Vapor Recovery Monitor (VRM)
Troubleshooting and Alarm Identification Guide

Vapor Recovery Monitor for In-Station Diagnostics
TS-EMS, Environmental Monitoring System
Part of TS-5 Series Consoles

<table>
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<tr>
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References
Franklin Fueling Systems:
http://www.franklinfueling.com
Tech Support: 1-800-984-6266

California Air Resources Board (CARB)
http://www.arb.ca.gov/vapor/vapor.htm

CARB Phase II EVR Executive Orders
http://www.arb.ca.gov/vapor/eo-evrphasell.htm
VR-201 Healy EVR Phase II without ISD
VR-202 Healy EVR Phase II with ISD

CARB Enhanced Vapor Recovery Compliance Guide
http://www.evrhome.org/

CARB Compliance Assistance Programs
http://www.arb.ca.gov/cap/cap.htm
ISD Handbook
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Important Safety Messages

INCON equipment is designed to be installed in association with volatile hydrocarbon liquids such as gasoline and diesel fuel. Installing or working on this equipment means working in an environment in which these highly flammable liquids may be present. Working in such a hazardous environment presents a risk of severe injury or death if these instructions and standard industry practices are not followed. Read and follow all instructions thoroughly before installing or working on this, or any other related, equipment.

As you read this guide, please be aware of the following symbols and their meanings:

**Warning**
- This symbol identifies a warning. A warning sign will appear in the text of this document when a potentially hazardous situation may arise if the instructions that follow are not adhered to closely. A potentially hazardous situation may involve the possibility of severe bodily harm or even death.

**Caution**
- This is a caution symbol. A caution sign will appear in the text of this document when a potentially hazardous environmental situation may arise if the instructions that follow are not adhered to closely. A potentially hazardous environmental situation may involve the leakage of fuel from equipment that could severely harm the environment.

**Danger**
- This symbol identifies an electrical danger. An electrical danger sign will appear in the text of this document when a potentially hazardous situation involving large amounts of electricity may arise if the instructions that follow are not adhered to closely. A potentially hazardous situation may involve the possibility of electrocution, severe bodily harm, or even death.

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**Warning**
- Follow all applicable codes governing the installation and servicing of this product and the entire system. Always lock out and tag electrical circuit breakers while installing or servicing this equipment and any related equipment. A potentially lethal electrical shock hazard and the possibility of an explosion or fire from a spark can result if the electrical circuit breakers are accidentally turned on during installation or servicing. Please refer to the Installation and Owner’s Manual for this equipment, and the appropriate documentation for any other related equipment, for complete installation and safety information.

**Warning**
- Follow all federal, state and local laws governing the installation of this product and its associated systems. When no other regulations apply, follow NFPA codes 30, 30A and 70 from the National Fire Protection Association. Failure to follow these codes could result in severe injury, death, serious property damage and/or environmental contamination.

**Warning**
- Always secure the work area from moving vehicles. The equipment in this manual is usually mounted underground, so reduced visibility puts service personnel working on this equipment in danger from moving vehicles entering the work area. To help eliminate these unsafe conditions, secure the area by using a service truck to block access to the work environment, or by using any other reasonable means available to ensure the safety of service personnel.

**Warning**
- When the console system is used to monitor tanks containing gasoline or other flammable substances, you may create an explosion hazard if you do not follow the requirements in this manual carefully.

**Warning**
- All wiring must enter the console’s enclosure through the designated knockouts. An explosion hazard may result if other openings are used.

**Warning**
- All wiring from probes or sensors to the console must be run in conduit separate from all other wiring. Failure to do so will create an explosion hazard.

**Warning**
- Substituting components could impair intrinsic safety. T5 series consoles are intrinsically safe for sensors installed in – Class I, Division 1, Group D – hazardous locations. Substitution of components could make the energy limiting circuitry in the system ineffective and could cause an explosion hazard. Repairs to a T5 series console or attached components should only be performed by a qualified, factory-trained technician.
Introduction
Contractor Requirements: Levels of Certification

A contractor must be certified to Levels 1, 2, and 5 in order to work on or change setup on the INCON Vapor Recovery Monitoring (VRM) System.

- **Level 1: Tank Sentinel Installation certification.** An installer that successfully completes this level will be certified to install the Tank Sentinel consoles, probes, and accessories.
- **Level 2: Tank Sentinel Start-up/Programming/Warranty certification.** A technician that successfully completes this level will be certified to start-up, program, and perform warranty service on Tank Sentinel consoles, probes, and accessories. Prerequisite: A technician must have Level 1 installation certification before completing Level 2.
- **Level 5: Vapor Recovery Monitoring (VRM).** A technician that successfully completes this level will be certified to operate and perform warranty service on the VRM System. Prerequisite: A technician must have Level 1 Installation certification and Level 2 Start-up/Programming/Warranty certification before completing Level 5.

Related Manuals
Executive Order VR-202

VRM Installation, Operators, and Maintenance Manual 000-2058

TS-VPS, Vapor Pressure Sensor, Installation Guide 000-2143

TS-VFM, Vapor Flow Meter, Installation Guide 000-2144

TS-5 Series Programming Guide 000-2142

TS-5 Series Installation Guide 000-2150

TS-5 Series Operators Guide 000-2151

TS-DTU Dispenser Retrofit Guide 000-2146

TS-DTU Console Side Installation Instructions 000-0080

Healy Troubleshooting Guide 405274001

It is recommended that Franklin Fueling System Technical Support (1-800-984-6266) be contacted for assistance with troubleshooting any alarm.

Introduction to the Guide

The purpose of this guide is to inform about the INCON In-Station Diagnostics (ISD) used in conjunction with Healy Enhanced Vapor Recovery (EVR) Phase II System and how to properly troubleshoot these systems. For complete installation, operation, and maintenance details of this system, refer to CARB Executive Order VR-202.

An ISD system is comprised of one vapor pressure sensor per site, one vapor flow meter per dispenser, one tank gauge console, and the appropriate ISD software for use with the console.

The vapor pressure sensor’s primary purpose is to continually measure the underground storage tank’s vapor containment pressure. This vapor containment area includes the tank ullage area, the vapor piping, and the CAS (Clean Air Separator). ISD continually monitors the vapor pressure sensor and performs assessments for pressurization and leakage in the vapor containment area.

