State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER VR-204-O

Balance Phase II Enhanced Vapor Recovery (EVR) Systems
Including In-Station Diagnostics (ISD) Systems

WHEREAS, the California Air Resources Board (ARB) has established, pursuant to California Health and Safety Code sections 25290.1.2, 39600, 39601 and 41954, certification procedures for systems designed for the control of gasoline vapor emissions during motor vehicle fueling operations (Phase II EVR vapor recovery systems) in CP-201, ***Certification Procedure for Vapor Recovery Systems at Gasoline Dispensing Facilities*** (Certification Procedure) as last amended January 9, 2013, incorporated by reference in title 17, California Code of Regulations, section 94011;

WHEREAS, ARB has established, pursuant to California Health and Safety Code sections 39600, 39601, 39607, and 41954, test procedures for determining the compliance of Phase II vapor recovery systems with emission standards;

WHEREAS, Vapor Systems Technologies (VST), Inc. requested amendment of the Balance Phase II Enhanced Vapor Recovery (EVR) System Executive Order VR-204 to include the VST reattachable breakaway as an alternate breakaway;

WHEREAS, the Certification Procedure provides that the ARB Executive Officer shall issue an Executive Order if he or she determines that the vapor recovery system conforms to all of the applicable requirements set forth in the Certification Procedure;

WHEREAS, G-01-032 delegates to the Chief of the Monitoring and Laboratory Division the authority to certify or approve modifications to certified Phase I and Phase II vapor recovery systems for gasoline dispensing facilities; and

WHEREAS, I, Michael T. Benjamin, Chief of the Monitoring and Laboratory Division, find that the Balance Phase II EVR Systems, as modified herein, conforms with all requirements set forth in the Certification Procedure, including compatibility when fueling vehicles equipped with onboard refueling vapor recovery systems, and results in a vapor recovery system which is at least 95 percent efficient and shall not exceed 0.38 pounds of hydrocarbons per 1,000 gallons of gasoline transferred when tested pursuant to TP-201.2, ***Efficiency and Emission Factor for Phase II Systems*** (July 26, 2012).

NOW, THEREFORE, IT IS HEREBY ORDERED that the Balance Phase II EVR Systems Including ISD Systems are certified to be at least 95 percent efficient and do not exceed 0.38 pounds of hydrocarbon per 1,000 gallons of gasoline transferred in attended and/or self-service mode when used with an ARB-certified Phase I vapor

recovery system and installed, operated, and maintained as specified herein and in the following exhibits. Exhibit 1 contains a list of the equipment certified for use with Balance Phase II EVR Systems including ISD Systems. Exhibit 2 contains the performance standards, specifications, and typical installation drawings applicable to Balance Phase II EVR Systems Including ISD Systems as installed in a gasoline dispensing facility (GDF). Exhibit 3 contains the manufacturing performance specifications and warranties. Exhibit 4 provides items required in conducting TP-201.3. Exhibit 5 is the liquid removal test procedure. Exhibit 6 provides items required in conducting TP-201.4. Exhibit 7 is the nozzle bag test procedure. Exhibit 8 is VST ECS hydrocarbon sensor verification test procedure. Exhibit 9 is the test procedure for determining VST ECS vapor processor activation pressure. Exhibit 10 is the Veeder-Root vapor pressure sensor verification test procedure. Exhibit 11 is the Veeder-Root vapor polisher operability test procedure. Exhibit 12 is the Veeder-Root vapor polisher hydrocarbon emissions verification test procedure. Exhibit 13 is the Hirt VCS 100 Processor with Indicator Panel Operability Test Procedure. Exhibit 14 is the Franklin Fueling Systems Clean Air Separator static pressure performance test procedure. Exhibit 15 is the VST Green Machine Compliance Test Procedure. Exhibit 16 is the Liquid Condensate Trap compliance test procedure. Exhibit 17 is the Veeder-Root ISD vapor flow meter operability test procedure. Exhibit 18 is accessing PMC and ISD parameters at gasoline dispensing facilities (GDFs) with Veeder-Root's "Maintenance Tracker" security feature installed & enabled. Exhibit 19 is the INCON ISD vapor flow meter operability test procedure. Exhibit 20 is the INCON vapor pressure sensor verification test procedure.

IT IS FURTHER ORDERED that compliance with the applicable certification requirements, rules and regulations of the Division of Measurement Standards of the Department of Food and Agriculture, the Office of the State Fire Marshal of the Department of Forestry and Fire Protection, the Division of Occupational Safety and Health of the Department of Industrial Relations, and the Division of Water Quality of the State Water Resources Control Board are made conditions of this certification.

IT IS FURTHER ORDERED that each component manufacturer listed in Exhibit 1 shall provide a warranty for the vapor recovery components to the initial purchaser. The warranty shall be passed on to each subsequent purchaser within the warranty period. The warranty shall include the ongoing compliance with all applicable performance standards and specifications and shall comply with all warranty requirements in Section 16.5 of the Certification Procedure. Manufacturers may specify that the warranty is contingent upon the use of trained installers. The manufacturer warranty tag, included with each component, shall be provided to the service station owner/operator at the time of installation.

IT IS FURTHER ORDERED that every certified component manufactured by VST, EMCO, OPW, Goodyear, Veeder-Root, Hirt, and Franklin Fueling Systems including INCON shall meet the manufacturing performance specifications as provided in Exhibit 3.

IT IS FURTHER ORDERED that the certified Balance Phase II EVR Systems Including ISD Systems shall be installed, operated, and maintained in accordance with the ***ARB Approved Installation, Operation, and Maintenance Manual***. Equipment shall be inspected weekly, quarterly, and annually per the procedures identified in the ***ARB Approved Installation, Operation, and Maintenance Manual***. These inspections shall also apply to systems certified by Executive Orders VR-204-A to N. A copy of the Executive Order and the ***ARB Approved Installation, Operation and Maintenance Manual*** shall be maintained at each GDF where a certified Balance Phase II EVR System Including ISD System is installed.

IT IS FURTHER ORDERED that equipment listed in Exhibit 1, unless exempted, shall be clearly identified by a permanent identification showing the manufacturer's name, model number, and serial number.

IT IS FURTHER ORDERED that any alteration in the equipment parts, design, installation, or operation of the system provided in the manufacturers' certification application or documents and certified hereby is prohibited and deemed inconsistent with this certification, unless the alteration has been submitted in writing and approved in writing by the Executive Officer or Executive Officer delegate.

IT IS FURTHER ORDERED that the following requirements are made a condition of certification. The owner or operator of the Balance Phase II EVR System Including ISD System shall conduct and pass the following tests no later than 60 days after startup and at least once in each twelve month period, using the following test procedures:

- TP-201.3, ***Determination of 2 Inch WC Static Pressure Performance of Vapor Recovery Systems of Dispensing Facilities*** (July 26, 2012);
- TP-201.4, ***Dynamic Back Pressure*** (July 3, 2002) in accordance with the condition listed in item 1 of the Vapor Collection section of Exhibit 2;
- Exhibit 4, ***Required Items in Conducting TP-201.3***;
- Exhibit 5, ***Liquid Removal Test Procedure****;*
- Exhibit 6, ***Required Items in Conducting TP-201.4***;
- Exhibit 8, ***VST ECS Hydrocarbon Sensor Verification Test Procedure*** *(if a VST ECS membrane processor is installed)*;
- Exhibit 9, ***Determination of VST ECS Processor Activation Pressure*** *(if a VST ECS membrane processor is installed)*;
- Exhibit 10, ***Veeder-Root Vapor Pressure Sensor Verification Test Procedure****;*
- Exhibit 11, ***Veeder-Root Vapor Polisher Operability Test Procedure*** *(if a Veeder-Root Vapor Polisher is installed)*;
- Exhibit 12, ***Veeder-Root Vapor Polisher Hydrocarbon Emissions Verification Test Procedure*** *(if a Veeder-Root Vapor Polisher is installed)*;
- Exhibit 13, ***Hirt VCS 100 Processor with Indicator Panel Operability Test Procedure*** *(if a Hirt VCS 100 processor is installed);*
- Exhibit 14, ***Franklin Fueling Systems Healy Clean Air Separator Static Pressure Performance Test Procedure*** *(if a Clean Air Separator is installed);*
- Exhibit 15, ***VST Green Machine Compliance Test Procedure***

(if a Green Machine is installed);

- Exhibit 16, ***Liquid Condensate Trap Compliance Test Procedure*** *(if a Liquid Condensate Trap is installed);*
- Exhibit 17, ***Veeder-Root ISD Vapor Flow Meter Operability Test Procedure*** *(if Veeder-Root ISD is installed)*;
- Exhibit 18, ***Accessing PMC and ISD Parameters at Gasoline Dispensing Facilities (GDFs) with Veeder-Root's "Maintenance Tracker" Security Feature Installed & Enabled*** *(if Maintenance Tracker is installed);*
- Exhibit 19, ***INCON; ISD Vapor Flow Meter Operability Test Procedure*** *(if INCON ISD is installed); and*
- Exhibit 20, ***INCON; Vapor Pressure Sensor Verification Test Procedure*** *(if INCON ISD is installed)*.

Local districts at their option may specify the testing frequency and related sequencing of the above tests. Notification of testing, and submittal of test results, shall be done in accordance with local district requirements and pursuant to policies established by that district. Local districts may require the use of alternate test form(s), provided they include the same minimum parameters identified in the datasheet referenced in the test procedure(s). Alternative test procedures, including most recent versions of the test procedures listed above, may be used if determined by ARB Executive Officer or Executive Officer delegate, in writing, to yield equivalent results.

IT IS FURTHER ORDERED that the following requirements are made a condition of certification. The owner or operator of the Balance Phase II EVR System Including ISD System shall conduct, and pass, the following tests no later than 60 days after startup using the following test procedure: Exhibit 7, ***Nozzle Bag Test Procedure***. Notification of testing, and submittal of test results, shall be done in accordance with local district requirements and pursuant to the policies established by that district. Alternative test procedures, including most recent versions of the test procedures listed above, may be used if determined by the ARB Executive Officer or Executive Officer delegate, in writing, to yield equivalent results.

IT IS FURTHER ORDERED that, except as provided above, local districts at their option may specify the testing, related sequencing, and testing frequency of the nozzle vapor valves. If the district requires the nozzle vapor valve be tested, the test shall be conducted in accordance with Exhibit 7, ***Nozzle Bag Test Procedure***.

IT IS FURTHER ORDERED that the Balance Phase II EVR Systems Including ISD Systems shall be compatible with gasoline in common use in California at the time of certification. The Balance Phase II EVR System Including ISD System is not compatible with gasoline that has a methanol content greater than 5 percent or an ethanol content greater than 10 percent. Any modifications to comply with future California gasoline requirements shall be approved in writing by the Executive Officer or Executive Officer delegate.

IT IS FURTHER ORDERED that the certification of Balance Phase II EVR Systems Including ISD is valid through April 1, 2014.

IT IS FURTHER ORDERED that Executive Order VR-204-N issued on February 8, 2013, is hereby superseded by this Executive Order. VST Phase II EVR Systems Including Veeder-Root ISD certified under Executive Order VR-204-A through N may remain in use at existing installations up to four years after the expiration date of this Executive Order when the certification is not renewed. This Executive Order shall apply to new installations or major modification of Phase II Systems with a throughput of more than 600,000 gallons per year. The installation of the ISD System is not authorized on a GDF with a throughput of less than or equal to 600,000 gallons per year.

Executed at Sacramento, California, this 11th day of October 2013.

Michael T. Benjamin, Chief
Monitoring and Laboratory Division

Attachments: Next Page

General Requirements

Exhibit 1 Equipment List
- Hanging Hardware
- Processors
- Liquid Condensate Trap
- ISD
  - Optional Wireless Components
  - Optional Maintenance Tracker Kit

Exhibit 2 System Specifications
- Hanging Hardware
- Processors
- Pressure/Vacuum Vent Valves for Storage Tank Vents
- Warranty
- Vapor Recovery Piping Configurations
- Dispensers
- Liquid Condensate Traps
- In-Station Diagnostics (ISD)
- Phase I Systems
- Maintenance Records
- Vapor Recovery Equipment Defects
- Veeder-Root ISD System Specifications
- INCON ISD System Specifications

Exhibit 3 Manufacturing Performance Specifications and Warranties
- Vapor Systems Technologies
- EMCO Wheaton Retail
- Veeder-Root
- Goodyear
- Hirt
- Franklin Fueling Systems Including INCON ISD System
- OPW

General Compliance Procedures

Exhibit 4 Required Items in Conducting TP-201.3
Exhibit 5 Liquid Removal Test Procedure
Exhibit 6 Required Items for Conducting TP-201.4
Exhibit 7 Nozzle Bag Test Procedure

Processor Specific Compliance Procedures

Exhibit 8 VST ECS Hydrocarbon Sensor Verification Test Procedure
Exhibit 9 VST ECS Determination of Processor Activation Pressure
Exhibit 10 Veeder-Root Vapor Pressure Sensor Verification Test Procedure
Exhibit 11 Veeder-Root Vapor Polisher Operability Test Procedure
Exhibit 12 Veeder-Root Vapor Polisher Hydrocarbon Emissions Verification Test Procedure

Exhibit 13 Hirt VCS 100 Processor with Indicator Panel Operability Test Procedure
Exhibit 14 Franklin Fueling Systems Healy Clean Air Separator Static Pressure Performance Test Procedure
Exhibit 15 VST Green Machine Compliance Test Procedure

LCT Specific Compliance Procedure
Exhibit 16 Liquid Condensate Trap Compliance Test procedure

ISD Specific Compliance Procedures
Exhibit 10 Veeder-Root Vapor Pressure Sensor Verification Test Procedure
Exhibit 17 Veeder-Root ISD Vapor Flow Meter Operability Test Procedure
Exhibit 18 Accessing PMC and ISD Parameters at Gasoline Dispensing Facilities (GDFs) with Veeder-Root's "Maintenance Tracker" Security Feature Installed & Enabled
Exhibit 19 INCON ISD System Vapor Flow Meter Operability Test Procedure
Exhibit 20 INCON ISD System Vapor Pressure Sensor Verification Test Procedure

EXHIBIT 1[1]

Equipment List
Hanging Hardware

Component	*Manufacturer / Model*
Nozzle	VST Model VST-EVR-NB, VST-EVR-NB (Rebuilt) Or EMCO Models A4005EVR, RA4005EVR (Rebuilt) (Figure 1A-1)
Coaxial Curb Hose	VST Model VDV-EVR Series Or Goodyear Model Maxxim Premier Plus *("NV" stamped on nozzle end)* (Figure 1A-2)
Coaxial Whip Hose	VST Model VSTA-EVR Series Or Goodyear Model Maxxim Premier Plus (Figure 1A-2)
Breakaway Coupling	VST Model VSTA-EVR-SBK, VSTA-EVR-SBK (Rebuilt), VSTA-EVR-SBK (Reattachable)[2] Or EMCO Model A4119EVR Or OPW Model 66CLP (Figure 1A-2)

Allowable Hanging Hardware Combinations Including ISD Systems

	Nozzle		Hose		Breakaway			ISD	
Processor	VST	EMCO	VST	Goodyear	VST	EMCO	OPW	Veeder-Root	INCON
VST Membrane	●		●	●	●	●	●	●	
Veeder Root Vapor Polisher	●	●	●	●	●	●	●	●	
FFS Clean Air Separator	●	●[3]	●	●	●	●	●	●	●[3]
Hirt VCS 100	●	●	●	●	●	●	●	●	
VST Green Machine	●		●	●	●	●	●	●	

[1] The local air district may require a permit application when changing between alternate components.
[2] The lower half of the VST reattachable breakaway, identified with a VST logo, cannot be used on the VST non-reattachable or rebuilt breakaways.
[3] EMCO Nozzle for use with FFS Clean Air Separator is not allowed with INCON ISD System.

ONLY ONE OF THE FOLLOWING FIVE (5) PROCESSOR GROUPS IS REQUIRED

VST Membrane
Processor Equipment List #1

Component	*Manufacturer / Model*
Veeder-Root TLS-350 Series, including but not limited to TLS-350, TLS-350 Plus, TLS-350R, Red Jacket ProMax, Gilbarco EMC consoles (TLS Console)	Veeder-Root 8482XX-XXX, 8470XX-XXX, ProMax 847097-XXX EMC PAO2620X000X X = Any digit (Figure 1A-3A)
RS232 Interface Module	Veeder-Root RS232 Interface Module Series (Figure 1A-3B)
VST Membrane Processor	VST Model VST-ECS-CS3-XXX (Figure 1A-4) where XXX represents motor phase and HC Sensor 110 =Single-Phase with HC Sensor 310=Three-Phase with HC Sensor
Pressure Management Control (PMC) Software Version Number	1.04
Vapor Pressure Sensor [1] (1 per GDF)	Veeder-Root 331946-001 – Wired, approved for installation in the dispenser or on the vent stack (Figure 1A-5) or Veeder Root 861190-201 - Low Powered Wireless, approved for installation on the vent stack only (Figure 1A-5)
Vapor Pressure Sensor Desiccant Tube - Optional (1 per GDF)	Veeder-Root 330020-717 – Dryer Tube (Figure 1A-5)
Multiport Card	Veeder-Root 330586-018
Universal Enclosure Kit [2]	Veeder-Root 330020-716 (Figure 1A-9)

[1] Wireless sensors require additional components specified in Veeder-Root Optional Wireless Component Equipment List.
[2] Only required for vapor pressure sensors installed on the vent line.

