

In-Station Diagnostics (ISD) Pressure Management Control (PMC)

TLS-450PLUS Consoles

Troubleshooting Guide



Notice

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

VEEDER-ROOT SHALL NOT BE LIABLE FOR ERRORS CONTAINED HEREIN OR FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THE FURNISHING, PERFORMANCE, OR USE OF THIS PUBLICATION.

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

This publication contains proprietary information which is protected by copyright. All rights reserved. No part of this publication may be photocopied, modified or translated to another language without the prior written consent of Veeder-Root. Contact TLS Systems Technical Support for additional troubleshooting information at 800-323-1799.

DAMAGE CLAIMS / LOST EQUIPMENT

Thoroughly examine all components and units as soon as they are received. If any cartons are damaged or missing, write a complete and detailed description of the damage or shortage on the face of the freight bill. The carrier's agent must verify the inspection and sign the description. Refuse only the damaged product, not the entire shipment.

Veeder-Root must be notified of any damages and/or shortages within 30 days of receipt of the shipment, as stated in our Terms and Conditions.

VEEDER-ROOT'S PREFERRED CARRIER

1. Contact Veeder-Root Customer Service at 800-873-3313 with the specific part numbers and quantities that were missing or received damaged.
2. Fax signed Bill of Lading (BOL) to Veeder-Root Customer Service at 800-234-5350.
3. Veeder-Root will file the claim with the carrier and replace the damaged/missing product at no charge to the customer. Customer Service will work with production facility to have the replacement product shipped as soon as possible.

CUSTOMER'S PREFERRED CARRIER

1. It is the customer's responsibility to file a claim with their carrier.
2. Customer may submit a replacement purchase order. Customer is responsible for all charges and freight associated with replacement order. Customer Service will work with production facility to have the replacement product shipped as soon as possible.
3. If "lost" equipment is delivered at a later date and is not needed, Veeder-Root will allow a Return to Stock without a restocking fee.
4. Veeder-Root will NOT be responsible for any compensation when a customer chooses their own carrier.

RETURN SHIPPING

For the parts return procedure, please follow the appropriate instructions in the "General Returned Goods Policy" pages in the "Policies and Literature" section of the Veeder-Root **North American Environmental Products** price list. Veeder-Root will not accept any return product without a Return Goods Authorization (RGA) number clearly printed on the outside of the package.

FCC INFORMATION

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

INSTALLATION IN THE STATE OF CALIFORNIA

Please refer to the California Air Resources Board Vapor Recover Certification Phase II EVR Executive Order web site (www.arb.ca.gov/vapor/eo-evrphaseII.htm) for the latest manual revisions pertaining to VR 204 (VST Phase II EVR System Including ISD System).

Warranty

This warranty applies only when the product is installed in accordance with Veeder-Root's specifications by Veeder-Root certified installers. 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. Veeder-Root is not liable for incidental, consequential, or indirect damages or loss, including, without limitation, personal injury, death, property damage, environmental damages, cost of labor, clean-up, downtime, installation and removal, product damages, loss of product, or loss of revenue or profits. This warranty applies to the initial purchaser and any subsequent purchaser for the duration of the warranty period. **THE WARRANTY CONTAINED HEREIN IS EXCLUSIVE AND THERE ARE NO OTHER EXPRESS, IMPLIED, OR STATUTORY WARRANTIES. WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.**

TLS-450PLUS MONITORING SYSTEM

We warrant that this product shall be free from defects in material and workmanship and is compliant with all applicable performance standards and specifications for which it has been certified, for a period of one (1) year from the date of installation when proof of date of installation is provided or twenty-four (24) months from the date of manufacture when proof of date of installation is not provided. During the warranty period, we 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 and at no charge to the purchaser. **LAMPS, FUSES, AND LITHIUM BATTERIES ARE NOT COVERED UNDER THIS WARRANTY.**

If "Warranty" is purchased as part of the Fuel Management Service, Veeder-Root will maintain the equipment for the life of the contract in accordance with the written warranty provided with the equipment. A Veeder-Root Fuel Management Services Contractor shall have free site access during Customer's regular working hours to work on the equipment. Veeder-Root has no obligation to monitor federal, state or local laws, or modify the equipment based on developments or changes in such laws.

MODULES, KITS, OTHER COMPONENTS (PARTS PURCHASED SEPARATE OF A COMPLETE CONSOLE)

We warrant that this product shall be free from defects in material and workmanship and is compliant with all applicable performance standards and specifications for which it has been certified, for a period of one (1) year from the date of installation when proof of the date of installation is provided or fifteen (15) months from the date of manufacture when proof of date of installation is not provided. We warrant that the lithium batteries (excluding EVR BATTERY PACK) shall be free from defects in material and workmanship for a period of three (3) months from date of invoice. We will repair or replace the product if the product is returned to us; transportation prepaid by user, within the warranty period, and is determined by us to be defective. **LAMPS AND FUSES ARE NOT COVERED UNDER THIS WARRANTY.**

IN STATION DIAGNOSTICS (ISD)

For components used in ISD systems (Vapor Flow Sensor, Vapor Pressure Sensor, Software, TLS RF, Wireless Repeater, Wireless Transmitter & Wireless Receiver), excluding **LAMPS, FUSES, AND LITHIUM BATTERIES**, the following warranty applies:

We warrant that this product shall be free from defects in material and workmanship and is compliant with all applicable performance standards and specifications for which it has been certified, for a period of one (1) year from the date of ISD start-up when proof of the date of install is provided or twenty-four (24) months from the date of manufacture when proof of date of installation is not provided. 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 and is compliant with all applicable performance standards and specifications for which it has been certified, for a period of one (1) year from the date of installation when proof of the date of install is provided or fifteen (15) months from date of manufacture when proof of date of installation is not provided. We will repair or replace the product if the product is returned to us; transportation prepaid by user, within the warranty period, and is determined by us to be defective.

EVR BATTERY PACK

We warrant that this product shall be free from defects in material and workmanship and is compliant with all applicable performance standards and specifications for which it has been certified, for a period of one (1) year from the date of installation when proof of the date of install is provided or fifteen (15) months from the date of manufacture when proof of date of installation is not provided. **The replacement EVR Battery Pack warranty period will be the REMAINING warranty period of the original EVR Battery Pack. LAMPS, FUSES, AND LITHIUM BATTERIES OTHER THAN THE EVR BATTERY PACK, ARE NOT COVERED UNDER THIS WARRANTY.**

Introduction

Contractor Certification Requirements	1
Related Manuals	1
Safety Warnings	2

ISD Post-Installation Checklist

ISD with Healy Assist System Checklist	4
ISD with VST Balance System/V-R Vapor Polisher Checklist	5
Question	5
Explanation	5
ISD ShutDown Requirements	6

ISD Alarm Message Diagnostics

ALARM MESSAGES	7
Warnings	7
Failures	7
Restarting Station After ISD Shutdown Alarms	7
ISD VAPOR LEAK WARN/FAIL	8
ISD Vapor Leakage	8
ISD Monitoring Category	8
Diagnostic Procedure	8
Common Causes	8
ISD GROSS PRES WARN/FAIL	9
ISD Gross Pressure	9
ISD Monitoring Category	9
Common Causes	9
Field Notes	9
ISD DEGRD PRES WARN/FAIL	10
ISD Degradation Pressure	10
ISD Monitoring Category	10
Diagnostic Procedure	10
Common Causes	10
Field Notes	10
hnn: GROSS COLLECT WARN/FAIL	11
Gross Collect	11
ISD Monitoring Category	11
Diagnostic Procedure	11
Common Causes	11
Field Notes	11
hnn: DEGRD COLLECT WARN/FAIL	12
Degradation Collect	12
ISD Monitoring Category	12
Diagnostic Procedure	12
Field Notes	12
hnn: FLOW COLLECT WARN/FAIL	13
Flow Collect	13
ISD Monitoring Category	13
Diagnostic Procedure	13
Field Notes	13
ISD VP STATUS WARN/FAIL	14
ISD Vapor Processor Status	14
ISD Monitoring Category	14
Diagnostic Procedure	14
Common Causes	14
ISD VP PRES WARN/FAIL	15

ISD Vapor Pressure.....	15
ISD Monitoring Category	15
Diagnostic Procedure (Hirt and Arid).....	15
ISD SENSOR OUT WARN/FAIL	16
ISD Sensor Out	16
ISD Monitoring Category	16
Diagnostic Procedure	16
Common Causes.....	16
ISD SETUP WARN/FAIL	17
ISD Setup	17
ISD Monitoring Category	17
Diagnostic Procedure	17
Common Causes.....	17
MISSING RELAY SETUP	18
Missing Relay Setup.....	18
ISD Monitoring Category	18
Diagnostic Procedure	18
Understanding TLS-450PLUS ISD Shutdown Requirements Setup for selected Pump Modes.....	18
MISSING TANK SETUP	26
Missing Tank Setup.....	26
ISD Monitoring Category	26
Diagnostic Procedure	26
MISSING HOSE SETUP	27
Missing Hose Setup.....	27
ISD Monitoring Category	27
Diagnostic Procedure	27
MISSING VAPOR FLOW MTR	28
Missing Vapor Flow Meter	28
ISD Monitoring Category	28
Diagnostic Procedure	28
WEB/GUI Procedure	28
MISSING VAPOR PRES SEN	29
Missing Vapor Pressure Sensor.....	29
ISD Monitoring Category	29
Diagnostic Procedure	29
WEB/GUI Procedure	29
fnn: CHK VAPOR FLOW MTR	30
Check Vapor Flow Meter	30
ISD Monitoring Category	30
hnn: VAPOR FLOW MTR SETUP	31
Vapor Flow Meter Setup.....	31
ISD Monitoring Category	31
Diagnostic Procedure	31

PMC Alarm Message Diagnostics

PMC SETUP FAIL	32
PMC Setup	32
ISD Monitoring Category	32
WEB/GUI Veeder-Root Vapor Polisher Diagnostic Procedure.....	32
PMC Sensor Fault	33
MISSING VP INPUT	35
Missing Vapor Processor Input.....	35
ISD Monitoring Category	35
Diagnostic Procedure	35

VP EMISSIONS	36
Vapor Processor Emissions	36
ISD Monitoring Category	36
Diagnostic Procedure	36
VP PRESSURE	37
Vapor Processor Pressure	37
ISD Monitoring Category	37
Diagnostic Procedure	37
Exhibit 11 Failures	38
Pressure Integrity test.....	38
Flow Test.....	38
Thermometer Test.....	38
Exhibit 12 Failures	38
Operation Alarms	39
Alarm Messages.....	39
Restarting Station After ISD Shutdown Alarms	39
Alarm Logs	40
Alarm Sequence	40
ISD Alarm Summary	41
Other Alarms	42
PMC Alarm Summary	43
PMC Setup Fail	44
PMC Sensor Faults	44

Miscellaneous Maintenance

Repairing Collection Vapor Recovery Equipment	46
All Systems (Healy)	46
Assist Systems (Healy).....	46
Balance Systems.....	46
Removing & Replacing Air Flow Meters	46

ISD/PMC Diagnostic Menus

Air Flow Meter Overview	47
General Column Descriptions.....	47
Constants Column Descriptions	47
Communication Column Descriptions	48
Channel Report Description	48
Atmospheric Sensor Overview	49
General Column Descriptions.....	49
Constants Column Descriptions	49
Communication Column Descriptions	49
Channel Report Description	49
Vapor Pressure Sensor Overview	50
General Column Descriptions.....	50
Constants Column Descriptions	51
Communication Column Descriptions	51
Channel Report Description	51
Diagnostics> Vapor Pressure Sensor> Calibrate	52
Selection Criteria	52
Field Descriptions.....	52
Calibrating the Vapor Pressure Sensor	53
Calibrating the Vapor Pressure Sensor with a Calibrated Test Device	54
Clearing the Calibration	54
Screen Printout: Vapor Pressure Sensor Calibration History	55
Field Descriptions.....	55

Vapor Valve Overview	56
General Column Descriptions.....	56
Constants Column Descriptions	57
Communication Column Descriptions	57
Channel Report Description	57
Hose Events	58
Hose Events Status Messages.....	58
Hose Histogram.....	61
Selection Criteria	61
Hose Histogram Status Messages	61
Diagnostics>Vapor Monitor>Pressure Graphs	62
Chart Description.....	62
Diagnostics>PMC>Status	63
Automatic Mode.....	64
Manual Mode.....	64
Switching Between Vapor Processor Modes.....	64
General Column Descriptions.....	64
PMC (Non-ISD) Status Report	65
Clear Test After Repair - ISD	66
Selection Criteria	66
Field Descriptions.....	67
Clear Test After Repair – PMC (NON-ISD)	68
Field Descriptions.....	68
Reports	69
Comm Modules	71
Comm Modules	71
Comm Module Slots	71
Comm Module Port Configurations	72
Viewing ISD Reports via RS-232 Connection	75
Connecting Laptop to TLS-450PLUS	75
Setting up The TLS-450PLUS Serial Port For ISD Regulator Access.....	76
Setting Up Communication Between Laptop And TLS-450PLUS	78
Sending Console Commands.....	79
Troubleshooting Commands for Technical Support	81
ISD Collection Issues	81
ISD Containment Issues.....	81
ISD with Vapor Processor	82
PMC (Non-ISD)	82
Reports FAQ	84
Daily Detail Report.....	84
Reports> ISD> Daily Detail Status Codes	85
Collection Report FP Ordering	88
Containment Degradation Results.....	89
ISD Status Missing Text	89
Missing All Reports for One Day	89
High A/L on All Nozzles	91
Diagnosing CVLD Reports	92
High A/L on All Nozzles.....	94
Diagnosing CVLD Reports	94

Figures

Figure 1.	Example Clear Test After Repair Screen	7
Figure 2.	Example: PUMP MODE = TLS Pump Control; No Dispenser Relays.....	20
Figure 3.	Example of Device Task: Assist EVR: PUMP MODE = TLS Pump Control; No Dispenser Relays	20
Figure 4.	Example of Device Task: Assist EVR: PUMP MODE= TLS Pump Control; with dispenser relays.	21
Figure 5.	Example: Assist EVR; Mode = TLS Pump Sense; No Dispenser Relays	23
Figure 6.	Example of Device Tasks: Assist EVR Mode = TLS Pump Sense; No Dispenser Relays	23
Figure 7.	Example: Assist EVR; Mode = External Pump Control; No Dispenser Relays	25
Figure 8.	Example of Device Tasks: Assist EVR Mode = External Pump Control; No Dispenser Relays	25
Figure 9.	Clear Test After Repair Screen	39
Figure 10.	Monthly Report Warning & Failure Log Example	40
Figure 11.	Example Vapor Pressure Sensor Calibration Screen - Calibration Displayed	53
Figure 12.	Example Vapor Pressure Sensor Calibration Screen - Calibration Accepted	54
Figure 13.	Example VPS Calibration History Printout	55
Figure 14.	Clearing Vapor Collection Test By Hose	59
Figure 15.	Vapor Monitor Hose Events Screen	59
Figure 16.	Clearing Vapor Collection Test By Hose	60
Figure 17.	Vapor Collection Hose Events Screen	60
Figure 18.	WEB - Vapor Collection Hose Events Screen	60
Figure 19.	Example Hose Histogram Screen - Web Only	61
Figure 20.	Example Vapor Monitor Pressure Graphs Screen - Web Only	62
Figure 21.	Accessing PMC Status Diagnostic Screen	63
Figure 22.	PMC Status Diagnostic Screen (Scroll Down to View Additional Fields)	63
Figure 23.	Accessing PMC Report	65
Figure 24.	PMC Status Report Example	65
Figure 25.	Clear Test After Repair Screen - Example with ISD	66
Figure 26.	Clear Test After Repair Screen - Example PMC w/o ISD	68
Figure 27.	Accessing ISD Reports	69
Figure 28.	TLS-450PLUS Console - Selectable Comm Modules	71
Figure 29.	TLS-450PLUS Console - Fixed Comm Modules	72
Figure 30.	TLS-450PLUS RS-232 DB9 Connector Pin Outs	72
Figure 31.	Example Tri-Comm Module Installation in Slot 1	73
Figure 32.	Tri-Comm Module Ports/Jumpers	74
Figure 33.	Connecting Laptop to TLS-450PLUS for Serial Communication	75
Figure 34.	Connect Laptop to an Available RS-232 Comm Port	76
Figure 35.	Example Serial Port Setup Screen	76
Figure 36.	Example Serial Port 3 Setup Screen	77
Figure 37.	Laptop Device Manager	78
Figure 38.	PuTTY Terminal Window	79

Tables

Table 1:	ISD Shutdown Alarms	6
Table 2.	PMC Device Fault Summary	33
Table 3.	ISD Alarm Summary	41
Table 4:	Other Alarms	42
Table 5.	Wireless Related Sensor Alarms	43

Table 6.	TLS-450PLUS (PMC) Alarm Troubleshooting Summary	43
Table 7:	PMC Setup Fail Diagnostic Procedure	44
Table 8.	PMC Device Fault Summary	44
Table 9.	Communication Bay Modules	71
Table 10.	Configurable (C)/Non-Configurable (NC) Ports for Selectable Comm Modules (Comm Bay Slots 1 - 3 Only)	72
Table 11.	Tri-Comm Module Port Configuration	74
Table 12:	Serial Commands for ISD Alarm, Monthly, and Daily Reports	80

Introduction

This manual contains suggested troubleshooting procedures for Veeder-Root In-Station Diagnostics (ISD)/ Pressure Management Control (PMC). This is not intended to replace required testing procedures required by any California Air Resource Board Executive Orders, or any local regulations. This manual's objective is to be a guide to show what "tools" are available to assist in troubleshooting possible issues pertaining to ISD/PMC. Further assistance can be obtained by contacting Veeder-Root Technical Support.

Contractor Certification Requirements

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

Service Technician Certification (Previously known as Level 2/3): Contractors holding valid Technician Certifications are approved to perform installation checkout, startup, programming and operations training, system tests, troubleshooting and servicing for all Veeder-Root Series Tank Monitoring Systems, including Line Leak Detection. This certification includes TLS-3xx and TLS4xx certification training.

In-Station Diagnostics (ISD-PMC) Technician Certification: ISD PMC Contractors holding a valid ISD/PMC Certification are approved to perform (ISD/PMC) installation checkout, startup, programming, and operations training. This training also includes troubleshooting and service techniques for the Veeder-Root In-Station Diagnostics system. A current Veeder-Root Technician Certification is a prerequisite for the ISD/PMC course.

All service personal on site must comply with all recommended safety practices identified by OSHA and your employer.

Review and comply with all the safety warnings in this and any related documents, and any other Federal, State or Local requirements.

Warranty Registrations may only be submitted by selected Distributors.






Related Manuals

577013-796	Vapor Flow Meter Installation Manual
577013-797	Pressure Sensor Installation Manual
577013-401	TLS Consoles Point-of-Sale (POS) Application Guide
577014-073	TLS-450PLUS Site Prep and Installation Manual
577014-033	TLS-XB Site Prep and Installation Manual
577014-461	In-Station Diagnostics Install, Setup & Operation For TLS-450PLUS Manual
577014-460	Pressure Management Control TLS-450PLUS Consoles for VR Polisher Install, Setup & Operation Manual
577014-484	In-Station Diagnostics (ISD) TLS-450PLUS Consoles for VR Polisher and Healy CAS Install, Setup & Operation Manual
577014-075	TLS450PLUS Troubleshooting Guide
577014-110	TLS-450PLUS/TLS4 Operator's Manual
577013-950	Veeder - Root Serial Interface Manual for TLS4 Series TLS-450 Series TLS-450Plus Series

Safety Warnings

⚠ WARNING **FAILURE TO COMPLY WITH THE FOLLOWING WARNINGS AND SAFETY PRECAUTIONS COULD CAUSE DAMAGE TO PROPERTY, ENVIRONMENT, RESULTING IN SERIOUS INJURY OR DEATH.**

The following safety symbols are used throughout this manual to alert you to important safety hazards and precautions.

	EXPLOSIVE Fuels and their vapors are extremely explosive if ignited.		FLAMMABLE Fuels and their vapors are extremely flammable.
	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.
⚠ WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.	NOTICE	NOTICE is used to address practices not related to physical injury.
	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.		

ISD Post-Installation Checklist

Refer to Post Installation Checklist to review installation. If you should experience Low Or No A/L Ratio during the Operability test, additional information on those results is discussed after the checklist.

DATE _____	
SERVICE COMPANY NAME	TELEPHONE
SERVICE TECHNICIAN	VEEDER-ROOT TECH CERTIFICATION #
_____	_____
TRAINING LEVEL (CIRCLE ONE): Serv. Tech. or ISD Tech.	ISD TRAINED? <input type="checkbox"/>
STATION NAME	
STATION ADDRESS	CITY STATE ZIP
<p>WARNING!</p> <p>Before installing any vapor recovery equipment the installer must be familiar with all state and federal regulations regarding the safe installation and operation of each component. (NFPA 30A).</p> <p>A Certified Veeder-Root contractor or Authorized Service Contractor (ASC) with Veeder-Root In-Station Diagnostics training must be available (on-site) to over-see this post-installation checklist.</p> <p>Review and comply with all the safety warnings in the installation manuals and any other national, State or Local requirements.</p> <p>For a complete list of precautions, please consult the Veeder-Root ISD manuals.</p>	
<p>Required Reference Manuals</p> <p>In-Station Diagnostic Install, Setup and Operation, Manual No. 577014-484 <input type="checkbox"/></p> <p>Pressure Management Control Install, Setup, & Operation Manual 577014-460 <input type="checkbox"/></p> <p>In-Station Diagnostics (ISD) Install, Setup, & Operation Manual 577014-484 <input type="checkbox"/></p> <p>TLS-450PLUS Console Site Prep and Installation Manual 577014-073 <input type="checkbox"/></p> <p>TLS-450PLUS/TLS4 Operator's Manual 577014-110 <input type="checkbox"/></p>	
<p>Laptop Recommended</p> <p>Laptop connection to console will allow ASC to access Pressure Graphs, Hose Histograms, etc. using the Veeder-Root WEB access.</p>	

ISD with Healy Assist System Checklist

Procedure The following recommended procedure can be followed at TLS GUI upon completion of the ISD software setup:	
STEP 1.	EVR TYPE is set to VACUUM ASSIST? - Check in Setup> Vapor Collection> General screen <input type="checkbox"/>
STEP 2.	VACUUM ASSIST TYPE is set to HEALY VAC? - Check in Setup> Vapor Collection> General screen <input type="checkbox"/>
STEP 3.	NOZZLE A/L RANGE MAX is set to 1.15 and MIN is set to 0.95? - Check in Setup> Vapor Collection> General screen <input type="checkbox"/>
STEP 4.	VAPOR PROCESSOR TYPE is set to NONE - Check in Setup> Vapor Management> Processor screen <input type="checkbox"/>
Step 5	Is there an Enabled Vapor Pressure Sensor to be used for PMC? Check in Setup> Devices> Pressure Sensor screen first. <input type="checkbox"/>
STEP 6.	There is an installed and ENABLED "AIRFLOW METER" (i.e. ISD Vapor Flow Meter) in each vapor recovery dispenser? - Check in Setup> Devices> Air Flow Meter screen <input type="checkbox"/>
STEP 7.	Is the Vapor Pressure Sensor in Step 5, assigned to be used for vapor management? Check in Setup> Vapor General> General screen. <input type="checkbox"/>
STEP 8.	There is a Hose configured and Enabled for each vapor recovery hose? - Check in Setup> Vapor Collection> Hose Settings screen <input type="checkbox"/>
STEP 9.	Each vapor recovery gasoline hose is assigned and mapped correctly in the Hose Mapping screen: Setup> Vapor Collection> Hose Mapping . <input type="checkbox"/>
STEP 10	Are all the required shutdown alarms assigned via Setup> Automatic Events> Device Tasks ? Use Online Help if assistance is needed. <input type="checkbox"/>
STEP 11.	Enter into setup and then exit out (this will cause a TLS console System Self Test). <input type="checkbox"/>
STEP 12.	Using Online Help and the Troubleshooting Guide, respond to all ISD Setup ALARMS posted on the console. <input type="checkbox"/>
STEP 13.	Repeat Steps 10 & 11 until there are no ISD setup or self-test alarms. The TLS Console display reads SYSTEM STATUS . <input type="checkbox"/>
STEP 14.	Turn the ISD Vapor Pressure Sensor valve so that the sensor is reading ambient pressure. Navigate to Menu> Diagnostics> Vapor Pressure Sensor> Calibrate . If the ambient pressure reading offset is greater than +/- 0.20 IWC call Veeder-Root Technical Support for assistance. Do not calibrate at this time. <input type="checkbox"/>
STEP 15.	Returned the ISD Vapor Pressure Sensor calibration valve so that the sensor is reading UST vapor pressure? - Check in Diagnostics> Vapor Pressure Sensor> Calibrate screen and verify that UST vapor pressure is now being read. <input type="checkbox"/>
STEP 16.	After dispensing via GUI: Diagnostics> Vapor Monitor> Hose Events : or WEB: Diagnostics> Vapor Monitor> Hose Diagnostics> Hose Events : An ISD A/L reading is coming in for each gasoline hose at the location? <input type="checkbox"/>
STEP 17.	The TLS console clock is set to the correct date, time and to U.S. Pacific Time Zone? <input type="checkbox"/>

ISD with VST Balance System/V-R Vapor Polisher Checklist

Procedure The following recommended procedure can be followed at the completion of the ISD software setup for VST Balance Systems with Veeder-Root Vapor Polisher:		
STEP 1.	EVR TYPE is set to BALANCE? - Check in Setup> Vapor Collection> General screen	<input type="checkbox"/>
STEP 2.	The Balance Nozzle Type is VST? - Check in Setup> Vapor Collection> General screen	<input type="checkbox"/>
STEP 3.	The Vapor Processor set to Veeder-Root Polisher? - Check in Setup> Vapor Management> Processor screen	<input type="checkbox"/>
Step 4.	Verify in Setup> Vapor Management> Processor that the Vapor Valve field shows the assigned Vapor Valve. If not, go to Setup> Devices> Vapor Valve configure and enable the installed Vapor Valve.	<input type="checkbox"/>
STEP 5.	There is an installed and enabled "AIRFLOW METER" (i.e. ISD Vapor Flow Meter) in each vapor recovery dispenser? - Check in Setup> Devices> Air Flow Meter screen.	<input type="checkbox"/>
STEP 6.	Is there an enabled Vapor Pressure Sensor assigned for PMC? Check in Setup> Vapor General> General screen. If not, check in Setup> Devices> Vapor Pressure Sensor .	<input type="checkbox"/>
STEP 7.	There is a Hose configured and Enabled for each vapor recovery hose? - Check in Setup> Vapor Collection> Hose Settings screen	<input type="checkbox"/>
STEP 8.	Each vapor recovery hose is assigned and mapped correctly in the Hose Mapping screen": Setup> Vapor Collection> Hose Mapping .	<input type="checkbox"/>
STEP 9.	Enter into setup and then exit out (this will cause a TLS console System Self Test).	<input type="checkbox"/>
STEP 10.	Using Online Help and the Troubleshooting Guide, respond to all ISD Setup ALARMS posted on the console.	<input type="checkbox"/>
STEP 11.	Repeat Steps 10 & 11 until there are no ISD setup or self-test alarms. The TLS Console display reads SYSTEM STATUS .	<input type="checkbox"/>
STEP 12.	Turn the ISD Vapor Pressure Sensor valve so that the sensor is reading ambient pressure. Navigate to Menu> Diagnostics> Vapor Pressure Sensor> Calibrate . If the ambient pressure reading offset is greater than +/- 0.20 IWC call Veeder-Root Technical Support for assistance. Do not calibrate at this time.	<input type="checkbox"/>
STEP 13.	Returned the ISD Vapor Pressure Sensor calibration valve so that the sensor is reading offset is UST vapor pressure? - Check in Diagnostics> Vapor Pressure Sensor> Calibrate screen and verify that UST vapor pressure is now being read.	<input type="checkbox"/>
STEP 14.	After dispensing via GUI: Diagnostics> Vapor Monitor> Hose Events : or WEB: Diagnostics> Vapor Monitor> Hose Diagnostics> Hose Events : An ISD A/L reading is coming in for each gasoline hose at the location?	<input type="checkbox"/>
STEP 15.	The TLS console clock is set to the correct date, time and to U.S. Pacific Time Zone?	<input type="checkbox"/>

QUESTION

Why are the A/L extremely low or non existent when running tests via **Diagnostics>Vapor Monitor>Hose Events** immediately after installation?