The vapor flow meter is a volume measuring meter. When vapors are returned from a vehicle’s gasoline tank to the underground storage tank during dispensing, the volume is measured and analyzed to assess how well the vapor collection process is working.

A Healy EVR Phase II System includes one VP1000 vacuum pump per dispenser, one Clean Air Separator (CAS) per site, and the appropriate Healy hanging hardware, including Model 900 nozzles, at each fueling point.

The VP1000 Vacuum Pump is activated for each transaction and provides the vacuum for the Model 900 nozzle to collect vapors at the vehicle. The CAS is a containment vessel connected with the ullage space of all underground gasoline storage tanks to control ullage pressure.

**Note:** Clear/Reset Alarm can only be performed by a certified technician. A maintenance log entry must be made documenting the service and reason for the Clear/Reset Alarm. Clear/Reset Alarm must be performed according to the requirements of the local air district having jurisdiction over the site and CARB Executive Order VR-202.
Notes on Troubleshooting

The main task of troubleshooting is to gather enough information to find a component or configuration that is causing an alarm condition. The service technician should first begin accumulating information. The primary source for VRM related alarms should be from the INCON ISD system.

A technician should first pull the Alarm History report for the last 30 days. This can show if there is a trend or if there is an intermittent alarm that could be influencing the current alarm condition.

Next view the Daily Report. This will show the daily averages for each fueling point and for the Ullage pressure system. The Daily Report can help identify problem fueling points or patterns in the pressure system. Zero A/L ratios typically point to an ISD related problem, while high A/L ratios is most frequently a problem with the vapor assist systems. Low average A/L ratios could have either vapor assist or ISD related causes. The Min and Max, as well as the 75 and 95%, can be found on the Daily Report and are great aids in troubleshooting Ullage Pressure warnings.

When troubleshooting the ISD system always update to the latest version of firmware. Often troubleshooting aids, such as diagnostic tools or specialized reports are added.

After the information has been collected and the firmware is brought up to the latest revision, next determine what type of alarm is present. There are a few categories of causes that the alarm can fall under:

**Collection or Pressure related alarms:** These are alarms that are related to the collection of vapor from the vehicle and the monitoring of the tank pressure. True Collection alarms/Pressure alarms are completely related to the Phase I & II systems, but can be influenced or caused by other alarm and programming conditions.

**Hardware alarms:** These alarms are related to either wiring or hardware failure, though some may be caused by Software/Programming alarms. Hardware alarms can cause both Collection and Pressure alarms to occur if they are left untreated.

**Software/Programming:** These causes may reflect themselves in either collection/pressure related alarms or in hardware related alarms.

**Dispenser Interface Communication:** These causes relate to the communication between the DIM and the POS. If the connection is not made or if there is an error in the programming, a collection alarm may occur.

As with any troubleshooting, after gathering information begin the process of elimination, starting with the quickest and easiest to eliminate and working toward the more complex. The rest of this guide will help the technician to evaluate the alarm condition and the processes necessary to rectify it.
Introduction to ISD Vapor Collection

ISD vapor collection data compares fueling point V/L’s (Vapor over Liquid ratios) based on CARB specifications detailed in CP-201. V/L ratio is the amount of vapor collected in comparison to the amount of liquid dispensed. In the Healy Phase II Vapor Recovery System, the certified V/L range is 0.95 to 1.15, as determined by VR-202 Exhibit 5 testing.

If ISD vapor collection data does not meet the appropriate specifications, ISD will produce a warning alarm and then a failure alarm as specified below.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
<th>ISD Report Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly Vapor Collection Alarm (Degradation)</td>
<td>V/L average for Non-ORVR transactions is greater than 1.32 or less than 0.81</td>
<td>INCON – Weekly Vapor Collection Warning / Failure</td>
</tr>
<tr>
<td>Daily Vapor Collection Alarm (Gross)</td>
<td>V/L average for Non-ORVR transactions is greater than 1.90 or less than 0.33</td>
<td>INCON – Daily Vapor Collection Warning / Failure</td>
</tr>
</tbody>
</table>

Note: On-Board Refueling Vapor Recovery (ORVR) equipped vehicles generate fueling point V/L ratios in the 0.15 to 0.50 range. V/L ratios below 0.15 are assessed as no vapor collection by the ISD.
Identifying Collection Alarms

Start

Print an ISD Monthly Report (See pages 36 and 38 for examples)

See IOM 22 (INCON) from Executive Order VR-202 for printing instructions

Review the Warning Alarm and Failure Alarm sections to determine active alarms

Is an active Weekly Vapor Collection Alarm present?

Yes → Refer to Section One of this guide

No

Is an active Daily Vapor Collection Alarm present?

Yes → Refer to Section Two of this guide

No

Review maintenance log to determine what actions have been taken to Clear / Reset Alarm
Section One: Weekly Vapor Collection Alarms

Introduction to Weekly Vapor Collection Alarms
This section is about ISD Weekly Vapor Collection warning and failure alarms. A Weekly Vapor Collection Alarm is an indication that based on a minimum of 30 Non-ORVR transactions the fueling point V/L average is beyond the ISD threshold on a weekly basis. This is usually an indication of a small blockage or small leak in the vapor recovery system.

Warning Alarms
A Weekly Vapor Collection Warning Alarm is activated and recorded when the fueling point V/L average for a minimum of 30 Non-ORVR transactions is greater than 1.32 or less than 0.81 for one week. If fewer than 30 Non-ORVR events occur in a week, VRM system may accumulate events over an additional week or weeks until a minimum of 30 Non-ORVR events is reached.

Note: ISD evaluates weekly vapor collection alarms on a calendar week basis.

Failure Alarms
When two such consecutive failed assessments occur, ISD will activate a Weekly Vapor Collection Failure Alarm, record that event, and prohibit fuel dispensing from the affected fueling point(s).

Note: With ISD, a warning alarm will be posted on calendar day 7 and then post the failure alarm on calendar day 14 with a shutdown of only the affected dispensers if no action is taken to correct the condition.

Probable Causes of Daily/Weekly Collection Alarms
- Leaking Hanging Hardware
- Leak in the vapor piping
- Damaged nozzle
- Plugged vapor piping
- DTU related issues
- VFM missing
- VFM vanes stuck or sticky
- No A/L’s
- Flow rates below 6 gpm or above 10 gpm
Check the maintenance log for any recent work performed. The leak may be traceable to previous work performed at the site.

