using one of the methods shown in the examples in Figure 5-9 below.

![Diagram showing connection of laptop to TLS console]

**Table 5-9. Cable** Requirements for Terminal Mode Connection to TLS**

<table>
<thead>
<tr>
<th>Connector at PC (DTE)</th>
<th>Connector at TLS (DTE)</th>
<th>Null Modem</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB9</td>
<td>DB9 male</td>
<td>Required</td>
</tr>
<tr>
<td>DB9</td>
<td>DB25 male</td>
<td>Not required</td>
</tr>
<tr>
<td>DB25</td>
<td>DB9 male</td>
<td>Not required</td>
</tr>
<tr>
<td>DB25</td>
<td>DB25 male</td>
<td>Required</td>
</tr>
</tbody>
</table>

**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.

![Connection Description window](image)

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.

![Connect To window](image)

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](setup_mode.png)

b. Press the FUNCTION key until you see the message:

   ![Communications Setup](communications_setup.png)

c. Press the STEP key until you see the message:

   ![Port Settings](port_settings.png)

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 - Odd, Stop Bits - 1. For the ‘Flow Control’ entry select None. Click OK.

   ![Example Port Settings Printout](port_set_example.png)

   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 (See example Figure 5-16)</td>
<td><code>&lt;SOH&gt;IV0500ddd</code> 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> 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.
### ISD Daily Report Details

**ISD Type:** Vacuum Assist  
**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 Daily Report Details - Serial to PC Format

**DATE** | **TIME** | **GRGS** | **DPOS** | **MAX** | **MIN** | **LEAK** | **ISD** | **FAIL** | **PASS** | **BLEND** | **BLEND** | **BLEND**
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
02/10 | 100% | -1.4N | -3.1N | -1.1 | -5.0 | 0N | PASS | 1.09 | 1.10 | 1.11
02/11 | 100% | -1.7N | -3.4N | -1.0 | -5.0 | 0N | PASS | 1.08 | 1.10 | 1.08
02/12 | 100% | -1.7N | -3.4N | -1.0 | -5.0 | 0N | PASS | 1.08 | 1.10 | 1.08
02/13 | 100% | -1.8N | -3.4N | -1.0 | -5.0 | 2N | PASS | 1.09 | 1.10 | 1.00
02/14 | 100% | -1.6N | -3.3N | -0.3 | -5.0 | 2N | PASS | 1.08 | 1.10 | 1.08
02/15 | 100% | -1.5N | -3.3N | 1.3 | -5.0 | 2N | PASS | 1.07 | 1.11 | 1.08
02/16 | 100% | -1.2N | -2.9N | 0.0 | -5.0 | 3 | PASS | 1.06 | 1.10 | 1.13
02/17 | 100% | -1.2N | -2.9N | 0.0 | -5.0 | 3 | PASS | 1.06 | 1.10 | 1.13
02/18 | 100% | -1.0N | -2.6N | 0.0 | -5.0 | 3 | PASS | 1.05 | 1.10 | 1.14
02/19 | 100% | -0.9N | -2.6N | 0.0 | -5.0 | 3 | PASS | 1.05 | 1.10 | 1.13
02/20 | 100% | -0.6N | -2.7N | 1.0 | -5.0 | 3 | PASS | 1.06 | 1.10 | 1.13
02/21 | 100% | -1.7N | -3.5N | 0.4 | -5.0 | 0N | PASS | 1.08 | 1.10 | 1.08
02/22 | 100% | -1.2N | -2.5N | 0.0 | -5.0 | 0N | PASS | 1.06 | 1.10 | 1.08
02/23 | 100% | -0.9N | -2.3N | 2.8 | -5.0 | 0N | PASS | 1.10 | 1.11 | 1.08
02/24 | 100% | -0.6N | -2.6N | 0.9 | -5.0 | 0N | PASS | 1.10 | 1.12 | 1.07
02/25 | 100% | -0.8N | -3.0N | -0.3 | -5.0 | 0N | PASS | 1.10 | 1.12 | 1.10
02/26 | 100% | -1.1N | -2.2N | 5.0 | -5.0 | 0 | PASS | 1.10 | 1.12 | 1.11
02/27 | 100% | -1.0N | -2.4N | -0.8 | -5.0 | 0 | PASS | 1.11 | 1.13 | 1.11
02/28 | 100% | -0.9N | -2.4N | -0.3 | -5.0 | 0 | PASS | 1.09 | 1.16 | 1.08
02/29 | 100% | -0.6N | -2.7N | 1.0 | -5.0 | 0 | PASS | 1.01 | 1.14 | 1.08