EXPLANATION

1. Refer to Post Installation Checklist (on page 3) to review installation.
2. If the A/L are non-existent or extremely low (50%) for all nozzles during the Operability Test - it indicates an air flow meter problem.
 - a. If using the BirProtocolDim protocol make sure "Units Reported is set to "US":
Setup>Communications>Serial Port.

- b. Healy Vacuum pump V/L needs to be set.
- c. Check the ball valve between the Healy pump and air flow meter is not closed or partially closed.
- d. Check that the installed meter does not still have the dust caps on. This will significantly reduce airflow for both all nozzles on the dispenser.

See fnn: CHK VAPOR FLOW MTR troubleshooting procedures (on page 30).

ISD ShutDown Requirements

For ISD on the TLS450PLUS, the gasoline lines must be able to be shutdown for required ISD Site/Hose alarms. Dispenser relays may be used to shutdown gasoline dispensers for Hose alarms.

The TLS 450 setup requires at least one Line to shutdown for required ISD alarms, otherwise the 'Missing Relay' warning will post. Ensure that all gasoline Lines/Hoses are configured to shutdown on required ISD Site/Hose alarms. Hoses may also be shutdown using dispenser relays. ISD shutdown requirements is accomplished using Automatic Events Setup. Refer to Table 1 for required ISD Shutdown alarms.

Table 1: ISD Shutdown Alarms

Alarm	Days to Failure	Shutdown Required
ISD DEGRD PRES WARN	30	Optional
ISD DEGRD PRES FAIL	-	Yes
ISD GROSS PRES WARN	7	Optional
ISD GROSS PRES FAIL	-	Yes
ISD VAPOR LEAK WARN	7	Optional
ISD VAPOR LEAK FAIL	-	Yes
ISD SENSOR OUT WARN	7	Optional
ISD SENSOR OUT FAIL	-	Optional ¹
ISD SETUP WARN	7	Optional
ISD SETUP FAIL	-	Optional ¹
hnn: DEGRD COLLECT WARN	7	Optional
hnn: DEGRD COLLECT FAIL	-	Yes
hnn: GROSS COLLECT WARN	1	Optional
hnn: GROSS COLLECT FAIL	-	Yes
hnn: FLOW COLLECT WARN	1	Optional
hnn: FLOW COLLECT FAIL	-	Yes
ISD VP STATUS WARN	1	Optional
ISD VP STATUS FAIL ²	-	Yes
ISD VP PRES WARN	1	Optional
ISD VP PRES FAIL ²	-	Yes
Assist EVR Systems Only		
Balance EVR Systems Only		
Vapor Processor Required		
¹ Shutdown is optional for these alarm conditions and it is recommended that they be enabled.		
² Shutdown applies to HIRT and ARID Permeator.		

ISD Alarm Message Diagnostics

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.

ALARM MESSAGES

ISD monitoring tests operate once each day. Warning and failure conditions are posted at the designated posting time after the tests are complete.

WARNINGS

WARNINGS indicate when attention is required. When a WARNING is posted a warning alarm event is logged in the ISD reports, posted on the status bar of the GUI and printed to the printer if setup in Automatic Events. If the condition persists, a WARNING will remain active for a 1, 7 or 30 day warning period depending on the test type.

FAILURES

If a WARNING condition persists, a FAILURE alarm will be posted after the warning period and THE SITE DISPENSING EQUIPMENT IS SHUTDOWN (see RESTARTING STATION AFTER ISD SHUTDOWN for instructions on restarting dispensing). When a FAILURE is posted a failure alarm event is logged in the ISD reports, posted on the status bar of the GUI and printed to the printer if setup in Automatic Events.

RESTARTING STATION AFTER ISD SHUTDOWN ALARMS

NOTICE Consult state and local regulations prior to restarting equipment.

After one of the ISD Shutdown Alarms occurs press **Menu>Diagnostics>Vapor Monitor>Clear Test After Repair**, to display the screen below and press the **Override Shutdown** button, then touch the Confirm message to continue operation of the site after the alarm has posted (see Figure 1). If the site or dispenser(s) is not shutdown, this button is grayed out, otherwise touch it to override the shutdown and resume dispensing.

Dispensing resumes, the alarm light continues to flash, and any alarm messages display until the alarm has been cleared. A 'PUMPS MANUALLY RE-ENABLED' event is entered in the 'Shutdown & Misc Event Log'.

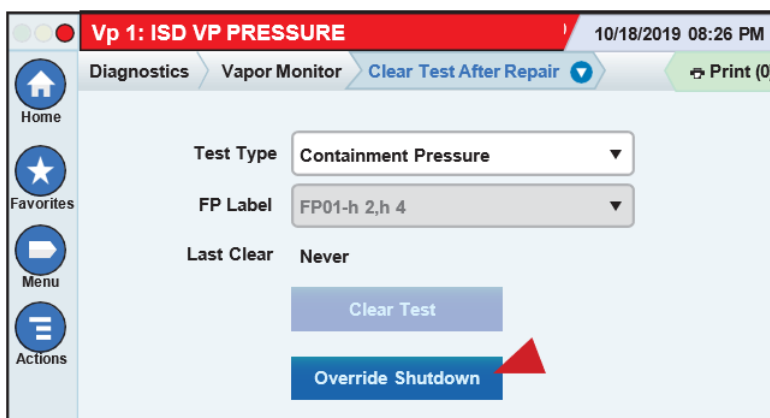


Figure 1. Example Clear Test After Repair Screen

ISD VAPOR LEAK WARN/FAIL

ISD VAPOR LEAKAGE

Vapor Leakage Detection test failure occurs when the vapor recovery containment system leaks at 2 times the allowable CARB standard defined in the TP-201.3. For a typical 12-hose site, that means it exceeds 8.5cfh (limit ranges over 8-10 cfh for <6 to >24 hoses).

ISD MONITORING CATEGORY

Vapor Containment Monitoring as implemented by over-pressurization and Vapor Leakage Detection tests, is responsible for ensuring that UST ullage pressure and system leak rate stay within regulatory boundaries. The Vapor Leakage Detection test will check all components for leaks including: P/V valves, dispenser piping, vacuum assist motors, nozzles, hoses, breakaways, vapor processor piping and elements as well as any other piping and fitting or component connected into the UST ullage space.

DIAGNOSTIC PROCEDURE

- Run a TP 201.3 test and use common field techniques for determining the source of the containment system leak.
- Fix all FLOW COLLECT alarms in a balance site first prior to diagnosing this alarm.

COMMON CAUSES

3. Phase I equipment, including but not limited to: dry breaks, spill buckets, tank inventory gauge caps, P/V valves, fill caps.
4. Phase II equipment, including but not limited to: breakaways, hoses, nozzles, whips, vacuum assist motors, solenoid valves, vapor shear valves.
5. Check drop tubes for leaks.
6. Tank(s) have the Thermal Coefficient incorrectly set.

Refer to the Clear Test Repair Menu (on page 66) for clearing this alarm on the TLS after repairs are complete.

ISD GROSS PRES WARN/FAIL

ISD GROSS PRESSURE

Gross over-pressure failure occurs when the 95th percentile of 7-days' ullage pressure data exceeds the gross over-pressure requirement. That means the pressure is greater than 1.3"wc for more than 1.2 hours a day on average or more than 8.4 hours for 7 days.

ISD MONITORING CATEGORY

Vapor Containment Monitoring as implemented by over-pressurization and Vapor Leakage Detection tests, is responsible for ensuring that UST ullage pressure and system leak rate stay within regulatory boundaries. The Vapor Leakage Detection test will check all components for leaks including: P/V valves, dispenser piping, vacuum assist motors, nozzles, hoses, breakaways, vapor processor piping and elements as well as any other piping and fitting or component connected into the UST ullage space.

COMMON CAUSES

1. Failure of pressure management control devices (e.g. check to make that the Healy Clean Air Separator is properly connected to UST's vapor space)
2. Failure of ORVR blocking Vapor Collection systems, including but not limited to: ORVR detecting assist nozzles
 - a. Check nozzle flow rates, change fuel filters on dispensers with low flow rates.
 - b. Check nozzle boots to make sure they are not torn
3. Faulty Phase I equipment leading to persistent over pressure conditions during bulk deliveries. (Refer maintenance personnel to EVR manufacturer troubleshooting guides for diagnostic procedures.)
4. Failure of ISD pressure sensor.

Refer to the Clear Test Repair Menu (on page 66) for clearing this alarm on the TLS after repairs are complete.

FIELD NOTES

1. Check that the EVR fittings are tight in the dispenser.
 - a. Loose fittings caused excessive leaks between the nozzle and vacuum pump which led to over collection, and the nozzle not identifying ORVR vehicles. These conditions lead to an overpressure condition.
 - b. If the nozzle hoods are broken or worn this can lead to an over pressure condition. It can also lead to Gross Collect alarms on nozzles that do not have a problem.
 - If the nozzle that triggered the alarm checks out OK, check the boots on the other nozzles at the site and repair the damaged ones. If the rubber boot on a nozzle is broken or worn, or the fuel filter is clogged lowering the fuel flow rate, it will cause the nozzle to not correctly identify ORVR vehicles. When there are several broken at the site, nozzles with good boots looked blocked to ISD and trigger this alarm.
 - This condition will also lead to ISD Gross Pressure warning also. When nozzles fail to identify ORVR vehicles because of the worn boot or clogged fuel filter, too much air is ingested into the underground tank which lead to an over pressure condition.
 - Clogged fuel filters will reduce fuel flow rate can contribute to overpressure conditions.
2. Some regulator tests can cause warning.

Check if a 2 inch pressure decay test on the day the ISD Gross Pressure alarm posted. If that is the case - the alarm will clear on its own in 7 days unless there is another contributing problem. We do not recommend using Clear Test Repair Menu to reset test data unless a repair has been documented.

ISD DEGRD PRES WARN/FAIL

ISD DEGRADATION PRESSURE

A degradation over-pressure failure occurs when the 75th percentile of 30-days' ullage pressure data exceeds the degradation over-pressure requirement. That means the pressure is greater than 0.3"wc for more than 6 hrs a day on average or more than 7.5 days for 30 days.

ISD MONITORING CATEGORY

Vapor Containment Monitoring as implemented by over-pressurization and Vapor Leakage Detection tests, is responsible for ensuring that UST ullage pressure and system leak rate stay within regulatory boundaries. The Vapor Leakage Detection test will check all components for leaks including: P/V valves, dispenser piping, vacuum assist motors, nozzles, hoses, breakaways, vapor processor piping and elements as well as any other piping and fitting or component connected into the UST ullage space.

DIAGNOSTIC PROCEDURE

Perform an operability test on the pressure sensor to ensure the ISD system is not causing the fault. See ISD Setup & Operation Manual in Related Manuals.

COMMON CAUSES

- See ISD Gross Pressure (page 9)
- Refer to the Clear Test Repair Menu (on page 66) for clearing this alarm on the TLS after repairs are complete.

FIELD NOTES

1. Check that the EVR fittings are tight in the dispenser (see ISD GROSS PRESSURE, Field Note 1 on page 9).

hnn: GROSS COLLECT WARN/FAIL

GROSS COLLECT

1-Day Gross A/L Test failure occurs when the A/L ratio is at least 75% below the lower certified A/L ratio or at least 75% above the upper certified ratio.

ISD MONITORING CATEGORY

Vapor Collection Monitoring for sites equipped with assist vapor recovery systems is responsible for ensuring that proper front-end vapor capture is occurring during fueling events. Among other components, front-end equipment includes the nozzle, hose and the breakaway. Vapor collection is assisted by vacuum motor(s) located inside the dispenser vapor return piping.

DIAGNOSTIC PROCEDURE

1. Find the hose that triggered the alarm by looking at the Collection Tests in the ISD CARB Daily Report.

```
-----  
COLLECTION TESTS  
GROSS      DGRD  
A/L (#)    A/L(#)  
  
FP 1:  BLEND3      PASS  
BLKD(265)W 0.00 (284)W  
FP 2:  BLEND3      FAIL  
0.93(179) 0.93(179)
```

*These lines appear if
EVR type=VACUUM ASSIST*

W - Warning is on FP 1 Blend3 hose.

2. A certified technician for the EVR equipment manufacturer must inspect the equipment.

Refer to the Clear Test Repair Menu (on page 66) for clearing this alarm on the TLS after repairs are complete.

COMMON CAUSES

- Failure of the EVR equipment.
- Gross Collect All Hoses: All hoses have extremely high A/L.

The most common cause of High A/L on all Nozzles at the same time is the dispenser events are artificially Low. The TLS-450PLUS utilizes a dual RS-232 board (0332868-001 RS-232 Dual Interface Module (Comm. Slots 1,2,3) that can be configured for one of its ports to be configured as a VR BIR protocol DIM (EDIM). This protocol requires a "G" in the DIM setup string.

FIELD NOTES

- If the nozzle that triggered the alarm checks out OK, check the boots on the other nozzles at the site and repair the damaged ones.
- This alarm should not occur at a VST Balance site. If it does check EVR Type setup in the **Setup> Vapor Collection> General** screen
- Verify Hose Mapping is correct via **Setup> Vapor Collection>Hose Mapping**.
- Verify Hose Events via Diagnostics>Vapor Monitor>Hose Events (WEB: Hose Diagnostics).

hnn: DEGRD COLLECT WARN/FAIL

DEGRADATION COLLECT

A 7-day Degradation A/L Test failure occurs when the A/L ratio is at least 25% below the lower certified A/L ratio or at least 25% above the upper certified ratio.

ISD MONITORING CATEGORY

Vapor Collection Monitoring for sites equipped with assist vapor recovery systems is responsible for ensuring that proper front-end vapor capture is occurring during fueling events. Among other components, front-end equipment includes the nozzle, hose and the breakaway. Vapor collection is assisted by vacuum motor(s) located inside the dispenser vapor return piping.

DIAGNOSTIC PROCEDURE

- Perform the TP 201.5 A/L test. To find the hose that triggered the alarm by looking at the Collection Tests in the ISD CARB Daily Report.
- Refer to the Clear Test Repair Menu (on page 66) for clearing this alarm on the TLS after repairs are complete.

FIELD NOTES

This alarm should not occur at a VST Balance site. If it does check EVR Type setup in the **Setup> Vapor Collection> General** screen.

hnn: FLOW COLLECT WARN/FAIL

FLOW COLLECT

A 1-Day Vapor Collection Flow Performance Test failure occurs when the vapor collection flow performance is less than 50%.

ISD MONITORING CATEGORY

Vapor Collection Monitoring for sites equipped with balance vapor recovery systems is responsible for ensuring that front-end vapor collection is operating within certified range with respect to the baseline collection performance during fueling events. The baseline collection performance is established by CARB and is the A/L standard for the system. Among other components, front-end equipment includes the nozzle, hose and the breakaway. A balance vapor recovery system relies upon a tight bellows seal in order to allow displaced vapors to return to the UST during fueling events.

DIAGNOSTIC PROCEDURE

- Perform the TP201.4 test.
- Find the hose that triggered the alarm by looking at the Collection Tests in the ISD CARB Daily Report.

```
-----  
COLLECTION TESTS  
GROSS  
V/L(#)  
  
FP 1:  BLEND3      PASS  
V/L =  1.06(221)  
FP 2:  BLEND3      NOTEST  
V/L =  0.53(201)W
```

*These lines appear if
EVR type=Balance*

W - Warning is on FP 2 Blend3 hose.

- Refer to the Clear Test Repair Menu (on page 66) for clearing this alarm on the TLS after repairs are complete.

FIELD NOTES

This alarm should not occur at a Healy Assist site. If it does check EVR Type setup in the **Setup> Vapor Collection> General** screen.

ISD VP STATUS WARN/FAIL

ISD VAPOR PROCESSOR STATUS

1-Day Processor Test

ISD MONITORING CATEGORY

Vapor Processor Monitoring is responsible for ensuring that the vapor processor is operating within normal parameters with no risk of releasing excessive HC effluent emissions.

DIAGNOSTIC PROCEDURE

- Refer the problem to a certified technician for the processor manufacturer.
- Refer to the Clear Test Repair Menu (on page 66) for clearing this alarm on the TLS after repairs are complete.

COMMON CAUSES

- TLS Console Controlled Processor
 - VP EMISSIONS WARN, VP EMISSIONS FAIL (Veeder-Root Polisher)
- Non-TLS Console Controlled Processor
 - Inn: EXTERNAL INPUT ALARM (ARID, HIRT)

ISD VP PRES WARN/FAIL

ISD VAPOR PRESSURE

1 Day Over-Pressure Test

ISD MONITORING CATEGORY

Vapor Processor Monitoring is responsible for ensuring that the vapor processor is operating within normal parameters with no risk of releasing excessive HC effluent emissions.

DIAGNOSTIC PROCEDURE (HIRT AND ARID)

- TLS controlled processor (ARID):
 - Put the processor in manual ON mode and see if the pressure drops. Perform the operability test required by the processor.
- Non-TLS controlled processor (HIRT):
 - Clear all collection alarms prior to fixing this problem.
 - Verify processor operation.

Refer to the Clear Test Repair Menu (on page 66) for clearing this alarm on the TLS after repairs are complete.

ISD SENSOR OUT WARN/FAIL

ISD SENSOR OUT

System Setup Self-Test

ISD MONITORING CATEGORY

System Self-Test Monitoring algorithms are designed to ensure the proper setup and operation of the ISD monitor. Among other items, the self-test algorithms will check for a properly configured TLS Console monitor as well as the correct number of functioning sensors and interface modules.

System Self-Test Monitoring algorithms are broken down into two types of tests:

1. ISD sensor out self-test, designed to monitor for properly functioning sensors.
2. Setup self-test, designed to verify the monitor configuration.

DIAGNOSTIC PROCEDURE

Verify that the ISD setup is complete.

COMMON CAUSES

The following low level TLS conditions will generate high level ISD SENSOR OUT alarms at assessment time:

Tnn: PROBE OUT (Tank Inventory device)

Mnn: DISABLED DIM ALARM (MDIM Module device)

Enn: DISABLED DIM ALARM (EDIM Module device)

Enn: COMMUNICATION ALARM (EDIM Module device)

Afnn: COMMUNICATION ALARM (Air Flow Meter device)

Atnn: COMMUNICATION ALARM (Atmospheric Pressure Sensor device)

Vpnn: COMMUNICATION ALARM (Vapor Pressure Sensor device)

VVnn: COMMUNICATION ALARM (Vapor Valve device)

Hcnn: COMMUNICATION ALARM (Hydrocarbon Sensor device)

fnn: CHK VAPOR FLOW MTRPMC SENSOR FAULT

Refer to the Clear Test Repair Menu (on page 66) for clearing this alarm on the TLS after repairs are complete.

ISD SETUP WARN/FAIL

ISD SETUP

One or more of the ISD setup requirements have not been started.

ISD MONITORING CATEGORY

ISD Setup Diagnostic self-tests are designed to monitor and ensure that ISD setup requirements have started. It does not imply that it is complete. Setup self-test will verify:

1. That the ISD system is properly setup to shutdown affected fueling point(s) as required by CP-201 regulations.
2. At least one tank contains gasoline. Thermal coefficients on the gasoline tanks are in the correct range greater than or equal to 0.00060 and less than or equal to 0.00079. (Typically gasoline coefficients are programmed to 0.000700).
3. At least one Gasoline Hose is mapped (**Setup> Vapor Collection> Hose Mapping**).
4. At least one Air Flow Meter is configured and Mapped to a gasoline Hose (**Setup> Vapor Collection> Hose Mapping**).
5. One Vapor Pressure Sensor is configured and assigned to ISD in **Setup>Vapor General> General**.
6. An external input(s) is setup if a non-TLS Console Controlled Processor (HIRT, ARID) is installed (**Setup> Vapor Management> Processor**).

Setup self-testing occurs following a power-up, when exiting Setup, as well as at Assessment Time. A failure will result in a ISD SETUP WARN and warning event recording. Consecutive failures over a 7-day period will result in a ISD SETUP FAIL alarm, failure event recording, and attempted shutdown of the affected fueling point(s).

DIAGNOSTIC PROCEDURE

1. Look for one of the Common Cause alarm conditions (See below).
2. Once all the conditions are removed, enter into setup and then exit out (this will cause a TLS console System Self Test. The condition should clear..

There are two times when the ISD system setup is checked:

1. Just prior to the programed ISD Assessment Time (**Setup>Vapor General>General**)
2. When exiting the SETUP MENU via the TLS GUI or WEB access.

Refer to the Clear Test Repair Menu (on page 66) for clearing this alarm on the TLS after repairs are complete.

COMMON CAUSES

The following conditions will generate this warning:

- MISSING RELAY SETUP
- MISSING HOSE SETUP
- MISSING TANK SETUP
- MISS VAPOR FLOW MTR
- MISS VAPOR PRESS SEN
- MISSING VP INPUT
- hnn: VAPOR FLOW MTR SETUP
- PMC SETUP FAIL

MISSING RELAY SETUP

MISSING RELAY SETUP

At least one gasoline line to shutdown on required ISD alarms. Hose alarms may also be shutdown using dispenser relays.

ISD MONITORING CATEGORY

ISD Setup Diagnostic self-tests (ref. page 17) are designed to monitor and ensure proper configuration setup has been initiated. Setup self-test will verify that the ISD system is properly setup to shutdown affected fueling point(s) as required by CP-201 regulations.

DIAGNOSTIC PROCEDURE

Once all common causes are resolved, enter into setup and then exit out (this will cause a TLS console System Self Test. The condition should clear.

UNDERSTANDING TLS-450PLUS ISD SHUTDOWN REQUIREMENTS SETUP FOR SELECTED PUMP MODES

These instructions will illustrate the minimum setup requirements as per Pump Mode to complete the ISD Shutdown requirements.

For In-Station Diagnostics (ISD), the California Air Resources Board (CARB) requires that gasoline dispensing be shutdown for specific ISD Site alarms and Hose alarms (See **Table 1**). This can be accomplished by assigning the required ISD Site alarms and Hose alarms to an Automatic Event for each gasoline line. For Hose alarms this can also be accomplished by assigning the required Hose alarms to an Automatic Event for each dispenser relay (See example Fig 1).

Note: ISD only applies to gasoline tanks:

1. The TLS-450PLUS considers a tank to be a gasoline tank if its thermal coefficient is greater than or equal to 0.00060 and less than or equal to 0.00079. (Typically, the thermal coefficient for a gasoline tank is programmed to 0.000700.)
2. All gasoline tanks must be assigned to a pump and that pump has to be assigned to a line. A tank cannot be assigned to a relay in the TLS-450PLUS.

Pump Mode Setups: (Pump Mode = TLS Pump Control)

These are the steps required for ISD Shutdown if pump mode selected = TLS Pump Control

Available Pump Modes in **Setup > Pumps and Lines > Pumps**:

TLS Pump Control: Pump is controlled or actuated locally by the console. This includes control by Intelligent Pump Control. There are two ways of controlling a pump: 1) with a relay or 2) with a Pump Controller.

Pump Mode = TLS Pump Control

1. For each Pump on a Gasoline line:
 - a. Via: **Setup > Devices > Relay**:
 - i. Configure/Enable a Relay
 - ii. Set the Type to Pump Control Output
 - b. Via: **Setup > Devices > External Input**:
 - i. Configure/Enable an External Input

- ii. Set the Type to Pump Sense
- c. Via: **Setup > Pumps and Lines > Pumps:**
 - i. Configure/Enable a Pump
 - ii. Set the Mode to TLS Pump Control
 - iii. Assign the appropriate Tank to the Pump
 - iv. Set the Pump Control to the appropriate Relay
 - v. Set the Pump Sense to the appropriate External Input
- 2. For each Gasoline Line:
 - a. Via: **Setup > Pumps and Lines > Lines:**
 - i. Configure/Enable a Line
 - ii. Assign the appropriate gasoline Pump(s) to the Line
 - b. Via: **Setup > Automatic Events > Device Tasks:**
 - i. Add a task for required ISD Site Alarms:
 - 1. Set the Device to the Gasoline Line
 - 2. Select each required ISD Site Alarm as a Trigger
 - 3. Hose Site Shutdown Option (if available): select the Hose Alarms for each Gasoline Hose as a Trigger
- 3. Dispenser Relay Shutdown Option: For each Dispenser Relay:
 - a. Via: **Setup > Devices > Relay:**
 - i. Configure/ Enable Relay
 - ii. Set the Type to Standard
 - b. Via: **Setup > Automatic Events > Device Tasks:**
 - i. Add a task for each Dispenser Relay:
 - 1. Set the Device to the Relay
 - 2. Select each required Hose Alarm for the appropriate Gasoline Hose(s) as a Trigger.



Figure 2. Example: PUMP MODE = TLS Pump Control; No Dispenser Relays

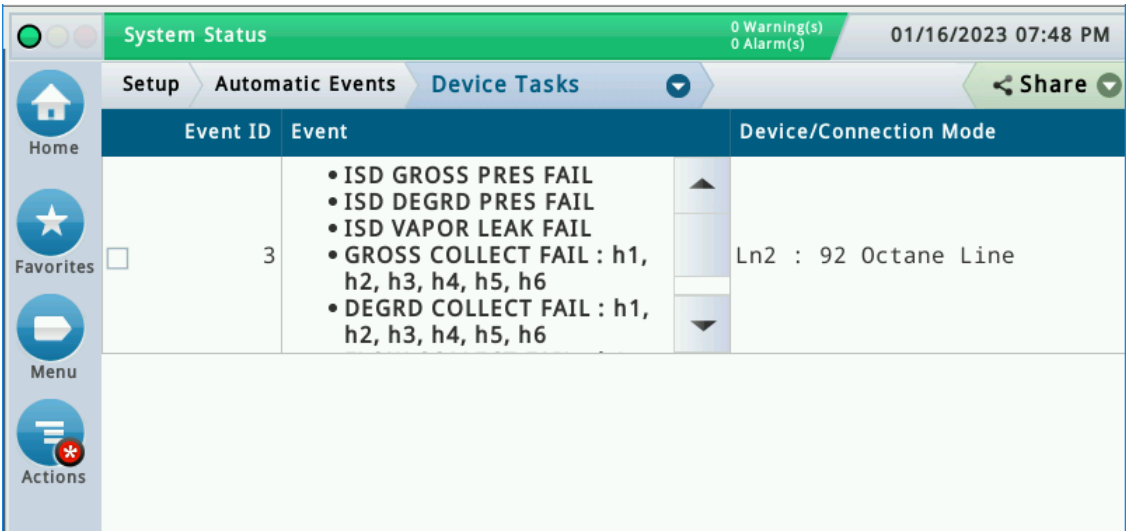


Figure 3. Example of Device Task: Assist EVR: PUMP MODE = TLS Pump Control; No Dispenser Relays

NOTICE For Balance EVR, the GROSS COLLECT FAIL and DEGRD COLLECT FAIL events would be replaced with FLOW COLLECT FAIL.