Print an ISD Daily Report and find the fueling point in alarm. Review the report to determine if the alarm is due to high A/L or low A/L.*

Is the alarm caused by High A/L averages greater than for a 1.92 daily or 1.32 for a weekly alarm?

Yes

This could be an indicator of a small leak in the dispenser vapor piping or hanging hardware, pushing Non-ORVR transactions over the ISD upper limit. Proceed to the Healy Troubleshooting Guide, 405274001 Section One - Troubleshooting

No

Is the alarm caused by Low A/L averages less than 0.33 for a daily or 0.81 for a weekly alarm?

No

Consult maintenance log and then contact Technical Support

Yes

Print Alarm History Report. If installed, have there been any DTU alarms?

Have there been any VFM Missing alarms?**

No

No

Are the A/L’s at or near Zero?***

No

No

Refer to the DTU troubleshooting section of this manual.

Refer to the VFM Missing section

Refer to the No A/L or DIM Communications section of this manual

* - A Weekly Warning or Failure will not change the symbol in the Daily ISD Report for the fueling point in alarm. The symbol represents the daily result. When reviewing the Daily Report, you need to look at the averages for the 7 days prior to the alarm.

** - An active VFM Missing Alarm will cause all subsequent A/Ls to go to zero. Zero A/Ls will be added to the Daily/Weekly A/L average.

*** - Programming or DIM communication errors can cause all subsequent A/Ls to go to zero. Zero A/Ls will be added to the Daily/Weekly A/L average.
Section Two: Daily Vapor Collection Alarms

Introduction to Daily Vapor Collection Alarms

This section of the guide is to ISD Daily Vapor Collection alarms.

A Daily Vapor Collection Alarm is an indication that based on a minimum of 15 Non-ORVR transactions the fueling point V/L average is beyond the ISD threshold on a daily basis. This is usually an indication of a large blockage or large leak in the vapor line.

A daily vapor collection alarm can also be generated if a Vapor Flow Meter (VFM) is not communicating to the console.

Warning Alarms

A Daily Vapor Collection Warning Alarm is activated and recorded when the fueling point V/L average for a minimum of 15 Non-ORVR transactions is greater than 1.90 or less than 0.33 for one day. If fewer than 15 Non-ORVR events occur in a day, the ISD system may accumulate events over an additional day or days until a minimum of 15 Non-ORVR events is reached.

Failure Alarms

When two such consecutive failed assessments occur, ISD will activate a Daily Vapor Collection Failure Alarm, record that event, and prohibit fuel dispensing from the affected fueling points.

Note: With Veeder-Root ISD, a failure alarm will shutdown the entire site. With INCON ISD, only the affected dispenser will be shutdown with a failure alarm.

Print a VRM Daily Report for the last 3 days (see Figures 3 & 5 for examples)

Review daily averages from reports on fueling points with active alarms

Is the V/L averaging greater than 1.90 for one day?

Yes

This would be an indicator of a large leak in the dispenser vapor piping or hanging hardware

No

Is the V/L averaging less than 0.33 for one day?

Yes

This would be an indicator of a large blockage in the dispenser vapor piping or hanging hardware

No

Refer to Healy Troubleshooting Guide 405274001 page 11

IOM 22 (INCON) from Executive Order VR-202

Continue to the A/L chart on the previous page
Troubleshooting Zero A/L
Use the following chart for troubleshooting Zero A/L problems.

Common Causes:
- Incorrect Setup
  - Probe module channel is not set to TS-VFM
  - More than one dispenser is mapped to the same VFM.
- DIM not communicating

Print an ISD Daily Report and an Alarm History Report for the last 30 days

Are all the fueling points showing zero A/L? YES

NO

Check Flow Meter Setup, verify the following:
- Probe Module has correct number of VFMs
- Vapor Recovery Monitoring section is assigned with the correct VFMs and Fueling Point numbers.

Was setup modified? NO

YES

Run Manual A/L

Did the Manual A/L return any Liquid Volume? YES

NO

Record results in maintenance log

If not already setup, change the number of Hook per dispenser to zero in the AC Input Module setup.

Run a Manual A/L on any dispenser. Check the VRM Status page before the transaction finishes.

Does the VRM Status page show the fueling point in “DISPENSING” mode?

YES

Proceed to DIM Troubleshooting section for possible setup issue.

NO

Proceed to DIM Troubleshooting section for possible communication issue.
**Introduction to ISD Ullage Pressure**

The console collects ullage pressure measurements and evaluates these measurements in comparison to CARB specifications detailed in CP-201. In a properly maintained Healy EVR Phase II Vapor Recovery System, the ullage pressure will normally be at or below atmospheric pressure, thus limiting the occurrence of the following alarms.

If ISD ullage pressure data does not meet the appropriate specifications, ISD will produce a warning alarm and then failure alarm as specified below.

**Table 2: ISD Ullage Pressure Terminology**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
<th>ISD Report Term</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monthly Ullage Pressure Alarm</strong></td>
<td><strong>Degradation</strong></td>
<td><strong>INCON – Monthly Ullage Pressure Warning / Failure</strong></td>
</tr>
<tr>
<td></td>
<td>Ullage pressure is greater than +0.3&quot; WC for 25% of time</td>
<td></td>
</tr>
<tr>
<td><strong>Weekly Ullage Pressure Alarm</strong></td>
<td><strong>Gross</strong></td>
<td><strong>INCON – Weekly Ullage Pressure Warning / Failure</strong></td>
</tr>
<tr>
<td></td>
<td>Ullage pressure is greater than +1.3&quot; WC for 5% of time</td>
<td></td>
</tr>
<tr>
<td><strong>Ullage Pressure Leak Test Alarm</strong></td>
<td>Leak rate at least 2 times allowable standard from TP-201.3</td>
<td><strong>INCON – Weekly Ullage Pressure Leak Test Warning / Failure</strong></td>
</tr>
</tbody>
</table>
Identifying Pressure Alarms

Print ISD Monthly Report (See pages 36 & 38 for examples) → See IOM 22 from Executive Order VR-202

Review the Warning Alarm and Failure Alarm sections to determine active alarms

Is an active Monthly Ullage Pressure Alarm present? Yes → Refer to Section Three of this guide
No

Is an active Weekly Ullage Pressure Alarm present? Yes → Refer to Section Four of this guide
No

Is an active Ullage Pressure Leak test Alarm present? Yes → Refer to Section Five of this guide
No

Review maintenance log to determine what actions have been taken to Clear / Reset Alarm or contact FFS Tech Support for further assistance
Section Three: Monthly Ullage Pressure Alarms

Introduction to Monthly Ullage Pressure Alarms

This section of the guide is to inform installers, operators, and other personnel about ISD Monthly Ullage Pressure warning and failure alarms. A Monthly Ullage Pressure Alarm is an indication that the ullage pressure is above the ISD threshold on a monthly basis.