---

#### Collection Tests - Daily Average Hose A/L Ratio

<table>
<thead>
<tr>
<th>DATE</th>
<th>BLEND</th>
<th>BLEND</th>
<th>BLEND</th>
<th>BLEND</th>
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<td>02/12</td>
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<td>1.03</td>
<td>1.03</td>
<td>1.03</td>
<td>1.03</td>
</tr>
</tbody>
</table>

---

**ISD EVR Report Format**

---

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

**SITE NAME**
**SITE STREET**
**CITY, ST**
**PHONE**
**(MM/DD, YYYY HH:MM AM/PM)**

**ISD Daily Report Details**

**ISD Type:** 01.03

**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
IV0200
MAR 1, 2004 12:20 AM

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

ISD MONTHLY STATUS REPORT

EVR TYPE: VACUUM ASSIST
ISD TYPE: 01.03
VAPOR PROCESSOR TYPE: NO VAPOR PROCESSOR

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

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
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

Figure 5-15. ISD Monthly Status Report - Serial to PC Format
<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>23:59:01</td>
<td>A/L Ratio Degradation</td>
<td>FP 6 BLEND</td>
<td>0.00</td>
</tr>
<tr>
<td>04-02-27</td>
<td>23:59:01</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>23:59:01</td>
<td>A/L Ratio Gross Blockage</td>
<td>FP 6 BLEND</td>
<td>BLKD</td>
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<tr>
<td>04-02-25</td>
<td>23:59:01</td>
<td>A/L Ratio Gross Blockage</td>
<td>FP 5 BLEND</td>
<td>BLKD</td>
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</tbody>
</table>

**Failure Alarms**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Description</th>
<th>Reading</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>04-02-27</td>
<td>23:59:01</td>
<td>A/L Ratio Gross Blockage</td>
<td>FP 6 BLEND</td>
<td>BLKD</td>
</tr>
<tr>
<td>04-02-27</td>
<td>23:59:01</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>
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<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>23:59:01</td>
<td>A/L Ratio Gross Blockage</td>
<td>DISABLED FP 06 BLEND</td>
</tr>
<tr>
<td>04-02-27</td>
<td>23:59:01</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>
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<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>04-02-14</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>04-02-11</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 5-16. ISD Alarm Status Report - Serial to PC Format
6 Maintenance

TLS Console

The TLS console, including interface modules, do not require scheduled maintenance, but the station operator is responsible to ensure printer paper is properly loaded and front panel indicator lights are operational. 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.

This menu only appears if this SmartSensor type is a pressure sensor.

(Continued on next page.)
This menu only appears if this Smartsensor type is a pressure sensor.

**CALIBRATE SMARTSENSOR**

**PRESS <ENTER>**

Prints out sensor calibration history - see example at right.

**ENTER ZERO REFERENCE PRESSURE:** +XX.XXX

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.