Event ID	Event	Device/Connection Mode
2	<ul style="list-style-type: none"> • ISD GROSS PRES FAIL • ISD DEGRD PRES FAIL • ISD VAPOR LEAK FAIL 	Ln1 : PRESSURE LLD #1
3	<ul style="list-style-type: none"> • GROSS COLLECT FAIL : h1, h2 • DEGRD COLLECT FAIL : h1, h2 	R7 : DISP 1-2
4	<ul style="list-style-type: none"> • GROSS COLLECT FAIL : h3, h4 • DEGRD COLLECT FAIL : h3, h4 	R8 : DISP 3-4

Figure 4. Example of Device Task: Assist EVR: PUMP MODE= TLS Pump Control; with dispenser relays.

NOTICE For Balance EVR, the GROSS COLLECT FAIL and DEGRD COLLECT FAIL events would be replaced with FLOW COLLECT FAIL.

Pump Mode Setups: (Pump Mode = Pump Sense)

These are the steps required for ISD Shutdown If pump mode selected = Pump Sense

Available Pump Modes in **Setup > Pumps and Lines > Pumps**:

Pump Sense: The console senses if the pump is active when a pump request signal is sent to turn on/off the pump (this signal also acts as a tank "active" signal to the console).

Pump Mode = Pump Sense

1. For each Pump on a Gasoline Line:
 - a. Via: **Setup > Devices > Relay**:
 - i. Configure/Enable a Relay to supply power to pump control device
 - ii. Set the Type to Standard
 - b. Via: **Setup > Devices > External Input**:
 - i. Configure/Enable an External Input (Pump Sense) for the pump
 - ii. Set the Type to Pump Sense
 - c. Via: **Setup > Pumps and Lines > Pumps**:
 - i. Configure/Enable a Pump
 - ii. Set the Mode to Pump Sense

- iii. Assign the appropriate Tank to Pump
 - iv. Set the Pump Sense to the appropriate External Input
- 2. For each Gasoline Line:
 - a. Via: **Setup > Pumps and Lines > Lines:**
 - i. Configure / Enable a Line
 - ii. Assign the appropriate gasoline Pump(s) to the Line
 - b. Via: **Setup > Automatic Events > Device Tasks:**
 - i. Add a task for required ISD Site Alarms
 - ii. Set the Device to the Gasoline Line
 - iii. Select each required ISD Site Alarm as a Trigger
 - iv. Hose Site Shutdown Option: Select the Hose Alarms for each Gasoline Hose as a Trigger
- 3. For each Relay setup in Step 1a above
 - a. Via: **Setup > Automatic Events > Device Tasks:**
 - i. Add a Task for LINE OUT alarm:
 - 1. Set the Device to the Relay
 - 2. Select LINE OUT for the appropriate Line as a Trigger
- 4. Dispenser Relay Shutdown option: For each Dispenser Relay:
 - a. Via: **Setup > Devices > Relay:**
 - i. Configure/Enable Relay
 - ii. Set the Type to Standard
 - b. Via: **Setup > Automatic Events > Device Tasks:**
 - i. Add a task for each Dispenser Relay:
 - 1. Set the Device to the Relay
 - 2. Set each required Hose Alarm for the appropriate Gasoline Hose(s) as a Trigger.



Figure 5. Example: Assist EVR; Mode = TLS Pump Sense; No Dispenser Relays

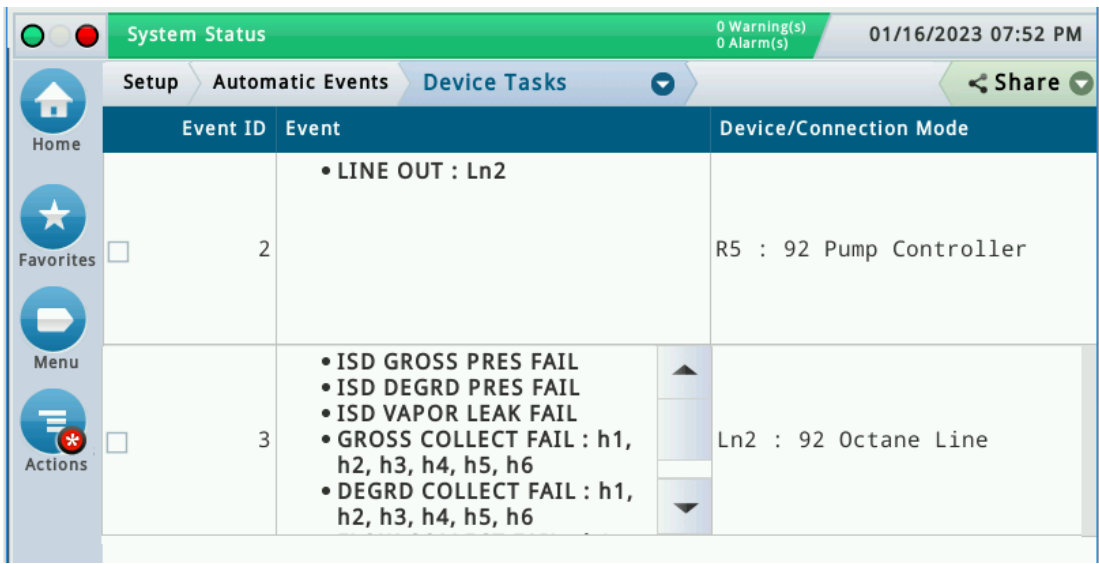


Figure 6. Example of Device Tasks: Assist EVR Mode = TLS Pump Sense; No Dispenser Relays

NOTICE For Balance EVR, the GROSS COLLECT FAIL and DEGRD COLLECT FAIL events would be replaced with FLOW COLLECT FAIL.

Pump Mode Setups: (Pump Mode = External Pump Control)

These are the steps required for ISD Shutdown if pump mode selected = External Pump Control

Available Pump Modes in **Setup > Pumps and Lines > Pumps**:

External Pump Control: Pump is controlled externally to the console and identifies tanks that are line manifolded together.

Pump Mode = External Pump Control

1. For each Pump on a Gasoline Line:
 - a. Via: **Setup > Devices > Relay**:
 - i. Configure/Enable a Relay to supply power to pump control device
 - ii. Set the Type to Standard
 - b. Via: **Setup > Pumps and Lines > Pumps**:
 - i. Configure/Enable a Pump
 - ii. Set the Mode to External Pump Control
 - iii. Assign the appropriate Tank to Pump
2. For each Gasoline Line:
 - a. Via: **Setup > Pumps and Lines > Lines**:
 - i. Configure/Enable a Line
 - ii. Assign the appropriate gasoline Pump(s) to the Line
 - b. Via: **Setup > Automatic Events > Device Tasks**:
 - i. Add a task for required ISD Site Alarms:
 1. Set the Device to the Gasoline Line
 2. Select each required ISD Site Alarm as a Trigger
 3. Hose Site Shutdown Option: Select the Hose Alarms for each Gasoline Hose as a Trigger
3. For each Relay setup in Step 1a above:
 - a. Via: **Setup > Automatic Events > Device Tasks**:
 - i. Add a task for a LINE OUT alarm:
 1. Set the Device to the Relay
 2. Select LINE OUT for the appropriate Line as a Trigger
4. Dispenser Relay Shutdown option: For each Dispenser Relay:
 - a. Via: **Setup > Devices > Relay**:
 - i. Configure/Enable Relay
 - ii. Set the Type to Standard
 - b. Via: **Setup > Automatic Events > Device Tasks**:
 - i. Add a task for each Dispenser Relay:
 1. Set the Device to the Relay
 2. Select each required Hose Alarm for the appropriate Gasoline Hose(s) as a Trigger.

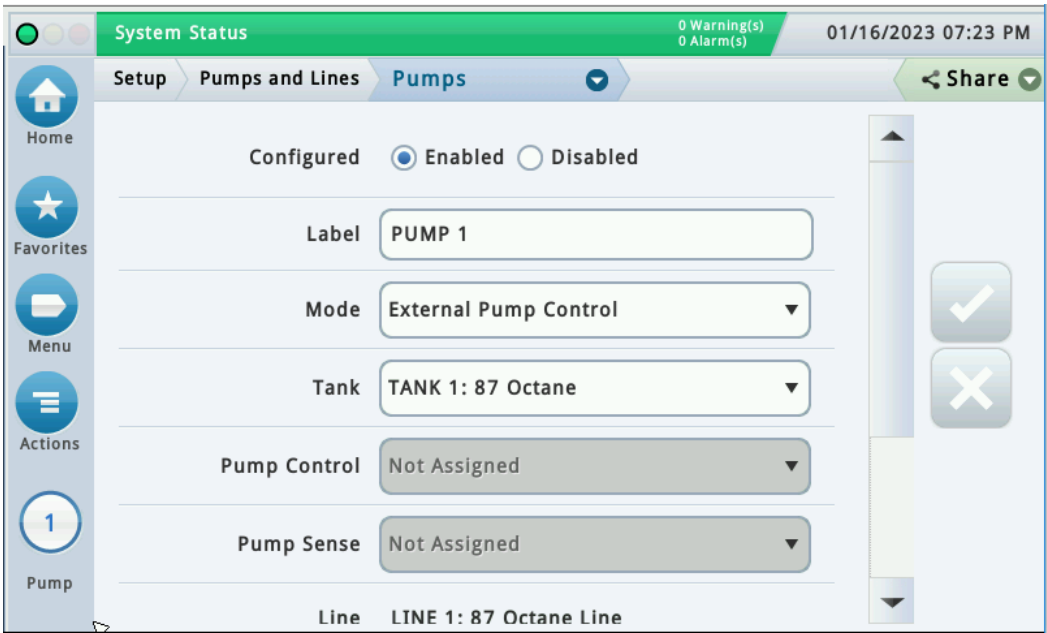


Figure 7. Example: Assist EVR; Mode = External Pump Control; No Dispenser Relays



Figure 8. Example of Device Tasks: Assist EVR Mode = External Pump Control; No Dispenser Relays

NOTICE For Balance EVR, the GROSS COLLECT FAIL and DEGRD COLLECT FAIL events would be replaced with FLOW COLLECT FAIL.

MISSING TANK SETUP

MISSING TANK SETUP

There are no vapor recovery (gasoline) tanks defined, or at least one gasoline pump (STP) does not have a gasoline tank assigned to it.

ISD MONITORING CATEGORY

ISD Setup Diagnostic self-tests (ref. page 17) are designed to monitor and ensure proper monitor configuration. Setup self-test will verify at least one tank contains gasoline.

DIAGNOSTIC PROCEDURE

Via **Setup>Tank>General**

Verify Thermal Coefficient: Thermal coefficients on the gasoline tanks are in the correct range greater than or equal to 0.00060 and less than or equal to 0.00079. (Typically gasoline coefficients are programmed to 0.000700)

1. Each Gasoline tanks must be assigned to a pump. **Setup>Pump and Lines>Pumps**
2. Pump must be assigned to a Line. **Setup>Pump and Lines>Line**
3. Then assign all the required ISD alarms to the controlling device. See Missing Relay Setup page 18.

Once all causes are removed, enter into setup and then exit out (this will cause a TLS console System Self Test. The condition should clear.

MISSING HOSE SETUP

MISSING HOSE SETUP

The Hose Mapping needs at least one hose mapped.

ISD MONITORING CATEGORY

ISD Setup Diagnostic self-tests (ref. page 17) are designed to monitor and ensure proper monitor configuration. Setup self-test will verify at least one fuel position and gas hose is setup.

DIAGNOSTIC PROCEDURE

- This warning indicates the mapping of the hose devices to the dispensed products has not been started. Complete hose setup in **Setup > Vapor Collection > Hose Setup** and complete its mapping in **Setup > Vapor Collection > Hose Mapping**. Refer to the ISD Setup manual (P/N 57701-484 or 577014-461).
- The absence of this alarm does not mean the Hose Mapping is correct. The alarm indicates that the Hose Mapping has no hoses assigned.
- Once all the hoses are mapped, enter into setup and then exit out (this will cause a TLS console System Self Test. The condition should clear.

MISSING VAPOR FLOW MTR

MISSING VAPOR FLOW METER

There is no Air Flow Meter (AFM) assigned to a configured/enabled hose.

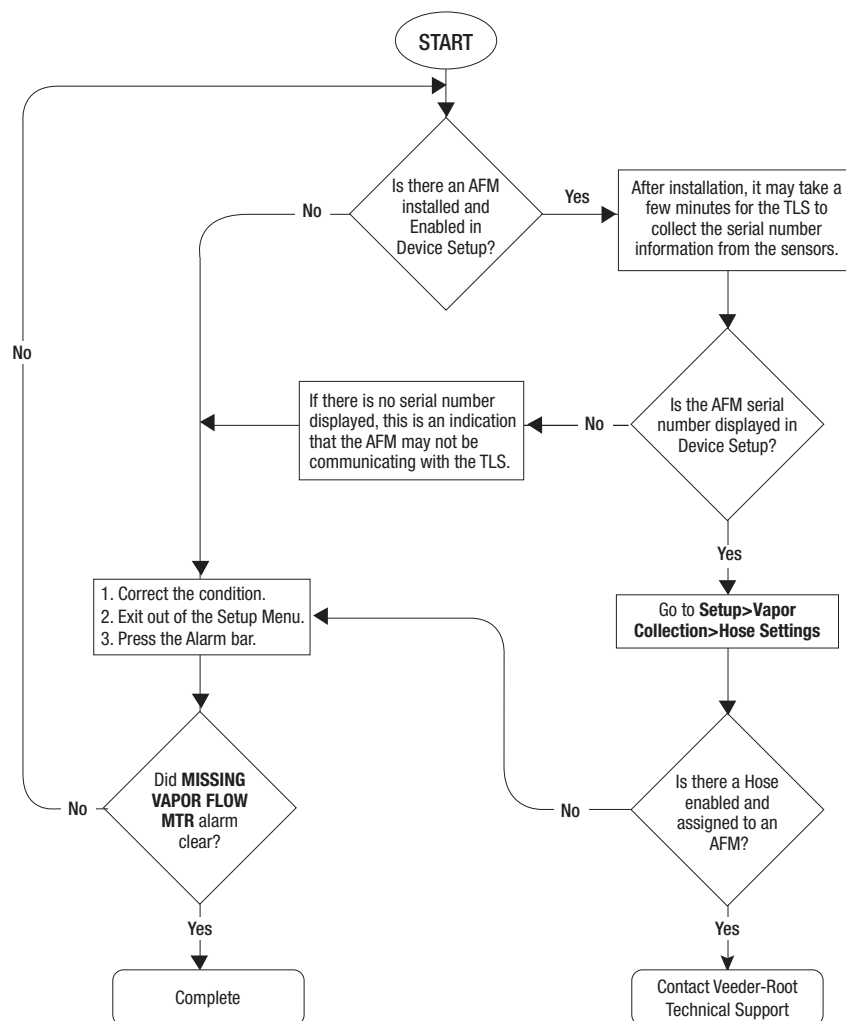
ISD MONITORING CATEGORY

ISD Setup Diagnostic self-tests (ref. page 17) are designed to monitor and ensure proper monitor configuration. Setup self-test will verify at least one Air Flow Meter is setup.

DIAGNOSTIC PROCEDURE

The absence of this alarm does not mean the Hose Setup/Mapping is correct. The alarm indicates that Hose Setup is has not been started.

WEB/GUI PROCEDURE



RS232 Command Verification:

IV430000: Set Sensor Table ISD In Use Flag

MISSING VAPOR PRES SEN

MISSING VAPOR PRESSURE SENSOR

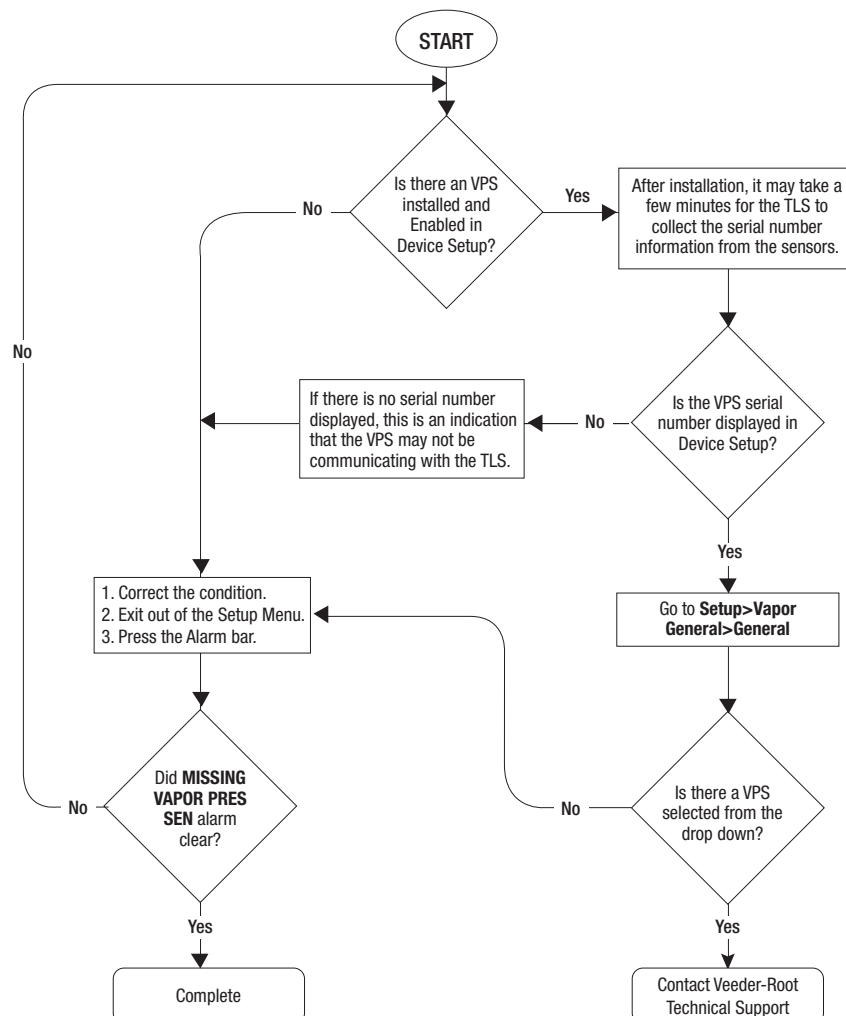
There is no Vapor Pressure Sensor (VPS) configured Enabled or assigned to ISD.

ISD MONITORING CATEGORY

ISD Setup Diagnostic self-tests (ref. page 17) are designed to monitor and ensure proper monitor configuration. Setup self-test will verify at least one Vapor Pressure Sensor is setup.

DIAGNOSTIC PROCEDURE

WEB/GUI PROCEDURE



RS232 Command Verification:

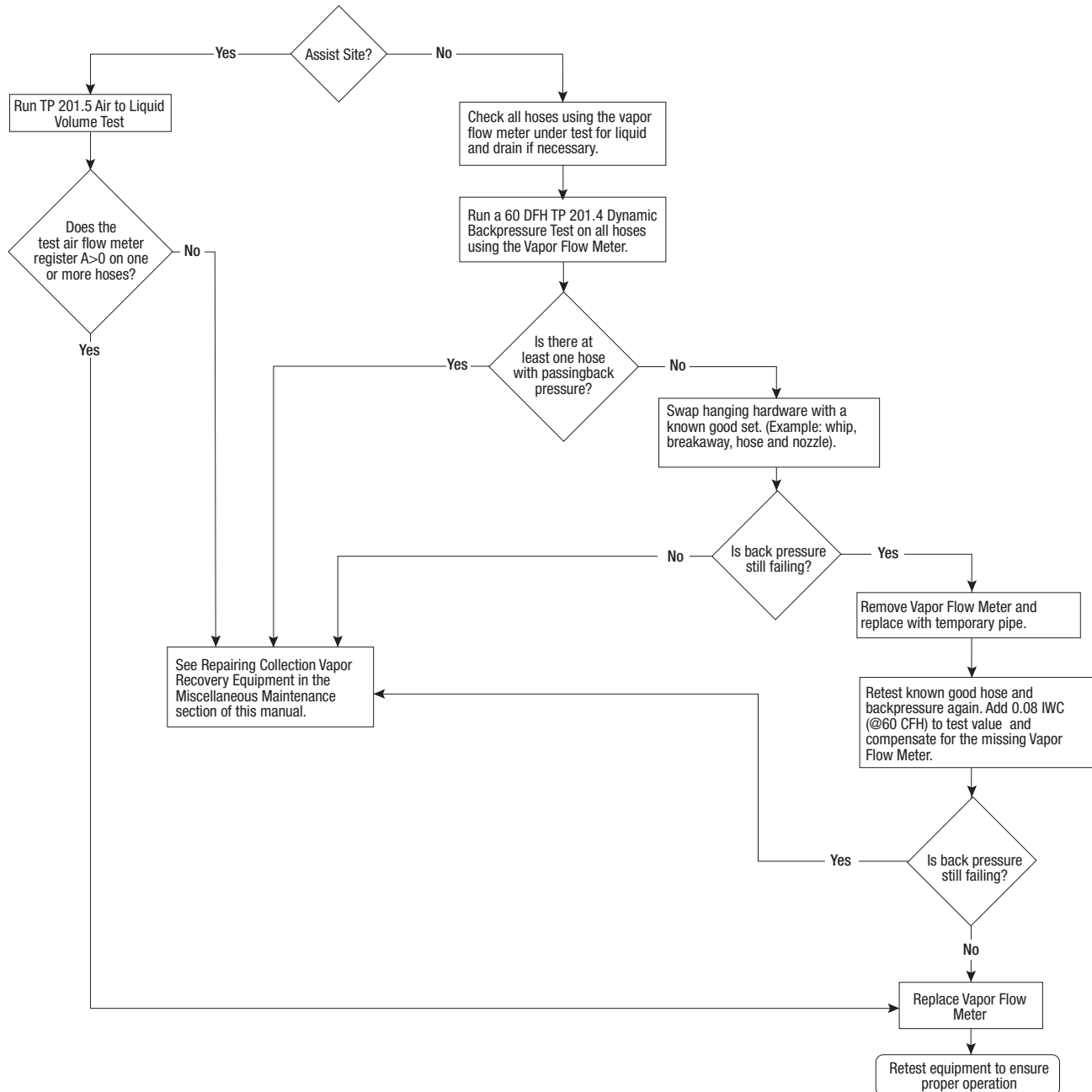
IV430000: Set Sensor Table ISD In Use Flag

fnn: CHK VAPOR FLOW MTR**CHECK VAPOR FLOW METER**

Failure of locked rotor test - possible locked Air Flow Meter.

ISD MONITORING CATEGORY

System Diagnostic Procedure



Field Notes - See "Removing & Replacing Air Flow Meters" on page 46

hnn: VAPOR FLOW MTR SETUP

VAPOR FLOW METER SETUP

Incoming transaction from a hose with an unavailable Air Flow Meter.

ISD MONITORING CATEGORY

ISD Setup Diagnostic self-tests (ref. page 17) are designed to monitor and ensure proper monitor configuration. Setup Self-Test will verify that an incoming transaction of a mapped hose has an available Air Flow Meter.

DIAGNOSTIC PROCEDURE

1. Using GUI/WEB, go to **Setup> Vapor Collection> Hose Mapping**. Find the AFM assigned to Hose nn.
2. Go to Hose Setup, select the Hose nn assigned the AFM. If there is an "!" next to the AFM number, the AFM is not enabled.
3. Go to **Setup> Devices**: Enable the AFM.
4. After the next dispense from the hose, the alarm condition will clear.

PMC Alarm Message Diagnostics

PMC SETUP FAIL

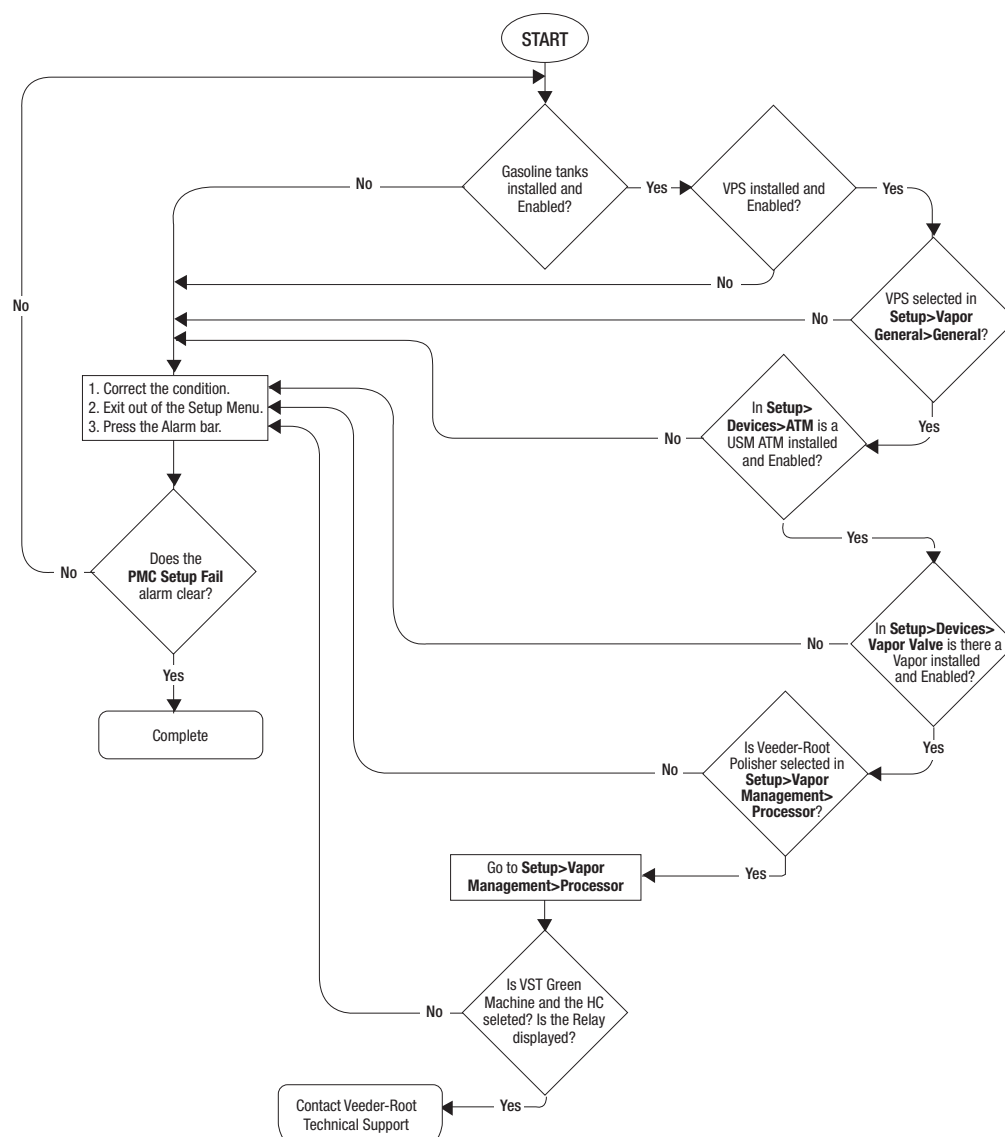
PMC SETUP

Incomplete PMC Setup requirements

ISD MONITORING CATEGORY

ISD Setup Diagnostic self-tests (ref. page 17) are designed to monitor and ensure proper monitor configuration. Setup self-test will verify that the Pressure Management Control is configured.