Veeder-Root Vapor Polisher
Processor Equipment List #2

Component	*Manufacturer / Model*
Veeder-Root TLS-350 Series, including but not limited to TLS-350, TLS-350 Plus, TLS-350R, Red Jacket ProMax, Gilbarco EMC consoles (TLS Console)	Veeder-Root 8482XX-XXX, 8470XX-XXX, Promax 847097-XXX EMC PAO2620X000X X = Any digit (Figure 1A-3A)
RS232 Interface Module	Veeder-Root RS232 Interface Module Series (Figure 1A-3B)
Veeder-Root Vapor Polisher [1]	Veeder Root Vapor Polisher 332761-002 (Figure 1A-6) - Wired or Wireless
PMC Software Version Number	1.04
Vapor Pressure Sensor [1] **(1 per GDF)**	Veeder-Root 331946-001 – Wired, approved for installation in the dispenser or on the vent stack (Figure 1A-5) or Veeder Root 861190-201 - Low Powered Wireless, approved for installation on the vent stack only (Figure 1A-5)
Vapor Pressure Sensor Desiccant Tube - Optional **(1 per GDF)**	Veeder-Root 330020-717 – Dryer Tube (Figure 1A-5)
Smart Sensor Interface Module **(1 per GDF)** With Atmospheric Sensor	Veeder-Root 329356-004 (Figure 1A-7) Veeder-Root 332250-001
Universal Enclosure Kit [2]	Veeder-Root 330020-716 (Figure 1A-9)

[1] Wireless sensors require additional components specified in Veeder-Root Optional Wireless Component Equipment List.
[2] Only required for vapor pressure sensors installed on the vent line.

Franklin Fueling Systems - Healy Clean Air Separator
Processor Equipment List #3

Component	*Manufacturer / Model*
Franklin Fueling Systems Clean Air Separator	Healy Model 9961 Clean Air Separator (Figures 1A-10 and 1A-11) Healy Model 9961H Clean Air Separator (Figures 1A-12 and 1A-13)

Hirt VCS 100
Processor Equipment List #4

Component	Manufacturer / Model
Hirt Thermal Oxidizer With Indicator Panel	Hirt Model VCS 100 (Figure 1A-15) Leg Attachments: 5” – M39 48”- M40
Hirt 1/4" Check Valve (optional component)	Hirt P65

VST Green Machine
Processor Equipment List #5

Component	Manufacturer / Model
Veeder-Root TLS-350 Series, including but not limited to TLS-350, TLS-350 Plus, TLS-350R, Red Jacket ProMax, Gilbarco EMC consoles (TLS Console)	Veeder-Root 8482XX-XXX, 8470XX-XXX, Promax 847097-XXX EMC PAO2620X000X X = Any digit (Figure 1A-3A)
RS232 Interface Module	Veeder-Root RS232 Interface Module Series (Figure 1A-3B)
Green Machine Processor, including controller	VST Model VST-GM-CS1-100 (Figure 1A-22)
Pressure Management Control (PMC) Software Version Number	1.04
Vapor Pressure Sensor[1] (1 per GDF)	Veeder-Root 331946-001 – Wired, approved for installation in the dispenser or on the vent stack (Figure 1A-5) or Veeder Root 861190-201 - Low Powered Wireless, approved for installation on the vent stack only (Figure 1A-5)
Vapor Pressure Sensor Desiccant Tube - Optional (1 per GDF)	Veeder-Root 330020-717 – Dryer Tube (Figure 1A-5)
Multiport Card	Veeder-Root 330586-018
Universal Enclosure Kit [2]	Veeder-Root 330020-716 (Figure 1A-9)

[1] Wireless sensors require additional components specified in Veeder-Root Optional Wireless Component Equipment List.
[2] Only required for vapor pressure sensors installed on the vent line.

Liquid Condensate Trap
Equipment List

Component	Manufacturer / Model
Riser Adapter	INCON model TSP-K2A (Figure 1A-14)
In-Line Filter	140 micron, Swagelok B-4F2-140 or SS-4F2-140, or equivalent (Figure 1A-14)
Screen	Aluminum Insect screen (18X14 mesh), or Stainless Steel Insect screen (18X18 mesh). (Figure 1A-14)
Stainless Steel Hose Clamp	Sized to secure screen to suction tube. (Figure 1A-14)
Liquid Sensor[1]	Must have an audible and visual alarm (Figure 1A-14)
Liquid Condensate Trap[1]	Any capacity, manufacturer, make and model (Figure 1A-14)

[1] Must meet applicable State Water Resources Control Board requirements (e.g. LG 113, LG 167 and LG 169) and any local authority having jurisdiction which includes the Certified Unified Program Agency (CUPA).

ONLY ONE OF THE FOLLOWING TWO (2) ISD SYSTEM GROUPS IS REQUIRED

Veeder-Root ISD System
Equipment List #1

Component	Manufacturer / Model
Veeder-Root TLS-350 Series, including but not limited to TLS-350, TLS-350 Plus, TLS-350R, Red Jacket ProMax, Gilbarco EMC consoles (TLS Console)	Veeder-Root 8482XX-XXX, 8470XX-XXX, Promax 847097-XXX EMC PAO2620X000X X = Any digit (Figure 1A-3A)
Balance Low Pressure Drop Vapor Flow Meter [1] (1 per Dispenser)	Veeder-Root 332374-XXX - Wired or Wireless (Figure 1A-8) X = Any digit
Vapor Pressure Sensor [1] (1 per GDF)	Veeder-Root 331946-001 –Wired, approved for installation in the dispenser or on the vent stack (Figure 1A-5) or Veeder Root 861190-201 - Low Powered Wireless, approved for installation on the vent stack only (Figure 1A-5)
Vapor Pressure Sensor Desiccant Tube - Optional (1 per GDF)	Veeder-Root 330020-717 – Dryer Tube (Figure 1A-5)
Smart Sensor Interface Module (1 per GDF)	Veeder Root 329356-004, 332250-001 (Figure 1A-7)
RS232 Interface Module	Veeder-Root RS232 Interface Module Series (Figure 1A-3B)
ISD Software Version Number[2]	Veeder-Root 1.05
Universal Enclosure Kit [3]	Veeder-Root 330020-716 (Figure 1A-9)
Dispenser Interface Module	Veeder-Root DIM Series

[1] Wireless sensors require additional components specified in Veeder-Root Optional Wireless Component Equipment List.
[2] For new installations ISD software version 1.05 is compatible with all processors listed in this EO. For existing installations, refer to the Veeder-Root ISD software version compatibility matrix listed in this Exhibit.
[3] Only required for vapor pressure sensors installed on the vent line.

Veeder-Root
Optional Wireless Component Equipment List

Component	Manufacturer / Model
TLS RF Console-2 Box (1 per GDF)	Veeder-Root 332242-002 (Figure 1A-9)
RF Transmitter (1 per Veeder-Root Sensor including Vapor Pressure Sensor, Low Pressure Drop Vapor Flow Meter, and Vapor Polisher Processor)	Veeder-Root 332235-016 (Figure 1A-9)
RF Transmitter Battery Pack **(**1 per Transmitter)	Veeder-Root 332425-011 (Figure 1A-9)
RF Repeater (1 per GDF)	Veeder-Root 332440-030 (Figure 1A-9)
RF Receiver (1 per GDF)	Veeder-Root 332440-029 (Figure 1A-9)

Veeder-Root
Optional Maintenance Tracker Security Feature

Component	Manufacturer/Model
Maintenance Tracker Kit	Veeder-Root 330020-546 Consists of the following components: • Technician Key (Figure 1A-16) • Interface Module RS232/485 Dual Module with DB9 Converter or Single Port Module with DB 25 converter (Figure 1A-17) • Manual

INCON ISD System
Equipment List #2

Component	*Manufacturer/Model*
ISD Console **TS-EMS** **TS-550** **TS-5000**	INCON / TEMSXXXX/YV INCON / T550XXXX/YYYYV INCON / T5000XXXX/YYYYV Where: X represents hardware option (Example: X can be: 'D' for Display, 'P' for Printer) Y represents software option (Example: Y can be: 'S' for Secondary Containment Monitoring or T Tank Testing) V represents Vapor Recovery Monitoring Application (Figure 1A-18) Note: 1. All consoles come standard with RS-232 (COMM1) and Ethernet ports for data access.
ISD Vapor Recovery Monitoring (VRM) Software	INCON / TS-VRM Version 1.3.0 Note: INCON/TS-VRM software version 1.3.0 is approved for and shall be used or installed only with uni-hose dispensers.
ISD Vapor Flow Meter (1 per Dispenser)	INCON TS-VFM (Figure 1A-19)
ISD Vapor Pressure Sensor (1 per GDF)	INCON TS-VPS (Figure 1A-20)
Data Transfer Unit (Optional) **(1 per dispenser and** **1 per GDF)**	INCON TS-DTU / P (Figure 1A-21) Note: Optional installation method for the replacement of dedicated wires to VFM and VPS. Refer to the IOM for more information.
Dispenser Retrofit Kit **(Optional)** (1 per dispenser with DTU)	INCON TS-DRK/x Where X represents Type of Installation Kit W, Wayne Installation Kit E, Gilbarco Encore Installation Kit A, Gilbarco Advantage Installation Kit T, Tokheim Installation Kit

Veeder-Root ISD
Software Version Compatibility Matrix

Software Version*	Processor						Options		
	VST		Veeder- Root Vapor Polisher Standard Capacity	Veeder- Root Vapor Polisher Extended Capacity	Healy CAS	Hirt VCS 100	Dispenser Shutdown*** and Collection Monitoring Update	Wireless Components	Maintenance Tracker
	Membrane	Green Machine							
1.01	●				●				●
1.02	●		●		●				●
1.03	●		●		●		●		●
1.04	●			●	●		●	●	●
1.05**	●	●		●	●	●	●	●	●

*Software Version 1.01 has been revoked for GDF's equipped with multiproduct (six pack) dispensers with fuel blending. Subject GDFs must upgrade to higher version software (1.02, 1.03, 1.04, or 1.05) by 07/01/2012.

**For new installations ISD software version 1.05 is compatible with all processors listed in this EO. For existing installations, refer to the above software compatibility matrix.

With the exception of multiproduct (six pack) dispensers with fuel blending, software Versions 1.01, 1.02, 1.03, and 1.04 may remain in use at existing GDFs.

Software Version 1.05 must be installed at new GDFs or those undergoing a major modification as determined by date when the district issues the permit to construct.

***Dispenser shutdown can be achieved by alternate means for GDFs equipped with Software Version 1.01 and 1.02 as indicated in the ARB approved IOM for the Veeder-Root ISD System.

Figure 1A-1
VST Model VST-EVR- NB Nozzle

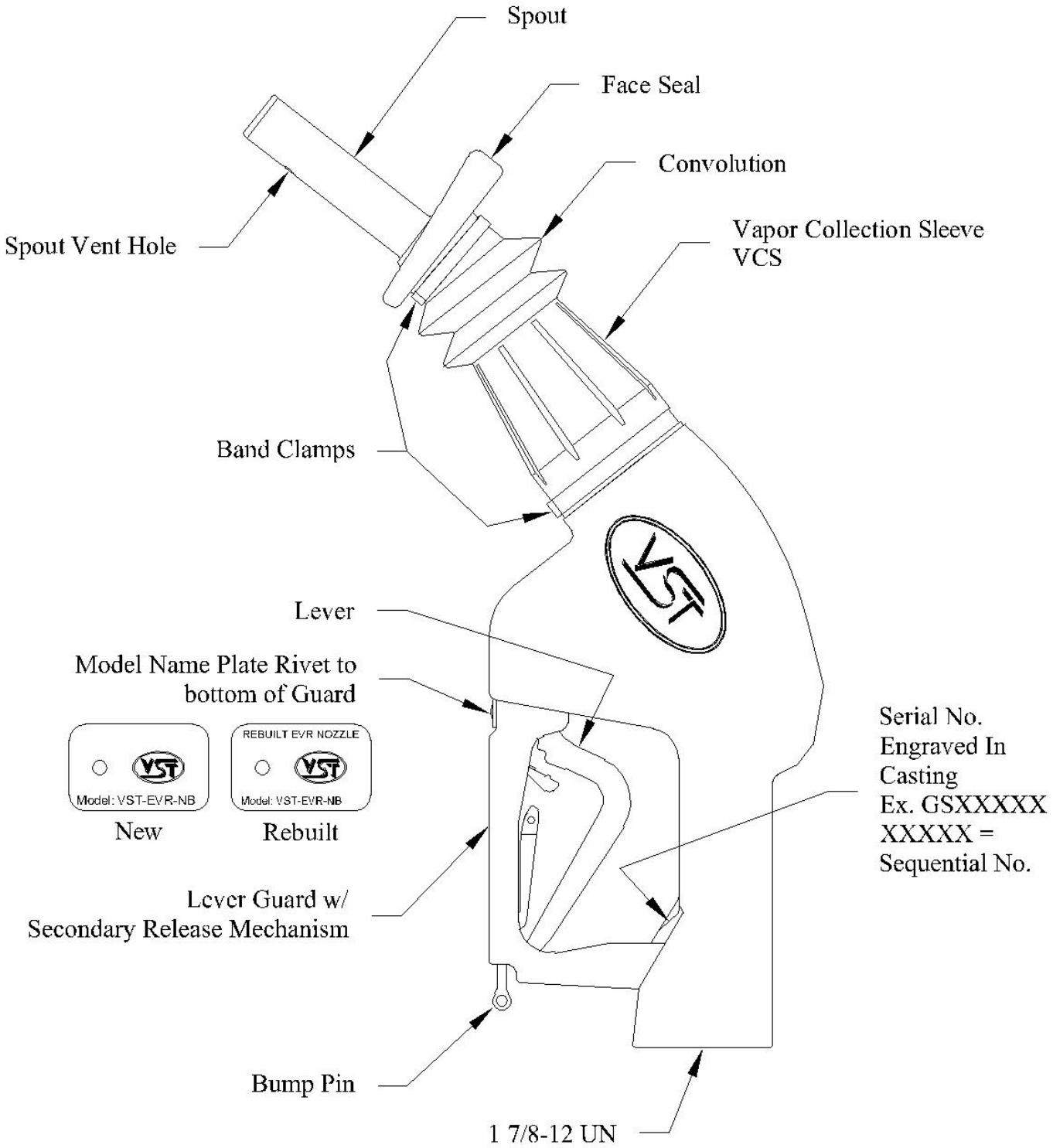


Figure 1A-1 (continued)
EMCO Model A4005EVR Nozzle

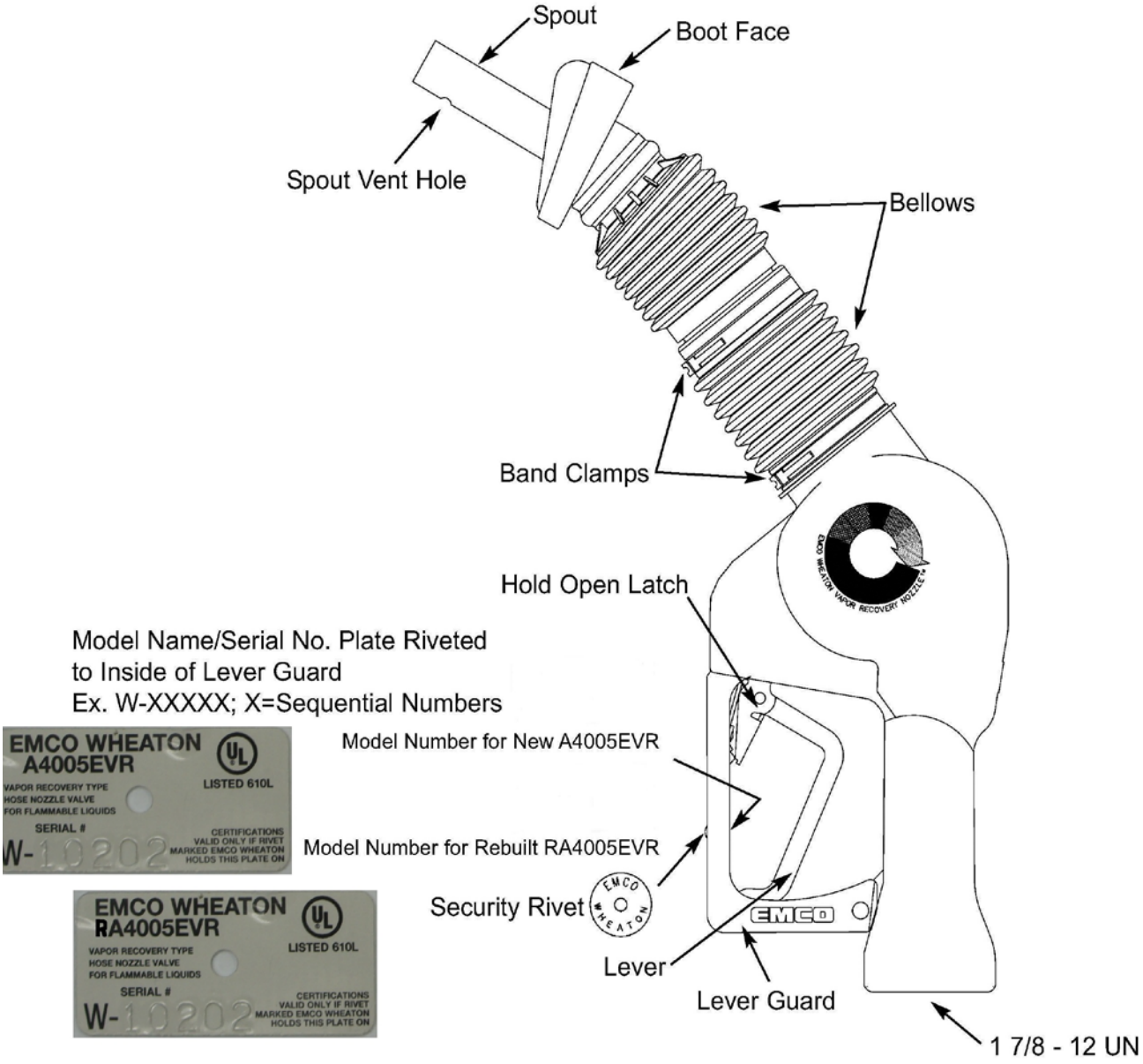
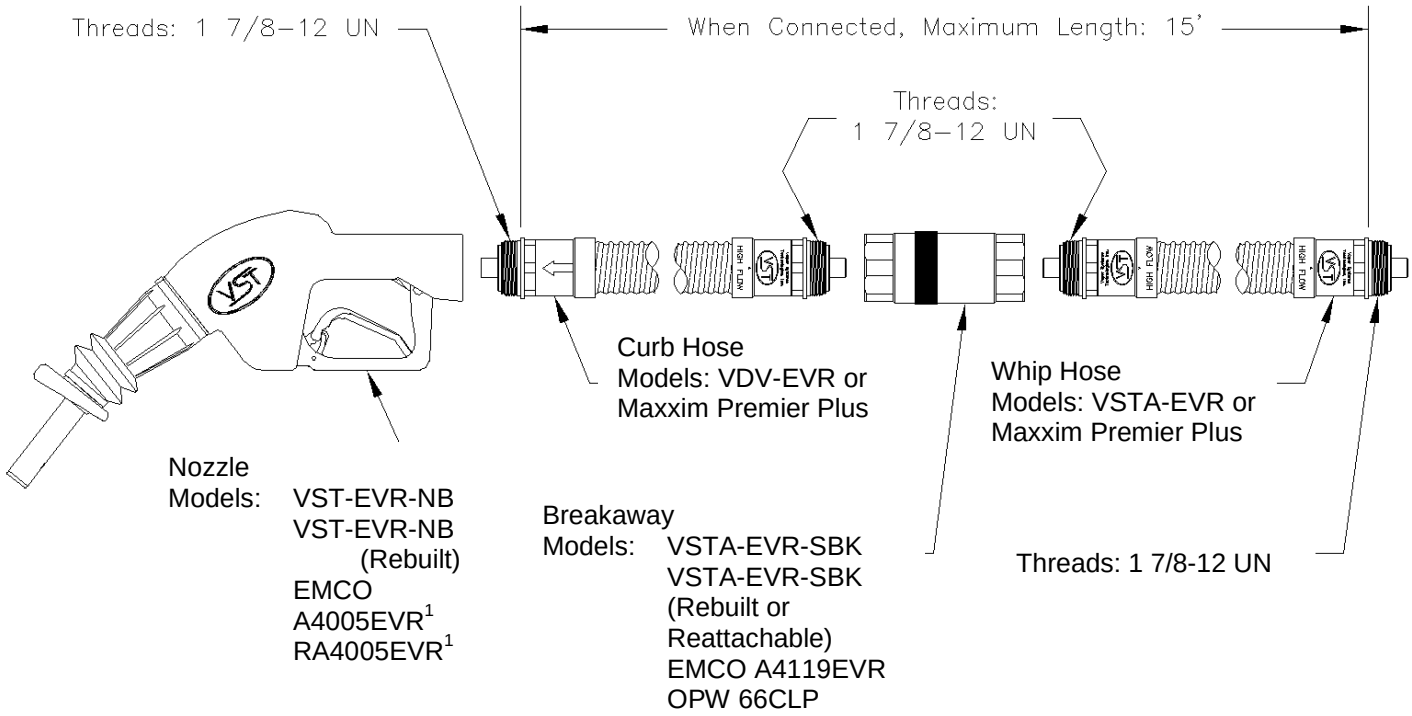