Warning Alarms

A Monthly Ullage Pressure Warning Alarm is activated and recorded when the ullage pressure is greater than +0.3” WC for 25% of the time for one month.

Note: The console evaluates monthly ullage alarms on the first day of each month.

Failure Alarms

When two such consecutive failed assessments occur, the console will activate a Monthly Ullage Pressure Failure Alarm, record that event, and prohibit fuel dispensing for the entire site.

Note: With INCON VRM, a warning alarm will be posted on calendar day 30 and then post the failure alarm on calendar day 60 if no action is taken to correct. The entire site will be shutdown in the event of a failure alarm.

Probable Causes of Weekly/Monthly Pressure Alarms

- Ball Values are closed to feeding the Clean Air Separator (CAS)
- Leaking P/V Valve (on negative side, which allows for ingestion of fresh air)
- Leak in vapor path between Vapor Pump and Nozzle
- VPS Isolation Ball Valve is closed.
- Pressure Sensor Open Circuit
- DTU related issues
- Slow Flow
- Site related conditions
  - Winter Fuels
  - Deliveries schedule
Upgrade the console to the latest firmware revision

Are the ball valves for the Clean Air Separator in the correct operating positions?

No

Set ball valves per Exhibit 4 of Executive Order VR-202 to complete repairs.

Yes

Is the ball valve near the TSP-VPS in the correct operating position?

No

See Exhibit 10 from Executive Order VR-202 to complete repairs.

Yes

Pull off shrink wrap and expose/remove tube from epoxy pack. See Exhibit 10 from Executive Order VR-202 to bring system to 0 and re-calibrate VPS

At the TS-VPS junction box, is the clear reference tube exposed to atmosphere?

No

Clear Monitoring

Yes

View the Alarm History Report. Is there any active or historic indications of a Pressure Sensor Open Circuit Alarm?

Yes

See Pressure Sensor Open Circuit portion of this Manual.

No

View Daily Report. Is there a dispenser or multiple dispensers that exhibit high A/L’s?

Yes


No

Install a WC gauge to the dispenser where the VPS is located (be sure the ball valve is closed until gauge is installed or the pressure will be released)

Continued on next page
Does the readings on the WC gauge match the readings on the ISD?

Yes

Is there a slow-flow situation (2-4 gpm) occurring at the site?

Yes

Check the A/L for a ORVR car. This will most likely be high and may even be close to a 1 to 1 ratio. Slow flow situations mean that if the nozzle closes the ORVR diaphragm the amount of vapor returned will be close to the same as the amount of liquid let through. This will cause the reading to be near positive after fueling. Quiet times may send the site over the threshold thus causing an alarm. Fix the GPM problem and clear monitoring.

No

See Exhibit 10 from Executive Order VR-202 to bring system to 0 and re-calibrate VPS

Clear / Reset Alarm

ISD system is functioning correctly. Look for other causes including:
- Cracking Pressure on Vent Valve TP21.3E
- PV Valve Test via Exhibit 4 CAS testing
- Pressure Performance of Healy CAS TP-96-3
- Tank “Tie Test” per ARB TP-96-1 or TP-201-3
Section Four: Weekly Ullage Pressure Alarms
Introduction to Weekly Ullage Pressure Alarms
This section of the guide is to inform installers, operators, and other personnel about ISD weekly ullage pressure alarms. A Weekly Ullage Pressure Alarm is an indication that the ullage pressure is above the ISD threshold on a weekly basis.

Warning Alarms
A Weekly Ullage Pressure Warning Alarm is activated and recorded when the ullage pressure is greater than +1.3” WC for 5% of the time for one week.

Failure Alarms
When two such consecutive failed assessments occur, the console will activate a Weekly Ullage Pressure Failure Alarm, record that event, and prohibit fuel dispensing for the entire site.

Note: With INCON VRM, a warning alarm will be posted on calendar day 7 and then post the failure alarm on calendar day 14 if no action is taken to correct. The entire site will be shut down in the event of a failure alarm with both Veeder-Root and INCON ISD.

Course of Action

- Print ISD Daily Report from the last 3 days (See Figures 3 & 5 for examples)
- See IOM 22 from Executive Order VR-202
- Review 95th percentile values from Daily Reports
- Weekly Ullage Pressure Alarms indicate greater than 1.3” WC for more than 1.2 hours / day on average, or more than 8.4 hours for 7 days on average
- Continue to the troubleshooting section on page 14
Section Five: Ullage Pressure Leak Test Alarms

Introduction to Ullage Pressure Leak Test Alarms

This section of the guide is about ISD ullage pressure leak test alarms. An Ullage Pressure Leak Test Alarm is an indication that a leak in the Phase I and/or Phase II vapor recovery system is in excess of the CP-201 standard on a weekly basis.

Warning Alarms

An Ullage Pressure Leak Test Warning Alarm is activated and recorded when the leak rate of the vapor recovery system is two times the allowable rate as stated in TP-201.3 for one week.

Failure Alarms

When two such consecutive failed assessments occur, ISD will activate an Ullage Pressure Leak Test Failure Alarm, record that event, and prohibit fuel dispensing for the entire site.