WEB/GUI VEEDER-ROOT VAPOR POLISHER DIAGNOSTIC PROCEDURE



PMC Sensor Fault

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

Table 2. PMC Device Fault Summary

Fault Message	Devices	Cause	Suggested Troubleshooting
Communication Alarm	Vapor Valve, Vapor Pressure Sensor, Tank Probe, Atmospheric Pressure Sensor	Device not communicating with TLS	Check wiring and connections from USM to the device in alarm.
			Power cycle the TLS
			Verify device addressing in Setup>Devices
			Wireless application: Verify TLS RF functionality.
Pressure Fault Alarm	Atmospheric Pressure Sensor	The pressure readings are invalid (out-of-range, or have not changed for an extended period of time).	Power cycle console power. If alarm does not clear, contact VR Technical Support for further assistance.
Valve Command Fault	Vapor Valve	The valve fails calibration	Check installation of all Vapor Valve components including Thermal Probe and Vapor Sensor Assembly. Refer to manual 577013-920. Call V-R Technical Support if further assistance is needed.
Valve Noise Fault		The valve fails calibration due to data noise. If successful, calibration cannot be completed in 24 hours the alarm posts.	
Cap (Capacitor) Not Charging		Vapor valve capacitor does not initially charge within 60 minutes, or subsequent recharges after 15 minutes.	
Cap (Capacitor) Not Holding Fault		Vapor valve capacitor discharges when idle (i.e., not resulting from an open/close request) more than 3 times in 24 hours.	
Reference Register Fault		At least 1 of the 4 reference resistors is out-of-range repeatedly.	
Vapor Sensor Resistance Fault		The vapor sensor resistance reads out-of-range repeatedly.	
Temperature Range Fault		Outlet temperature reads out-of-range repeatedly.	
Data Noise Fault		Frequent noise is affecting sensor readings for more than 30 minutes.	

Vapor Valve diagnostics can be obtained via the GUI or WEB: Diagnostics> Vapor Valve> Overview, or via RS232 command IB6100 (see examples below).

```
IB6100
SEP 4, 2022 1:09 PM
s 2:Vapor valve

VAPOR VALVE
SERIAL NUMBER      123456
VALVE POSITION:    OPEN
OPEN CAP:          CHARGED
CLOSE CAP:         CHARGED
AMBNT TMP:        65.08 F
OUTLET TMP:        75.05 F
SENSOR FAULTS:
VALVE COMMAND FAULT
```

```
IB6100
SEP 4, 2022 1:09 PM
s 2:Vapor valve

VAPOR VALVE
SERIAL NUMBER      123456
VALVE POSITION:    OPEN
OPEN CAP:          CHARGED
CLOSE CAP:         CHARGED
AMBNT TMP:        65.08 F
OUTLET TMP:        75.05 F
SENSOR FAULTS:
CAP NOT HOLDING
```

```
IB6100
SEP 4, 2022 1:09 PM
s 2:Vapor valve

VAPOR VALVE
SERIAL NUMBER      123456
VALVE POSITION:    OPEN
OPEN CAP:          CHARGED
CLOSE CAP:         CHARGED
AMBNT TMP:        65.08 F
OUTLET TMP:        75.05 F
SENSOR FAULTS:
CAP NOT CHARGING
```

```
IB6100
SEP 4, 2022 1:09 PM
s 2:Vapor valve

VAPOR VALVE
SERIAL NUMBER      123456
VALVE POSITION:    OPEN
OPEN CAP:          CHARGED
CLOSE CAP:         CHARGED
AMBNT TMP:        65.08 F
OUTLET TMP:        75.05 F
SENSOR FAULTS:
TEMPERATURE RANGE
```

MISSING VP INPUT

MISSING VAPOR PROCESSOR INPUT

An external input for the HIRT and ARID vapor processor cannot be found.

ISD MONITORING CATEGORY

System Self-Test Monitoring algorithms are designed to ensure the proper setup and operation of the ISD monitor. Among other items, the self-test algorithms will check for a properly configured TLS Console monitor as well as the correct number of functioning sensors and interface modules.

System Self-Test Monitoring algorithms are broken down into two types of tests:

1. ISD sensor out self-test, designed to monitor for properly functioning sensors.
2. Setup self-test, designed to verify the monitor configuration.

DIAGNOSTIC PROCEDURE

- This warning only applies to EVR systems with an HIRT or ARID vapor processor.
- Ensure that the external inputs are properly configured in **Setup> Devices> External Input:**

HIRT: One External Input

Indicates a fault from the vapor processor.

Type: Vapor Processor

Orientation: Normally Open

Verify in **Setup> Vapor Management< Processor** that Ext Input 1 field is populated.

ARID: Two External Inputs

First External Input;

Indicates a fault from the vapor.

Type: Vapor Processor

Orientation: Normally Open

Second External Input;

Indicates vapor processor is active.

Type: Vapor Processor 2

Orientation: Normally Open

Verify in **Setup> Vapor Management< Processor** that Ext Input 1 and Ext Input 2 fields are populated.

- Once all the causes are removed, enter into setup and then exit out (this will cause a TLS console System Self Test).

VP EMISSIONS

VAPOR PROCESSOR EMISSIONS

The effluent emissions concentration test occurs at daily intervals at the daily assessment time after at least one day's HC%, processor run time and station throughput has been collected. A failure occurs when the mass emission exceeds the defined threshold for the system. A failure of the effluent emissions concentration test will result in a warning and warning event recording. Two consecutive 1-day periods of effluent emissions concentration test failures will result in a failure alarm, failure event recording, and shutdown of the site. The processor is not allowed to operate while the emission FAILURE is active

ISD MONITORING CATEGORY

Vapor Processor Monitoring is responsible for ensuring that the vapor processor is operating within normal parameters.

DIAGNOSTIC PROCEDURE

Veeder-Root Polisher:

- Ensure Polisher is in Automatic Mode.
- Resolve any Vapor Valve, Atmospheric Pressure Sensor, Vapor Pressure Sensor Fault Alarms.
- Resolve Vapor Leakage and Collection alarm conditions.
- Exhibit 11: Veeder-Root Vapor Polisher; Operability Test Procedure
- Exhibit 12: Veeder-Root Vapor Polisher; Hydrocarbon Emissions Verification Test Procedure

ARID:

VR-202: Exhibit 15

ARID Technologies AT-150 Permeator Compliance Test Procedure

Refer to the Clear Test Repair Menu (on page 66) for clearing this alarm on the TLS after repairs are complete.

VP PRESSURE

VAPOR PROCESSOR PRESSURE

The processor over-pressure test occurs at daily intervals at the daily assessment time after at least 1-day's UST ullage vapor pressure data has been collected. A VST ECS Membrane Processor failure occurs when the 90th percentile of 1-day's ullage pressure data (i.e. 10% of the pressure data) is equal to or exceeds 1" wc. A Veeder-Root Polisher failure occurs when the 90th percentile of 1-day's ullage pressure data (i.e. 10% of the pressure data) is equal to or exceeds 2.3" wc. A failure of the processor over-pressure test will result in a warning and warning event recording. Two consecutive 1-day periods of processor over-pressure test failures will result in a failure alarm, failure event recording, and shutdown of the site.

ISD MONITORING CATEGORY

Vapor Processor Monitoring is responsible for ensuring that the vapor processor is operating within normal parameters with no risk of releasing excessive HC effluent emissions.

DIAGNOSTIC PROCEDURE

- Refer to the Clear Test Repair Menu (on page 66) for clearing this alarm on the TLS after repairs are complete.

Exhibit 11 Failures

NOTICE Reference current CARB Executive Order's for up to date testing procedures and requirements.

PRESSURE INTEGRITY TEST

- Check that lockable three way valve is in the test position. If not in test position switch valve to test position and rerun Pressure Integrity test.
- Verify the Polisher solenoid control valve is in the closed position by accessing the TLS PMC Diagnostics. If Control valve is in open position, close Valve by accessing PMC Diagnostics and rerun Pressure Integrity test.
- Check for leaks on your test equipment. Find leaks using leak detection solution (I.E. Soap and Water) and repair. Rerun Pressure Integrity test.
- Check all fittings and connections on the VR Vapor Polisher for leaks. Find leaks using leak detection solution (I.E. Soap and Water) and repair. Rerun Pressure Integrity test.
- Check the Filter basket for leaks Tighten four filter basket screws and check filter o-ring and replace if necessary. Rerun Pressure Integrity test
- Check for leaks around the manifold If leaks found call Veeder-Root Technical support at 800-323-1799.

FLOW TEST

- Verify all test equipment has current calibrations. Have equipment calibrated per NIST specifications.
- Check that lockable three way valve is in the test position If not in test position switch valve to test position and rerun Pressure Integrity test.
- Verify the Polisher solenoid control valve is in the open position by accessing the TLS PMC Diagnostics. If Control valve is in closed position, put valve in manual mode, and then open the valve. Rerun Pressure Integrity test.
- Verify your nitrogen flow rate is at 18.0 SFCH Adjust flow rate per test procedure and rerun Flow test. If flow test continues to fail contact Veeder-Root Technical support at 800-323-1799.

THERMOMETER TEST

- Replace Tank probe if gas tank thermometer fails all tests.
- Replace Vapor Valve thermometer if Vapor Valve thermometer fails all tests.
- Replace ambient temperature sensor if ambient temperature sensor is out of range.

Exhibit 12 Failures

- Run Vapor Polisher operability test as outlined in Executive Order 203/204 Exhibit 11 to check for leaks. Run only the pressure integrity portion of Exhibit 11 at this time.
- If the Vapor Polisher fails any part of the test run the force purge procedure as outlined in Executive Order 203/204 Exhibit 12 Appendix A.
- Perform Vapor Pressure Sensor operability test as outlined in Executive Order 203/204 Exhibit 10.

Operation Alarms

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.

ALARM MESSAGES

ISD monitoring tests operate once each day. Warning and failure conditions are posted at the designated posting time after the tests are complete.

Warnings

WARNINGS indicate when attention is required. When a WARNING is posted a warning alarm event is logged in the ISD reports, posted on the status bar of the GUI. A printout can occur if setup in Automatic Events. If the condition persists, a WARNING will remain active for a 1, 7 or 30 day warning period depending on the test type.

Failures

If a WARNING condition persists, a FAILURE alarm will be posted after the warning period and THE SITE DISPENSING EQUIPMENT IS SHUTDOWN (see RESTARTING STATION AFTER ISD SHUTDOWN for instructions on restarting dispensing). When a FAILURE is posted a failure alarm event is logged in the ISD reports, posted on the status bar of the GUI. A printout can occur if setup in Automatic Events.

RESTARTING STATION AFTER ISD SHUTDOWN ALARMS

NOTICE Consult state and local regulations prior to restarting equipment.

After one of the ISD Shutdown Alarms occurs press Menu>Diagnostics>Vapor Monitor>Clear Test After Repair, to display the screen below and press the **Override Shutdown** button, then touch the **Confirm** message to continue operation of the site after the alarm has posted (see Figure 9). If the site or dispenser(s) are not shutdown, this button is grayed out, otherwise press to override a shutdown in effect and resume dispensing. Dispensing resumes, the alarm light continues to flash, and any alarm messages display until the alarm has been cleared. A 'PUMPS MANUALLY RE-ENABLED' event is entered in the 'Shutdown & Misc Event Log'.

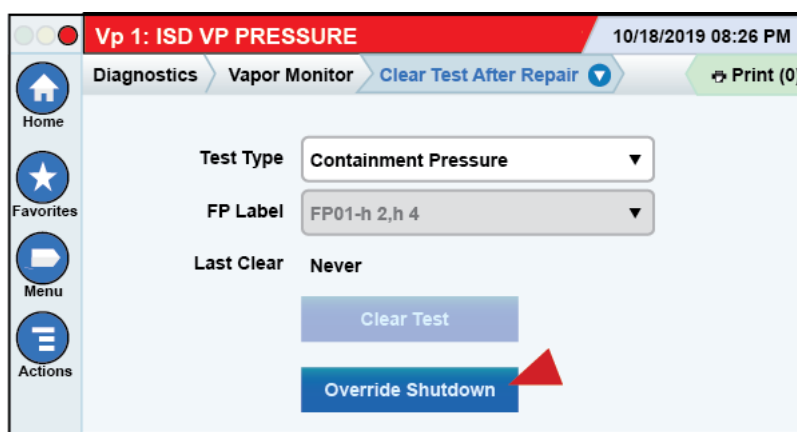


Figure 9. Clear Test After Repair Screen

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.

Warning Alarms					
<u>Date</u>	<u>Time</u>	<u>Description</u>	<u>Reading</u>	<u>Value</u>	
2022/01/0	23:59	VAPOR VAPOR CONTAINMENT LEAKAGE	CFH@2"WC	14	
2022/01/0	23:59	A/L RATIO DEGRADATION	FP2 MID	0.69	
2022/12/3	23:59	VAPOR VAPOR CONTAINMENT LEAKAGE	CFH@2"WC	13	
2022/12/3	23:59	A/L RATIO DEGRADATION	FP2 MID	0.67	
Failure Alarms					
<u>Date</u>	<u>Time</u>	<u>Description</u>	<u>Reading</u>	<u>Value</u>	
2022/01/0	23:59	A/L RATIO GROSS BLOCKAGE	FP1 REG	0.06	
2022/01/0	23:59	A/L RATIO DEGRADATION	FP1 REG	0.14	
2022/01/0	23:59	A/L RATIO GROSS BLOCKAGE	FP1 MID	0.13	
2022/01/0	23:59	A/L RATIO DEGRADATION	FP1 MID	0.15	

Figure 10. Monthly Report Warning & Failure Log Example

ALARM SEQUENCE

Each ISD monitoring test operates once a 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 3 summarizes the ISD Alarms.

NOTICE Alarms with footnote 2 will result in a site shutdown.

Table 3. ISD Alarm Summary

Displayed Message	ISD Monitoring Category	Light Indicator	Cause	Suggested Troubleshooting
ISD VAPOR LEAK WARN	Containment	Yellow	Vapor Leakage Detection test warning	<ul style="list-style-type: none"> •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 LEAK FAIL ¹	Containment	Red	Vapor Leakage Detection test - 8th consecutive failure	
ISD GROSS PRES WARN	Containment	Yellow	Gross Over Pressure test warning	<ul style="list-style-type: none"> •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 •Look for problems using one or more of the following VR-202 procedures/tests: Dispenser Integrity Test B-3 (i.e. 'Plumbing Tightness' test), Exhibit 4, Exhibit 5, Exhibit 9 (pressure sensor only) or Flow Rate Verification per section 1.2.3.
ISD GROSS PRES FAIL ¹	Containment	Red	Gross Over Pressure test - 8th consecutive failure	
ISD DEGRD PRES WARN	Containment	Yellow	Degradation Over-Pressure test warning	
ISD DEGRD PRES FAIL ¹	Containment	Red	Degradation Over-Pressure test - 30th consecutive failure	
ISD VP STATUS WARN	Processor	Yellow	Failure of Vapor Processor Effluent Emissions or Duty Cycle test	<ul style="list-style-type: none"> • Troubleshooting Guide • VP Emissions Test
ISD VP STATUS FAIL ¹	Processor	Red	2nd Consecutive Failure of Vapor Processor Status test	
VP EMISSION WARN ²	Processor	Yellow	Mass emission exceeded the certified threshold	<ul style="list-style-type: none"> • Troubleshooting Guide • Exhibit 11
VP EMISSION FAIL ²	Processor	Red	2nd Consecutive Mass Emission test failure	
hnn: GROSS COLLECT WARN	Collection	Yellow	1-Day Gross A/L Test warning	<ul style="list-style-type: none"> •Visually inspect hanging hardware at the affected fueling point •Exhibit 7 Nozzle Bag Test •VR-202 Exhibit 5
hnn: GROSS COLLECT FAIL ¹	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 ¹	Collection	Red	7-Day Degradation A/L Test - consecutive failure	
hnn: FLOW COLLECT WARN	Collection	Yellow	1-Day Gross A/L Test warning	<ul style="list-style-type: none"> • Visually inspect hanging hardware at the affected fueling point • Exhibit 7 Nozzle Bag Test • VR-202 Exhibit 5
hnn: FLOW COLLECT FAIL ¹	Collection	Red	1-Day Gross A/L Test failure - 2nd consecutive failure	
ISD VP PRESSURE WARN ²	Processor	Yellow	90 th percentile of 1 day ullage pressure exceeds 2.3 IWC	Exhibit test for ARID Permeator Processor
ISD VP PRESSURE FAIL ²	Processor	Red	2 nd consecutive failure of vapor	

Table 3. ISD Alarm Summary

Displayed Message	ISD Monitoring Category	Light Indicator	Cause	Suggested Troubleshooting
ISD SENSOR OUT WARN	Self-Test	Yellow	ISD Sensor Out Self-Test warning	Confirm ISD sensor & module installation / communication per Setup section.
ISD SENSOR OUT FAIL ¹	Self-Test	Red	ISD Sensor Out Self-Test - 8th consecutive failure	
ISD SETUP WARN	Self-Test	Yellow	System Setup Self-Test warning	Confirm ISD programming per Setup section.
ISD SETUP FAIL ¹	Self-Test	Red	System Setup Self-Test failure - 8th consecutive failure	
PMC SETUP FAIL	Self-Test	Red	PMC is not configured or missing components	• See "PMC SETUP FAIL" on page 32
PMC SENSOR FAULT	Self-Test	Red	Component used by PMC has failed or reported an error condition.	• Check for Sensor Device alarm or fault.

¹ ISD Shutdown Alarms - see ISD Quick Reference Guide P/N 577014-462.

² ARID Permeator Processor

OTHER ALARMS

Table 4 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.

NOTICE Additional TLS console alarms listed in the **TLS-450PLUS Console Troubleshooting Guide (P/N 577014-075)** may be posted and may lead to an ISD shutdown alarm if persistent.

Table 4: Other Alarms

Displayed Message	Light Indicator	Set Condition	Clear Condition
MISSING RELAY SETUP	Red	At least one gasoline line/relay to shutdown on required ISD alarms.	Complete required shutdown alarms via Settings> Automatic Events> Device Tasks for all vapor recovery (gasoline) products.
MISSING TANK SETUP	Red	There are no vapor recovery (gasoline) tanks defined, or at least one gasoline pump (STP) does not have a gasoline tank assigned to it.	Complete gasoline tank setup, verify thermal coefficients. Ensure ISD shutdown requirements are complete.
MISSING HOSE SETUP	Red	The Hose Mapping needs at least one Hose mapped.	Complete the Hose Mapping.
hnn: VAPOR FLOW MTR SETUP	Red	Incoming transaction from a hose with an unavailable Air Flow Meter.	Ensure assigned Air Flow Meter is configured Enabled for the specific hose.
MISS VAPOR PRES SEN	Red	There is no Vapor Pressure Sensor configured Enabled or assigned to ISD.	Complete Vapor Pressure Setup and assign VPS in Setup> Vapor General> General .
MISS AIR FLOW MTR	Red	At least one AFM must be assigned to a Configured/Enabled Hose.	Assign an AFM to all Configured/Enabled Hose(s) in Hose Settings.

Table 4: Other Alarms

Displayed Message	Light Indicator	Set Condition	Clear Condition
afnn: CHK VAPOR FLOW MTR	Red	Failure of locked rotor test - possible locked air flow meter.	Locked rotor test passes or air flow meter deconfigured, or test cleared.

Table 5. Wireless Related Sensor Alarms

Displayed Message	Devices	Light Indicator	Description	Suggested Troubleshooting
BATTERY WARNING	Vapor Valve, VPS, AFM and Probe	Yellow	Device transmitter reports battery status as 'Replace' for 24 hours	Remove and replace battery pack

PMC Alarm Summary

Table 6 contains a listing of the PMC generated alarms including their displayed message and cause. TLS Console PMC alarms may be interspersed amongst non-PMC alarms.

Table 6. TLS-450PLUS (PMC) Alarm Troubleshooting Summary

Displayed Message	Description	Light Indicator	Suggested Troubleshooting
VP EMISSION WARN	Mass emission exceeded the certified daily threshold	Yellow	<ul style="list-style-type: none"> • Troubleshooting Guide www.vsthose.com. • Exhibit 8 • Exhibit 9
VP EMISSION FAIL	2nd Consecutive mass emission failure	Red	
PMC SETUP FAIL	PMC is not configured or missing components.	Red	<ul style="list-style-type: none"> • Troubleshooting Guide www.vsthose.com • See ISD Troubleshooting Guide, P/N 577013-819 • Exhibit 8 • Exhibit 9
PMC SENSOR FAULT	Component used by PMC has failed or reported an error condition. See Troubleshooting section for complete description of sensors and associated conditions that can cause a sensor fault.	Red	Check for Device Alarm or Fault.

PMC Setup Fail

A PMC Setup Fail warning occurs when the PMC setup is not complete. Follow the diagnostic steps in Table 7 below to resolve this issue.

Table 7: PMC Setup Fail Diagnostic Procedure

Step	Procedure
1	Gasoline Tanks Configured and Enabled?
2	ATM Sensor Configured and Enabled?
3	Vapor Valve installed, Configured and Enabled?
4	In Setup>Vapor Management>Processor: Is the Vapor Processor Type assigned?
5	In Setup>Vapor General>General: Is the Vapor Pressure Sensor assigned?
6	Exiting out of Setup will cause the TLS Console System Self-Test.
7	If alarm does not clear, contact Veeder-Root Technical Support at (800) 323-1799.

PMC Sensor Faults

Table 8 contains a listing of the device generated alarms including their cause and suggested troubleshooting. TLS Console PMC alarms may be interspersed amongst non-PMC alarms, please see TLS Series manuals for more information.

Table 8. PMC Device Fault Summary

Fault Message	Devices	Cause	Suggested Troubleshooting
Communication Alarm	Vapor Valve, Vapor Pressure Sensor, Tank Probe, Atmospheric Pressure Sensor	Device not communicating with TLS	Power cycle the TLS
			Verify device addressing in Setup>Devices
Pressure Fault Alarm	Atmospheric Pressure Sensor	The pressure readings are invalid (out-of-range, or have not changed for an extended period of time).	USM/ATM Module Group (P/N 0332812-006) may need to be replaced. ATM sensor may be faulty. Contact VR Technical Support for further assistance.

Table 8. PMC Device Fault Summary

Fault Message	Devices	Cause	Suggested Troubleshooting
Valve Command Fault	Vapor Valve	The valve fails calibration	Check installation of all Vapor Valve components including Thermal Probe and Vapor Sensor Assembly. Refer to manual 577013-920. Call V-R Technical Support if further assistance is needed.
Valve Noise Fault		The valve fails calibration due to data noise. If successful, calibration cannot be completed in 24 hours the alarm posts.	
Cap (Capacitor) Not Charging		Vapor valve capacitor does not initially charge within 60 minutes, or subsequent recharges after 15 minutes.	
Cap (Capacitor) Not Holding Fault		Vapor valve capacitor discharges when idle (i.e., not resulting from an open/close request) more than 3 times in 24 hours.	
Reference Register Fault		At least 1 of the 4 reference resistors is out-of-range repeatedly.	
Vapor Sensor Resistance Fault		The vapor sensor resistance reads out-of-range repeatedly.	
Temperature Range Fault		Outlet temperature reads out-of-range repeatedly.	
Data Noise Fault		Frequent noise is affecting sensor readings for more than 30 minutes.	

Miscellaneous Maintenance

Repairing Collection Vapor Recovery Equipment

ALL SYSTEMS (HEALY)

Check common vapor recovery piping both before and after the ISD Air Flow meter.

ASSIST SYSTEMS (HEALY)

Check common vacuum assist electronics

BALANCE SYSTEMS

Check hose liquid extraction

Removing & Replacing Air Flow Meters

When removing and replacing a Air Flow Meter follow these steps:

1. Power down the console.
2. Replace the air flow meter according to the instructions in the Related Manuals.
3. Power up the console.

No changes are required to the ISD Setup.

ISD/PMC Diagnostic Menus

Air Flow Meter Overview

Select **Menu>Diagnostics>Air Flow Meter>Overview** to display the Air Flow Meter overview screen. This screen provides a report with general and communication diagnostic information for air flow meters.

GENERAL COLUMN DESCRIPTIONS

Column	Descriptions
Type	Sensor type description
Status	Displays one or more of the following messages: <ul style="list-style-type: none">• NORMAL• SETUP DATA WARNING• COMMUNICATION ALARM• BATTERY WARNING (Wireless Only)• CHK VAPOR FLOW MTR
Serial Number	Console auto-detected serial number of this device
Flow Volume	The volume of air flow measured
Battery Status	[Wireless Device Only] Indicates the status of the battery in a wireless device. Possible battery status messages: <ul style="list-style-type: none">• Unknown• Full• Medium• Low• Replace

CONSTANTS COLUMN DESCRIPTIONS

Column	Descriptions
Device Code	The device code for the sensor, i.e., 1 = AIRFLOW METER
Counts Per MilliGallon	The number of counts the meter records per milligallons of air
Seconds Between Samples	The air flow meter typically collects samples every 5 seconds

COMMUNICATION COLUMN DESCRIPTIONS

Column	Descriptions
Samples Read	The number of times attempts have been made to read the sensor
Samples Used	The number of samples that were read without errors
Parity Errors	The number of samples that had parity or CRC (data corruption) errors
Partial Read	The number of samples with only a partial response
Comm. Errors	The number of communication errors (e.g., when the sensor did not respond to a poll)
Restarts	The number of restarts

CHANNEL REPORT DESCRIPTION

The Channel Report lists the raw data (in hex format) of each communication channel of the sensor and provides an indication of the sensor's current state. The number of channels and what each channel represents is specific to each sensor.

Atmospheric Sensor Overview

Select **Menu>Diagnostics>Atmospheric Sensor>Overview** to display the Atmospheric Sensor overview screen.

This screen provides a report with general and communication diagnostic information for atmospheric pressure sensors.

GENERAL COLUMN DESCRIPTIONS

Column	Descriptions
Type	Sensor type description
Status	Possible messages: <ul style="list-style-type: none"> • NORMAL • SETUP DATA WARNING • COMMUNICATION ALARM • PRESSURE FAULT ALM
Serial Number	Console auto-detected serial number of this device/USM
Date	Sensor date code (always 00/01)
Pressure	The current pressure reading for the sensor

CONSTANTS COLUMN DESCRIPTIONS

Column	Descriptions
Model	Not applicable to this sensor type
Device Code	The device code for the sensor, i.e., 18 = Atmospheric Sensor.
Slope	Factory calibrated pressure slope
Offset	Factory calibrated pressure offset

COMMUNICATION COLUMN DESCRIPTIONS

Column	Descriptions
Samples Read	The number of times attempts have been made to read the sensor
Samples Used	The number of samples that were read without errors
Parity Errors	The number of samples that had parity or CRC (data corruption) errors
Partial Read	The number of samples with only a partial response
Comm. Errors	The number of communication errors (e.g., when the sensor did not respond to a poll)
Restarts	Not applicable to this sensor type

CHANNEL REPORT DESCRIPTION

The Channel Report lists the raw data (in hex format) of each communication channel of the sensor and provides an indication of the sensor's current state. The number of channels and what each channel represents is specific to each sensor.

Vapor Pressure Sensor Overview

Select **Menu>Diagnostics>Vapor Pressure Sensor>Overview** to display the Vapor Pressure Sensor overview.

This screen provides a report with general and communication diagnostic information for vapor pressure sensors. These sensors measure the pressure in the ullage space of underground storage tanks. The values can be used to evaluate vapor containment or perform vapor management. A pressure sample is read every 10 seconds on 24 channels (35 channels for wireless vapor sensors).