Figure 1A-2
Hanging Hardware
(Nozzle, Coaxial Curb Hose, Breakaway, and Coaxial Whip Hose)



[1] Alternate component for use with the Veeder-Root Vapor Polisher or Hirt Thermal Oxidizer processors or Clean Air Separator

Figure 1A-2 (continued)
VST Hanging Hardware
(Nozzle and Breakaway)

Vapor Systems Technologies, Inc.

Nozzle
VST Model VST-EVR-NB,
VST Model VST-EVR-NB (Rebuilt)

Vapor Systems
Technologies, Inc.

BREAKAWAY COUPLING
VST Model VSTA-EVR-SBK

Rebuilt and Reattachable
Breakaway Coupling
VST Model VSTA-EVR-SBK

VST logo on lower half of reattachable breakaway

Figure 1A-2 (continued)
VST Hanging Hardware
(Coaxial Curb Hose and Coaxial Whip Hose)

Figure 1A-2 (continued)
EMCO Hanging Hardware
(Nozzle and Safe Break Valve)

EMCO Wheaton Retail

Nozzle
EMCO Model A4005EVR

EMCO Wheaton Retail

Safe Break Valve
EMCO Model A4119EVR

Figure 1A-2 (continued)
OPW Hanging Hardware
(Breakaway)

Figure 1A-2 (continued)
Goodyear Hanging Hardware
(Curb and Whip Hoses**)**

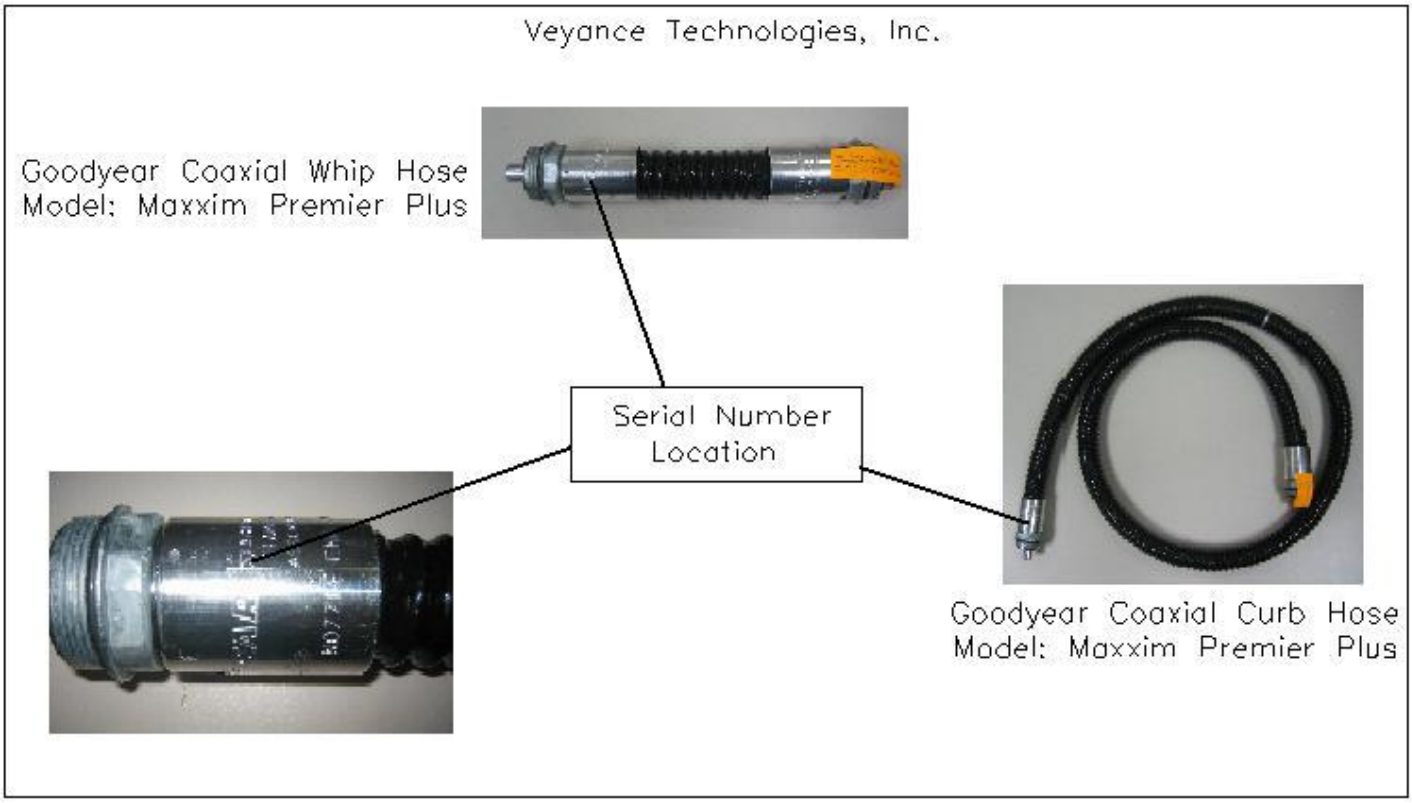


Figure 1A-3A
Veeder-Root TLS Console

Figure 1A-3B
Veeder-Root RS232 Interface Module Series

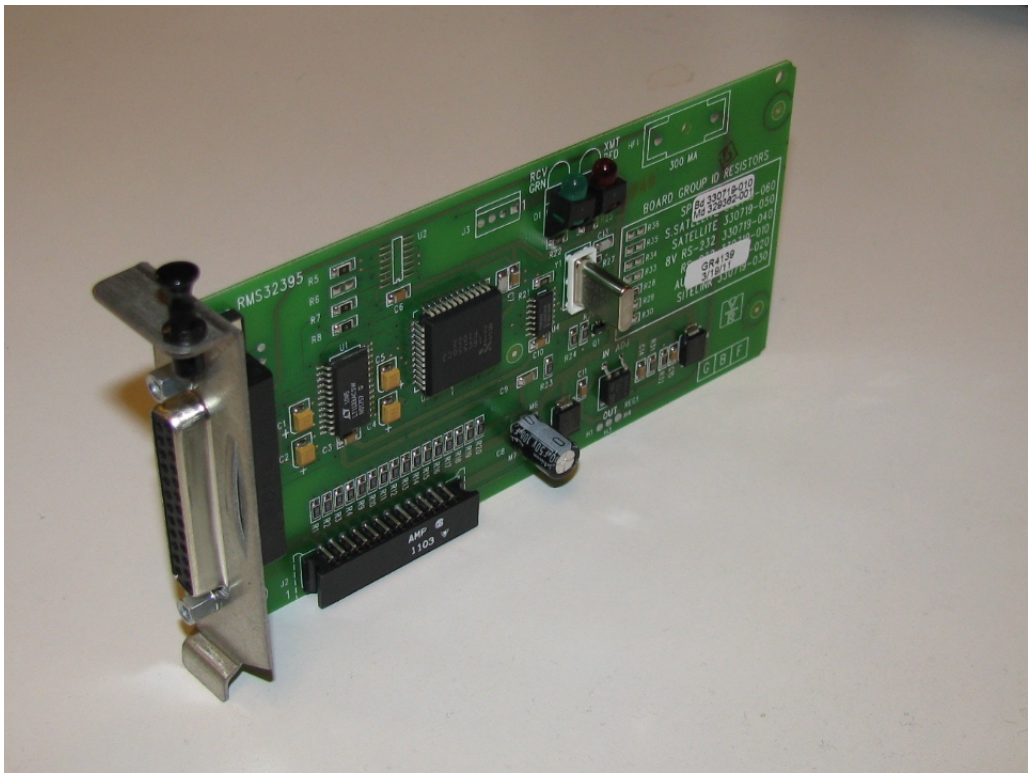
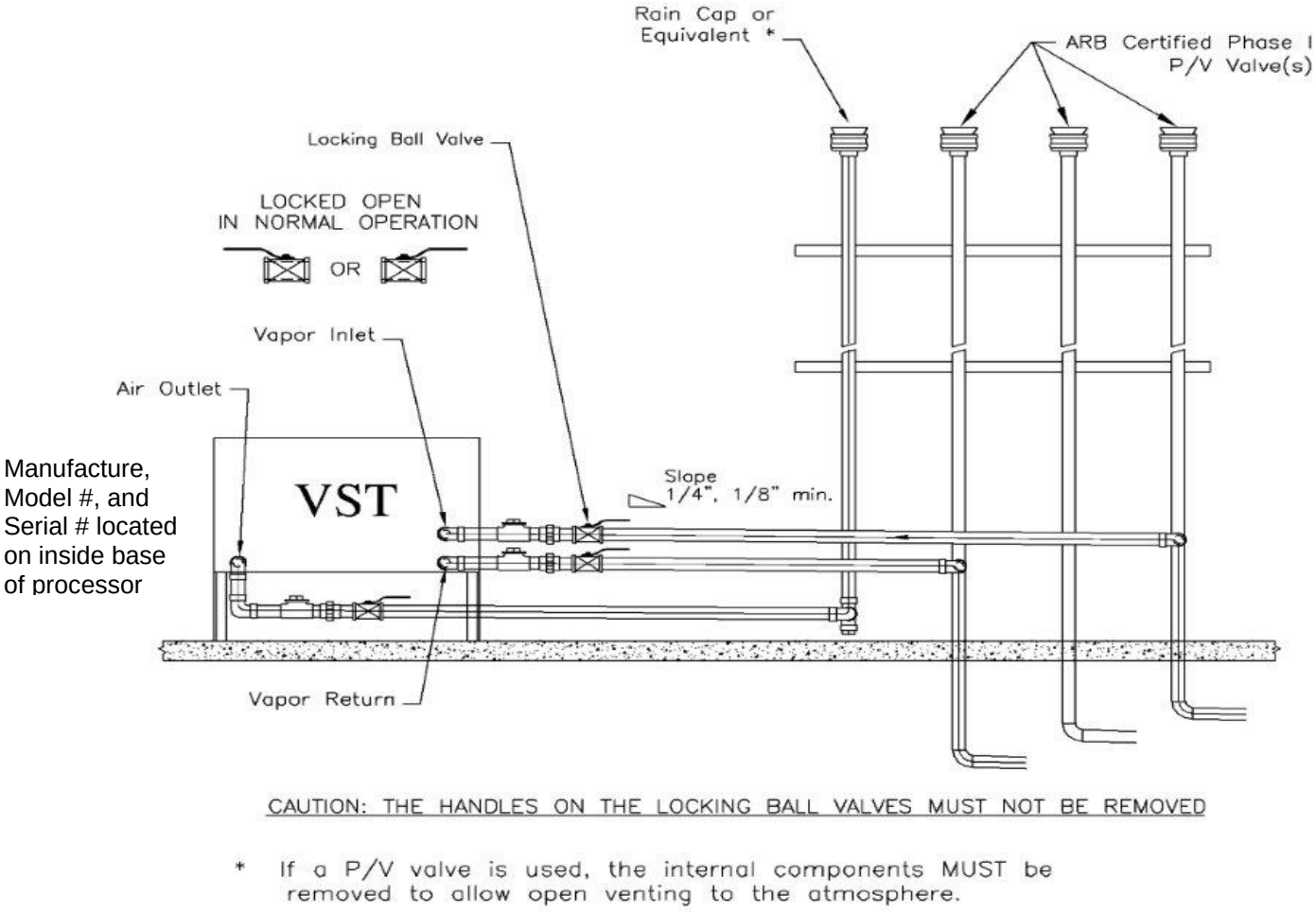


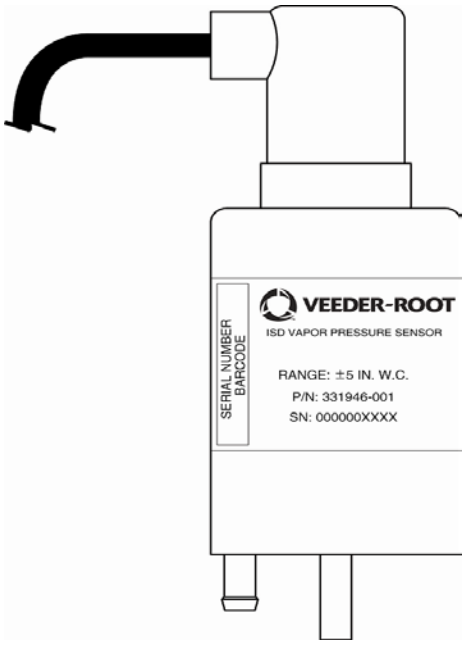
Figure 1A-4
Typical VST-ECS-CS3 Membrane Processor



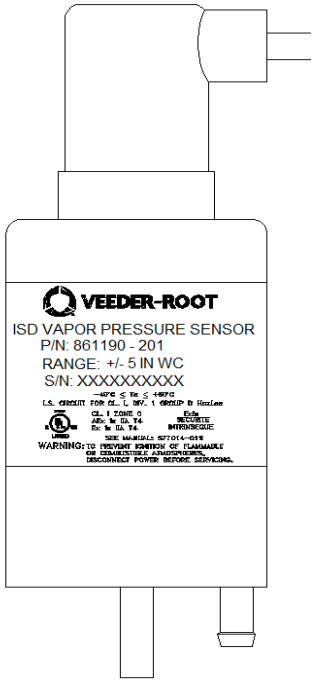
CAUTION: THE HANDLES ON THE LOCKING BALL VALVES MUST NOT BE REMOVED

* If a P/V valve is used, the internal components MUST be removed to allow open venting to the atmosphere.