Probable Causes of Ullage Pressure Leak Test Alarms

- VPS not communicating
- Incorrect programming
- Leaking Phase I or II component
- VPS Ball Valve in closed position
- Leaking hanging hardware or dispenser piping
- DTU related issues

Course of Action

1. Check the maintenance log for any recent work done. The leak may be traceable to previous work performed at the site.
2. Print an ISD Daily Report and an Alarm History report for the last 30 days.
3. Download the Pressure Log file and plot the pressure profile.
4. If a DTU has been installed, are there any DTU alarms? 
   - Yes: Refer to section XXXX, DTU Troubleshooting
   - No: Proceed to the Healy Troubleshooting Guide, 405274001 Section Five - Troubleshooting.
5. Have there been any Pressure Sensor Open Circuit alarms?
   - Yes: Refer to Section xxx, VPS Troubleshooting
   - No: Continued on next page
Install a WC gauge in the dispenser where the VPS is located (Make sure the ball valve is closed until after gauge is installed or pressure will be released)

Do the readings on the WC gauge match the readings on the ISD?

Were repairs made while following the Healy Troubleshooting Guide?

Contact FFS Technical Support for assistance

Refer to the Alarm history Report. Is there any active or historic indications of a Pressure sensor Open Circuit Alarm?

See Exhibit 10 from Executive Order VR-202 to bring the system to 0 and recalibrate the VPS. Then clear monitoring and record work done in the maintenance log.

See Pressure Sensor Open Circuit portion of this manual
Introduction to DIM Communication

This section of the guide is to inform installers, operators, and other personnel about the DIM or Dispenser Interface Module. The DIM communicates with the sites Point of Sale (POS) distribution box to receive information about sales. Through this connection, the DIM records the volume of liquid from each sale. For ISD, we use this information to compare to the Air Volume recorded by the vapor flow meter assigned to the same dispenser. This comparison becomes the ratio of A/L or Air divided by Liquid volume.

When problems with the communication between the ISD and the POS arise, Daily/Weekly collection errors can occur. Without this connection, the A/L readings will be 0. Communication problems may be site wide, dispenser specific or grade specific.

Check that all cables are connected between the POS and the ISD

Does the date change after a manual A/L?

Yes

DIM communication is established. Refer to No A/L section of this guide

No

Determine the distribution box type and proceeded to the appropriate section of this manual.
DIM Communications and Mapping: Wayne D-box

Do you have cable TSP-WDCBL? (FFS part # 600-0203)
No  Must have cable TSP-WDCBL

Connect the cable to the D-Box as shown. The other end of the cable connects to the ISD.

Settings for Dispenser Interface for the console as Wayne / Current Loop

Is communication established?
Yes  Clear alarms and monitor site
No  Break the Loop by removing the cable for 15 seconds and then reinstalling. This will cycle the connection and reset the line factors.

Was connection re-established?
Yes  Continued on next page
No  Check other conditions. Clear related alarms and record work in the maintenance log.

Black  Loop 1  —
Red   Loop 1  +
Green Loop 2  —
White Loop 2  +

Data Lines to Dispensers

Communication Lines to Console/POS

600-0203 Adapter
Cable Wires Loop 1

600-0203 Adapter Cable Wires Loop 2

Dispenser Interface Modules

Tune Communication
Wayne Current Loop

End of page
Position numbers:
Map the dispensers. Check numbers against the manual values

3+0
Under DIM Module, set grades to 3 and fueling points to 3 hoses.
Positions:
87=2
89=4
91=6

3+1
Under DIM Module, set grades to 4 and fueling points to 4 hoses.
Positions:
87=2
89=4
91=6

6-Packs
Under DIM Module, set grades to 3 and fueling points to 3 hoses.
Positions:
87=0
89=1
91=2

Do you have A/L readings?
No
Power cycle ISD for 5 minutes then change Wayne to Tolkeim and communication to Tolkeim STD and save changes, then change back and save changes.

Yes
Clear related alarms and record work in the maintenance log.

Do you have A/L readings?
Yes

No
Run DIM diagnostics found in the DIM Diagnostic manual #000-0274
DIM Communications and Mapping: Gilbarco, G-Site and Passport

**Gilbarco (both G-Site and Passport)**

- **What cable do you have?**
  - Any other than TSP-GDCBL
  - Must use TSP-GDCBL Cable

  **Use cable TSP-GDCBL**
  - For G-Site: Cable adapter 1002
  - For Passport: Cable adapter 1005

- **Which of two cables provided are you using?**
  - The 600-0201 Current Loop and 600-0202 RS422 cable look very similar. The cables are properly labeled for identification.
  - If labels are missing, visually inspect the cables for the single connector that contains (2) cables connected to it.
  - The 600-0201 Current Loop cable has (2) cables running into the connector that have the same diameter.
  - The 600-0202 RS422 cable has (2) cables running into the connector also, but one of the cables will have a much larger diameter.

- **EMS Set up**
  - Gilbarco – Dbox & MSI – Gilbarco – Current loop
  - Gsite / Passport - RS232 Duplex

- **Configure G-Site**
  - Set to EMC-Connect to Tank Monitor Port
  - Connect Cat 5 to tank monitor port on back of G-site CPU
  - Refer to cable instructions for port settings on Passport system.
  - Be sure TANK MONITOR ERROR Does Not appear on Bottom left of Screen on POS Monitor. If so, Power cycle both EMS and G-Site at same time. Error must be cleared prior to mapping dispensers.

- **Dispenser Interface Modules**
  - DIM 1
    - Type: GSite
    - Communication: RS232 Duplex

- **Does "Tank Monitor Error" appear at the bottom left of the POS monitor?**
  - Yes
    - Power cycle both the EMS and G-Site at the same time. Error must be cleared before mapping dispensers
  - No

- **How does G-Site / Passport see the dispenser?**
Confirm how dispensers are numbered in G-site and how G-site see dispensers (i.e. Dispenser may be numbered 1-2, 3-4, 5-6, or 13-14,15-16 but G-site may see 15-16 as 1-2). If this is the case the EMS will need to be wired as the G-site sees the dispensers NOT as they appear on the POS screen.

Confirm G-Site is selected as DIM type and not Gilbarco

Blending Dispensers:
- Under DIM Module Set Grades to 2 Unleaded and Premium Fueling points set to 2 Hoses
- Be sure both grades are set on each hose prior to querying dispensers
- Be sure both positions are at 0 prior to querying.

Non-Blending Dispensers:
- Under DIM module set grades to 3: Unleaded, Midgrade, Premium
- Set fueling points to 3-hose and name each grade.