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

**READ ZERO VALUE PRESSURE:** -XX.XXX

**ENTER SPAN REFERENCE PRESSURE:** -XX.XXX

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

**READ SPAN VALUE PRESSURE:** -XX.XXX

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

**CALB STATUS:** PASS

**PRESS <STEP> TO CONTINUE**
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 7-4.- 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>
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

<table>
<thead>
<tr>
<th>Hose ID①</th>
<th>FP②</th>
<th>Hose Label③</th>
<th>AFM Serial Number④</th>
<th>AFM Label⑤</th>
<th>Product Dispense(s)⑥</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Blend</td>
<td></td>
<td></td>
<td>AFM FP____</td>
<td>1st 2nd 3rd 4th</td>
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<tr>
<td>2</td>
<td>Blend</td>
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<td>AFM FP____</td>
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<td>3</td>
<td>Blend</td>
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<td>AFM FP____</td>
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<td>4</td>
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<td>AFM FP____</td>
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<tr>
<td>16</td>
<td>Blend</td>
<td></td>
<td></td>
<td>AFM FP____</td>
<td></td>
</tr>
</tbody>
</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 always Blend for single-hose dispensers.
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 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

<table>
<thead>
<tr>
<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>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td></td>
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<thead>
<tr>
<th>Product Dispense(s)</th>
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<tbody>
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<td>1st</td>
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## Multi-Hose Fueling Position Dispensers

<table>
<thead>
<tr>
<th>Hose ID¹</th>
<th>FP²</th>
<th>Hose Label³</th>
<th>AFM Serial Number⁴</th>
<th>AFM Label⁵</th>
<th>Product Dispense⁶</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>
<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>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AFM FP__ &amp;__</td>
</tr>
<tr>
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<td>AFM FP__ &amp;__</td>
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<td>AFM FP__ &amp;__</td>
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<td>AFM FP__ &amp;__</td>
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<td></td>
<td></td>
<td></td>
<td>AFM FP__ &amp;__</td>
</tr>
</tbody>
</table>

---

A-5
Appendix A: Site EVR/ISD Equipment Location Worksheet

Multi-Hose Fueling Position Dispensers

<table>
<thead>
<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>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AFM FP&lt;sub&gt;6&lt;/sub&gt;&amp;&lt;sub&gt;7&lt;/sub&gt;</td>
<td></td>
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<tr>
<td></td>
<td></td>
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<td></td>
<td>AFM FP&lt;sub&gt;6&lt;/sub&gt;&amp;&lt;sub&gt;7&lt;/sub&gt;</td>
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<td>AFM FP&lt;sub&gt;6&lt;/sub&gt;&amp;&lt;sub&gt;7&lt;/sub&gt;</td>
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<td></td>
<td></td>
<td>AFM FP&lt;sub&gt;6&lt;/sub&gt;&amp;&lt;sub&gt;7&lt;/sub&gt;</td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup>Hose ID: Identifier for the hose
<sup>2</sup>FP: Fuel Position
<sup>3</sup>Hose Label: Label of the hose
<sup>4</sup>AFM Serial Number: Serial number of the AFM
<sup>5</sup>AFM Label: Label of the AFM
<sup>6</sup>Product Dispense: Dispense product

Note: Cells with grey background indicate empty or unspecified data.
<table>
<thead>
<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>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
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<td></td>
<td>AFM FP __ &amp; __</td>
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<td>AFM FP __ &amp; __</td>
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</tr>
<tr>
<td>Hose ID&lt;sup&gt;1&lt;/sup&gt;</td>
<td>FP&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Hose Label&lt;sup&gt;3&lt;/sup&gt;</td>
<td>AFM Serial Number&lt;sup&gt;4&lt;/sup&gt;</td>
<td>AFM Label&lt;sup&gt;5&lt;/sup&gt;</td>
<td>Product Dispense&lt;sup&gt;6&lt;/sup&gt;</td>
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</tbody>
</table>