Figure 1A-5
Veeder-Root Vapor Pressure Sensors



Veeder-Root Model # 331946-001
Wired Vapor Pressure Sensor



Veeder-Root Model # 861190-201
Low Powered Wireless Vapor Pressure Sensor

Veeder-Root Model # 330020-717
Dryer Tube (Optional)

Figure 1A-6
Typical Veeder-Root Vapor Polisher

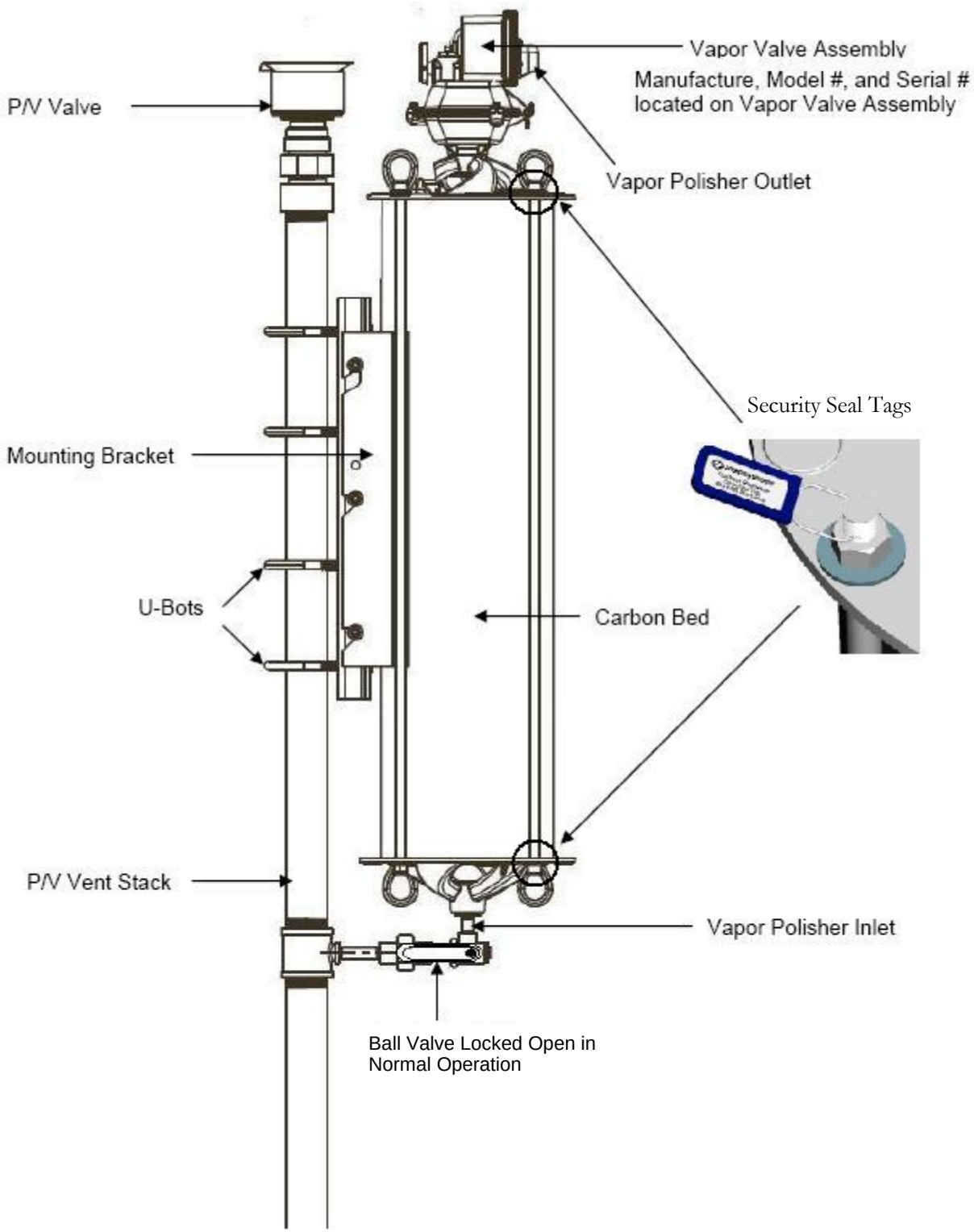


Figure 1A-7
Veeder-Root 329356-004, 332250-001
Smart Sensor Interface Module

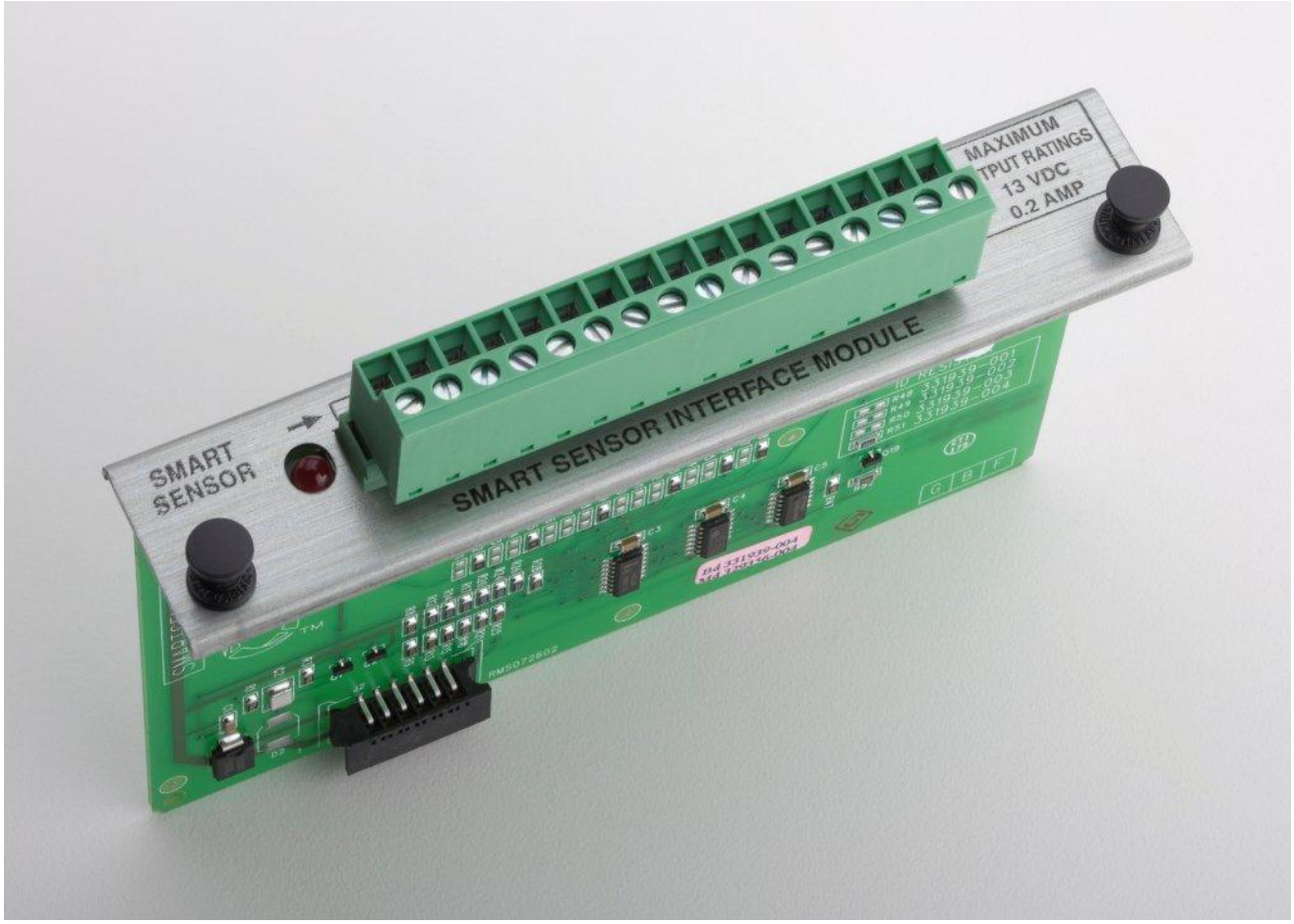


Figure 1A-8
Veeder-Root 332374-XXX
Balance Low Pressure Drop Vapor Flow Meter

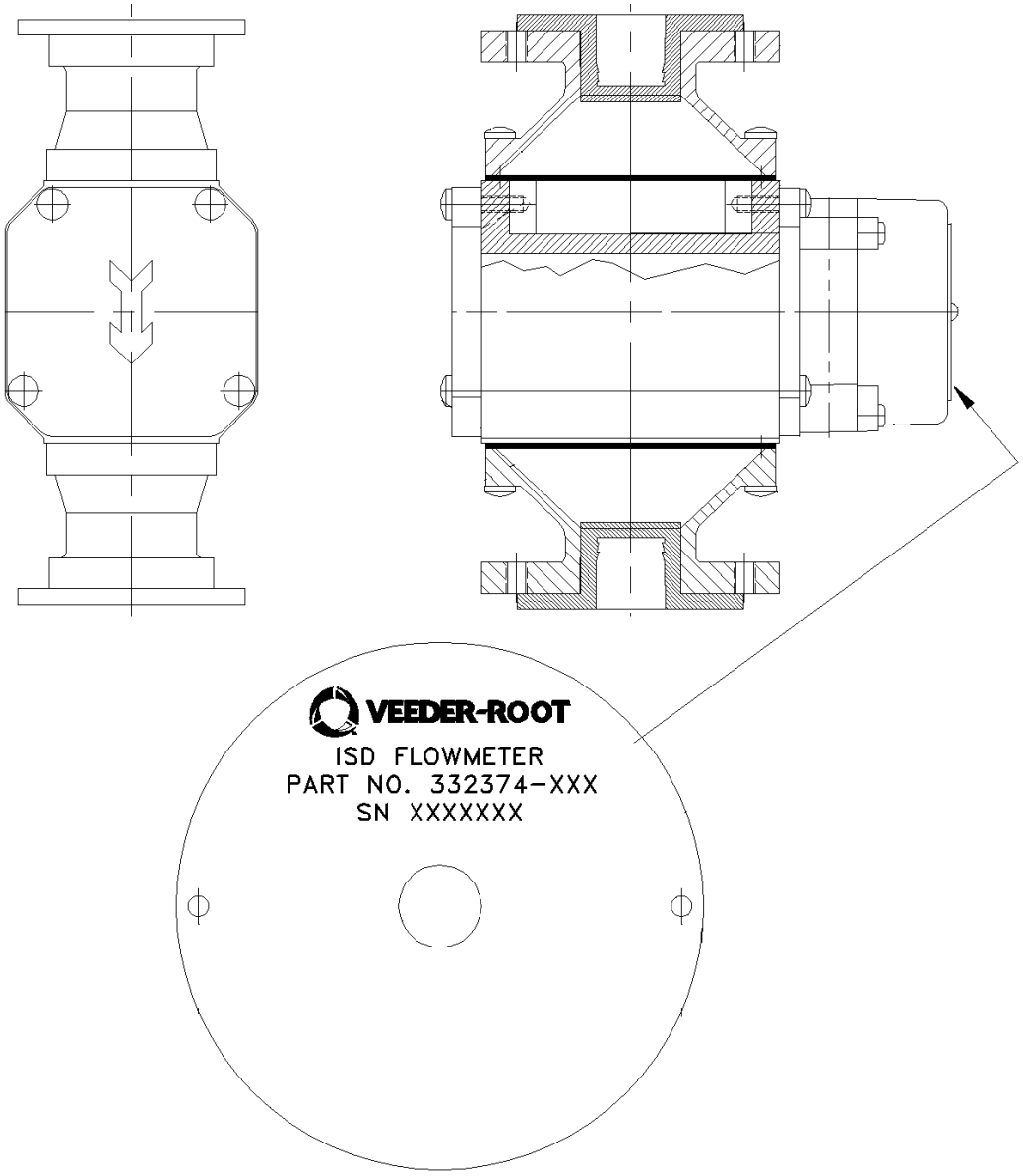


Figure 1A-9
Veeder-Root Optional Wireless Components

Wireless TLS RF Console

Wireless Receiver

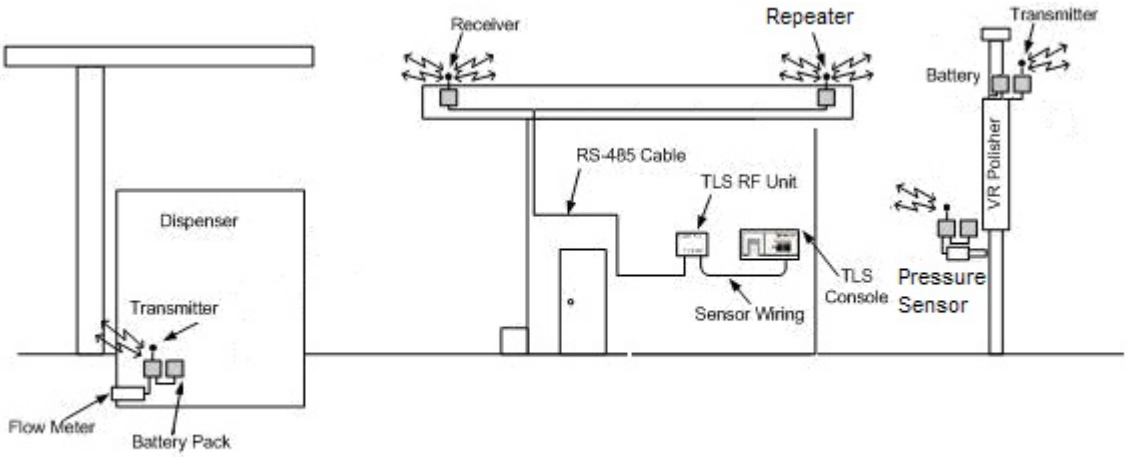
Wireless Repeater

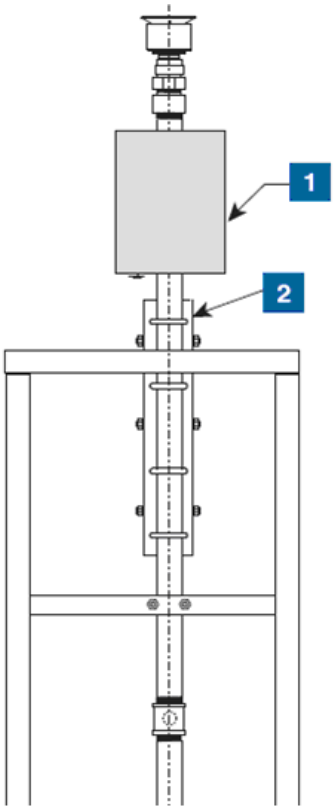
Wireless Transmitter

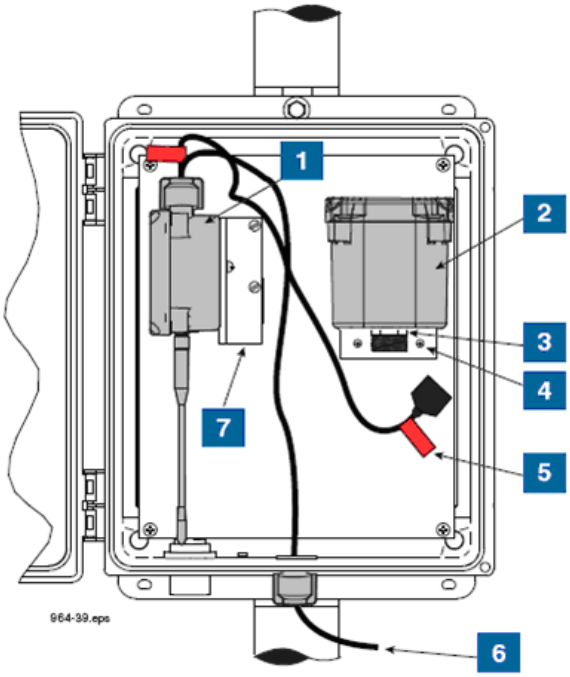
Wireless Battery Pack

Wireless Enclosure

Figure 1A-9 (continued)
Typical Configuration for Veeder-Root Wireless Components







1. CCVP transmitter/battery enclosure on vent stack
2. CCVP support bracket

1. Transmitter
2. Battery pack
3. Thin hex nut
4. Attach Battery L bracket using two #10 taptite screws
5. Battery caution label attached to battery cable (2 places)
6. Cable from CCVP
7. Attached Transmitter L bracket using two #10 taptite screws