Manual Mapping:
- Blenders = 0-unlead, 1-premium
- Non-Blenders-0-unleaded, 1-midgrade,2-premium.
- If there are 3+1 they will need to queried individually to ensure correct mapping.

Do you have A/L readings?

No

Power cycle EMS for 5 minutes then change G-Site to Tolkeim and communication to Tolkeim STD and save changes, then change back and save changes.

Yes

Clear all related alarms and record work in the maintenance log.
Tokheim 67-67B D-Box or M94/M98 Power Center

DIM Communications and Mapping: Tokheim

What cable do you have?

Use cable TSP-TSDCBL Part # 600-0204

ISD Set up
Tokheim – Tokheim STD

Locate The round black connectors on the existing console-to-D-Box cable. Disconnect the cable and attach the 600-0204 interface cable.

How is the DIM set up in the ISD? Verify Type and Communication.

Cycle Power on both the ISD and Tokheim

Remap Fueling Points. Run manual A/L and monitor site

Dispenser Interface

<table>
<thead>
<tr>
<th>Precision</th>
<th>≥</th>
<th>...</th>
<th>...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades</td>
<td>≥</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

Dispenser Interface Modules

<table>
<thead>
<tr>
<th>DIM 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type Communication Tokheim Tokheim STD</td>
</tr>
</tbody>
</table>

| Fueling Points | ≥ | ... | ... |
DIM Communications and Mapping: Bennet

**Bennet 515 D-Box**

What cable do you have?

- Use cable TSP-BSDCBL Part # 600-0208

Must use TSP-BDCBL Cable

- Any other than TSP-BDCBL

Cable must attach to the S-232 Communication Port #3 on the Bennet 515

**ISD Set up**

Bennett – RS232 Duplex

How is the DIM set up in the ISD? Verify Type and Communication.

Cycle Power on both the ISD and Tokheim

Remap Fueling Points. Run manual AVL and monitor site

### Dispenser Interface

<table>
<thead>
<tr>
<th>Precision</th>
<th>Grades</th>
<th>Dispenser Interface Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>DIM 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fueling Points</td>
</tr>
</tbody>
</table>

Type: Bennet515

Communication: RS232 Duplex
Introduction to Hardware Alarms

Hardware related alarms are related to equipment that is physically connected to the ISD system. The ISD uses these apparatuses to collect the data that it uses to determine the vapor collection and pressure related alarms.

The hardware includes:

- **Vapor Flow Meters**, one is mounted in every dispenser and uses a roots style vanes to sense the vapor flow through the return line.
- **Vapor Pressure Sensor**, one is mounted in the dispenser closest to the tanks, this sensor monitors the vacuum or pressure on the vapor collection system.
- **External Tank Gauge**, on EMS, define ISD systems an external tank gauge is required to collect ullage information for each tank.
- **Data Transfer Unit (DTU)**: One is mounted in each dispenser and one is also connected to the console. The dispenser-mounted DTUs transfer data from the VFMs and VPSs to the console.

Hardware related alarms may be caused by either a physical problem, such as a wiring connection, a damaged item or a programming error. Data Transfer Units (DTU) can influence some hardware alarms and should be taken into consideration when troubleshooting a site.

**To Start**

- Pull the Alarm History for the last 30 days
- Check all cables and connections
- If the site uses DTUs, check connections

**Clearing the Alarm**

Hardware alarms will clear automatically when the device returns to normal operation.
Introduction VFM Missing

This section of the guide introduces the VFM Missing or VFM Errors. These alarms occur when either the device is not communicating or partially communicating with the console. Communication errors could be caused by:

- A damaged encoder
- Wiring connections
- Faulty or improper wires
- A damaged channel on the probe module or other DTU related causes.

VFM Missing alarms can cause Daily or Weekly Vapor Collection alarms to occur due to the lack of Air Volume in the A/L ratio. VFM Missing alarms tend to be dispenser specific or DTU related.

This type of alarm will not occur due to poor flow or a blockage in the vapor recovery system. This alarm is only related to the communication of the Vapor Flow Meter.

<table>
<thead>
<tr>
<th>Probe Modules</th>
<th>Channel 1</th>
<th>Channel 2</th>
<th>Channel 3</th>
<th>Channel 4</th>
<th>Channel 5</th>
<th>Channel 6</th>
<th>Channel 7</th>
<th>Channel 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Channel 5</td>
<td>Name: disp 1/2 vfm</td>
<td>Type: TS-VFM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Channel 6</td>
<td>Name: disp 3/4 vfm</td>
<td>Type: TS-VFM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vapor Recovery Monitoring</th>
<th>Method</th>
<th>Type</th>
<th>Assist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dispenser Configuration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dispenser 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel Meter</td>
<td>disp 1/2 vfm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Fueling Point</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second Fueling Point</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dispenser 2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Diagnosing VFM Missing Error**

1. **VFM Missing**
   - Is the VFM Missing alarm clearing within 2 seconds? (Yes → Upgrade the firmware to the most current revision. Check all other conditions, clear any related alarms and record the work done in the maintenance log)
   - No →

2. **Is a DTU being used?** (Yes → Pull alarm history for the last 30 days)
   - No →

3. **Check DC Voltage at the red and black leads on the Probe Module**
   - Is the DTU (for the dispenser missing VFM) offline? (Yes → Troubleshoot the DTU)
   - No →

4. **Check DC Voltage at the red and black leads on the DTU**
   - Is the voltage between 18 and 22 VDC? (Yes → Cycle power to the ISD system)
     - No →
       - Does the alarm clear?
         - Yes → Replace the TSP-ENCD encoder on the VFM
         - No → Disconnect the VFM. Does Voltage go to 24 VDC?
           - Yes → Clear related alarms and record results in the maintenance log
           - No → If voltage stays the same, Troubleshoot the Probe module or DTU

   - Over →
     - Is the voltage over 22 volts or under 18 volts?
       - Yes → Connect the ENCD directly to the gauge. If voltage stays at 24 then replace TSP-ENCD encoder on the VFM. If voltage is in normal range, redo field connections
       - No →

   - Under →
Introduction to Pressure Sensor Open Circuit

This section is about Vapor Pressure Sensor (VPS) Open Circuit. VPS Open Circuit alarms occur when the Pressure Sensor is not communicating with the console. If left in alarm until the end of the week, the VRM System will issue an Ullage Pressure Leak Test alarm.