AFM FP__ &__

AFM FP__ &__

AFM FP__ &__
# Data Form for Vapor Pressure Sensor UST Pressure Test

<table>
<thead>
<tr>
<th>DATE OF TEST</th>
<th>______________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>SERVICE COMPANY NAME</td>
<td>SERVICE COMPANY’S TELEPHONE</td>
</tr>
<tr>
<td>SERVICE TECHNICIAN</td>
<td>HEALY or VEEDER-ROOT TECH CERTIFICATION # (as applicable)</td>
</tr>
<tr>
<td></td>
<td>ICC or DISTRICT TRAINING CERTIFICATION (as applicable)</td>
</tr>
<tr>
<td>STATION NAME</td>
<td>DISTRICT PERMIT #</td>
</tr>
<tr>
<td>STATION ADDRESS</td>
<td>CITY</td>
</tr>
</tbody>
</table>

| PRESSURE SENSOR LOCATION: DISPENSER FUELING POINT (FP) NUMBERS | FP # | PRESSURE SENSOR SERIAL NUMBER: | ______________________________ |
|-------------------------------------------------------------|------|---------------------------------|

<table>
<thead>
<tr>
<th>STEP 3</th>
<th>DIGITAL MANOMETER VALUE ___________________________ inches WC</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>STEP 3</th>
<th>TLS 350 SENSOR VALUE ___________________________ inches WC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(OBTAIN VALUE USING TLS CONSOLE KEYPAD SEQUENCE SHOWN IN FIG. 4-4, STEP 7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STEP 4</th>
<th>TLS 350 Sensor Value within ±0.2 inches WC of Digital Manometer Value?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes ☐ No ☐</td>
</tr>
<tr>
<td>IF NO: THE PRESSURE SENSOR IS NOT IN COMPLIANCE WITH THE PRESSURE SENSOR REQUIREMENTS.</td>
<td></td>
</tr>
</tbody>
</table>

| STEP 5 | MODE KEY PRESSED TO EXIT CALIBRATE SMART SENSOR MENU? | ☐ |
## Form 2
### Data Form for Vapor Pressure Sensor Ambient Reference Test

<table>
<thead>
<tr>
<th>STEP</th>
<th>ACTION</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pressure sensor location: dispenser fueling point (FP) numbers</td>
<td>FP #</td>
<td>Pressure sensor serial number:</td>
</tr>
<tr>
<td>2</td>
<td>Reference port cap removed?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Valve set to ambient reference port (per Fig. 4-3)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Non-calibrated sensor value</td>
<td>Inches WC</td>
<td></td>
</tr>
<tr>
<td>(obtain value using TLS console keypad sequence shown in Fig. 4-4, Step 7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Pressure between +0.20 &amp; -0.20?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>If no: the pressure sensor is not in compliance with the pressure sensor requirements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Reference port cap replaced?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Valve set to normal valve position (per Fig 4-3)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Mode key pressed to exit calibrate smart sensor menu?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Operability Test Procedure Data Worksheet

**Veeder-Root In-Station Diagnostics (ISD)**  
**Balance Vapor Flow Meter Operability Test Procedure**

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

<table>
<thead>
<tr>
<th>Service Technician</th>
<th>Veeder-Root Tech Certification #</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Station Name</th>
<th>District Permit #</th>
</tr>
</thead>
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<table>
<thead>
<tr>
<th>Station Address</th>
<th>City</th>
<th>State Zip</th>
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<table>
<thead>
<tr>
<th>ISD Flow Meter Total</th>
<th>Gas Flow Meter Total</th>
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<tbody>
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<td>4.13</td>
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<td>4.15</td>
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<td>4.13</td>
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<td>4.15</td>
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<table>
<thead>
<tr>
<th>Meter SN</th>
<th>Fueling Pos</th>
<th>Start</th>
<th>Stop</th>
<th>Difference Gal (Stop – Start)</th>
<th>Start</th>
<th>Stop</th>
<th>Difference Cubic Feet (Stop – Start)</th>
<th>Cubic feet To gallons</th>
<th>% Diff</th>
<th>Pass</th>
<th>Fail</th>
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</table>

1 Gallons = CubicFeet × 7.481  
2% Diff = \( \frac{ISDDiffGal - GasFlowMet \ erDiffGal}{GasFlowMet \ erDiffGal} \) × 100
# 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>
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</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Station Address</th>
<th>City</th>
<th>St</th>
<th>Ate</th>
<th>Zip</th>
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<tbody>
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</tbody>
</table>

## Steps

### 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)

- [ ]