Figure 1A-10
Healy Model 9961 Clean Air Separator

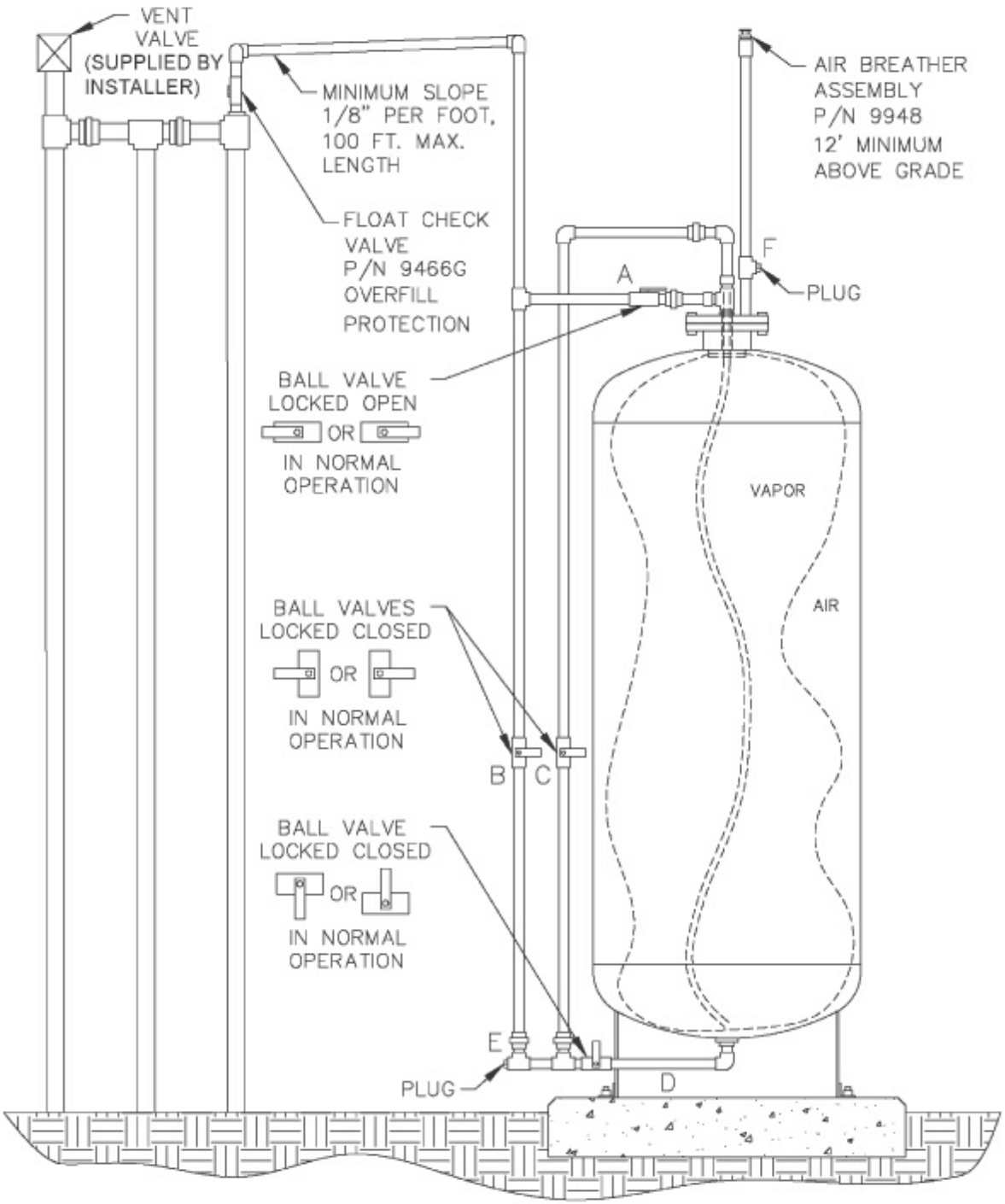


Figure 1A-11
Healy Model 9961 Clean Air Separator

Figure 1A-12
Healy Model 9961H Clean Air Separator

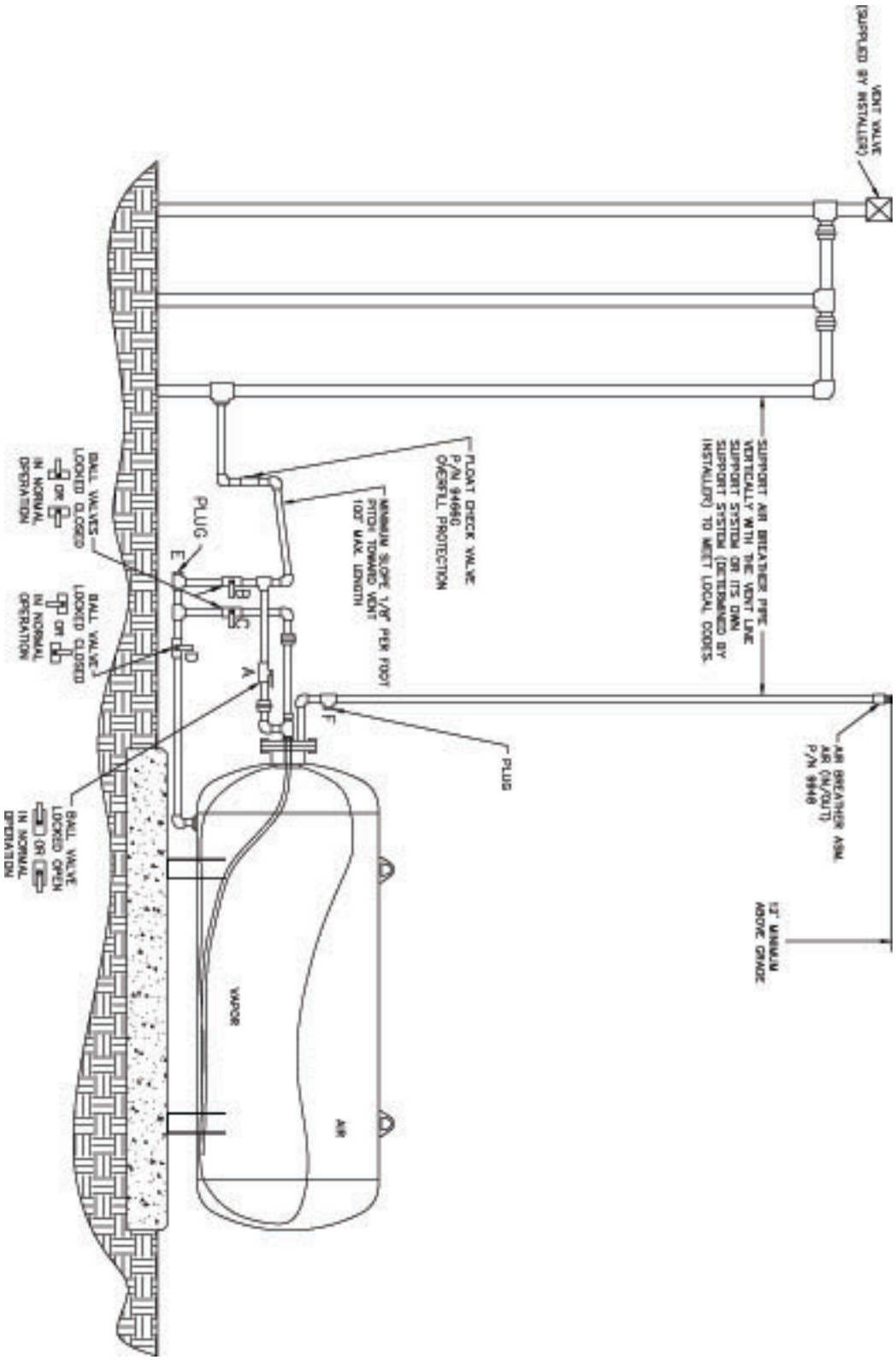
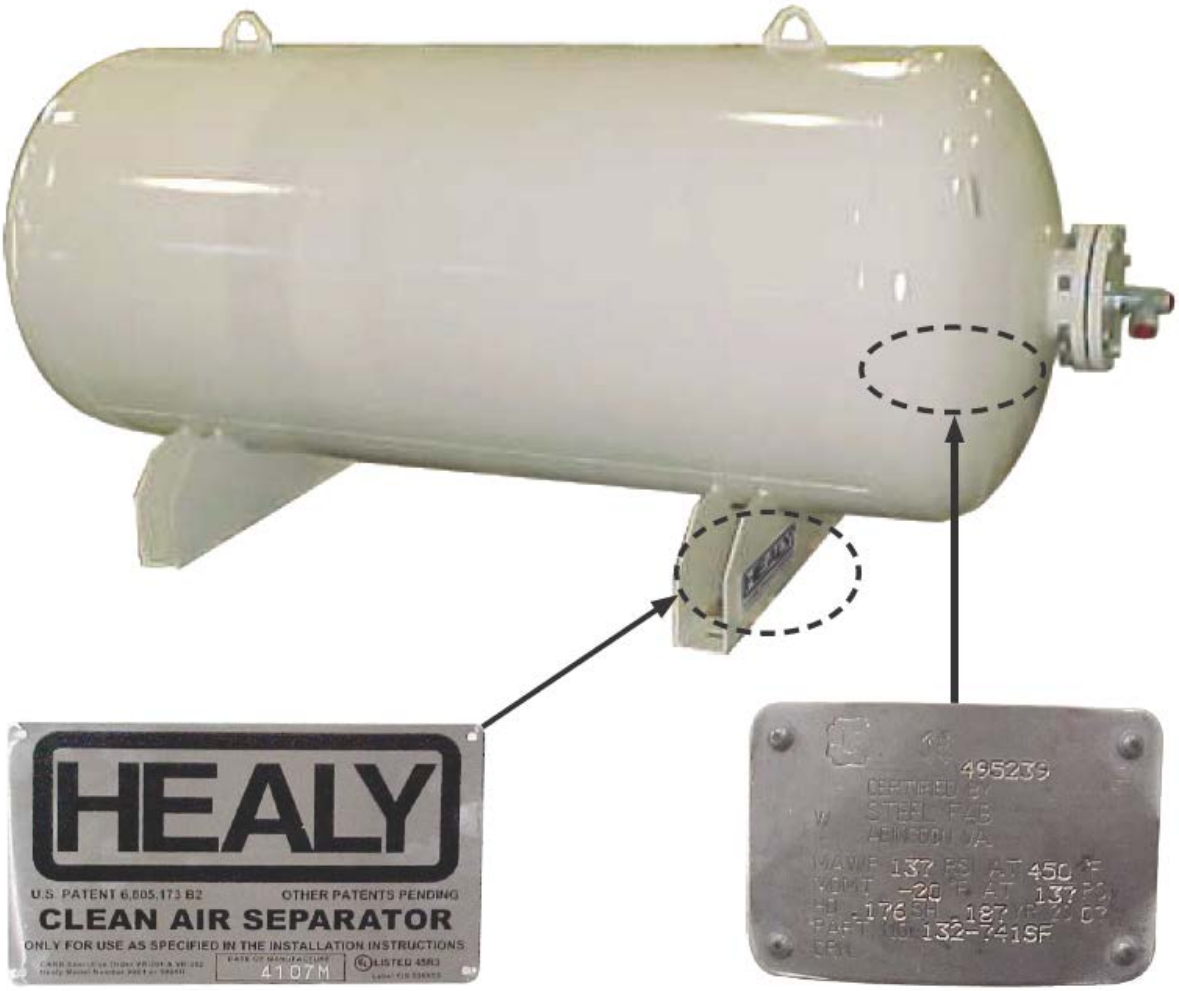


Figure 1A-13
Healy Model 9961H Clean Air Separator



Clean Air Separator Name Plate

Clean Air Separator Data Plate
(not pictured on far side of base)

Figure 1A-14
Typical Liquid Condensate Trap Installed Below the Transition Sump

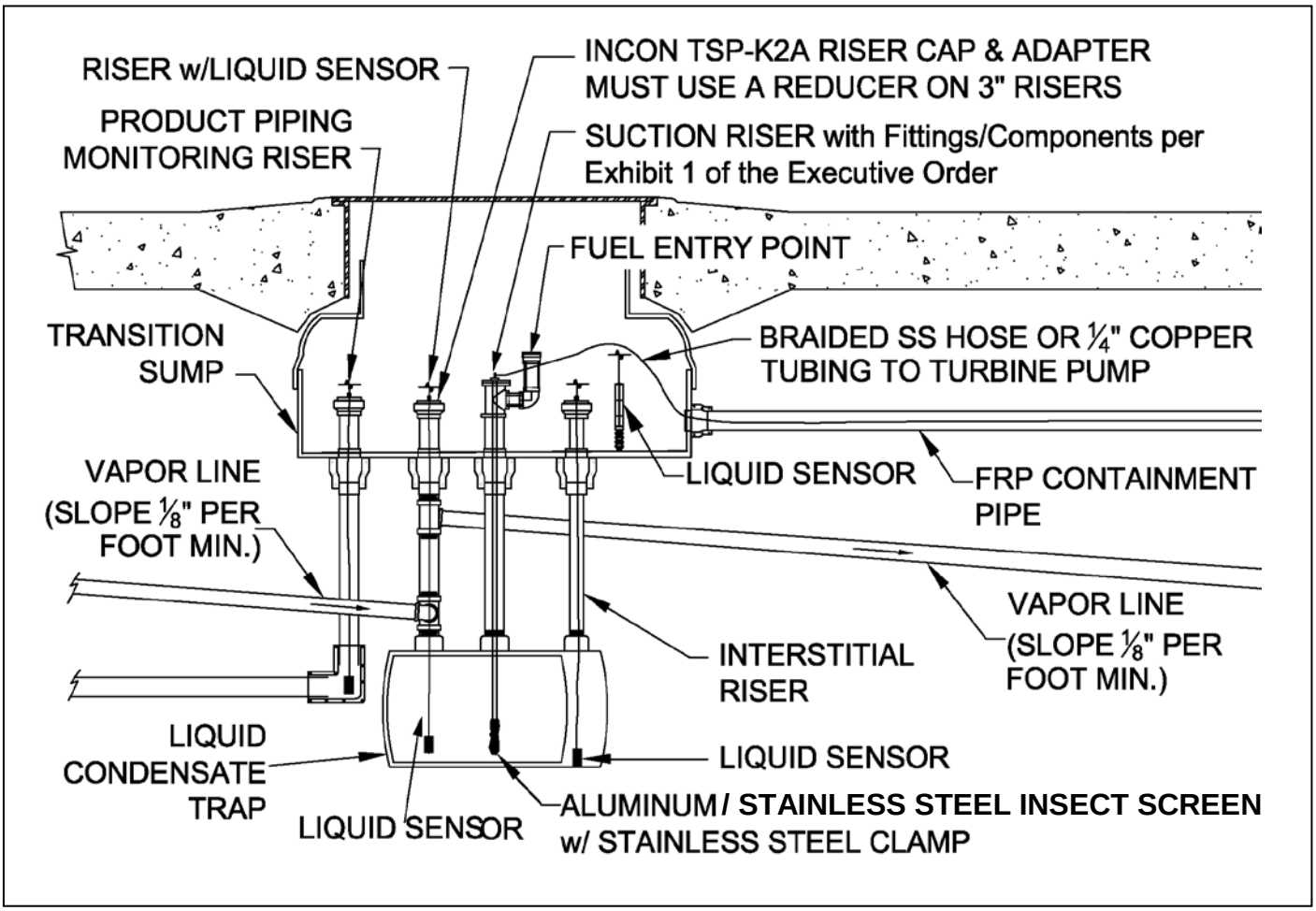


Figure 1A-14 (continued)
Typical Liquid Condensate Trap Installed Inside the Transition Sump

Note: A Liquid Condensate Trap installed inside a liquid AND vapor tight transition sump that is monitored with a liquid sensor can be single walled (if installed before July 1, 2004).

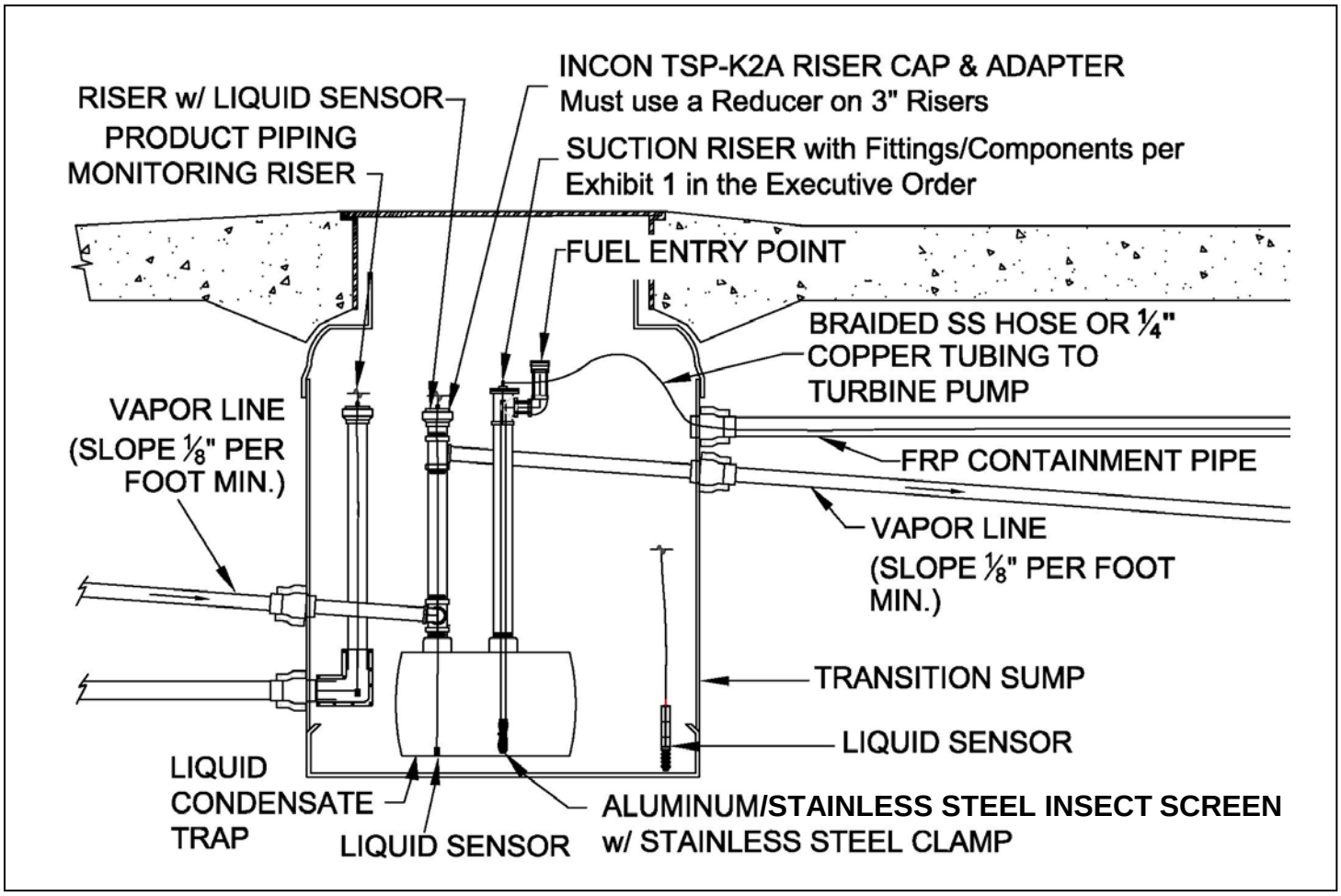
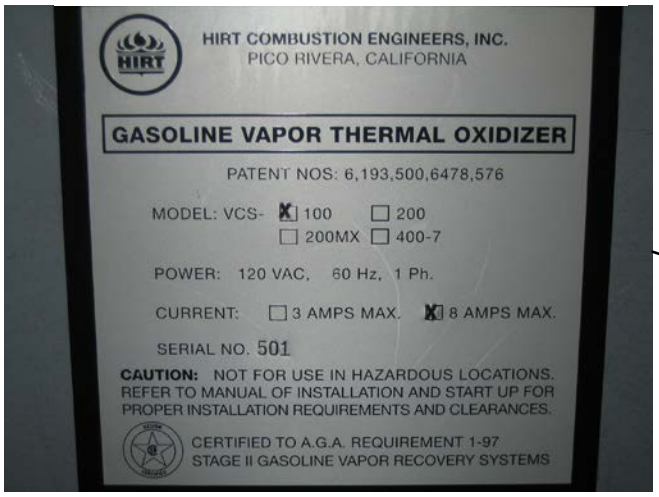
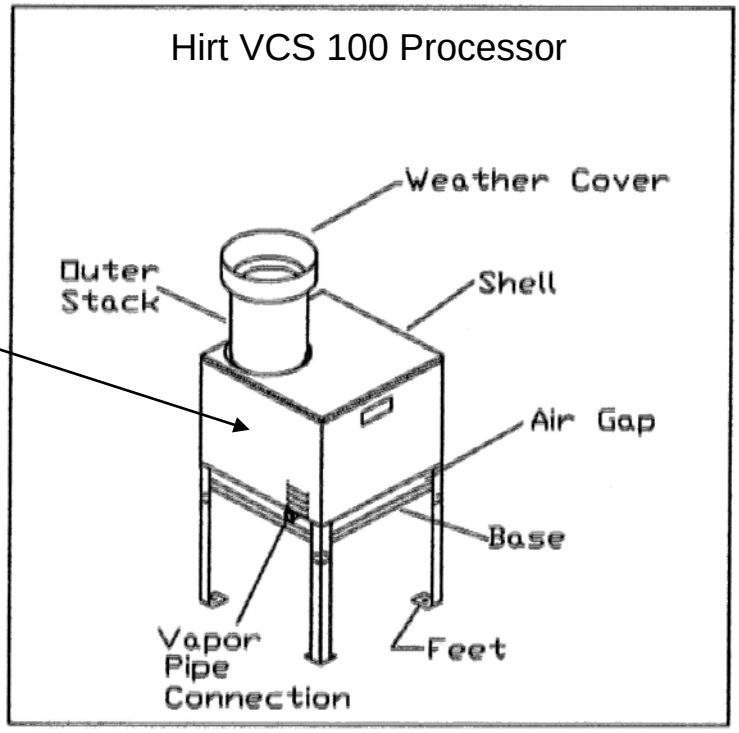