Open Circuit errors could be caused by:

- A damaged vapor pressure sensor
- Wiring connections
- Faulty or improper wires
- A damaged channel on the 4-20mA module
- DTU related causes.

![Image of 4-20mA Input Modules table]

<table>
<thead>
<tr>
<th>Module 1</th>
<th>Channels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel 1</td>
<td>...</td>
</tr>
<tr>
<td>Channel 2</td>
<td>...</td>
</tr>
<tr>
<td>Channel 3</td>
<td>...</td>
</tr>
<tr>
<td>Channel 4</td>
<td>...</td>
</tr>
<tr>
<td>Channel 5</td>
<td>Name: Dsp 1/2 vps, Service Type: Vapor Recovery Monitoring</td>
</tr>
<tr>
<td>Channel 6</td>
<td>...</td>
</tr>
<tr>
<td>Channel 7</td>
<td>...</td>
</tr>
<tr>
<td>Channel 8</td>
<td>...</td>
</tr>
</tbody>
</table>

- Power Supply
- Relay Modules
- Dispenser Interface
- Fuel Management System
- Vapor Recovery Monitoring
- Method Type: Assist
- Dispenser Configuration
- Grades
- Ullage Pressure Input
- Sensor: Dsp 1/2 vps
Pressure Sensor Open Circuit

- **Is the Pressure Sensor Open Circuit alarm clearing within 2 seconds?**
  - Yes: Upgrade the firmware to the most current revision. Check all other conditions, clear any related alarms and record the work done in the maintenance log
  - No

- **Is a DTU being used?**
  - Yes: Pull alarm history for the last 30 days
  - No

- **Check DC Voltage at the white and black leads on the Probe Module**
  - Yes
  - **Is the DTU (for the dispenser with the Pressure Sensor Open Circuit) offline?**
    - Yes: Troubleshoot the DTU
    - No
  - **Check DC Voltage at the white and black leads on the DTU**
    - Yes
    - **Is the voltage around 13 VDC?**
      - Yes: Cycle power to the ISD system
      - No
      - **Does the alarm clear?**
        - Yes: Replace the TS-VPS pressure sensor
        - No
      - **Replace the VPS. Does Voltage go to 18 VDC?**
        - Yes: Clear related alarms and record results in the maintenance log
        - No
          - **Does the alarm clear?**
            - Yes: Replace the TS-VPS pressure sensor
            - No
  - **Check DC Voltage at the white and black leads on the DTU**
    - Yes
    - **Is the voltage over or under 13 volts?**
      - Over: Connect the Pressure Sensor directly to the gauge. If voltage stays at 18 VDC then replace the TSP-VPS pressure sensor. If voltage returns to 13 Volts DC, redo field connections
      - Under: Troubleshoot the 4-20mA module or DTU
  - **Cycle power to the ISD system**
    - Yes
    - **Does the alarm clear?**
      - Yes: Replace the TS-VPS pressure sensor
      - No
  - **Disconnect the VPS. Does Voltage go to 18 VDC?**
    - Yes: Troubleshoot the 4-20mA module or DTU
    - No
      - **Does the alarm clear?**
        - Yes: Replace the TS-VPS pressure sensor
        - No
          - **Upgrade the firmware to the most current revision. Check all other conditions, clear any related alarms and record the work done in the maintenance log**
Introduction External ATG Alarm

This section of the guide is about an External ATG Connection Down alarm. The VRM System uses ullage volume for vapor containment leak detection. The console gathers ullage volume from an external ATG. When using an existing ATG for collecting ullage, then the ATG must have an available RS-232 port and have the ability to respond to TLS-250 or TLS-350 inventory command and be connected via a “Null Serial” cable.

There are two states associated with this alarm condition. A Warning Alarm will be generated when ISD system does not receive a response from the External ATG. A Failure alarm will be generated at midnight if the connection has not been restored and the ISD system cannot generate any ullage leak results.
Connect a computer to the EMS side of the serial cable. Set the ATG Serial port to communicate in Veeder-Root mode and use HyperTerminal to send a Control A200 command to the ATG.

Do HyperTerminal show tank data?

Yes

Is the connection established?

Yes

Check all other conditions, clear any related alarms and record the work done in the maintenance log.

No

Investigate the communication port on the ATG. Check the cable.

No

Does HyperTerminal show tank data?

Yes

Is the connection established?

Yes

Check all other conditions, clear any related alarms and record the work done in the maintenance log.

No

Make sure settings on both units are:
- Baud rate 9600
- Data bits 8
- Parity None
- Stop Bits 1
and cycle power

No

If the ATG is a Veeder-Root, attempt to cold-boot the system and re-program if local codes allow. Contact FFS Technical Support at 1-800-984-6266 if the problem persists

Yes

Are the settings the default for the EMS?

Yes

Upgrade to 1.2.0 or higher. Recycle power and check for connection.

No

Are the settings the default for the EMS?

Yes

Is the software revision 1.2.0 or higher?

No

Recycle power and check for connection.

Yes

Did the alarms clear?

No

From previous page

Cycle power to the ATG

Check all other conditions, clear any related alarms and record the work done in the maintenance log.
Introduction to DTU Alarms

This section of the guide is about Data Transfer Unit (DTU) alarm. DTU’s are used as semi-wireless units to transmit data from the VRM hardware in the dispensers to the ISD console.

There are two alarms that are directly associated with the DTU: a Console DTU mismatch and a DTU Offline. The Console DTU mismatch has to do with communication between the ISD console and the DTU that is wired into it. If the ISD console cannot establish contact with the DTU, this alarm will occur.

DTU Offline is an alarm pertaining to a single dispenser-mounted DTU. The ISD console has lost communication with that specific DTU. There may be many causes, but are typically programming/wiring, a bad DTU or noise interference.

While not a directly related DTU alarm, if a site is seeing large differences between the Roots meter or Tri-tester and the ISD console, then the J1 Jumper on the Power Supply Module in the console may not have been removed. This jumper must be removed when DTU’s are used.