GENERAL COLUMN DESCRIPTIONS

Column	Descriptions
Type	Sensor description
Status	Possible messages: <ul style="list-style-type: none"> • NORMAL • SETUP DATA WARNING • COMMUNICATION ALARM • BATTERY WARNING [Wireless Vapor Pressure Sensor only] - battery on wireless vapor pressure sensor needs to be replaced.
Serial Number	Console auto-detected serial number of this device
Battery Status [Wireless Device Only]	Indicates the status of the battery in a wireless device. Possible battery status messages: <ul style="list-style-type: none"> • Unknown • Full • Medium • Low • Replace
Date	Not applicable to this sensor type
Pressure [iwc] [kPa]	The vapor pressure reported by the vapor pressure sensor in inches water column [iwc] for ISD and RAP, kilopascal [kPa] for APM NOTICE This is the current pressure reading. It is the reading using the factory calibration. To see any calibrated pressure readings, see: Diagnostics > Vapor Pressure > Sensor > Calibrate .

CONSTANTS COLUMN DESCRIPTIONS

Column	Descriptions
Model	Not applicable to this sensor type
Device Code	The device code for the sensor, i.e., 4 = Wired Pressure Sensor, and 20 = Wireless Pressure Sensor.
Slope	Factory calibrated vapor pressure slope
Offset	Factory calibrated vapor pressure offset

COMMUNICATION COLUMN DESCRIPTIONS

Column	Descriptions
Samples Read	The number of times attempts have been made to read the sensor
Samples Used	The number of samples that were read without errors
Parity Errors	The number of samples that had parity or CRC (data corruption) errors
Partial Read	The number of samples with only a partial response
Comm. Errors	The number of communication errors (e.g., when the sensor did not respond to a poll)
Restarts	The number of times a sensor has been jump-started

CHANNEL REPORT DESCRIPTION

The Channel Report lists the raw data (in hex format) of each communication channel of the sensor and provides an indication of the sensor's current state. The number of channels and what each channel represents is specific to each sensor.

Diagnostics> Vapor Pressure Sensor> Calibrate

This screen allows you to manage the calibration of a vapor pressure sensor (VPS).

NOTICE Do not attempt to calibrate the Vapor Pressure Sensor without contacting Veeder Root Technical support first.

SELECTION CRITERIA

FIELD DESCRIPTIONS

Field	Descriptions
Address	The address of the vapor pressure sensor, selected in Setup> Devices> Vapor Pressure Sensor .
Label	The description for the vapor pressure sensor, entered in Setup> Devices> Vapor Pressure Sensor .
Serial Number	The serial number of the vapor pressure sensor, detected from the device.
Factory Pressure	The current pressure reading using the factory settings of the vapor pressure sensor (iwc). This is continually updated as the pressure changes.
Calibrated Pressure	The current calibrated value (iwc) using the stored calibration and date/time it was last calibrated. If the sensor was never calibrated outside of the factory, this field does not display. $\text{Calibrated Pressure} = (\text{Factory Pressure} * \text{Slope}) + \text{Offset}$
Zero Reference	The reference pressure that will be applied to the sensor while at atmosphere, typically 0. To the right of this field is the Zero Measured Reading, which is recorded when the Accept button is pressed.
Accept	Records the current Factory Pressure as the Measured Reading for Zero Reference. (Wait until the Factory Pressure is stable.) You must still save the screen for the calibration to be performed.
Span Reference	This optional field is used when calibrating the sensor at a Span pressure measured with a calibrated test manometer. The reference pressure that will be applied to the sensor by the test device, typically +2 iwc. To the right of this field is the Span Measured Reading, which is recorded when the Accept button is pressed.
Accept	Records the current Factory Pressure as the Measured Reading at Span Reference. (Wait until the Factory Pressure is stable.) You must still save the screen for the calibration to be performed.

CALIBRATING THE VAPOR PRESSURE SENSOR

1. Expose the sensor to atmospheric pressure by opening the valve at the bottom of the sensor.
2. Wait for the Factory Pressure to settle.
3. The Zero Reference should display the default of zero (0).
4. Press the **Accept** button. Press the Accept button. The Zero Measured Reading value will be recorded.
5. Save the screen. If the calibration is successful, the Calibrated Pressure field displays using the new calibration and the date/time of the calibration is updated. If the calibration fails, a pop-up informs you. Check the Zero Reference and Zero Measured reading fields and try the calibration procedure again.
6. You can use the **Share** button to print the calibration history, including any cleared calibrations.

System Status 0 Warning(s) 0 Alarm(s) 07/11/2021 05:33 AM

Diagnostics Vapor Pressure Sensor Calibrate Share

Home

Favorites

Menu

Actions

VP Sensor

Address B1.S3.4

Label VaporSensor1

Serial Number 0105062884

Factory Pressure [iwc] 2.099

Calibrated Pressure [iwc]

Zero Reference [iwc] 0 0.010 Accept

Span Reference [iwc] 2 2.099 Accept

Zero Measured Reading

Span Measured Reading

Figure 11. Example Vapor Pressure Sensor Calibration Screen - Calibration Displayed

Home

Favorites

Menu

Actions

1

VP Sensor

Diagnostics Vapor Pressure Sensor Calibrate

Share

Address B1.S3.4

Label VaporSensor1

Serial Number 0105062884

Factory Pressure [iwc] 2.099

Calibrated Pressure [iwc] 2.000 07/11/2021 05:33 AM

Zero Reference [iwc] 0

Span Reference [iwc] 0

Accept

Accept

Calibrated Pressure after saving Zero and Span Measured Readings

Figure 12. Example Vapor Pressure Sensor Calibration Screen - Calibration Accepted

CALIBRATING THE VAPOR PRESSURE SENSOR WITH A CALIBRATED TEST DEVICE

1. Expose the sensor to atmospheric pressure by opening the valve at the bottom of the sensor.
2. Wait for the Factory Pressure to settle.
3. The Zero Reference should display the default of zero (0).
4. Press the **Accept** button. The Zero Measured Reading value will be recorded.
5. Enter the Span Reference that you intend to expose the sensor to using the test device. This is generally +2 iwc.
6. Connect the test device to the ambient port and establish the desired pressure, as measured with a calibrated test manometer.
7. Wait for the Factory Pressure to settle.
8. Press the **Accept** button. The Span Measured Reading value will be recorded.
9. Save the screen. If the calibration is successful, the Calibrated Pressure field displays using the new calibration and the date/time of the calibration is updated. If the calibration fails, a pop-up informs you. Check the Zero Reference, Span Reference, and Zero and Span Measured Readings fields and try the calibration procedure again.
10. You can use the print button to print the calibration history, including any cleared calibrations.

CLEARING THE CALIBRATION

If you want to reset the calibration to the factory settings, you can clear the calibration:

1. Use **Actions > Clear Calibration**. [Web: Click Clear Calibration button.]

2. Confirm that you want to clear the calibration.

The Calibrated Reading value is now equal to the Factory Pressure value.

SCREEN PRINTOUT: VAPOR PRESSURE SENSOR CALIBRATION HISTORY

This printout shows the Vapor Pressure Calibration History which includes all successfully completed and cleared calibrations of the Vapor Pressure Sensor selected on the screen. This history will show the sensor's description (Label), date and time of the calibration, sensor's serial number along with the Slope and Offset which may be requested by technical support.

FIELD DESCRIPTIONS

Field	Descriptions
Sensor	The description (Label) for the vapor pressure sensor, entered in Setup> Devices> Vapor Pressure Sensor .
Date	Date and Time of the calibration.
S/N	The serial number of the vapor pressure sensor, detected from the device.
Slope	Slope adjusts the Calibrated Pressure over the span of readings as they move away from 0. Calibrated Pressure = (Factory Pressure * Slope) + Offset
Offset	Offset adjusts the Calibrated Pressure for a constant offset of readings (e.g. from 0). Calibrated Pressure = (Factory Pressure * Slope) + Offset .

```

07/11/21  5:34 AM

TLS_450 UST
VEEDER-ROOT TEST LAB
125 POWDER FOREST DR
SIMSBURY, CT 06070

VAPOR PRESSURE CALIBRATION HISTORY

SENSOR: 1 - VaporSensor1
DATE           S/N           SLOPE  OFFSET
-----
21/07/11 05:33 105062884 0.957 -0.010  Calibration
21/07/11 05:35 105062884 1.000  0.000  Clear Calibration

```

Figure 13. Example VPS Calibration History Printout

Vapor Valve Overview

Select **Menu>Diagnostics>Vapor Valve>Overview** to display the Vapor Valve overview screen.

This screen provides a report with general and communication diagnostic information for vapor valves. Vapor valves release excess air pressure from a carbon canister during Pressure Management Control (PMC).

GENERAL COLUMN DESCRIPTIONS

Column	Descriptions
Type	Sensor type description
Status	Displays one or more of the following messages: <ul style="list-style-type: none"> • NORMAL • SETUP DATA WARNING • Device Setup Data Problem • Address Not Set • COMMUNICATION ALARM • BATTERY WARNING (Wireless Only) • CAP NOT CHARGING (Capacitor) • CAP NOT HOLDING (Capacitor) • VALVE COMMAND FAULT • TEMP RANGE FAULT • REF RESISTOR FAULT (REF - Resistor) • RESISTOR RANGE FAULT • DATA NOISE FAULT • VALVE NOISE FAULT
Serial Number	Console auto-detected serial number of this device
Valve Position	Indicates whether the valve is open or closed
Battery Status [Wireless Device Only]	Indicates the status of the battery in a wireless device. Possible battery status messages: <ul style="list-style-type: none"> • Unknown • Full • Medium • Low • Replace
Open Capacitor	Indicates whether the capacitor that opens the valve is charged or discharged
Closed Capacitor	Indicates whether the capacitor that closes the valve is charged or discharged
Ambient Temp	Indicates the temperature of the atmosphere
Outlet Temp	Indicates the temperature of the outlet on the vapor valve

CONSTANTS COLUMN DESCRIPTIONS

Column	Descriptions
Device Code	The device code for the sensor, i.e., 14 = Vapor Valve
Model	The model number for this sensor
Firmware Version	The firmware version for the sensor

COMMUNICATION COLUMN DESCRIPTIONS

Column	Descriptions
Samples Read	The number of times attempts have been made to read the sensor
Samples Used	The number of samples that were read without errors
Parity Errors	The number of samples that had parity or CRC (data corruption) errors
Partial Read	The number of samples with only a partial response
Comm. Errors	The number of communication errors (e.g., when the sensor did not respond to a poll)
Restarts	The number of times this sensor restarted

CHANNEL REPORT DESCRIPTION

The Channel Report lists the raw data (in hex format) of each communication channel of the sensor and provides an indication of the sensor's current state. The number of channels and what each channel represents is specific to each sensor.

Hose Events

Via console GUI: **Menu>Diagnostics>Vapor Monitor> Hose Events**

Via WEB: **Menu>Diagnostics>Vapor Monitor>Hose Diagnostics>Hose Events** Tab

This is a diagnostic screen used to understand how well vapor collection is performing. It is used to verify A/L's to see over a period of time how well vapor collection is on a particular hose.

In-Station Diagnostics (ISD) hose events shows the hose events that are qualified gasoline dispenses used by this screen:

- Single hose dispense from the selected dispenser.
- Fuel dispensed >3.0 gallons.
- A/L Ratio > 0.0 and A/L Ratio < 5.0

HOSE EVENTS STATUS MESSAGES

Status Message	Description
#	Transaction number
Transaction Date/Time	Date and time of dispense
Duration	Duration in seconds of dispense
A/L	Air/Liquid ratio
Vapor	Amount of Vapor collected in gallons
Fuel	Amount of gasoline dispensed in gallons

It may take a few minutes after a dispense for the event to show in the data.

- If there was a recent Clear Test After Repair (CTAR) performed, the data shown will be the data since the last CTAR.
- The data seen on this screen is the same as shown on the Hose Histogram.
- Via WEB; The data on this screen is the same as shown in **Diagnostics>Vapor Monitor>Hose Diagnostics>Hose Event** Tab.

To refresh the data shown on the screen in the GUI, Select **Actions/FP Label**, and the Hose # again. [Refresh data in the Web by selecting Refresh].

- 1. Select **Menu>Diagnostics>Vapor Monitor** (Figure 14), then touch Hose Events (Figure 15).



Figure 14. Clearing Vapor Collection Test By Hose

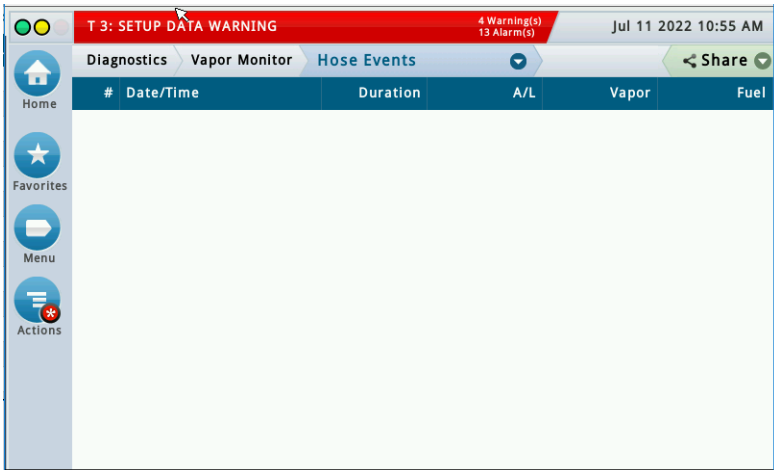


Figure 15. Vapor Monitor Hose Events Screen

- 2. Touch the Actions button, then select a FP hose (item 1 Figure 16), Hose # (item 2) and touch the ☒ button to display the vapor collection events for the selected hose (Figure 17).

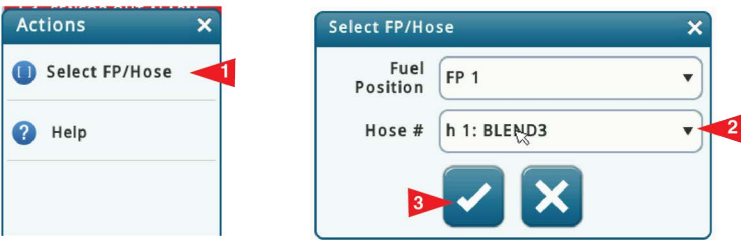


Figure 16. Clearing Vapor Collection Test By Hose

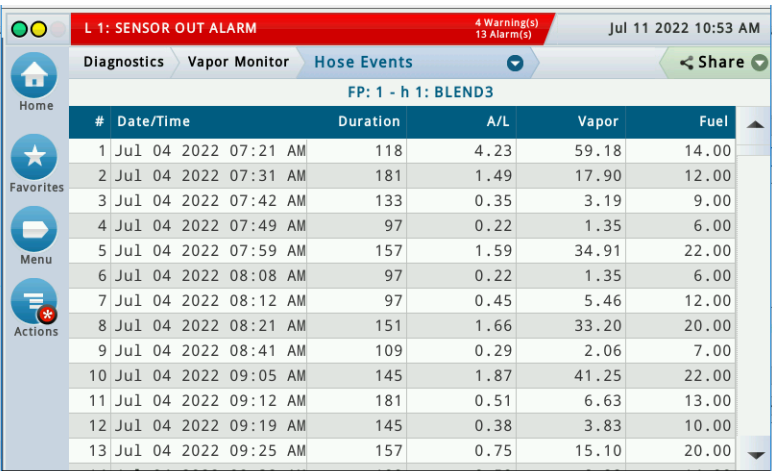


Figure 17. Vapor Collection Hose Events Screen

The data on the GUI screen above is the same as shown in **Diagnostics>Vapor Monitor>Hose**
Diagnostics>Hose Events Tab via the WEB.

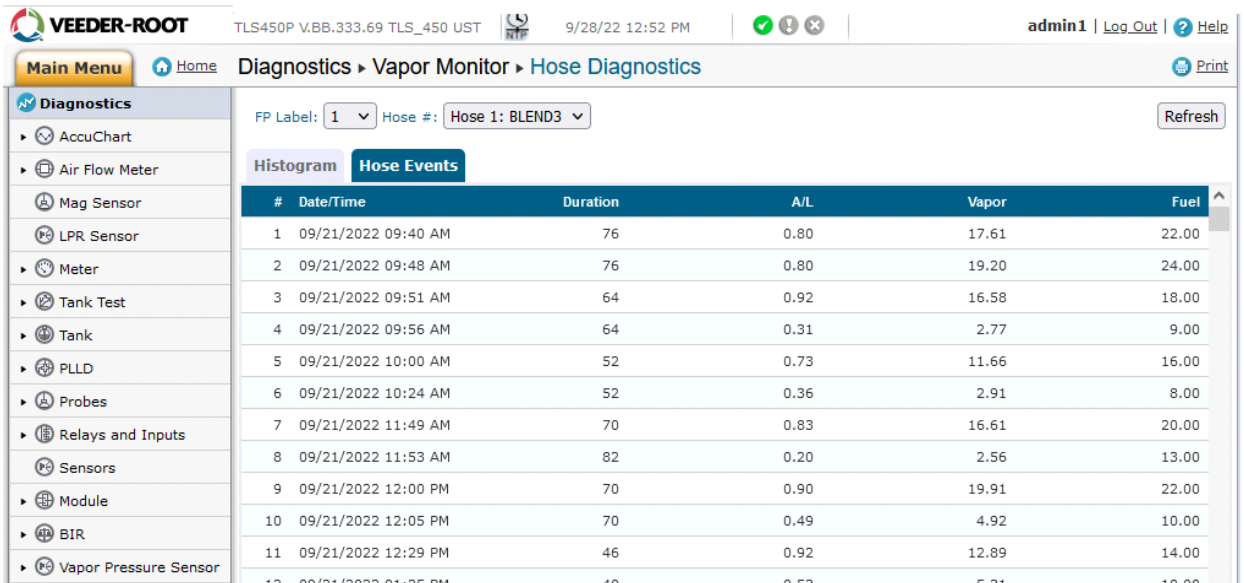


Figure 18. WEB - Vapor Collection Hose Events Screen

HOSE HISTOGRAM

Via WEB only: **Menu>Diagnostics>Vapor Monitor>Hose Diagnostics>Histogram Tab**

The Hose Histogram provides a visual representation of the overall performance of the hose. Information provided includes the A/L ratio of dispenses since the last Clear Test After Repair (CTAR), a status based on A/L data with suggested actions for possible issues (see Figure 19).

SELECTION CRITERIA

FP Label: Select the Fueling Point number on the dispenser that has the hose to be examined for A/L dispense

Hose # : Select the Hose #/Hose Label

HOSE HISTOGRAM STATUS MESSAGES

Status Message	Description
Normal	Transaction number
Hose Needs Adjusting	Check for proper A/L adjustment per Executive Order VR-202, Exhibit 5 test. EVR Type is Assist.
Hose Needs Replacement	Check with Nozzle Manufacturer for information regarding A/L shift, indicating possible need for replacement. EVR Type is Assist.
Hose Need Inspecting	Inspect nozzle for damage and work or torn boots. Check for proper dispensing fuel flow rates. Check dispenser fuel filters.
Insufficient Data	Not enough A/L data to process. There must be a minimum of 100 qualified dispenses.

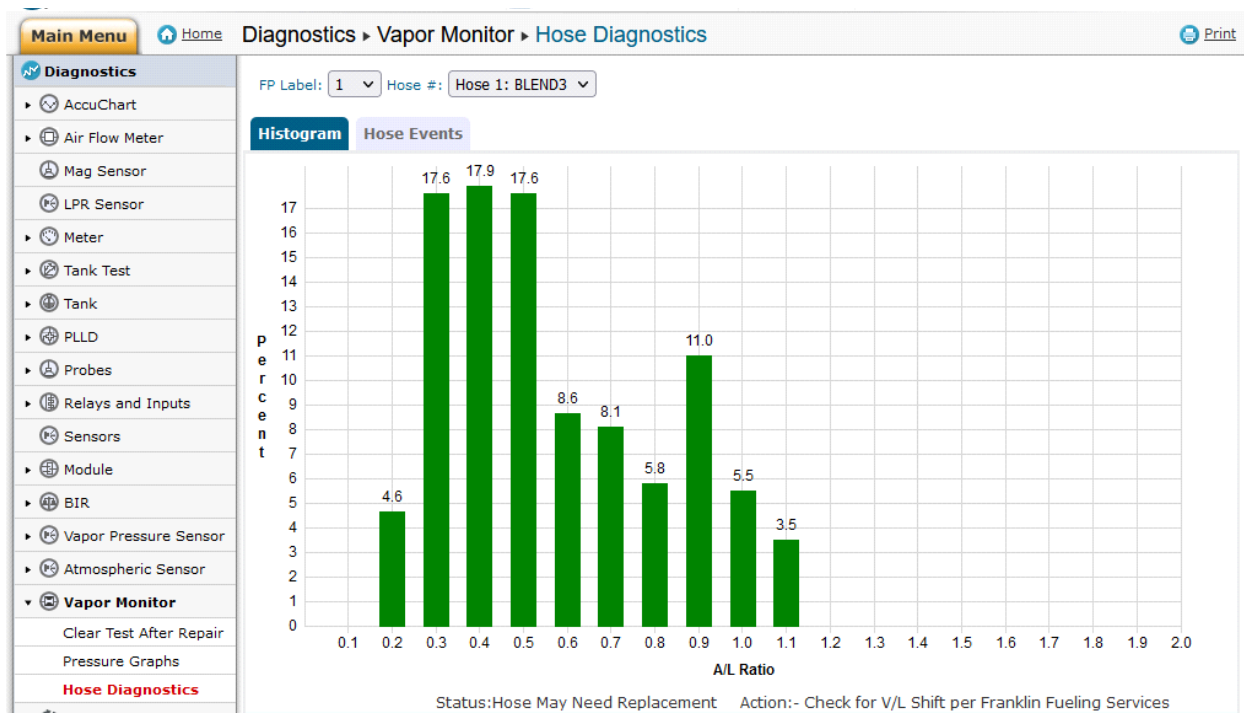


Figure 19. Example Hose Histogram Screen - Web Only

Diagnostics>Vapor Monitor>Pressure Graphs

This is only available via the WEB: **Menu>Diagnostics>Vapor Monitor>Pressure Graphs**

This screen lets you view a graphic representation of the vapor pressure, and ullage readings of the gasoline tanks which are used by In-Station Diagnostics. Vapor pressure, and ullage are illustrated with the corresponding time and date stamp, and represent what is occurring with the tank pressure and ullage during delivery and dispensing for that time period (see Figure 20).

- The time frame represented in the graph is approximately 30 hours.
- The Refresh button is used to provide the most recent data available.

CHART DESCRIPTION

The information on this chart provides:

- Vapor Pressure vs Time - Plots individual vapor (ullage) pressure samples (in inches of water column) versus time.
- Ullage vs Time - Plots individual ullage volume samples (in gallons) versus time

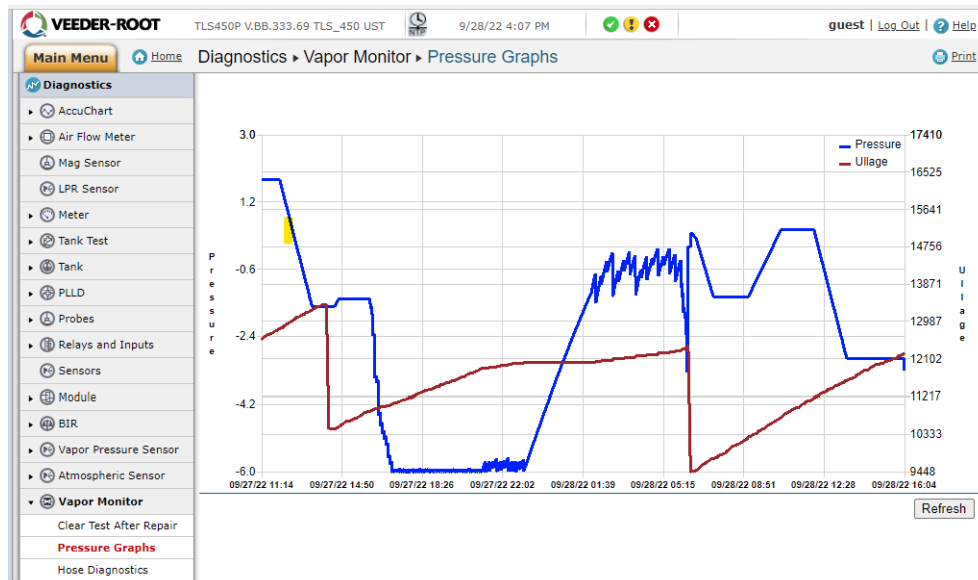


Figure 20. Example Vapor Monitor Pressure Graphs Screen - Web Only

Diagnostics>PMC>Status

The PMC Status screen provides a status report of Pressure Management Control (PMC).

1. Select **Menu>Diagnostics>PMC>Status** (Figure 21) to open the PMC Status screen (Figure 22).

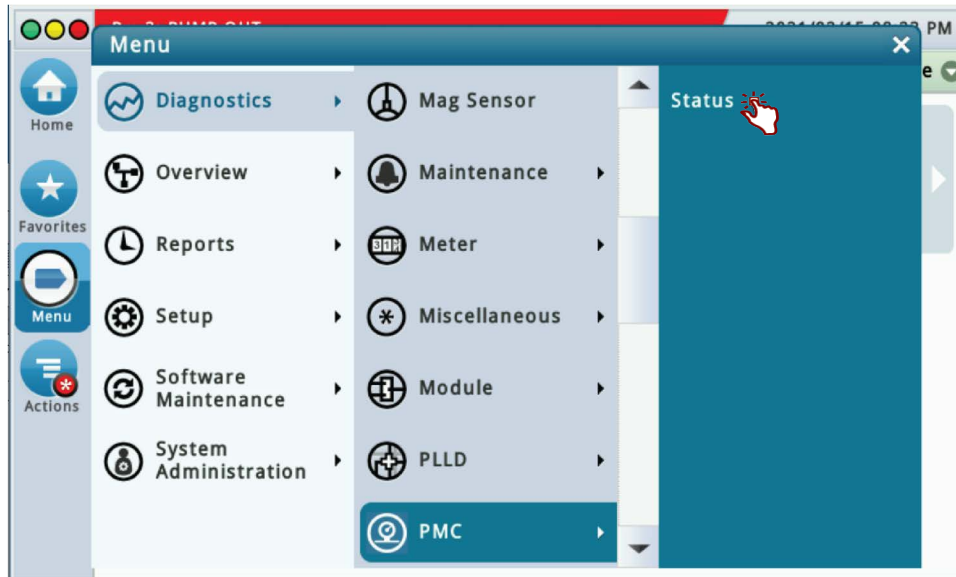


Figure 21. Accessing PMC Status Diagnostic Screen

2. Field display is dependent on the vapor processor installed.

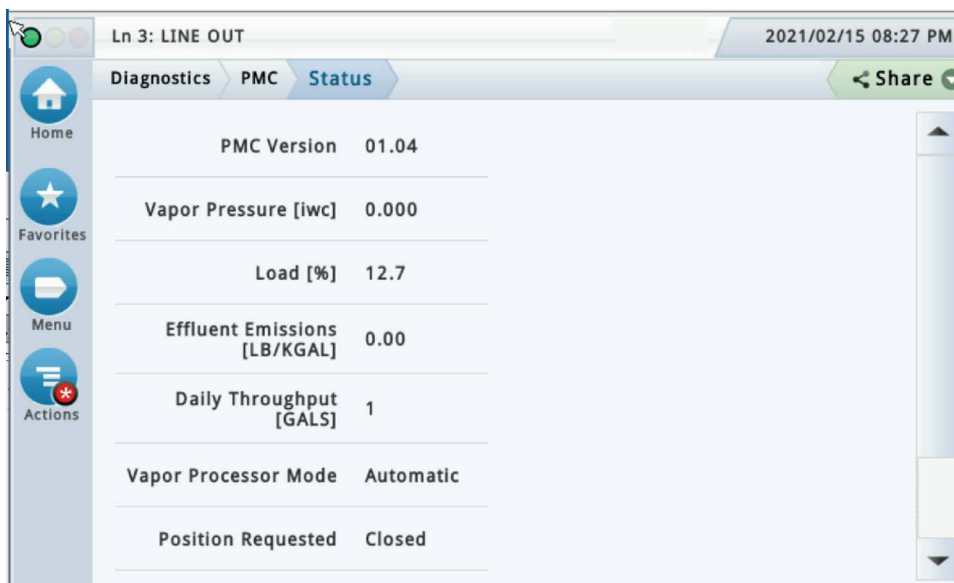


Figure 22. PMC Status Diagnostic Screen (Scroll Down to View Additional Fields)

AUTOMATIC MODE

If PMC mode is in AUTOMATIC, PMC will control flow through the Vapor Polisher using its vapor control valve. The control algorithms will monitor tank pressure, vapor temperature and carbon temperature to monitor carbon canister loading. Typically the valve opens to relieve the pressure and begin loading the canister. When the UST pressure becomes negative the valve opens and the purging process begins. The valve closes when the canister either reaches capacity or is empty after purging.