Figure 1A-15
Hirt VCS 100 Thermal Oxidizer and Indicator Panel

VCS 100 Identification Plate



Hirt VCS 100 Processor



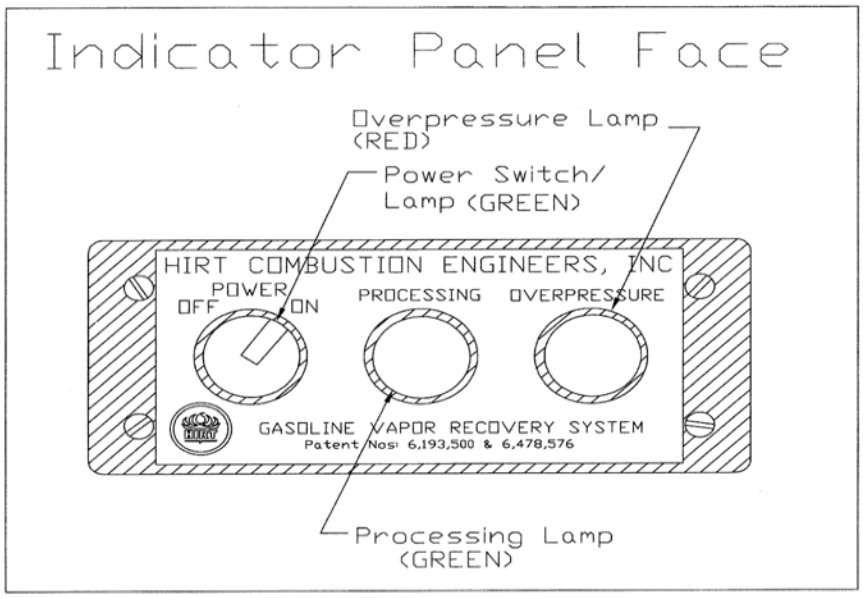
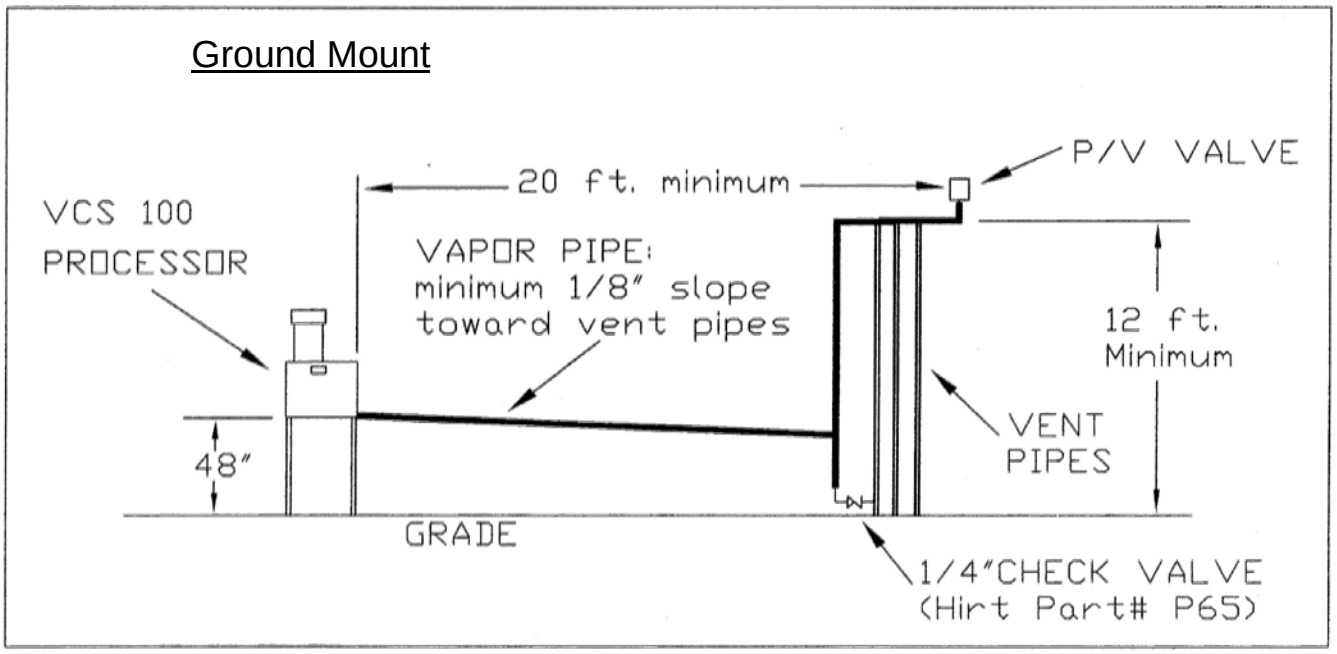


Figure 1A-15 (continued)
Typical Hirt VCS100 Thermal Oxidizer Processor



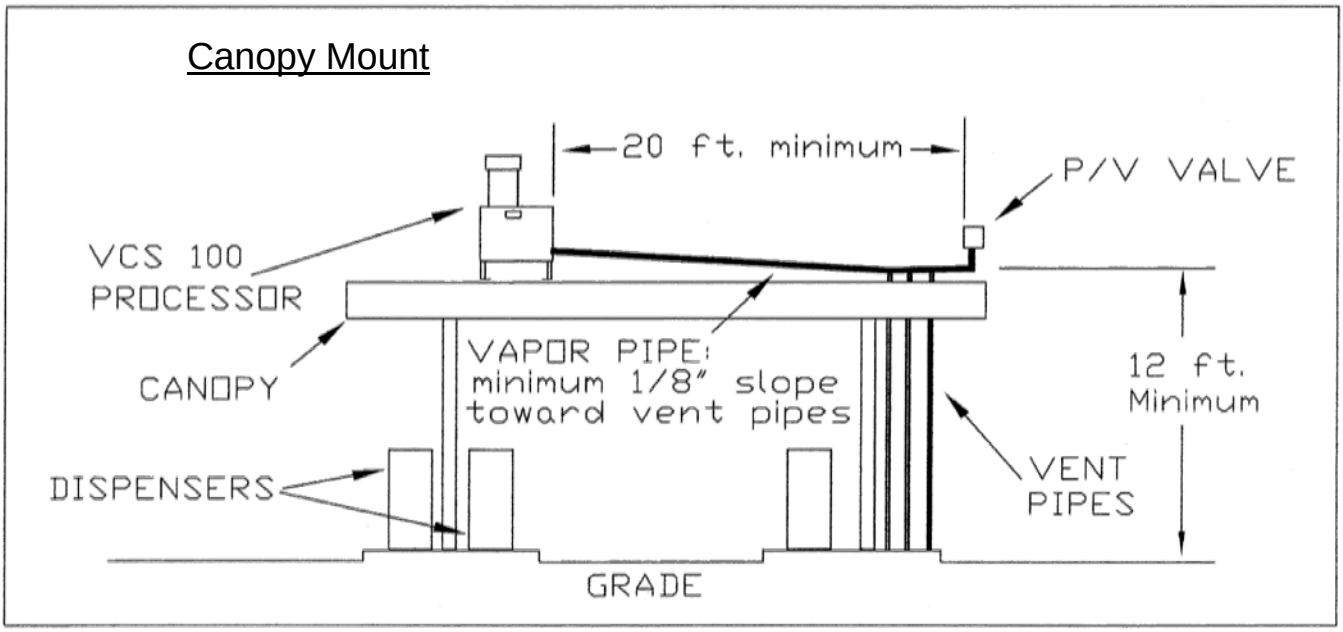


Figure 1A-16
Veeder-Root
Maintenance Tracker Technician Key

Figure 1-A 17
Veeder-Root
RS232 Interface Modules
Required for Maintenance Tracker

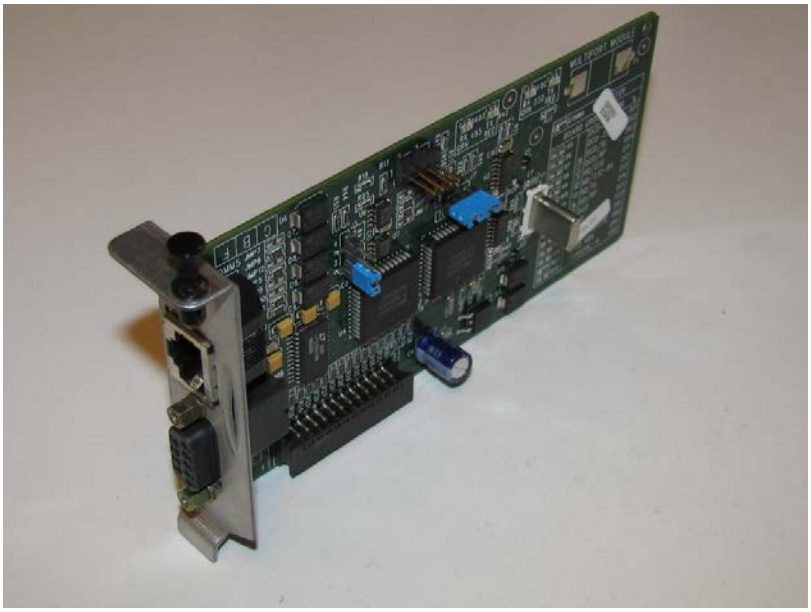
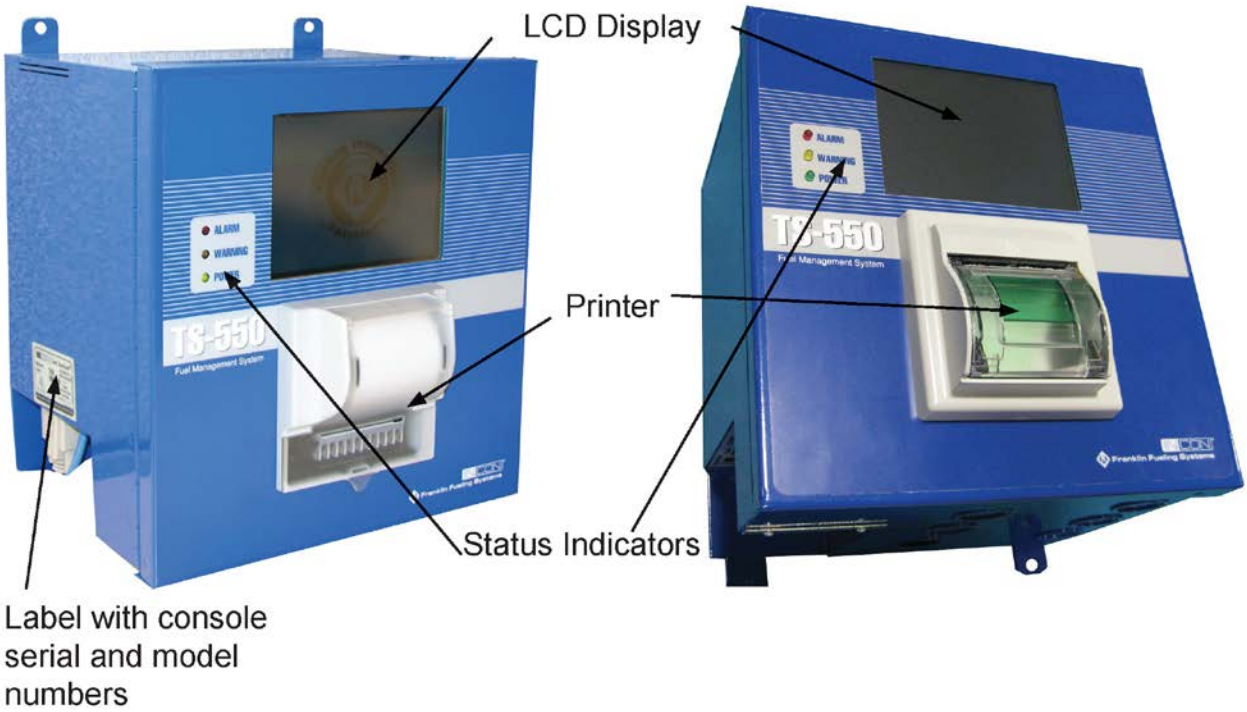