Possible Causes:

- Faulty Wiring
- Bad DTU
- Incorrect Programming
- Noise interference
- ISD Alarms that turn off dispensers
Print the Alarm History report

Is the DTU Mismatch Alarm clearing within 2 seconds?
- Yes → Upgrade the firmware to the current revision and clear any related alarms
- No → Did the alarm clear?
  - Yes → Check all other conditions, clear any related alarms and record the work done in the maintenance log.
  - No → Is the Console DTU wired correctly to the ISD console?
    - Yes → Correct the console DTU wiring
    - No → Did the alarm clear?
      - Yes → Swap the console DTU with another on-site and change programming.
      - No → Did the alarm clear?
        - Yes → Permanently replace Console DTU. Clear other related alarms.
        - No → Contact FFS Technical Support

<table>
<thead>
<tr>
<th>Belden Cable</th>
<th>BUS EXT</th>
<th>Console DTU Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Wire</td>
<td>HIGH</td>
<td>HIGH</td>
</tr>
<tr>
<td>Black Wire</td>
<td>LOW</td>
<td>LOW</td>
</tr>
<tr>
<td>Shield</td>
<td>GND</td>
<td>GND</td>
</tr>
</tbody>
</table>
DTU Offline

Does the Dispensers have power?

Yes

Print the Alarm History report

No

Establish power to the dispenser

Check all other conditions, clear any related alarms and record the work done in the maintenance log.

Did the alarm clear?

Yes

Upgrade the firmware to the current revision and clear any related alarms

No

Did the alarm clear?

Yes

Check all other conditions, clear any related alarms and record the work done in the maintenance log.

No

Check all other conditions, clear any related alarms and record the work done in the maintenance log.

Is the DTU Mismatch Alarm clearing within 2 seconds?

Yes

Upgrade the firmware to the current revision and clear any related alarms

No

Check all other conditions, clear any related alarms and record the work done in the maintenance log.

Are the unit ID numbers correct?

Yes

Correct any numbers that are wrong and clear any related alarms.

No

Check the DTU status for the troubled DTU. This is located under System and Diagnostic. Select Auto Refresh

Are all of the DTUs offline?

Yes

Offline

The Console had shut all dispensers down due to a Ullage Pressure Alarm. Please see Section 3 of this guide.

No

According to the alarm history, did they remain offline?

Yes

Alarm cleared

If they all went off at the same time, but have now cleared, this indicates a power loss, either manually or the console shutdown all the dispensers.

Are there Weekly/Monthly Ullage Pressure Alarms?

Yes

Are there a Daily/Weekly Vapor Collection Alarm?

No

See the Console DTU Mismatch chart on the previous page of this guide.

Yes

Is there a Console DTU Mismatch alarm?

No

The Console had shutdown the dispenser due to a Vapor collection warning. See Section 2 of this guide.

Yes

Correct any numbers that are wrong and clear any related alarms.

System Configuration

Remote Data Transfer Units

<table>
<thead>
<tr>
<th>Network ID</th>
<th>Number of Units</th>
<th>Unit ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>14-9609-8503-0006-E2</td>
</tr>
</tbody>
</table>

Continued on next page
Continued from previous page

- Is the quality at 0?
  - Yes: Correct wiring and recheck status.
  - No: Is the DTU wired correctly?
    - Yes: Swap DTU with another known working unit and change the unit ID numbers in the setup menu.
    - No: Is the Quality below 70%?
      - Yes: Permanently replace faulty DTU and clear related alarms.
      - No: Did the alarm clear for that dispenser?
        - Yes: Install the appropriate TS-DRK noise suppression cable.
        - No: There is some other cause. Contact FFS Technical Support.
      - No: Clear other related alarms and record the work done into the maintenance log.

- Did the alarm clear?
  - Yes: Clear other related alarms and record the work done into the maintenance log.
  - No: Permanently replace faulty DTU and clear related alarms.
INCON ISD Daily Report (Printout)

Note: For this example on 2/24/2009, fueling points 1 and 4 are below the daily transaction threshold, resulting in no assessment for that day.

Note: For this example on 2/26/2009, fueling points 3 and 4 are below the daily vapor collection threshold, indicating a potential blockage for that day.

Note: On the daily report, pressure 75th and 95th percentile are for the given day and are for reference only.
VRM Monthly Report

From: 02/01/2009
To: 02/27/2009

Statistics
February 2009
Operation[X]
100
Pass[X]
0

Operational Requirements
Vapor Collection Method
Assist
A/L Low
0.95
A/L high
1.15

Monitoring Requirements
Dly Vapor Coll. A/L
Occurred
02/01/2009 00:00:00
Occurred
02/08/2009 00:00:00
Occurred
02/15/2009 00:00:00
Occurred
02/27/2009 13:56

Weekly Vapor Coll. A/L
Low
0:33
High
1.90

Weekly Ullage Pressure W
Low
0:81
High
1.32

Monthly Ullage Pres. Mon.
High
1:30

Warning Alarms
Weekly Ullage Pressure W
Occurred
02/01/2009 00:00:00
Cleared
02/15/2009 00:00:00

Failure Alarms
Weekly Ullage Pressure F
Occurred
02/08/2009 00:00:00
Cleared
02/15/2009 00:00:00
Fueling Point 3
Weekly Vapor Collection
Occurred
02/01/2009 00:00:01

Note: The FP3 weekly vapor collection failure alarm on the report does not meet the monitoring requirements specified by CP-201.

Note: On the monthly report refer to the values listed under monitoring requirements. These are the values that cannot be exceeded for the monitoring period. Under the warning alarm and failure alarm sections, notice the weekly ullage pressure warning alarm and then failure alarm.
The ISD up-time is the percentage that the ISD System is running the VRM application. It calculates the up-time based on actual run-time during a 24-hour period. It is stated in CP-201 that the ISD system must be running 95% of the time on an annual basis.

### Ullage Pressure Readings

The highest and lowest ullage pressure is the highest and lowest average hourly pressure for each day.

The VRM records and stores the 75th and 95th highest ullage pressure for each day.
The ISD operation time is the cumulative operation time of the VRM application. It is stated in CP-201 that the ISD system must be running 95% of the time on an annual basis.

The EVR pass time is the percentage of time the entire EVR system is not in an Alarm state.

The ISD monitoring requirements are the limits which trigger alarms.

The EVR Operating Requirements list the EVR components installed at the site and their operating parameters (if applicable).

This is a list of current and past VRM warnings and failures.

The event log shows a description of any shutdowns and the action to re enable any fueling points.