MANUAL MODE

If PMC mode is in MANUAL, touch the **Actions** button to manually set the valve to be opened (Set Requested: OPEN) or closed ((Set Requested: CLOSED). This feature tests the operation of the valve without waiting for the Vapor Polisher to reach loading or purging thresholds. It also provides the necessary controls to perform 2" decay tests. The current UST ullage space vapor pressure is available in this screen.

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

SWITCHING BETWEEN VAPOR PROCESSOR MODES

With the Vapor Polisher Mode in Automatic, touch the **Actions** button to switch the PMC Mode to Manual (see Figure 22), or when in Manual Mode, touch the **Actions** button to set the vapor valve Open or Closed and /or touch 'Set VP Mode: Automatic' to exit Manual Mode.

GENERAL COLUMN DESCRIPTIONS

Column	Descriptions
PMC Version	The version of PMC installed (e.g., 1.04)
Vapor Pressure [inwc]	The vapor pressure reported by the vapor pressure sensor in inches water column
[Veeder-Root Polisher] Load [%]	The percentage of hydrocarbons reported by the Veeder-Root Polisher, which determines if the canister is open or closed.
[Veeder-Root Polisher] Effluent Emissions Test Status [LB/KGAL]	The amount of emissions (lbs per 1000 gallons) of dispensing.
[Veeder-Root Polisher] Daily Throughput [GALS]	Gallons of gasoline dispensed per day
[Veeder-Root Polisher] Vapor Processor Mode	Current mode of the vapor processor. <ul style="list-style-type: none"> • Automatic • Manual Use Actions > Set VP Mode to change the mode. [Web: Click Set VP Mode button].
[Veeder-Root Polisher] Position Requested	Position of the Vapor Valve that is requested next. <ul style="list-style-type: none"> • Open • Closed
[Veeder-Root Polisher] Position Current	Current position of the Vapor Valve <ul style="list-style-type: none"> • Open • Closed
[ARID Processor] VP State	Current state of the vapor processor: <ul style="list-style-type: none"> • On • Off
[ARID Processor] Vapor Processor Fault	Status of Vapor Processor <ul style="list-style-type: none"> • Normal • Fault
[Veeder-Root Polisher] Temp [DEG F]	Temperature of the ullage space.

NOTICE A site with no Vapor Processor will only show the version of PMC installed (e.g., 1.04).

PMC (Non-ISD) Status Report

1. You can access and view the PMC Status report from the TLS console front panel by selecting **Menu>Reports>PMC>Status** (see Figure 23 and Figure 24).

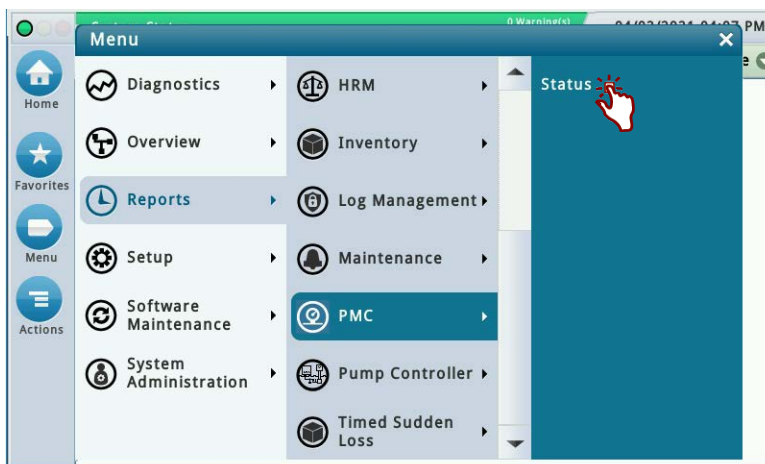


Figure 23. Accessing PMC Report

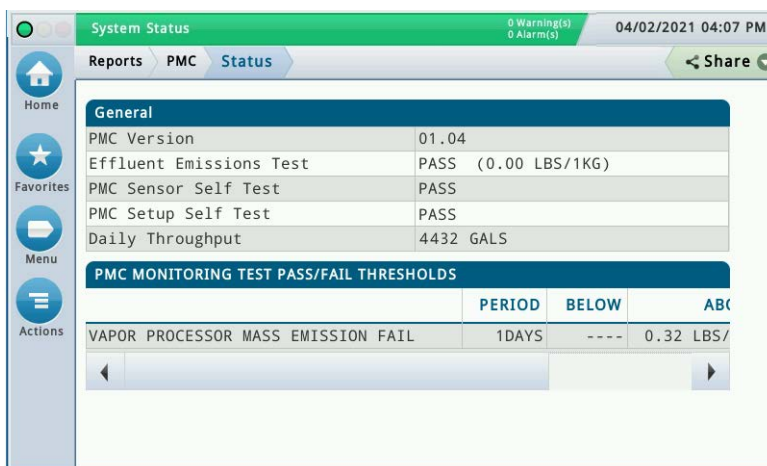


Figure 24. PMC Status Report Example

Clear Test After Repair - ISD

[Available with In-Station Diagnostics (ISD)]

Diagnostics>Vapor Monitor>Clear Test After Repair

Since ISD monitoring tests operate on sensor data gathered over a fixed time interval (calendar days), in normal operation, following a repair, it will be necessary for an Authorized Service Contractor (ASC) to perform a CLEAR TEST AFTER REPAIR (CTAR). This function clears prior failure condition data, warnings and alarms for selected ISD tests. The result will be a "No Test" until the correct amount (days) of new data are available for the cleared test(s). Using this feature will result in a logged entry in the ISD "Shutdown & Misc. Event Log". The customer would be expected to retain evidence that a repair was performed.



Figure 25. Clear Test After Repair Screen - Example with ISD

SELECTION CRITERIA

When a Clear Test After Repair is performed with a test type for various test types, the following alarms will be cleared:

FIELD DESCRIPTIONS

Field	Description
Test Type	<p>Select the type of test you want to clear. Choices are:</p> <p>Containment Pressure</p> <ul style="list-style-type: none"> • ISD GROSS PRES WARN • ISD GROSS PRES FAIL • ISD DEGRD PRES WARN • ISD DEGRD PRESS FAIL • VP PRESSURE WARN • VP PRESSURE FAIL <p>Vapor Collection</p> <ul style="list-style-type: none"> • hnn: GROSS COLLECT WARN • hnn: GROSS COLLECT FAIL • hnn: DEGRD COLLECT WARN • hnn: DEGRD COLLECT FAIL • hnn: FLOW COLLECT WARN • hnn: FLOW COLLECT FAIL • hnn: AIRFLOW MTR SETUP <p>Vapor Leak</p> <ul style="list-style-type: none"> • ISD VAPOR LEAK WARN • ISD VAPOR LEAK FAIL <p>Vapor Processor</p> <ul style="list-style-type: none"> • ISD VP PRES WARN • ISD VP PRES FAIL • ISD VP STATUS WARN • ISD VP STATUS FAIL • VP EMISSIONS WARN • VP EMISSIONS FAIL <p>Sensor Out</p> <ul style="list-style-type: none"> • ISD SENSOR OUT WARN • ISD SENSOR OUT FAIL <p>Setup</p> <ul style="list-style-type: none"> • ISD SETUP WARN • ISD SETUP FAIL
Last Clear	If a Clear Test After Repair was performed on the selected Test Type, the date and time of that Last Clear is posted here. If no test has been cleared, it will state "Never".
FP label	<p>[Available for Vapor Collection test type only]</p> <p>Select the fueling position label to be cleared, clear by checking the box to the left of the label. If there is only one hose assigned to this fuel position label, the last cleared date displays to the right. If there is more than one hose assigned to the fuel position label, expand the list to show each hose. This allows selection of individual hoses to be cleared. The last cleared date for each individual hose displays.</p> <p>Once the fuel position label/hose(s) to be cleared are selected, press the Clear Test button.</p>
Clear Test	Press to clear the test. This function clears prior failure condition data, warnings, and alarms for the selected ISD tests. Using this feature will result in a "TEST MANUALLY CLEARED" logged entry in the ISD "Shutdown & Misc Event Log". the Last Clear field will also update.
Override Shutdown	If the site or dispenser(s) are not shutdown, this button is greyed out, otherwise press to override a shutdown in effect and resume dispensing. Dispensing resumes, the alarm light continues to flash, and any alarm messages display until the alarm has been cleared. A "PUMPS MANUALLY RE-ENABLED" event is entered in the "Shutdown & Misc Event Log".

CLEAR TEST AFTER REPAIR – PMC (NON-ISD)

[Available with Pressure Management Control (PMC)]

Since monitoring tests operate on sensor data gathered over a fixed time interval, in normal operation, following a repair, it will be necessary for an Authorized Service Contractor (ASC) to perform a CLEAR TEST AFTER REPAIR (CTAR). This function clears prior, failure condition data, warnings and alarms for selected Vapor Processor tests. Using this feature will result in a logged entry on this screen. The customer would be expected to retain evidence that a repair was performed.

When a Clear Test After Repair is performed with a test type of Vapor Processor, the following alarms will be cleared:

- VP EMISSIONS WARN
- VP EMISSIONS FAIL

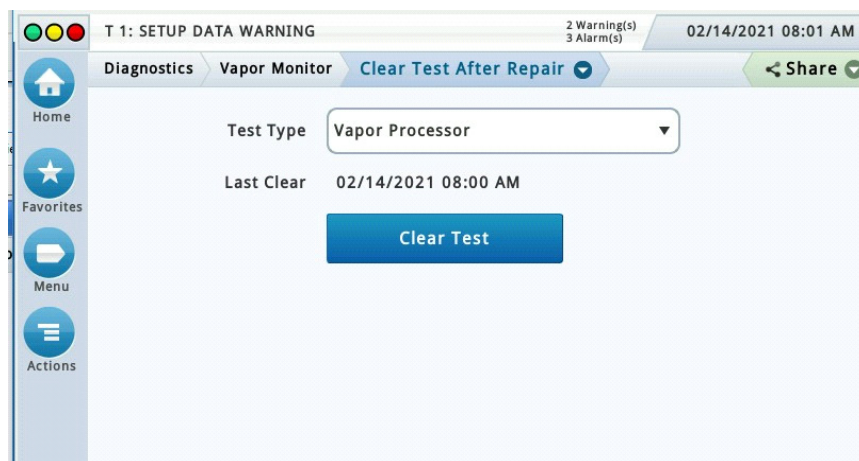


Figure 26. Clear Test After Repair Screen - Example PMC w/o ISD

FIELD DESCRIPTIONS

Field	Description
Test Type	Select the type of test you want to clear. • Vapor Processor
Last Clear	If a Clear Test After Repair was performed on the selected Test Type, the date and time of that Last Clear is posted here. If no test has been cleared, it will state "Never".
Clear Test	Press to clear the test. This function clears prior, failure condition data, warnings, and alarms for the selected test. The Last Clear field will also update.

Reports

There are two main reports (CP-201 required) that are stored by the ISD system: the Monthly Status Report (CARB Monthly), stored for 12-months, and the Daily Status Report (CARB Daily), stored for 365 days. You can access and view or print out ISD reports from the TLS console front panel by selecting **Menu>Reports>ISD** (see Figure 27).



Figure 27. Accessing ISD Reports

- The Daily Status Report (CARB Daily) 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
 - Vapor Processor monitoring test results
- The Monthly Status Report (CARB Monthly) includes:
 - ISD operational up-time (as a percentage)
 - EVR/ISD system pass time (as a percentage)
 - Last 10 Warnings log
 - Last 10 Failures log
 - Last 10 Misc. Events log
- Daily Collection Report includes daily results of:
 - ISD EVR Status
 - % Up Time
 - Vapor Collection Monitoring test results for each gasoline fueling position.
 - The printout will also include the ISD Status Report.

- Daily Containment Report includes daily results of:
 - ISD EVR Status
 - Vapor Containment Monitoring Gross (75th percentile), Degradation (95th percentile) with Max and Min daily pressures.
 - Vapor Leakage Detection (CVLD)
 - Vapor Processor Monitoring tests results
 - The printout will also include the ISD Status Report
- Status Events (Monthly) Report (The selected day range: Status Report - includes:
 - Status report
 - Warning Alarms
 - Failure Alarms
 - Shutdown & Misc. Event Log

NOTICE Additional report details can viewed within reports by touching the Actions button and then touching Help.

Comm Modules

COMM MODULES

Table 9 lists Comm Modules for the TLS-450PLUS designed and manufactured by Veeder-Root.

Table 9. Communication Bay Modules

Part No.	Item
332818-001	SiteFax/Modem Single Port Module
333460-001	Ethernet Module (Factory Installed Slot 4 Only)
333477-001	USB module (Factory installed Slot 5 Only)
332866-001	RS-232 Single Port Module (also used for EDIM or Satellite S-SAT or Satellite H-JBox Modules apps.)
332868-001	RS-232 Dual Port Module (also used for EDIM or Satellite S-SAT or Satellite H-JBox Modules apps.)
332867-001	RS-485 Single Port Module
332869-001	RS-485 Dual Port Module
333807-000	Tri-Comm Module
333140-001	CDIM Module
333651-001	IFSF LON Module

COMM MODULE SLOTS

1. The Comm Bay is divided into 5 slots numbered from 1 to 5 going from left to right. Only slots 1-3 are available for user-selectable Comm Modules (Figure 28). Slots 4 and 5 are fixed and can not be changed (see Figure 29).

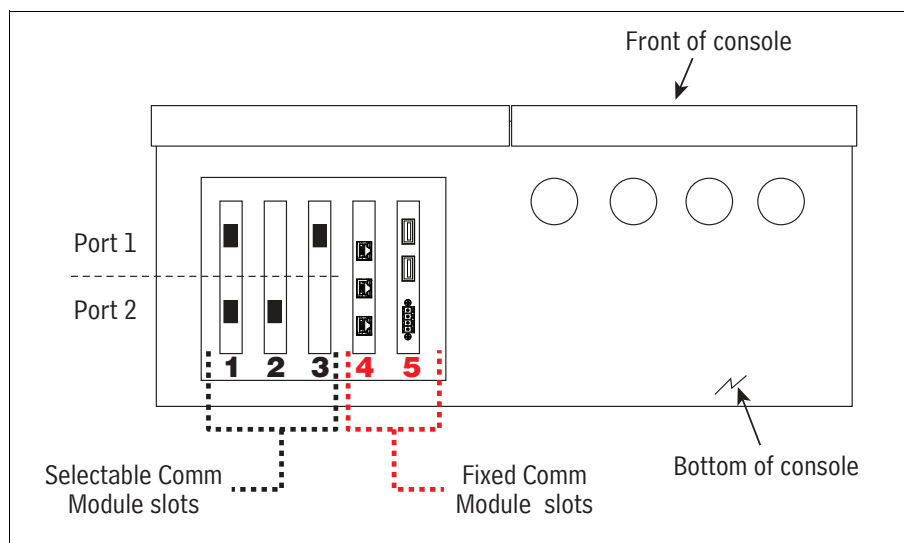


Figure 28. TLS-450PLUS Console - Selectable Comm Modules

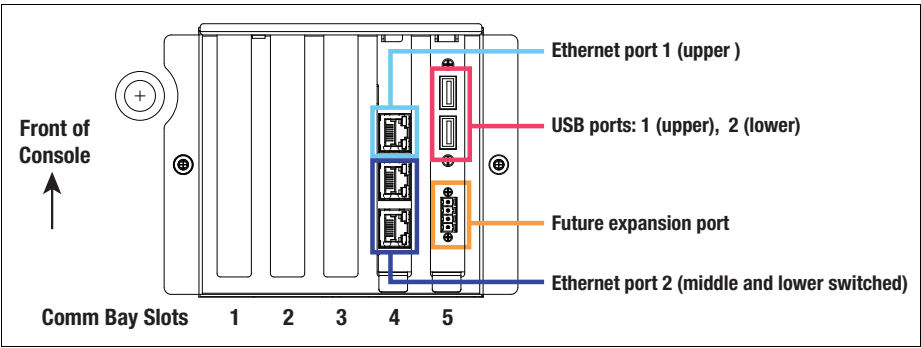


Figure 29. TLS-450PLUS Console - Fixed Comm Modules

COMM MODULE PORT CONFIGURATIONS

NOTICE To avoid attaching a Comm Module cable to a non-configurable (NC) port, identify the configurable (C) ports of any Comm Module being installed. Also verify the Comm cable port connections to Comm Modules in slots 4 and 5. Record all Comm port connections for use at setup.

User-selectable Comm Port configurations will depend on features ordered. Slots 1-3 (Figure 28) can be used for any combination of Comm Modules found in Table 10 or Table 11 as appropriate.

Table 10. Configurable (C)/Non-Configurable (NC) Ports for Selectable Comm Modules (Comm Bay Slots 1 - 3 Only)

Comm Module	Comm Type	Slot 1		Slot 2		Slot 3	
		Port		Port		Port	
		1	2	1	2	1	2
RS-232 Single Port (also EDIM, Satellite S-SAT and Satellite H-JBox apps.)	Serial	NC	C	NC	C	NC	C
RS-232 Dual Port (also EDIM, Satellite S-SAT and Satellite H-JBox apps.)*		C	C	C	C		
RS-485 Single Port		NC	C	NC	C	NC	C
RS-485 Dual Port*		C	C	C	C		
RS-232/RS-485 Dual Port*		C (RS-232)	C (RS-485)	C (RS-232)	C (RS-485)		
Tri-Comm		C	C	C	C		
SiteFax / Modem		NC	C	NC	C	NC	C
CDIM	DIM	C	NC	C	NC		
IFSF LON		C	NC	C	NC	C	NC
*An unclearable alarm will be posted if this Comm Module is in Slot 3.							

2. Typical TLS-450PLUS RS-232 DB9 connector pin outs are shown in Figure 30.

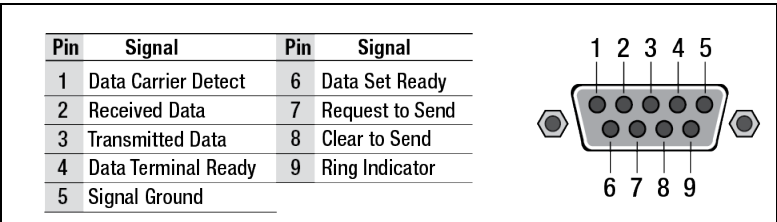


Figure 30. TLS-450PLUS RS-232 DB9 Connector Pin Outs

If using a Tri-Comm Module (slots 1 or 2 only), refer to Figure 34 for Tri-Comm Module locations and Table 11 for Tri-Comm Module port configurations.

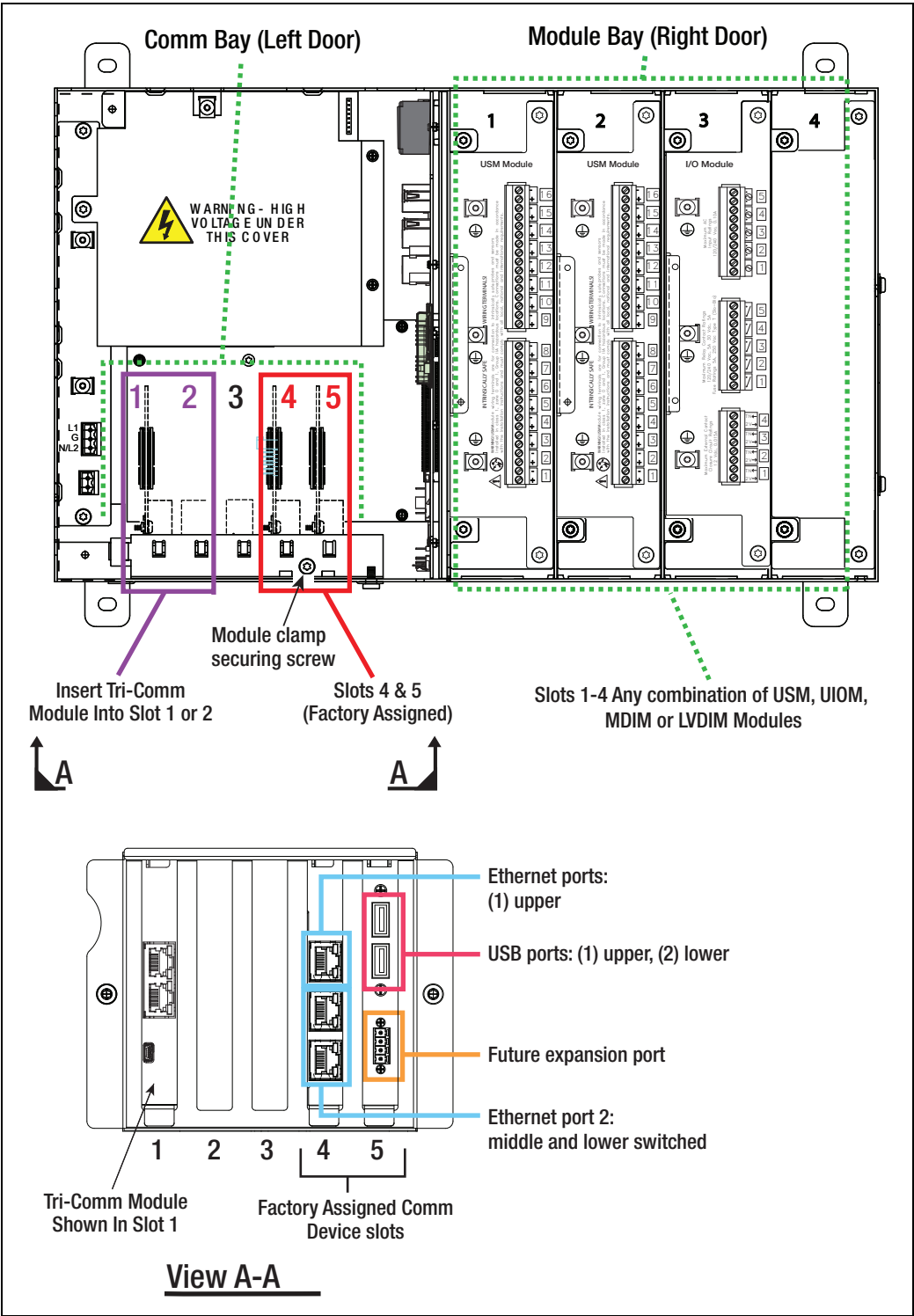


Figure 31. Example Tri-Comm Module Installation in Slot 1

Tri-Comm Module Ports and Jumper configurations are shown in Figure 32.

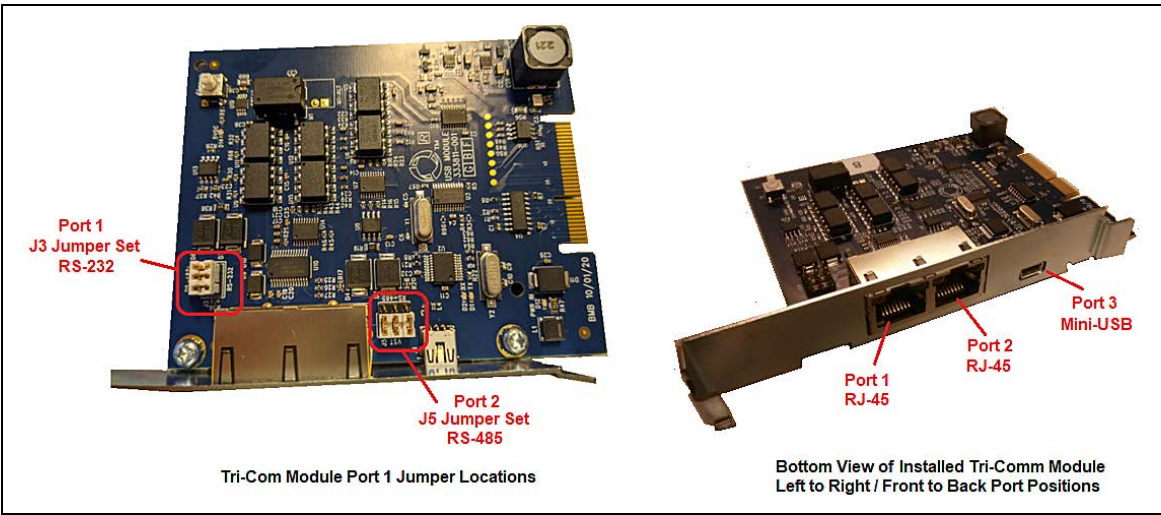


Figure 32. Tri-Comm Module Ports/Jumpers

Table 11. Tri-Comm Module Port Configuration

Item	Port 1		Port 2	Port 3
Communication Type	RS-232 or RS-485 (Dependent upon jumper positioning)		RS-485 (Only)	Mini USB/Inquiry Only
Connector Type	RJ-45	RJ-45	RJ-45	Mini USB
Cable Pin Outs	RS-232 <ul style="list-style-type: none">• Pin 1 – DCD• Pin 2 – RXD• Pin 3 – TXD• Pin 4 – DTR• Pin 5 – GND• Pin 6 – DSR• Pin 7 – RTS• Pin 8 – CTS	RS-485 <ul style="list-style-type: none">• Pin 2 – RS-485B• Pin 3 – RS-485A• Pin 5 – GND	RS-485 <ul style="list-style-type: none">•Pin 5 – GND•Pin 6 – RS-485 A•Pin 7 – RS-485 B	-----
Data Bit Parity Stop Bit Data Rate	Configurable		Configurable	Fixed at: <ul style="list-style-type: none">• 8 Data Bits,• No Parity,• 1 Stop Bit.• Data Rate (configurable)

Viewing ISD Reports via RS-232 Connection

CONNECTING LAPTOP TO TLS-450PLUS

- 1. Connect your laptop to one of the TLS-450PLUS RS-232 Comm port using one of the methods shown in the in Figure 33 below.