Figure 1A-18
INCON TS-550

INCON TEMSXXXX/YV
INCON T550XXXX/YYYYV
INCON T5000XXXX/YYYYV



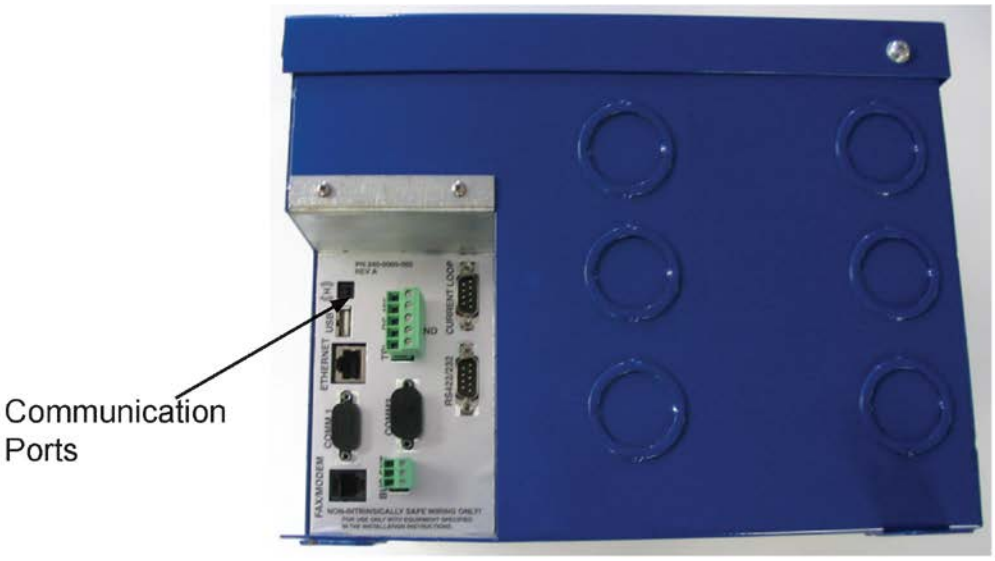


Figure 1A-19
INCON TS-VFM
Vapor Flow Meter

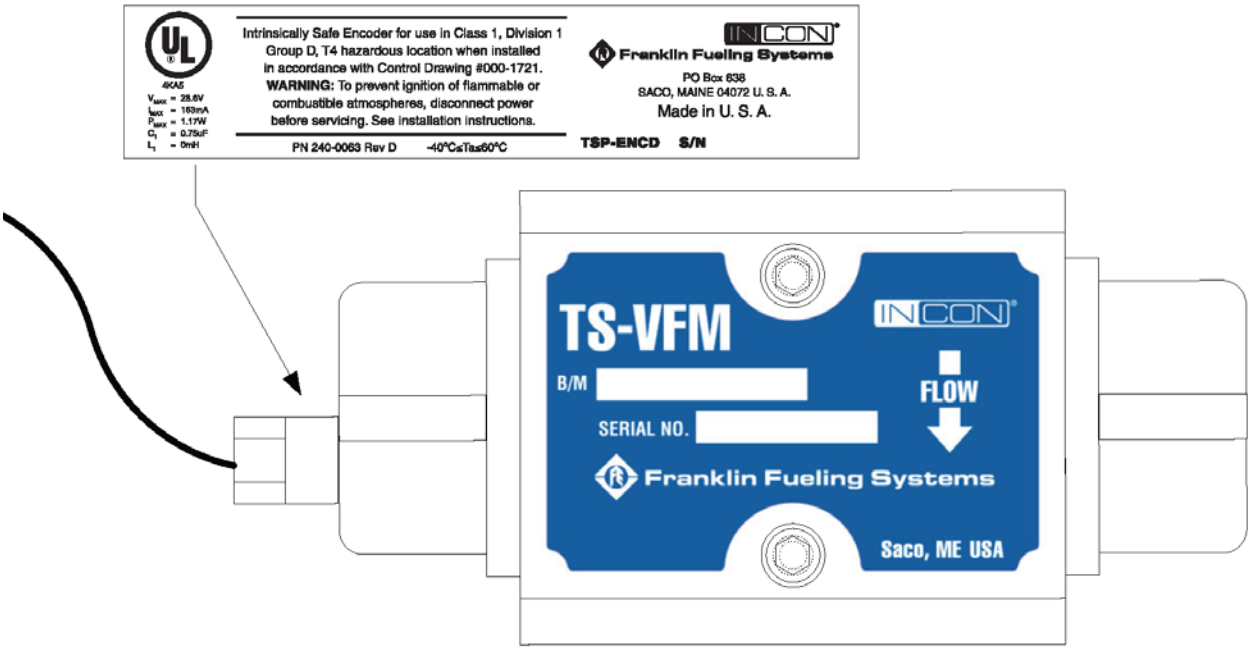


Figure 1A-20
INCON TS-VPS
Vapor Pressure Sensor

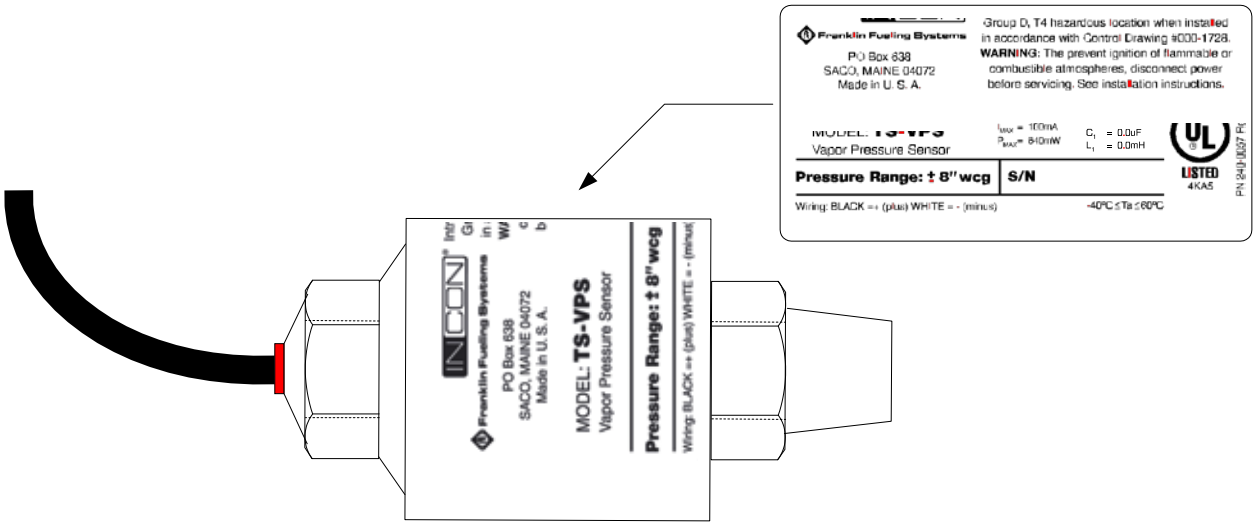
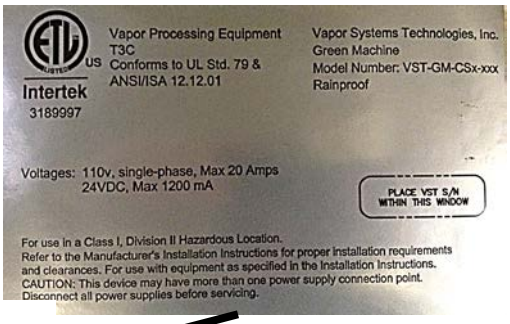
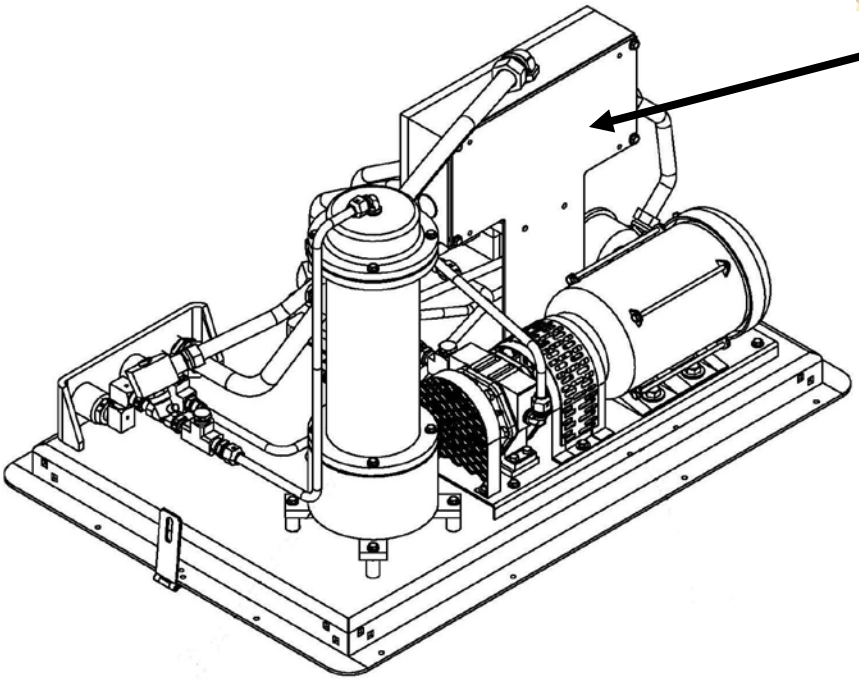


Figure 1A-21
INCON TS-DTU / P
Data Transfer Unit

Label with DTU Serial Number and ID Number

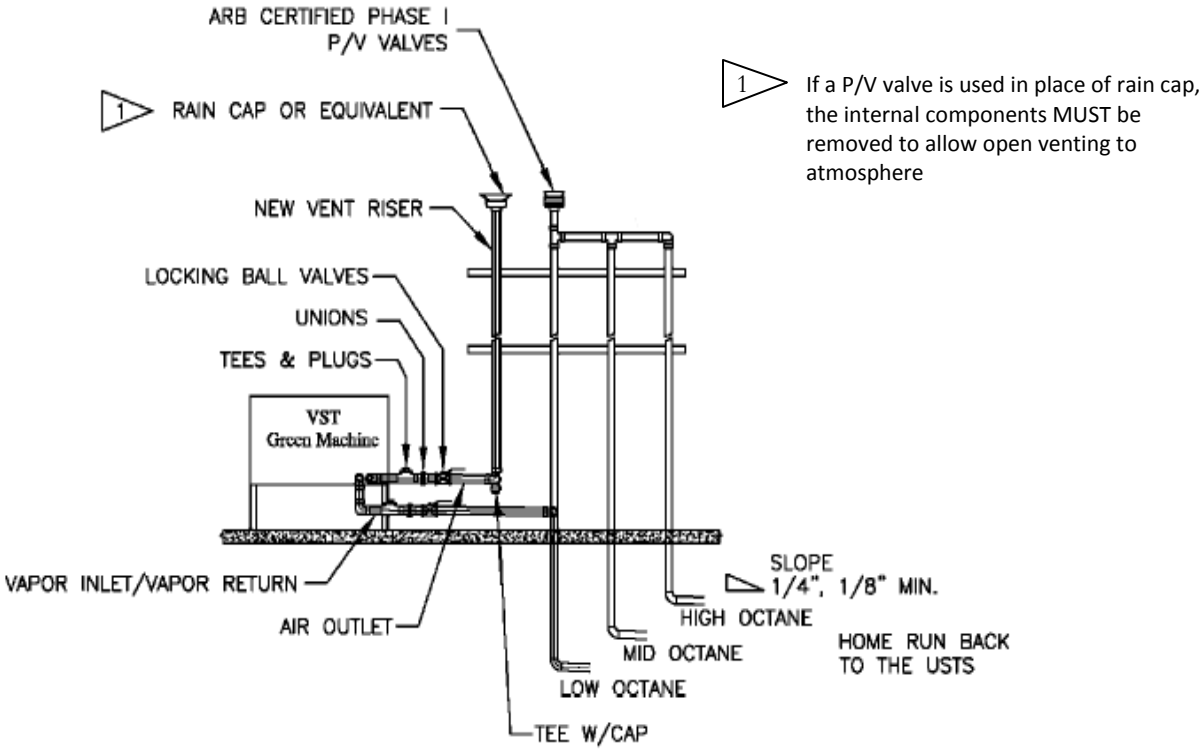
Figure 1A-22
VST Green Machine Processor





Label with serial number is located inside the Green Machine housing on the electrical junction box.

Figure 1A-22 continued
VST Green Machine, Typical Ground Mounted Configuration



VST Green Machine, Typical Vent Mounted Configuration

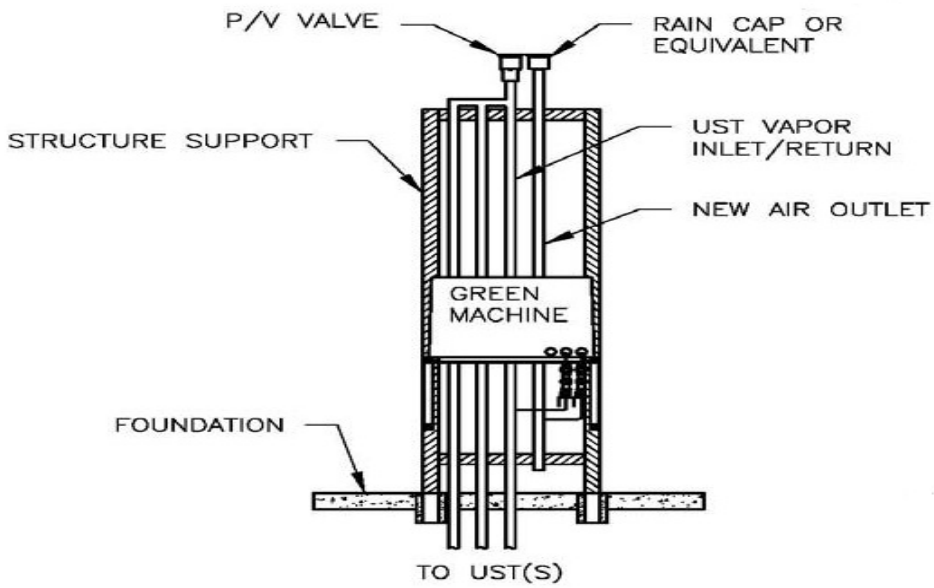
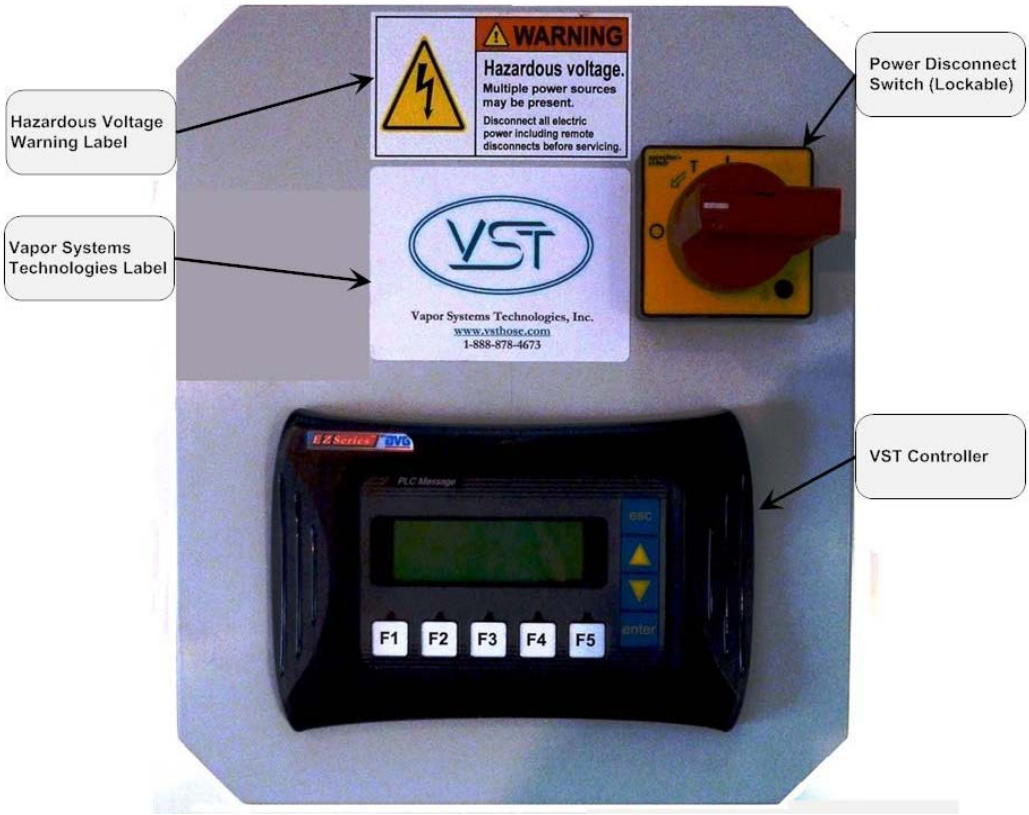


Figure 1A-22 Continued
VST Green Machine Control Panel



VST Green Machine Port Combiner

EXHIBIT 2

System Specifications

This exhibit contains the installation, maintenance and compliance standards and specifications that apply to Balance Phase II EVR Systems Including ISD Systems installed at gasoline dispensing facilities (GDFs). All components must be installed, maintained, and operated in accordance with the specifications in the **ARB Approved Installation, Operation and Maintenance Manual** (IOM). Installation, maintenance and repair of system components, including removal and installation of such components in the course of any required tests, shall be performed by technicians certified by the appropriate manufacturer unless otherwise specified in the IOM. Additional certifications may be required in accordance with local district requirements.

Hanging Hardware

Nozzle

1. A vapor collection sleeve shall be installed on the VST nozzle at the base of the spout, as shown in **Figure 2B-1**. A vapor collection bellows shall be installed on the EMCO nozzle at the base of the spout, as shown in **Figure 2B-2**.

2. The VST Model VST–EVR-NB and EMCO Model A4005EVR nozzles have an integral vapor valve which prevents the loss of vapor from the underground storage tanks, ensures proper operation of the system and prevents the ingestion of air into the system. The performance of the nozzle vapor valve can be determined by items 2.1 or 2.2.

    2.1. The maximum allowable leak rate for the nozzle vapor path, as determined by TP-201.2B, shall not exceed 0.07 cubic feet per hour (CFH) at a pressure of two inches water column (2.00” WC)

    2.2. Verification of the integrity of the vapor valve can be performed on installed nozzles using the nozzle bag test procedure in Exhibit 7.

3. The gasoline flow rate of the nozzle shall be between six (6.0) and ten (10.0) gallons per minute as determined by the applicable provisions of section 6 or 7 of Exhibit 5 or by direct observation for 30 seconds minimum at the maximum hand held position.

Vapor Collection

1. The system pressure drop from the nozzle to the UST, as determined by TP-201.4 (Methodology 1) and Exhibit 6, shall not exceed the following:

0.35 inches WC at a flow rate of 60 CFH of Nitrogen; and
0.62 inches WC at a flow rate of 80 CFH of Nitrogen.

Coaxial Hoses

1. The maximum length of the curb hose, breakaway, and whip hose combined shall not exceed fifteen feet as measured from the base of the nozzle to the end of dispenser adapter or dispenser, as appropriate (Reference Exhibit 1, Figure 1A-2).

2. The liquid removal rate shall not be less than five milliliters per gallon (5.0 ml/gal) as determined by Exhibit 5 when tested with a gasoline flow rate between six (6.0) and ten (10.0) gallons per minute. Liquid removal requirement is applicable to all grades of gasoline.

3. All hoses shall have a permanent marking indicating the liquid pick-up location.

4. Any hose configuration is allowed when installed in accordance with IOM section 8.

Breakaway Couplings

1. The VST breakaways, models VSTA-EVR-SBK and VSTA-EVR-SBK (Rebuilt), and EMCO safe break couplings are non-reconnecting and shall be replaced following a drive-off.

2. The VST breakaways, model VSTA-EVR-SBK (Reattachable), and OPW breakaways can be reconnected following a drive-off after conducting a visual and functional assessment per the drive-off procedure.

Flow Limiter

1. No flow limiter is allowed for this system.

Processors

VST ECS Membrane Processor

1. The processor vapor integrity shall demonstrate compliance with the static pressure decay criteria of TP-201.3 and Exhibit 4.

2. Unless there is maintenance or testing being conducted on the processor, the processor shall be on and in the automatic vapor processor mode and the three ball valves shall be locked in the open positions shown in **Figure 2B-3** for normal processor operation. The handles of the ball valves shall not be removed.

3. Piping to and from the processor shall be sloped 1/8” per foot minimum toward the vent line(s).

4. The hydrocarbon concentration of the ECS membrane processor taken from the Hydrocarbon Diagnostic Report shall be between ± one percent (±1%) for the zero and mid-range gas and ± two percent (±2%) for the high-range gas, when tested in accordance with Exhibit 8.

5. The processor shall activate when the pressure of the underground storage tank is less than or equal to 0.4 inches WC (≤0.4 inches WC) as determined by Exhibit 9.

6. The Vapor Pressure Sensor shall be between +0.2 and –0.2 inches WC when tested in accordance with section 9 of Exhibit 10.

7. The pressure reading from the TLS console shall be within ±0.2 inches WC of the measured ullage UST pressure as determined by section 8 of Exhibit 10.