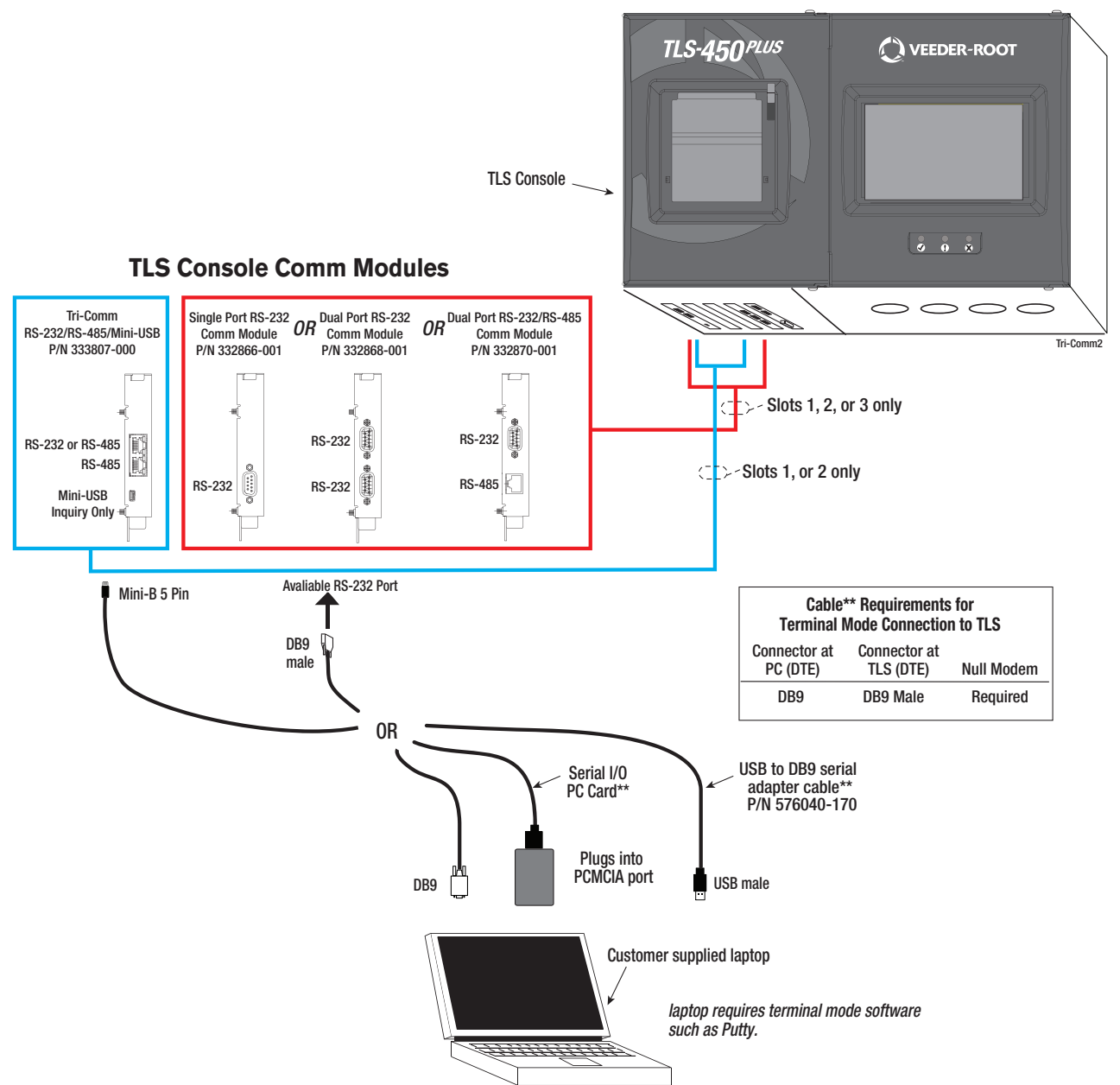


Figure 33. Connecting Laptop to TLS-450PLUS for Serial Communication

If using a USB to DB9 Serial adapter cable (P/N 576040-170), or equivalent, you will need to follow the instructions shipped with the adapter cable.

2. Select an available RS-232 Comm port on the TLS-450PLUS Comm cage (see Figure 34).

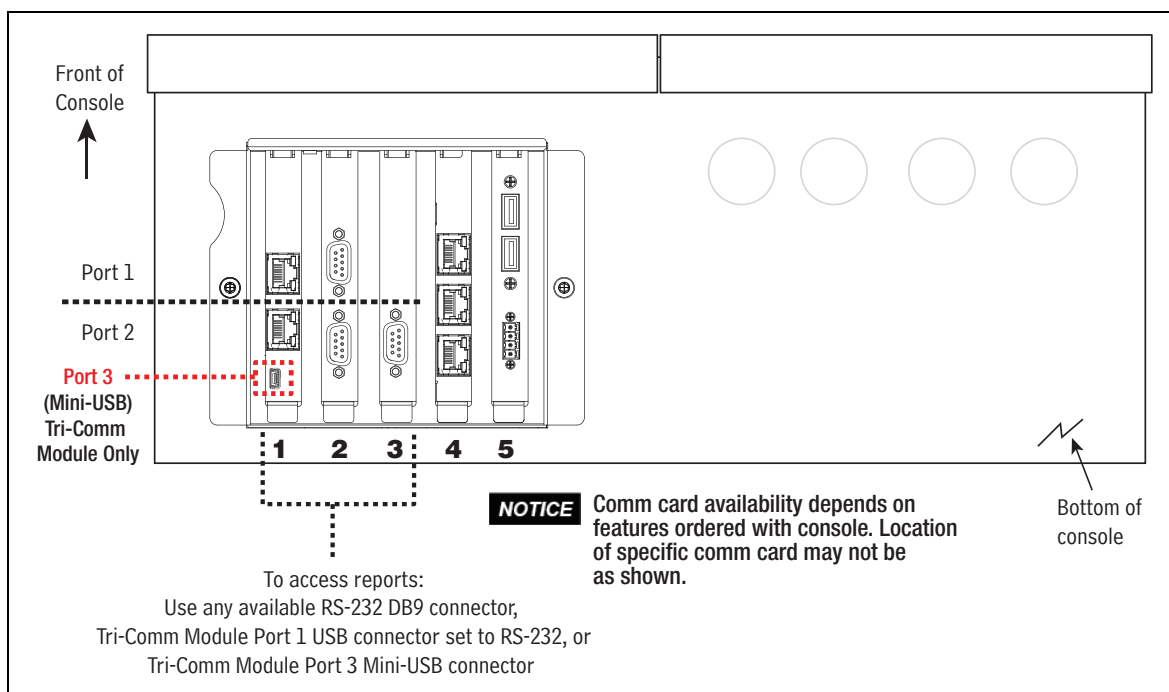


Figure 34. Connect Laptop to an Available RS-232 Comm Port

SETTING UP THE TLS-450PLUS SERIAL PORT FOR ISD REGULATOR ACCESS

1. On the TLS-450PLUS touch **Menu>Setup>Communication>Serial Port**. Use the required ISD dedicated Comm port, e.g., select serial port 3 (Figure 35).

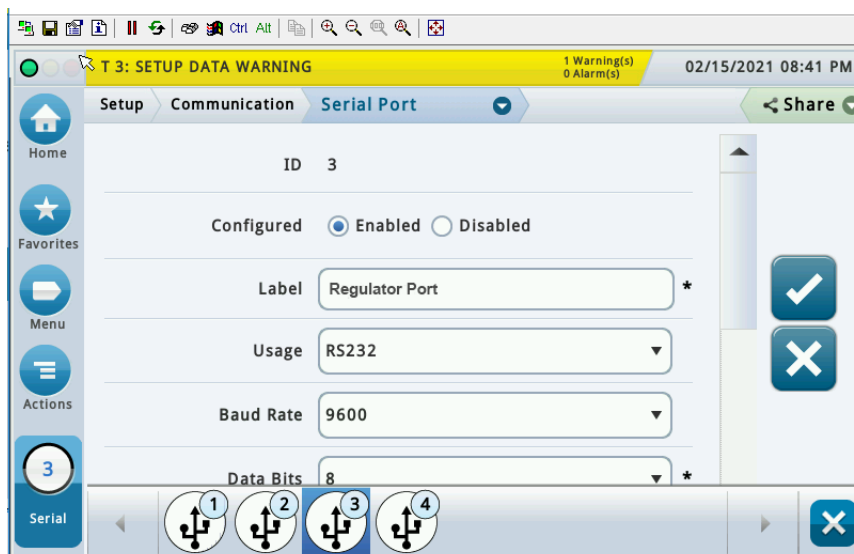


Figure 35. Example Serial Port Setup Screen

- c. Verify that the Usage entry is RS-232 and copy the settings, especially Baud Rate, Data Bits, Parity and Stop Bits which we will use to set up PuTTY.

The screenshot displays the 'Serial Port' setup screen for ID 3. The interface includes a top status bar with a yellow warning banner 'T 3: SETUP DATA WARNING', '1 Warning(s)', '0 Alarm(s)', and the date/time '02/15/2021 08:42 PM'. A left sidebar contains navigation icons for Home, Favorites, Menu, Actions, and a 'Serial' section with a circled '3'. The main area shows the 'Serial Port' configuration for ID 3, with a 'Configured' status of 'Enabled'. The settings are as follows:

Field	Value
ID	3
Configured	Enabled
Label	Regulator Port *
Usage	RS232
Baud Rate	9600
Data Bits	8 *
Parity	NO PARITY *
Stop Bits	1
Use Handshaking	NO HANDSHAKING
Serial Command Security	Disabled
Security Code	[Empty]
RS232 End of Message	Disabled
ETX Characters Display	[0x03]
ETX Characters Computer	[0x03]

On the right side of the configuration area, there are two large buttons: a blue checkmark button and a blue 'X' button. A vertical scrollbar is visible on the right edge of the main content area.

Figure 36. Example Serial Port 3 Setup Screen

Setting Up Communication Between Laptop And TLS-450PLUS

1. There are many free, open source, terminal emulator, serial console, and network file transfer applications that work with Windows computers. Putty is such a program it can be downloaded using the link below:

<https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html>

2. Determine which laptop COM port you will use to connect to the TLS-450PLUS.
 - a. Right click Start and then click Device Manager.
 - b. In the Device Manager screen click the expand arrow (>) next to **Ports (COM & LPT)**.

If Ports (COM & LPT) is not showing in 'Device Manager', look for unknown devices or a yellow exclamation point (see Figure 37).

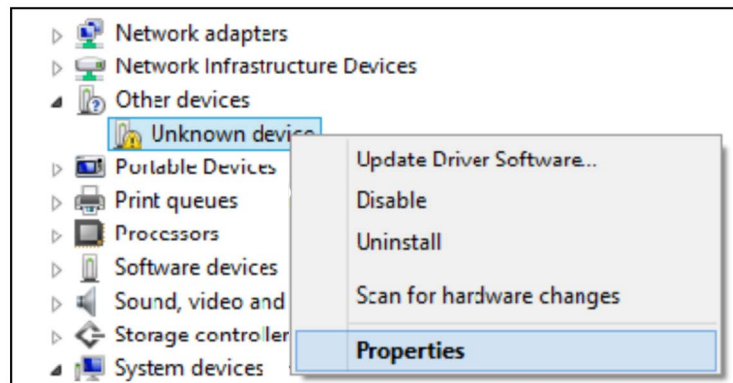


Figure 37. Laptop Device Manager

- Right click choose uninstall this device.
 - Scan for new devices.
 - If the yellow exclamation point reappears install the manufacturer's driver for the device.
 - If there are no unknown devices and the port is a USB device unplug and plug the device back in.
 - If no change try another port if available.
 - If still no change reboot the machine.
- c. Open your preferred terminal program. be sure to select the correct serial port and set the proper baud rate data bits stop bits and parity.
 - d. Open a new session with the correct settings.

- e. After clicking the **Open** button, the terminal window opens in which you enter desired commands (see Figure 38).

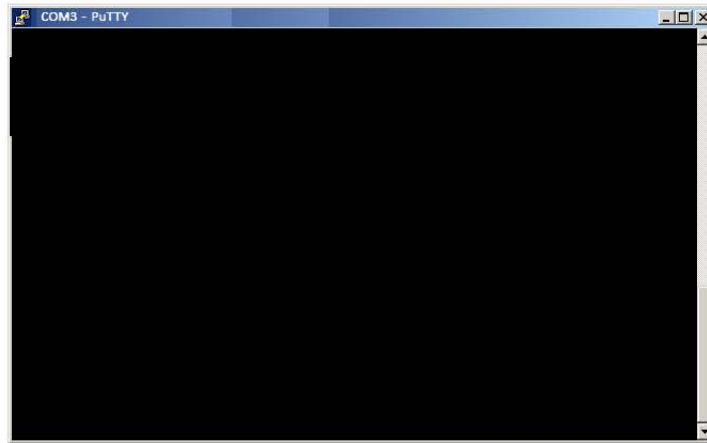


Figure 38. PuTTY Terminal Window

SENDING CONSOLE COMMANDS

Table 12 shows four important ISD console commands: IV0500, IV0200, IV0100, and IB6100. The <SOH> shown in the table means that you must press and hold the **Ctrl** key while you press the **A** key.

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

NOTICE If you want to see the characters of the command as you type them in, look for a setting in your terminal emulator 'Echo typed characters locally', and set it active.

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.

If you have local echo enabled 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 12: Serial Commands for ISD Alarm, Monthly, and Daily Reports

Report Type	Serial Command (PC to Console) ¹
Daily Report Details	<SOH>IV0500ddd Where ddd = number of days, 001 = yesterday and today, 002 = two days ago, etc.
Monthly Status Report	<SOH>IV0200yyyymm Where yyyy = year number, e.g. 2003, mm = month number, 01 = January, 02 = February, etc.
Alarm Status	<SOH>IV0100
Vapor Processor Runtime Diagnostic Report ²	<SOH>IV8000
Vapor Processor Status Report ²	<SOH>IV8200
Vapor Valve Diagnostic Report ²	<SOH>IB6100
Daily Vapor Polisher Diagnostic Report	<SOH>IV8800yyyymmddnnnn Where: yyyy = year number, e.g., 2003, mm = month number (01 = January, 02 = February, etc.), dd = day of the month, nnnn = number of records after the date entered (9999 = all).
Non-Priority Alarm History Report	<SOH>I11100
Priority Alarm History Report	<SOH>I11200

¹<SOH> = CTRL+A. For more information on TLS console serial commands, refer to the V-R Serial Interface Manual.²Not available for FFS-CAS Processor or HIRT VCS 100.

Troubleshooting Commands for Technical Support

Below are suggested commands to pull data for Technical Support assistance when there are no remote communications available to the console. The lists below will provide a starting point for assisting in diagnosing the issue.

NOTICE Most of the ISD serial commands work with the TLS350 and TLS450PLUS.

Please refer to VEEDER-ROOT SERIAL INTERFACE MANUAL TLS4 Series Manual 577013-950 for a further reference.

ISD COLLECTION ISSUES

Code	Function
I11100	Priority Alarm History Report
I11200	Non-Priority Alarm History Report
I11300	Active Alarm Report
I20100	In-Tank Inventory Report
IV0200	ISD Monthly Status Report
IV0700030	ISD Daily Report Details (30 DAYS)
IV1200030	Vapor Collection Test Results (30 RECORDS)
IV4200	Set Clear Sensor/AFM/Hose Maps
IV430000	Set Sensor Table ISD In Use Flag
IV4A00	Read Hose Table Data
IV4E00	Set ISD EVR TYPE
I@A002	Meter Map Diagnostics

Additional if available:

Hose Event printout of hose in alarm:

Diagnostics>Vapor Monitor>Hose Events (WEB: Hose Diagnostics)

Hose Histogram (WEB ONLY) of hose in alarm:

Diagnostics>Vapor Monitor>Hose Diagnostics>Histogram

ISD CONTAINMENT ISSUES

Code	Function
I11100	Priority Alarm History Report
I11200	Non-Priority Alarm History Report
I11300	Active Alarm Report
I20100	In-Tank Inventory Report

IV0200	ISD Monthly Status Report
IV0700030	ISD Daily Report Details (30 DAYS)
IV1200030	Vapor Collection Test Results (30 RECORDS)
IS6400	Get Vapor Pressure Sensor Serial Number
IV430000	Set Sensor Table ISD In Use Flag

Additional if available: Pressure Graph (WEB only) Printout:

Diagnostics>Vapor Monitor>Pressure Graph

ISD WITH VAPOR PROCESSOR

Code	Function
IB6100	Vapor Valve Diagnostic
IS6400	Get Vapor Pressure Sensor Serial Number
IS7700	Get Atmospheric Pressure Sensor Status Report
IB6100	Vapor Valve Diagnostic
IV8000	Vapor Processor Report
IV8100	Percent Hydrocarbon Report
IV8200	Vapor Processor Status Report
IB6100	Vapor Valve Diagnostic
IB3U00	Vapor Valve Constants Data
IB3V00	Vapor Valve Diagnostic Overview
IVC000	Automatic/Manual Vapor Processor Control

Additional if available: Pressure Graph (WEB only) Printout:

Diagnostics>Vapor Monitor>Pressure Graph

PMC (NON-ISD)

Code	Function
I11100	Priority Alarm History Report
I11200	Non-Priority Alarm History Report
I11300	Active Alarm Report
I20100	In-Tank Inventory Report
IS6400	Get Vapor Pressure Sensor Serial Number
IV430000	Set Sensor Table ISD In Use Flag
IS7700	Get Atmospheric Pressure Sensor Status Report

IVC000	Automatic/Manual Vapor Processor Control
IVC100	Manual Override of Vapor Processor
IV8000	Vapor Processor Report
IV8100	Percent Hydrocarbon Report
IV8200	Vapor Processor Status Report
IVC000	Automatic/Manual Vapor Processor Control
IB6100	Vapor Valve Diagnostic
IB3U00	Vapor Valve Constants Data
IB3V00	Vapor Valve Diagnostic Overview

Additional if available: Pressure Graph (WEB only) Printout:

Diagnostics>Vapor Monitor>Pressure Graph

Reports FAQ

DAILY DETAIL REPORT

A Daily Detail example report is shown below:

```

IV0700
MMDDYYYY HH:MM XM
S--- STATION HEADER ---
ISD DAILY REPORT DETAILS
EVR TYPE: VACUUM ASSIST
ISD TYPE: 01.03
VAPOR PROCESSOR TYPE: NO VAPOR PROCESSOR
OVERALL STATUS           :WARN          EVR VAPOR COLLECTION :PASS
EVR VAPOR CONTAINMENT    :WARN
ISD MONITOR UP-TIME      : 99%          STAGE I TRANSFERS: 9 of 20 PASS
EVR/ISD PASS TIME       : 90%

```

Status Codes: (W)Warn (F)Fail (D)Degradation Fail (G)Gross Fail

(ISD-W)ISD Self-Test Warning (ISD-F)ISD Self-Test Fail (N)No Test

ISD	ISD	---CONTAINMENT TESTS---						STAGE	---COLLECTION TESTS-DAILY AVERAGE HOSE A/L RATIO-----				
DATE	STATUS	%UP	GROSS	DGRD	MAX	MIN	LEAK	I	VAPOR	FP1	FP2	FP3	FP4
		TIME	95%	75%	"WC	"WC	CFH	XFR	PRCSR	BLEND	BLEND	BLEND	BLEND
12/16	PASS	100%	3.2N	2.8N	3.0	-5.0	0	PASS		0.88	1.04	0.98	0.91
12/17	PASS	100%	3.5N	3.2N	3.6	0.4	0			0.93	0.96	0.95	1.01
12/18	PASS	100%	3.5N	3.2N	3.8	2.4	0			0.88	0.90	0.90	1.01
12/19	PASS	100%	3.5N	3.3N	3.7	2.2	0			0.92	0.95	0.96	0.97
12/20	PASS	100%	3.5N	3.3N	5.0	-5.0	0	FAIL		0.95	0.91	0.97	1.01
12/21	W	99%	3.5W	3.2N	0.3	-2.9	0	FAIL		0.83	1.02	0.93	1.02
12/22	PASS	100%	0.3N	0.2N	0.4	-0.2	0			0.97	0.99	0.93	0.95
12/23	PASS	100%	3.4N	3.2N	3.6	0.0	0			0.93	0.93	0.89	1.05
12/24	PASS	100%	3.4N	3.1N	3.7	1.8	1			0.94	1.00	0.92	0.84
12/25	PASS	100%	3.4N	3.1N	3.4	-5.0	0	PASS		0.94	0.82	0.94	0.98
12/26	PASS	100%	3.4N	3.2N	3.9	1.9	0			0.96	0.95	0.92	1.01
12/27	PASS	100%	3.5N	3.2N	3.7	2.4	0			0.92	0.97	0.94	0.99
12/28	W	100%	3.5W	3.2N	5.0	-1.8	0	PASS		0.95	1.01	0.95	0.98
12/29	PASS	100%	0.4N	0.2N	0.5	-0.2	17N			0.95	0.98N	0.95	0.99
12/30	PASS	100%	0.4N	0.2N	0.7	-5.0	3N	FAIL		0.96	1.00	0.93	0.90
12/31	PASS	100%	0.3N	0.1N	0.4	-0.7	3N			0.94	0.99	0.95	1.01
01/01	PASS	100%	0.3N	0.1N	0.3	-0.4	2N			0.96	0.98	0.93	1.00
01/02	PASS	100%	0.3N	0.1N	0.3	-0.3	2N			0.98	1.04	1.00	1.03
01/03	PASS	100%	0.3N	0.1N	0.5	-0.3	3N			0.95	1.01	0.93	1.03
01/04	PASS	100%	-0.0N	-0.3N	0.0	-0.8	3			0.92	0.89	0.93	0.98
01/05	PASS	100%	-0.1N	-0.3N	0.5	-5.0	2	PASS		0.95	0.99	0.92	1.03
01/06	PASS	100%	-0.2N	-0.5N	-2.1	-5.0	2			0.96	0.98	0.88	1.04
01/07	PASS	100%	-0.2N	-0.7N	-0.4	-2.1	1			0.98	1.00	0.94	1.01
01/08	PASS	100%	0.0N	-0.4N	0.3	-1.2	2			0.96	0.97	0.93	1.01
01/09	PASS	100%	0.1N	-0.1N	0.3	-0.3	2			0.98	1.00	0.87	1.02
01/10	PASS	100%	0.2	0.0N	0.3	-0.4	2			0.97	0.98	0.90	0.98
01/11	PASS	100%	0.2	0.0N	0.8	-4.3	2	PASS		0.98	1.00	0.93	1.02
01/12	PASS	100%	0.2	0.0N	0.3	-3.2	2			0.99	1.02	0.92	1.00
01/13	PASS	100%	0.2	0.0N	0.4	-0.4	3			0.96	1.00	0.92	0.97
01/14	PASS	100%	0.6	0.0N	3.7	-0.9	3	PASS		0.99	0.99	0.93	1.01
01/15	W	100%	3.5W	0.1N	4.1	2.0	1			0.95N	1.01	0.95	0.97N

REPORTS> ISD> DAILY DETAIL STATUS CODES**Assist Daily Detail Status Codes****Question**

When and why do the status codes appear? (see example below.)

```

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

      ISD   ISD   ---CONTAINMENT TESTS---   STAGE   ---COLLECTION TESTS-DAILY AVERAGE HOSE A/L RATIO---
      EVR   STATUS  TIME  95%   75%   "WC   "WC   CFH   I   VAPOR   FP1   FP2   FP3   FP4
      DATE  STATUS  TIME  95%   75%   "WC   "WC   CFH   I   VAPOR   BLEND BLEND BLEND BLEND
12/15  PASS  100%  3.2N  2.8N  3.0  -5.0  0   PASS  XFR  PRCSR  0.88N  1.04  0.98  0.91  No Test, no events
12/16  PASS  100%  3.2N  2.8N  3.0  -5.0  0   PASS  XFR  PRCSR  0.88N  1.04  0.98  0.91  No Test, low events
12/17  WARN  100%  3.5N  3.2N  3.6  0.4  0   PASS  XFR  PRCSR  0.88N  1.04  0.98  0.91  No Test, low events
12/18  FAIL  100%  3.5N  3.2N  3.8  2.4  0   PASS  XFR  PRCSR  0.88N  1.04  0.98  0.91  No Test, low events
12/19  WARN  100%  3.5N  3.3N  3.7  2.2  0   PASS  XFR  PRCSR  0.88N  1.04  0.98  0.91  No Test, low events
12/20  WARN  100%  3.5N  3.3N  3.7  2.2  0   PASS  XFR  PRCSR  0.88N  1.04  0.98  0.91  No Test, low events
12/21  FAIL  100%  3.5N  3.3N  3.7  2.2  0   PASS  XFR  PRCSR  0.88N  1.04  0.98  0.91  No Test, low events
12/22  FAIL  100%  3.5N  3.3N  3.7  2.2  0   PASS  XFR  PRCSR  0.88N  1.04  0.98  0.91  No Test, low events
12/23  PASS  100%  3.5N  3.3N  3.7  2.2  0   PASS  XFR  PRCSR  0.88N  1.04  0.98  0.91  No Test, low events
12/24  ISD-W  100%  3.5N  3.3N  3.7  2.2  0   PASS  XFR  PRCSR  0.88N  1.04  0.98  0.91  No Test, low events
12/25  ISD-F  100%  3.5N  3.3N  3.7  2.2  0   PASS  XFR  PRCSR  0.88N  1.04  0.98  0.91  No Test, low events

```

Explanation**Assist Systems - Hose W,F,G,D Results**

Next to each hose collection daily average A/L result there is an assessment. The absence of any of the results listed above indicates a pass. If any of the listed conditions **W,F,G, D** or **N** exist, they will post before a pass. The assessment can indicate the result for one (or combination,) of three tests called Statistical Test, Gross Test and Degradation Test.

- **W** - Warning for Statistical (BLKD), Gross (A/L) and/or Degradation (A/L).
 - Indicates a statistical warning if BLKD appears instead of the A/L value.
 - Indicates either a Gross or Degradation warning if the A/L value appears next to it. You can distinguish which of the two warning conditions it is by comparing the A/L value with the gross and degradation ranges defined in the IV00 or IV02 reports. It is important to make this distinction as a gross test will convert to a failure and shutdown on the 2nd day and the degradation test will convert to a failure and shutdown on the 8th day.
- **F** - Statistical Failure - A BLKD is posted instead of an A/L value.
 - Automobiles equipped with ORVR equipment appear as a blocked dispensing event (A/L very low). ISD separates out this type of activity from blockages that are caused by something other than ORVR vehicles. It does this statistically using multiple dispensing events. When there are more blockages than would be expected from normal ORVR traffic, a BLKD warning is issued.
- **G** - Failure for Gross Test and will appear with A/L value.
- **D** - Failure for Degradation Test and will appear with A/L value.
- **N** - No Test.

ISD MONITORING TEST PASS/FAIL THRESHOLDS

	PERIOD	BELOW	ABOVE
VAPOR COLLECTION ASSIST SYSTEM A/L GROSS FAIL	1DAYS	0.33	1.90
VAPOR COLLECTION ASSIST SYSTEM A/L DEGRADATION FAIL	7DAYS	0.81	1.32
VAPOR CONTAINMENT GROSS FAIL, 95th PERCENTILE	7DAYS	----	1.30"wcg
VAPOR CONTAINMENT DEGRADATION, 75th PERCENTILE	30DAYS	----	0.30"wcg
VAPOR CONTAINMENT LEAK DETECTION FAIL @2"wcg	7DAYS	----	8.00cfh
STAGE I VAPOR TRANSFER FAIL, 50th PERCENTILE	20MINS	----	2.50"wcg

Assist Systems - Hose N No Test Result

- If the Degradation test did not run and the Gross test did not run, then an **N** is posted.
- If there were no events received to make any conclusion about the A/L value for the hose, the A/L value is replaced with N.
- If there are some events received, enough to calculate an average, but not enough to complete a test, the No Test result will appear with an A/L average.

Assist Systems - Hose Pass Result

- When none of the above results **W,F,G,D,N** appear then it is a **PASS**.
- If the Degradation test did not run (no test), but the Gross test passed, the result is a **PASS**.
- If the Gross test did not run (no test), but the Degradation test passed, the result is a **PASS**.

Assist Systems - Code Precedent (listed high to low)

1. **G, F** - Gross Failure (A/L) and Gross Stat Failure (BLKD)
2. **D** - Degradation Failure (A/L)
3. **W** - Gross Warning (A/L) and Gross Stat Warning (BLKD)
4. **W** - Degradation Warning (A/L)
5. **PASS** - Pass Gross and/or Degradation test.
6. **N** - No Test - Neither Gross nor Degradation test complete.

Assist Systems - Self Test Codes

- **ISD-W** - A self test warning condition exists. See ISD SETUP
- **ISD-F** - A self test warning condition persisted for 7 days and resulted in a Failure.

BALA NCE: DAILY STATUS CODES

Question

When and why do the status codes appear? (see example below.)

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

ISD		ISD	---CONTAINMENT TESTS---						STAGE			---COLLECTION TESTS-DAILY AVERAGE HOSE A/L RATIO---				
DATE	STATUS	EVR	%UP	GROSS	DGRD	MAX	MIN	LEAK	I	VAPOR	FP1	FP2	FP3	FP4		
				95%	75%	"WC	"WC	CFH	XFR	PRCSR	BLEND	BLEND	BLEND	BLEND		
12/15	PASS		100%	3.2N	2.8N	3.0	-5.0	0	PASS		N	N	1.04	0.98	0.91	No Test, no events
12/16	PASS		100%	3.2N	2.8N	3.0	-5.0	0	PASS		0.88N	1.04	0.98	0.91		No Test, low events
12/17	WARN		100%	3.5N	3.2N	3.6	0.4	0			BLKDW		0.96	0.95	1.01	Stat Warn
12/18	FAIL		100%	3.5N	3.2N	3.8	2.4	0			BLKDF		0.90	0.90	1.01	Stat Fail
12/19	PASS		100%	3.5N	3.3N	3.7	2.2	0			0.78	0.95	0.96	0.97		All Pass
12/20	WARN		100%	3.5N	3.3N	3.7	2.2	0			0.30W	0.95	0.96	0.97		FLOW Warn
12/21	FAIL		100%	3.5N	3.3N	3.7	2.2	0			0.30G	0.95	0.96	0.97		FLOW Fail
12/22	PASS		100%	3.5N	3.3N	3.7	2.2	0			0.78	0.95	0.96	0.97		All Pass
12/23	PASS		100%	3.5N	3.3N	3.7	2.2	0			0.92	0.95	0.96	0.97		All Pass
12/24	ISD-W		100%	3.5N	3.3N	3.7	2.2	0			0.92	0.95	0.96	0.97		ISD Self Test Warn
12/25	ISD-F		100%	3.5N	3.3N	3.7	2.2	0			0.92	0.95	0.96	0.97		ISD Self Test Fail

Explanation

Balance Systems - Hose W, F, G, N Results

Next to each hose collection daily average A/L result, there is an assessment. The absence of any of the results listed above indicates a pass. If any of the listed conditions, W, G, or F exist, they will post before a pass. The assessment can indicate the result for one of two tests called Statistical Test or Flow Performance Test.

- **W** - Warning for Statistical (BLKD).
 - Indicates a statistical warning if BLKD appears instead of the A/L value.
 - Indicates a Flow Collect warning if the A/L value appears next to it.
- **W** - Warning for Flow Performance Test and will appear with A/L value.
A Flow Collect warning will convert to a failure and shut down on the 2nd day.
- **F** - Statistical Failure- A BLKD is posted instead of an A/L value.
Automobiles equipped with ORVR equipment appear as a blocked dispensing event (A/L very low). ISD separates out this type of activity from blockages that are caused by something other than ORVR vehicles. It does this statistically using multiple dispensing events. When there are more blockages than would be expected from normal ORVR traffic, a BLKD warning is issued.
- **G** - Failure for Flow Performance Test and will appear with A/L value.
- **N** - No Test.

ISD MONITORING TEST PASS/FAIL THRESHOLDS

	PERIOD	BELOW	ABOVE
VAPOR COLLECTION BALANCE SYS FLOW PERFORMANCE	1DAYS	0.60	----
VAPOR CONTAINMENT GROSS FAIL, 95th PERCENTILE	7DAYS	----	1.30"wcg
VAPOR CONTAINMENT DEGRADATION, 75th PERCENTILE	30DAYS	----	0.30"wcg
VAPOR CONTAINMENT LEAK DETECTION FAIL @2"WCG	7DAYS	----	12.50cfh
STAGE I VAPOR TRANSFER FAIL, 50th PERCENTILE	20MINS	----	2.50"wcg
VAPOR PROCESSOR SELF TEST FAIL	1DAYS	----	----
VAPOR PROCESSOR MASS EMISSION FAIL (LB/KGAL)	1DAYS	----	0.32

Balance Systems - Hose N No Test Result

- If the Flow performance did not run, then an **N** is posted.
- If there were no events received to make any conclusion about the A/L value for the hose, the A/L value is replaced with an **N**.
- If there are some events received, enough to calculate an average, but not enough to complete a test, the No Test result will appear with an A/L average.

Balance Systems - Hose Pass Result

- When none of the above results **W**, **F**, **G** or **N** appear, then it was a pass.

Balance Systems - Code Precedent (Listed high to low)

1. **G, F** - Flow Collect Failure (A/L) and Statistical Failure (BLKD).
2. **W** - Flow Collect Warning (A/L and Statistical Warning (BLKD).
3. **Pass** - Pass Flow Performance Test.
4. **N** - No Test - Flow Performance Test not completed.

Balance systems - Self Test Codes

- **ISD-W** - A self test warning condition exists. See ISD SETUP.
- **ISD-F** - A self test warning condition persisted for 7 days and resulted in a Failure.

COLLECTION REPORT FP ORDERING

Question

Should I be concerned if the fueling position numbers are out of order in the header?

Explanation

When using a Gilbarco current loop DIM the fueling position numbers may not be in order in the header. The fueling position numbers come from the current loop and may not match the numbers on the side of the dispenser or on the POS.

See following example:

```
IV0700
MMDDYYYY HH:MM XM
---STATION 1 HEADER---
```

```
ISD DAILY REPORT DETAILS
EVR TYPE: VACUUM ASSIST
ISD TYPE: 01.03
VAPOR PROCESSOR TYPE: NO VAPOR PROCESSOR
OVERALL STATUS           :WARN          EVR VAPOR COLLECTION :PASS
EVR VAPOR CONTAINMENT     :WARN
ISD MONITOR UP-TIME       : 99%          STAGE I TRANSFERS: 23 of 23 PASS
EVR/ISD PASS TIME        : 86%
```

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

	ISD	ISD	---CONTAINMENT TESTS---					STAGE		--COLLECTION TESTS-DAILY AVG.HOSE A/L RATIO--			
	EVR	%UP	GROSS	DGRD	MAX	MIN	LEAK	I	VAPOR	FP4	FP1	FP2	FP3
DATE	STATUS	TIME	95%	75%	"WC	"WC	CFH	XPR	PRCSR	BLEND	BLEND	BLEND	BLEND
02/01	PASS	100%	0.2N	0.0N	0.4	-0.0	0N	PASS		N N	N N	N N	N N
02/02	PASS	100%	0.2N	0.1N	0.2	-0.0	10N			N N	N N	N N	N N
02/03	PASS	100%	0.2N	0.0N	0.3	-0.8	33N			0.89	0.96	0.95	0.98

CONTAINMENT DEGRADATION RESULTS

Question

Why is the Degradation Test Result a No Test?

Explanation

Containment Degradation Results will not post until after the system has been running 7 Days.

When the containment pressure remains at or below -5"wc for most of the day (Look at MAX "WC and MIN "WC) there may not be enough samples available over the past 7 days to perform an assessment, so a N test is reported.

ISD STATUS MISSING TEXT

Question

Why are the ISD EVR status and % Up time sometimes missing for the last day in the report?

Explanation

The daily detail report sometimes does not have the ISD Average and ISD EVR STATUS and ISD % UP TIME for the last day, but it does have all the other results for the day (containment and collection). If there is a post delay configured in ISD, the daily detail report will not show ISD EVR STATUS or % UP TIME if it is pulled during the time period between the assessment and the post. The ISD EVR STATUS and % UP TIME are part of the daily post and have not occurred yet. After the post time the ISD EVR STATUS or % UP TIME will show up in the daily detail report.

The post delay is not to be used in ISD. Instead of using the post delay the assessment time must be scheduled for the time they want the alarms to post.

MISSING ALL REPORTS FOR ONE DAY

Question

Why am I missing all the results for one day?

Explanation

In the example report below there is one day where all the reports are missing.

1. One possible cause is the assessment time was programmed for a new hour. The assessment time may not be reached until the next day, so it looks like a day is missing. However, the test has been done, but more than 24 hours were included in the test following the missing one. You can tell this has happened by looking at the time warnings were posting previously and the time they are posting presently. The time will be different.
2. The TLS clock time was changed to a time beyond the assessment time, skipping the test for that day. The Miscellaneous Event log will show the time change.
3. The TLS was not powered during the programmed assessment time and the assessment was skipped for that day. The Miscellaneous Event log will show an ISD SHUTDOWN and ISD STARTUP event that will show it was down during the assessment time.

IV0700

MMDDYY HH:MM XM

--STATION HEADER--

ISD DAILY REPORT DETAILS

EVR TYPE: VACUUM ASSIST

ISD TYPE: 01.03

VAPOR PROCESSOR TYPE: NO VAPOR PROCESSOR

OVERALL STATUS :WARN

EVR VAPOR COLLECTION :PASS

EVR VAPOR CONTAINMENT :WARN

ISD MONITOR UP-TIME :100%

STAGE I TRANSFERS: 26 of 26 PASS

EVR/ISD PASS TIME : 96%

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		---CONTAINMENT TESTS---										STAGE		---COLLECTION TESTS-DAILY AVERAGE HOSE A/L RATIO-----									
DATE	STATUS	%UP	GROSS	DGRD	MAX	MIN	LEAK	I	VAPOR	FP7	FP8	FP4	FP5	FP6	FP1	FP2	FP3						
02/17	PASS	100%	-5.0	-5.0N	-4.1	-5.0	1			0.99	N	N	0.93	0.85	0.91	0.92	1.06	0.91					
02/18	PASS	100%	-5.0	-5.0N	-5.0	-5.0	1N	PASS		1.00	N	N	1.00	0.86	0.88	0.96	1.08	0.89					
02/19	PASS	100%	-4.6	-5.0N	0.7	-5.0	1	PASS		0.98	N	N	0.96	0.84	0.87	0.90	1.04	0.88					
02/20	PASS	100%	-4.7	-5.0N	-5.0	-5.0	1N			0.99	0.93	0.96	0.85	0.90	0.90	1.04	0.90						
02/21	PASS	100%	-2.6	-5.0N	-0.5	-5.0	1N	PASS		0.98	0.98	0.92	0.86	0.92	0.92	1.02	0.88						
02/22	PASS	100%	-2.4	-5.0N	2.6	-5.0	1	PASS		0.96	0.94	0.92	0.86	0.85	0.91	1.02	0.92						
02/23	PASS	100%	-2.2	-5.0N	0.8	-5.0	1	PASS		0.96	0.90	0.92	0.87	0.88	0.94	1.07	0.88						
02/24	PASS	100%	-1.6	-5.0N	-0.0	-5.0	1	PASS		0.95	0.89	0.91	0.85	0.95	0.90	0.98	0.86						
02/25	PASS	100%	-1.4	-5.0N	1.0	-5.0	1	PASS		0.95	0.83	0.95	0.91	0.92	0.93	1.07	0.85						
02/26	PASS	100%	-2.4	-5.0N	-2.7	-5.0	2	PASS		0.95	0.89	0.93	0.93	0.99	0.96	1.07	0.91						
02/27	PASS	100%	-2.4	-5.0N	-3.9	-5.0	2			0.99	0.90	0.97	0.88	0.89	0.91	1.04	0.91						
02/28	PASS	100%	0.0	-5.0N	5.0	-5.0	3	PASS		0.98	0.91	0.90	0.91	0.97	0.96	1.05	0.95						
03/01	PASS	100%	0.1	-5.0N	0.2	-5.0	4			0.95	0.96	0.88	0.87	0.90	0.89	1.05	0.97						
03/02	PASS	100%	0.1	-5.0N	0.8	-5.0	5	PASS		0.96	0.95	0.95	0.84	0.92	0.94	1.01	1.04						
03/03	W	100%	0.1	-5.0N	-2.9	-5.0	13W			1.00	0.91	0.94	0.82	0.94	0.93	1.08	1.03						
03/04	PASS	100%	0.1	-5.0N	-4.3	-5.0	4	PASS		0.95	0.90	0.94	0.88	0.89	0.94	1.08	1.03						
03/05	PASS	100%	0.1	-4.9N	-3.1	-5.0	4			0.99	0.92	0.98	0.88	0.90	0.94	1.03	1.02						
03/06	PASS	100%	0.1	-4.9	-5.0	-5.0	4	PASS		0.95	0.83	0.93	0.85	0.91	0.91	1.08	1.08						
03/07	PASS	100%	-0.0	-4.9	-4.9	-5.0	0			0.99	0.86	0.95	0.91	0.91	0.94	1.09	1.02						
03/08	PASS	100%	-3.5	-4.9	0.0	-5.0	2	PASS		0.99	0.94	0.97	0.89	0.93	0.93	1.13	1.07						
03/09	PASS	100%	-3.5	-4.8	-1.7	-5.0	2			0.99	0.92	0.96	0.89	0.94	0.92	1.05	1.06						
03/10	PASS	100%	-2.9	-4.6	-2.1	-5.0	2	PASS		1.01	0.93	0.96	0.89	0.91	0.89	1.08	1.02						
03/11	PASS	100%	-2.9	-4.8	-5.0	-5.0	2			0.99	0.88	0.98	0.91	0.89	1.02	1.04	1.05						
03/12	PASS	100%	-2.9	-4.9	-5.0	-5.0	2			0.99	0.91	1.00	0.90	0.91	1.00	1.07	1.07						
03/13	PASS	100%	-2.9	-4.9	-0.0	-5.0	2	PASS		0.99	0.90	0.97	0.93	0.90	1.00	1.01	1.06						
03/14	PASS	100%	-2.9	-4.9	-2.5	-5.0	2	PASS		0.91	0.86	1.00	0.93	0.89	0.95	1.14	1.03						
03/15	PASS	100%	-3.0	-4.9	-5.0	-5.0	2	PASS		0.97	0.90	0.96	0.94	0.84	0.98	1.12	1.02						
03/16	PASS	100%	-4.3	-4.9	-3.8	-5.0	2			0.91	0.91	0.99	0.91	0.94	1.00	1.10	1.02						
03/17																							
03/18	PASS	100%	-5.0N	-4.9	-4.9	-5.0	0N			0.97	0.91	1.00	0.89	0.91	1.00	1.09	1.09						
03/19	PASS	100%	-5.0N	-4.9	-4.7	-5.0	0N			0.98	0.94	0.97	0.90	0.90	1.01	1.04	1.05						

HIGH A/L ON ALL NOZZLES

Question

Why is my report showing large A/L for all Dispensers?

Explanation

- The most common cause of High A/L on all Nozzles at the same time is the dispenser events are artificially low. This can be caused by the DIM not having a 'G' in the DIM setup string. The only DIM that requires this is the BIR Protocol Dispenser Interface Module P/N 330280-001.
- Gross Collect warnings and alarms can result from this condition. See example reports from two sites below.

-----Example Site Report with High A/L-----

IV0500
MMDDYY HH:MM XM

--STATION HEADER--

ISD DAILY REPORT DETAILS

EVR TYPE: VAPOR ASSIST

ISD TYPE: 01.03

VAPOR PROCESSOR TYPE: NO VAPOR PROCESSOR

OVERALL STATUS :FAIL EVR VAPOR COLLECTION :FAIL
EVR VAPOR CONTAINMENT :WARN
ISD MONITOR UP-TIME : 99% STAGE I TRANSFERS: 30 of 30 PASS
EVR/ISD PASS TIME : 50%

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

ISD	ISD	---CONTAINMENT TESTS---						STAGE	
EVR	%UP	GROSS	DGRD	MAX	MIN	LEAK	I	VAPOR	
DATE	STATUS	TIME	95%	75%	"WC	"WC	CFH	XFR	PRCSR
05/24	ISD-W	100%	0.0N	0.0N	0.0	0.0	0N	PASS	
05/25	ISD-W	100%	0.1N	0.0N	5.0	-5.0	N	PASS	N N N N N N
05/26	PASS	99%	0.0N	0.0N	0.4	-0.2	0N	PASS	N N N N N N
05/27	PASS	100%	0.1N	0.0N	0.0	-0.0	N		N N N N N N
05/28	PASS	100%	0.1N	0.0N	0.0	-0.0	N		N N N N N N
05/29	PASS	100%	0.0N	0.0N	0.0	-0.0	N		N N N N N N
05/30	PASS	100%	0.1N	0.0N	0.7	-0.3	N		7.93N 8.00N N N
05/31	PASS	99%	0.1N	0.0N	0.4	-0.4	N		5.54N 6.39N 1.94N
06/01	W	99%	0.1	0.0N	0.3	-0.3	W		4.91N 6.22N 3.12N
06/02	W	100%	0.1	0.0N	2.7	-1.1	14N	PASS	4.41W 6.35N 3.25N
06/03	F	100%	0.2	0.0N	0.9	-0.8	8N		4.40G 6.23W 2.90N
06/04	W	100%	0.1N	-0.4N	0.2	-2.9	1N		4.14N 5.00N 2.71W

```

---COLLECTION TESTS-DAILY AVERAGE HOSE A/L RATIO-----
05/24
05/25
05/26  N N  N N  N N  N N  N N
05/27  N N  N N  N N  N N  N N  N N  N N  N N
05/28  N N  N N  N N  N N  N N  N N  N N  N N
05/29  N N  N N  N N  N N  N N  N N  N N  N N
05/30  3.74N 4.17N 4.02N  N N 4.26N  N N 4.23N 1.08N  N N
05/31  3.62N 3.91N 3.90N 2.82N 4.26N 3.79N 3.28N 1.65N 4.06N
06/01  3.70N 2.92N 3.90N 1.92N 2.86N 3.02N 3.54N 2.18N 4.06N
06/02  3.12N 2.56W 3.80N 2.28N 2.25N 2.81W 3.29N 2.05W 2.50N
06/03  2.51W 2.35G 3.06N 2.17W 2.21N 2.92G 3.22W 2.32G 2.57N
06/04  3.09N 1.90N 2.94N 2.99N 2.20N 2.20N 3.81N 2.86N 2.70N

```

DIAGNOSING CVLD REPORTS

Question

NO TEST is reported every day. What can cause this?

Explanation

- The first 7 days after startup CVLD will always report NO TEST.
- If the pressure is below -5 " wc every day (look at max min value in Daily Detail Report under Containment) a test is not performed.
- If there is pressure above -5 " wc check and make sure the thermal coefficients on the gasoline tanks are in the correct range greater than or equal to 0.00060 and less than or equal to 0.00079. (Typically gasoline coefficients are programmed to 0.000700).

IV0700

MMDDYYYY HH:MM XM

--STATION HEADER--

ISD DAILY REPORT DETAILS

EVR TYPE: VACUUM ASSIST

ISD TYPE: 01.03

VAPOR PROCESSOR TYPE: NO VAPOR PROCESSOR

OVERALL STATUS :WARN EVR VAPOR COLLECTION :PASS
 EVR VAPOR CONTAINMENT :WARN
 ISD MONITOR UP-TIME :100% STAGE I TRANSFERS: 26 of 26 PASS
 EVR/ISD PASS TIME : 96%

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		---CONTAINMENT TESTS---						STAGE		---COLLECTION TESTS-DAILY AVERAGE HOSE A/L RATIO-----							
DATE	STATUS	%UP	GROSS 95%	DGRD 75%	MAX "WC"	MIN "WC"	LEAK CFH	I XFR	VAPOR PRCR	FP7 BLEND	FP8 BLEND	FP4 BLEND	FP5 BLEND	FP6 BLEND	FP1 BLEND	FP2 BLEND	FP3 BLEND
02/17	PASS	100%	-5.0	-5.0N	-4.1	-5.0	1			0.99	N N	0.93	0.85	0.91	0.92	1.06	0.91
02/18	PASS	100%	-5.0	-5.0N	-5.0	-5.0	1N	PASS		1.00	N N	1.00	0.86	0.88	0.96	1.08	0.89
02/19	PASS	100%	-4.6	-5.0N	0.7	-5.0	1	PASS		0.98	N N	0.96	0.84	0.87	0.90	1.04	0.88
02/20	PASS	100%	-4.7	-5.0N	-5.0	-5.0	1N			0.99	0.93	0.96	0.85	0.90	0.90	1.04	0.90
02/21	PASS	100%	-2.6	-5.0N	-0.5	-5.0	1N	PASS		0.98	0.98	0.92	0.86	0.92	0.92	1.02	0.88
02/22	PASS	100%	-2.4	-5.0N	2.6	-5.0	1	PASS		0.96	0.94	0.92	0.86	0.85	0.91	1.02	0.92
02/23	PASS	100%	-2.2	-5.0N	0.8	-5.0	1	PASS		0.96	0.90	0.92	0.87	0.88	0.94	1.07	0.88
02/24	PASS	100%	-1.6	-5.0N	-0.0	-5.0	1	PASS		0.95	0.89	0.91	0.85	0.95	0.90	0.98	0.86
02/25	PASS	100%	-1.4	-5.0N	1.0	-5.0	1	PASS		0.95	0.83	0.95	0.91	0.92	0.93	1.07	0.85
02/26	PASS	100%	-2.4	-5.0N	-2.7	-5.0	2	PASS		0.95	0.89	0.93	0.93	0.99	0.96	1.07	0.91
02/27	PASS	100%	-2.4	-5.0N	-3.9	-5.0	2			0.99	0.90	0.97	0.88	0.89	0.91	1.04	0.91
02/28	PASS	100%	0.0	-5.0N	5.0	-5.0	3	PASS		0.98	0.91	0.90	0.91	0.97	0.96	1.05	0.95
03/01	PASS	100%	0.1	-5.0N	0.2	-5.0	4			0.95	0.96	0.88	0.87	0.90	0.89	1.05	0.97
03/02	PASS	100%	0.1	-5.0N	0.8	-5.0	5	PASS		0.96	0.95	0.95	0.84	0.92	0.94	1.01	1.04
03/03	W	100%	0.1	-5.0N	-2.9	-5.0	13W			1.00	0.91	0.94	0.82	0.94	0.93	1.08	1.03
03/04	PASS	100%	0.1	-5.0N	-4.3	-5.0	4	PASS		0.95	0.90	0.94	0.88	0.89	0.94	1.08	1.03
03/05	PASS	100%	0.1	-4.9N	-3.1	-5.0	4			0.99	0.92	0.98	0.88	0.90	0.94	1.03	1.02
03/06	PASS	100%	0.1	-4.9	-5.0	-5.0	4	PASS		0.95	0.83	0.93	0.85	0.91	0.91	1.08	1.08
03/07	PASS	100%	-0.0	-4.9	-4.9	-5.0	0			0.99	0.86	0.95	0.91	0.91	0.94	1.09	1.02
03/08	PASS	100%	-3.5	-4.9	0.0	-5.0	2	PASS		0.99	0.94	0.97	0.89	0.93	0.93	1.13	1.07
03/09	PASS	100%	-3.5	-4.8	-1.7	-5.0	2			0.99	0.92	0.96	0.89	0.94	0.92	1.05	1.06
03/10	PASS	100%	-2.9	-4.6	-2.1	-5.0	2	PASS		1.01	0.93	0.96	0.89	0.91	0.89	1.08	1.02
03/11	PASS	100%	-2.9	-4.8	-5.0	-5.0	2			0.99	0.88	0.98	0.91	0.89	1.02	1.04	1.05
03/12	PASS	100%	-2.9	-4.9	-5.0	-5.0	2			0.99	0.91	1.00	0.90	0.91	1.00	1.07	1.07
03/13	PASS	100%	-2.9	-4.9	-0.0	-5.0	2	PASS		0.99	0.90	0.97	0.93	0.90	1.00	1.01	1.06
03/14	PASS	100%	-2.9	-4.9	-2.5	-5.0	2	PASS		0.91	0.86	1.00	0.93	0.89	0.95	1.14	1.03
03/15	PASS	100%	-3.0	-4.9	-5.0	-5.0	2	PASS		0.97	0.90	0.96	0.94	0.84	0.98	1.12	1.02
03/16	PASS	100%	-4.3	-4.9	-3.8	-5.0	2			0.91	0.91	0.99	0.91	0.94	1.00	1.10	1.02
03/17																	
03/18	PASS	100%	-5.0N	-4.9	-4.9	-5.0	0N			0.97	0.91	1.00	0.89	0.91	1.00	1.09	1.09
03/19	PASS	100%	-5.0N	-4.9	-4.7	-5.0	0N			0.98	0.94	0.97	0.90	0.90	1.01	1.04	1.05

HIGH A/L ON ALL NOZZLES

Question

Why is my report showing large A/L for all Dispensers?

Explanation

- The most common cause of High A/L on all Nozzles at the same time is the dispenser events are artificially low. This can be caused by the DIM not having a 'G' in the DIM setup string. The only DIM that requires this is the BIR Protocol Dispenser Interface Module P/N 330280-001.
- Gross Collect warnings and alarms can result from this condition. See example reports from two sites below.

-----Example Site Report with High A/L-----

IV0500

MMDDYYYY HH:MM XM

--STATION HEADER--

ISD DAILY REPORT DETAILS

EVR TYPE: VACUUM ASSIST

ISD TYPE: 01.03

VAPOR PROCESSOR TYPE: NO VAPOR PROCESSOR

```
OVERALL STATUS           :FAIL           EVR VAPOR COLLECTION :FAIL
EVR VAPOR CONTAINMENT    :WARN
ISD MONITOR UP-TIME      : 99%           STAGE I TRANSFERS: 30 of 30 PASS
EVR/ISD PASS TIME       : 50%
```

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

DATE	STATUS	ISD %UP	---CONTAINMENT TESTS---				STAGE						
			GROSS 95%	DGRD 75%	MAX "WC	MIN "WC	LEAK CFH	I XFR	VAPOR PRCSR				
05/24	ISD-W	100%	0.0N	0.0N	0.0	0.0	0N	PASS					
05/25	ISD-W	100%	0.1N	0.0N	5.0	-5.0	N	PASS		N N	N N	N N	
05/26	PASS	99%	0.0N	0.0N	0.4	-0.2	0N	PASS		N N	N N	N N	
05/27	PASS	100%	0.1N	0.0N	0.0	-0.0	N			N N	N N	N N	
05/28	PASS	100%	0.1N	0.0N	0.0	-0.0	N			N N	N N	N N	
05/29	PASS	100%	0.0N	0.0N	0.0	-0.0	N			N N	N N	N N	
05/30	PASS	100%	0.1N	0.0N	0.7	-0.3	N			7.93N	8.00N	N N	
05/31	PASS	99%	0.1N	0.0N	0.4	-0.4	N			5.54N	6.39N	1.94N	
06/01	W	99%	0.1	0.0N	0.3	-0.3	W			4.91N	6.22N	3.12N	
06/02	W	100%	0.1	0.0N	2.7	-1.1	14N	PASS		4.41W	6.35N	3.25N	
06/03	F	100%	0.2	0.0N	0.9	-0.8	8N			4.40G	6.23W	2.90N	
06/04	W	100%	0.1N	-0.4N	0.2	-2.9	1N			4.14N	5.00N	2.71W	



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