8. The TLS console audible alarm shall be installed at a location that is most likely to be occupied by the station attendant during normal station operation (e.g., cash register).

9. The TLS console controlling the membrane shall have an RS232 port which shall be installed in a location that allows the RS232 port to be easily accessible, and if applicable per district requirements, for use at any time. A vacant RS232 serial port shall always be available to electronically download reports.

10. The hydrocarbon concentration of the VST ECS Processor shall not exceed twelve percent (12%) as determined by accessing the Vapor Processor Status Report. See Exhibit 8 for instruction on how to obtain the vapor processor status report.

<u>VST Green Machine Processor</u>

1. Unless there is maintenance or testing being conducted on the processor, the processor shall be on and in the automatic vapor processor mode and the two ball valves shall be locked in the open positions shown in **Figure 2B-30** for normal processor operation. The handles of the ball valves shall not be removed.

2. Piping to and from the processor shall be sloped 1/8” per foot minimum toward the vent line(s).

3. The processor shall activate when the pressure of the underground storage tank is less than or equal to 0.4 inches WC (≤0.4 inches WC) as determined by Exhibit 9.

4. The Vapor Pressure Sensor shall be between +0.2 and –0.2 inches WC when tested in accordance with section 9 of Exhibit 10.

5. The pressure reading from the TLS console shall be within ±0.2 inches WC of the measured ullage UST pressure as determined by section 8 of Exhibit 10.

6. The TLS-350 audible alarm shall be installed at a location that is most likely to be occupied by the station attendant during normal station operation (e.g., cash register).

7. The TLS console controlling the Green Machine Processor shall have an RS232 port which shall be installed in a location that allows the RS232 port to be easily accessible, and if applicable per district requirements, for use at any time. A vacant RS232 serial port shall always be available to electronically download reports.

8. The hydrocarbon concentration of the VST Green Machine Processor shall not exceed seventeen percent (17%) as determined by Exhibit 15.

9. The carbon type shall be BAX G1500 manufactured by MeadWestvaco.

Veeder-Root Vapor Polisher

1. The carbon type shall be BAX G1500 manufactured by MeadWestvaco.

2. Unless there is maintenance or testing being conducted on the processor, the vapor polisher shall be on and in the automatic vapor processor mode and the inlet ball valve shall be locked in the open position shown in **Figure 2B-4** for normal polisher operation. The handle of the ball valve shall not be removed.

3. The pressure reading from the TLS console shall be within ±0.2 inches WC of the measured ullage UST pressure as determined by section 8 of Exhibit 10.

4. The Vapor Pressure Sensor shall be between +0.2 and –0.2 inches WC when tested in accordance with section 9 of Exhibit 10.

5. The Vapor Polisher pressure decrease between starting and ending pressures shall be less than 0.5 inches WC loss when tested in accordance with Exhibit 11. The ending pressure must be greater than 7.0 inches WC. Pressure drop across the Vapor Polisher at 18.0 standard cubic feet per hour flow shall be between 1.69 inches WC and 2.25 inches WC when tested in accordance with Exhibit 11. Differences in temperature readings shall not exceed 10 ºF when tested in accordance with Exhibit 11. The atmospheric pressure sensor reading shall be within 10% of the atmospheric pressure obtained from a local independent source when tested in accordance with Exhibit 11.

6. The hydrocarbon concentration from the vapor polisher outlet shall not exceed 9000 ppm iso-butane (0.9% by volume iso-butane) when tested in accordance with Exhibit 12.

7. The TLS console controlling the vapor polisher shall have an RS232 port which shall be installed in a location that allows the RS232 port to be easily accessible, and if applicable per district requirements, for use at any time. A vacant RS232 serial port shall always be available to electronically download reports.

8. Security seal tags must be installed on the vapor polisher. If for any reason the seal tags are damaged or missing, the district may require that Exhibit 11 and Exhibit 12 be conducted and pass prior to installing new security seal tags.

Hirt VCS 100 Thermal Oxidizer

1. The processor vapor integrity shall demonstrate compliance with the static pressure decay criteria of TP-201.3 and Exhibit 4.

2. Unless there is maintenance or testing being conducted on the processor, the processor shall be on (power lamp is lit). The ball valve on the inlet of the processor shall be locked in the open position shown in **Figure 2B-17** and the 3-Way Valve handle shall be pointing down in the Normal Operating Position (Opened to UST Ullage) shown in **Figure 2B-18** during normal processor operation. The handles of the ball valves shall not be removed.

3. The processor shall be installed at least 20 feet from the pressure/vacuum vent valve(s) and the associated piping shall be sloped 1/8" per foot minimum toward the vent line(s) or tank fitting.

4. The VCS 100 Indicator Panel shall be installed at a location that is most likely to be occupied by the station attendant during normal station operation (e.g., cash register).

5. The processor shall activate when the processor is exposed to an atmospheric pressure input and the Processing lamp at the Indicator Panel shall light within three (3) minutes as determined by Exhibit 13.

6. When the processor is exposed to an atmospheric pressure input, the OVERPRESSURE lamp at the Indicator Panel shall light within sixty two (62) minutes as determined by Exhibit 13.

7. If the OVERPRESSURE lamp lights, the system is not in proper working order. The GDF owner/operator shall immediately take the following actions:

    a. record the date and time the OVERPRESSURE lamp lit in the station's maintenance and alarm records;
    b. investigate the cause of the OVERPRESSURE light as provided by section 16 of the Installation, Operations, and Maintenance Manual. Record results of inspections, maintenance, and/or testing conducted in the station's maintenance and alarm records; and if necessary,
    c. record the date and time when the GDF owner/operator called the maintenance contractor for service.

Franklin Fueling Systems Clean Air Separator Pressure Management System

1. The Clean Air Separator vapor integrity shall be evaluated using the test procedure outlined in Exhibit 14 of the Executive Order.

2. The Franklin Fueling Systems Clean Air Separator shall be installed within 100 feet from the vent line(s), and the associated piping shall be sloped 1/8" per foot minimum toward the vent line(s).

3. Unless there is maintenance or testing being conducted on the Franklin Fueling Systems Clean Air Separator, the four ball valves shall be locked in the positions shown in **Figure 2B-16** or **2B-16H** for normal Clean Air Separator operation. Figure 2B-16 applies to vertical CAS installations and Figure 2B-16H applies to horizontal CAS installations

Pressure/Vacuum Vent Valves for Storage Tank Vents

1. All P/V vent valves shall be an ARB certified P/V valve for a Phase I system.

2. At least one pressure/vacuum (P/V) vent valve shall be installed on each tank vent. The maximum number of P/V vent valves allowed and P/V vent valve performance specifications are listed in the applicable Phase I EVR Executive Order. Vent lines may be manifold to minimize the number of P/V vent valves and potential leak sources, provided the manifold conforms to all applicable fire regulations. However, the vents connecting the vapor inlet and vapor outlet to the VST ECS Membrane Processor cannot be manifold together.

Warranty

Each manufacturer listed in Exhibit 1 shall include a warranty tag with the certified component(s). The manufacturer warranty tag, included with each component, shall be provided to the service station owner/operator at the time of installation.

Vapor Recovery Piping Configurations

NOTE: Vapor Return Piping shall meet the requirements specified in section 4.11 of CP-201.

1. Vapor Return and Vent Lines

   For facilities installed on or after April 1, 2003, all vapor return and vent lines shall be a minimum nominal internal diameter of 2 inches from the dispensers or the vent stacks to the first manifold. All lines after the first manifold and back to the underground storage tank shall have a minimum nominal internal diameter of 3 inches.

   Note: Facilities permitted by a local district prior to April 1, 2003 shall be required to meet the three inch diameter standard only upon facility modification which involves the addition, replacement, or removal of 50 percent or more of the buried vapor piping.

2. All vapor return lines shall have a minimum slope of 1/8 inch per foot from the dispenser riser to the riser of the UST. A slope of 1/4 inch or more per foot is recommended wherever feasible.

3. The dispenser shall be connected to the riser with either flexible or rigid material that is listed for use with gasoline. The dispenser-to-riser connection shall be installed so that any liquid in the lines will drain toward the storage tank. The internal diameter of the connector, including all fittings, shall not be less than one inch (1").

   Note: The dispenser-to-riser connection is defined as the piping connection between the dispenser piping and the inlet of the dispenser riser. A vapor shear valve may also be part of the riser connection.

4. There is no length restriction for the vapor return piping of the system as long as the system complies with the maximum pressure drop requirement, item 1 of the Vapor Collection section.

5. No product shall be dispensed from any fueling point at a GDF installed with the Balance Phase II EVR System if there is a vapor line that is disconnected and open to the atmosphere.

6. Bulk Plant Operations are not allowed with this system.

Dispensers

1. The dispenser vapor piping must be sized adequately to meet the maximum pressure drop requirement, item 1 of the Vapor Collection section.

2. Dispenser vapor piping shall be installed so that any liquid in the lines will drain toward the dispenser riser.

Liquid Condensate Traps

1. Liquid condensate trap connections and fittings shall not leak. Compliance with this requirement shall be verified by the use of commercial liquid leak detection solution or by bagging, when the vapor containment space of the underground storage tanks is subjected to a non-zero pressure. (Note: Leak detection solution will detect leaks only when positive gauge pressure exists).

2. The Liquid Level Sensor shall alarm within five (5) minutes when tested in accordance with Exhibit 16, **Liquid Condensate Trap Compliance Test**.

3. The Liquid Level Sensor audible alarm shall be installed at a location that is most likely to be heard by the station attendant during normal station operation (e.g. cash register).

4. The Liquid Evacuation System shall automatically evacuate gasoline when tested in accordance with Exhibit 16, **Liquid Condensate Trap Compliance Test.**

5. A metal tag specifying the capacity of the Liquid Condensate Trap shall be installed and maintained as specified in the Installation, Operation, and Maintenance Manual.

In-Station Diagnostics (ISD)

1. The gasoline dispensing facility operator/owner and contractor shall comply with local district requirements, if any, following a warning or failure alarm by the Veeder-Root or INCON In-Station Diagnostics (ISD) system. Following ISD vapor collection and/or containment monitoring failure alarm(s), the ISD system shall shut down individual dispensers or submersible pumps to all gasoline tanks.

2. Suggested Troubleshooting, found in Table 12-3 of the Veeder-Root In-Station Diagnostics (ISD) Install, Setup, and Operation Manual and Section 4 of the ARB Approved Installation, Operation, and Maintenance Manual recommend that certain tests be conducted to verify the cause of the ISD warning or failure alarms. Additionally, for Balance Phase II EVR systems installed with Clean Air Separator and INCON ISD systems, suggested troubleshooting, found in Appendix A (Alarm Codes) of the INCON Vapor Recovery Monitoring Installation, Operation, and Maintenance Manual (ARB Approved Installation, Operation, and Maintenance Manual), recommends that certain tests be conducted to verify the cause of the ISD warning or failure alarms. Districts may require that these tests or other tests specified by the districts be conducted in response to the ISD alarms.

3. For this certification, the baseline vapor collection performance value used was 1.0. This value will not be used for enforcement purposes.

4. The table below provides a list of expiration dates for each ISD software version that has been revoked.

ISD System Software Version Expiration Dates

Phase II EVR System Description	ISD Manufacturer	Revoked Software Version	Last Date Software May Remain In Use	Notes
VR-204 Series	Veeder-Root*	Version 1.01 for Multi-Product (six pack) Dispensers with Fuel Blending	07/01/2012	Only applies to GDFs equipped with multi-product dispensers with fuel blending. Does not apply to GDFs equipped with uni-hose dispensers with fuel blending. Subject GDFs must upgrade to the currently certified software version (1.03 or later)

* Existing GDFs equipped with Veeder Root ISD Software Version 1.02 may remain in use because it has not been revoked. Existing sites equipped with Veeder Root Software Version 1.01 may remain in use if not equipped with multi-product dispenser with fuel blending.

Phase I System

1. The Phase I system shall be an ARB-certified system that demonstrates compliance with the static pressure decay test criteria contained in TP-201.3 and Exhibit 4.

Maintenance Records

1. Each GDF operator owner shall keep records of alarms and maintenance performed at the facility. Such records shall be maintained on site in accordance with district requirements or policies. The records shall include alarm date and time, nature of the alarm, troubleshooting, maintenance or repair performed to validate and/or correct alarms, component, or system failures, date when maintenance or repair was conducted, name and Certified Technician Identification Number of individual conducting maintenance or test, affiliation, and telephone number. Additional information may be required in accordance with local district requirements. An example of a GDF maintenance and alarm form is shown in **Figure 2B-20**.

2. Maintenance shall be conducted in accordance with the Scheduled Maintenance section of the ARB approved Installation, Operation, and Maintenance Manual.

Vapor Recovery Equipment Defects

The following is deemed a defect for the affected grade point(s) or system.

Grade Points – VST Nozzles

1. The grade point shall be removed from service when more than 30% of a nozzle face seal is missing (e.g., a triangular or similar shape in which greater than 2.5 inches of the faceplate circumference is missing (accumulated).

2. The grade point shall be removed from service when more than 0.4 square inches of a nozzle vapor collection sleeve is missing (e.g., a rectangular shape of greater than nine/sixteenth (9/16) inches or more on each side, a circular shape of eleven/sixteenth (11/16) inches or more in diameter, or a triangular shape of seven/eighth (7/8) inches on the side.

3. The grade point shall be removed from service when the total slit length in the convolutions exceeds 18 inches as determined by direct measurements.

Grade Points – EMCO Nozzles

4. The grade point shall be removed from service when more than 0.4 square inches of a nozzle boot face material is missing (e.g., a triangular or similar shape in which greater than 7/16 inches of the boot face circumference is missing (accumulated)).

5. The grade point shall be removed from service when there is slit across seven (7) consecutive bellows convolutions as determined by direct measurements.

6. The grade point shall be removed from service when there is a 360 degree cut around the bellows convolution.

Grade Points – General

7. The grade point shall be removed from service when the dispensing rate is greater than ten (10.0) gallons per minute (gpm) or less than five (5.0) gpm as determined by the applicable provisions of section 6 or 7 of Exhibit 5 or by direct observation for 30 seconds minimum at the maximum hand held position.

8. The grade point shall be removed from service when a hose is found to have greater than 150 ml of gasoline in the vapor side as determined by sections 6.1 to 6.5 of Exhibit 5. Note: Prior to draining gasoline from the vapor side of the hose, use EMCO tool P/N 494635EVR (for EMCO EVR nozzle) or VST tool P/N VST STP 100 (for VST EVR nozzle) and plug the fuel spout. **Do not activate dispenser when draining gasoline from the vapor side of the hose.**

9. The fueling point shall be removed from service when the system pressure drop exceeds the following conditions as determined by Methodology 1 of TP-201.4 and Exhibit 6:

   0.95 inches WC at a flow rate of 60 CFH of Nitrogen; and
   1.52 inches WC at a flow rate of 80 CFH of Nitrogen.

10. The grade point shall be removed from service when any hose has a visible opening as determined by direct observation.

11. The grade point shall be removed from service when any nozzle lever has spring tension (live lever) when the vapor recovery sleeve or bellows is uncompressed as determined by the weekly interlock inspection procedure per IOM Section 2.

12. The grade point shall be removed from service when the nozzle automatic liquid shut-off mechanisms malfunction in any manner as determined by EPO No. 26-F (See Vapor Recovery Equipment Defects List) or direct observation.

13. The grade point shall be removed from service when any nozzle has a defective vapor valve as determined by Exhibit 7 or when the vapor valve has a leak rate that exceeds 0.07 cubic feet per minute at a pressure of two (2) inches WC as determined by TP-201.2B.

14. The grade point or system shall be removed from service when any component required by this Executive Order is absent, installed improperly or disconnected as determined by direct observation.

System with VST ECS Processor

1. Unless there is maintenance or testing being conducted on the VST ECS processor, the system shall be removed from service when the three ball valves on the VST ECS processor are not locked in the proper operating configuration (**Figure 2B-3**) as determined by direct observation.

2. Unless there is maintenance or testing being conducted on the VST ECS processor, the system shall be removed from service when the ECS membrane processor is not on or in the automatic vapor processor mode as determined by the Diagnostic section of the Pressure Measurement Control (Section 12) of IOM.

System with VST Green Machine Processor

1. Unless there is maintenance or testing being conducted on the VST Green Machine processor, the system shall be removed from service when the two ball valves on the VST Green Machine processor are not locked in the proper operating configuration (**Figure 2B-30**) as determined by direct observation.

2. Unless there is maintenance or testing being conducted on the VST Green Machine processor, the system shall be removed from service when the Green Machine processor is not on or in the automatic vapor processor mode as determined by the Diagnostic section of the IOM Section 18.

3. Unless there is maintenance or testing being conducted on the VST Green Machine processor, the system shall be removed from service when the Green Machine controller is not on as determined by the VST Control Panel section of IOM Section 18.

System with Veeder-Root Vapor Polisher

1. Unless there is maintenance or testing being conducted on the Veeder-Root Vapor Polisher, the system shall be removed from service when the ball valve on the Vapor Polisher is not locked in the proper operating configuration (**Figure 2B-4**) as determined by direct observation.

2. Unless there is maintenance or testing being conducted on the Veeder-Root Vapor Polisher, the system shall be removed from service when the Vapor Polisher is not in the automatic mode as determined by the Diagnostic section of the Pressure Measurement Control (Section 12) of IOM.

System with Hirt Thermal Oxidizer

1. Unless there is maintenance or testing being conducted on the Hirt Thermal Oxidizer, the system shall be removed from service when the ball valve on the Thermal Oxidizer is not locked in the proper operating configuration (**Figure 2B-17**) as determined by direct observation.

2. Unless there is maintenance or testing being conducted on the Hirt Thermal Oxidizer, the system shall be removed from service when the Thermal Oxidizer Indicator Panel is not in the “power on” position (power lamp is lit).

System with Franklin Fueling Systems Clean Air Separator

1. The system shall be removed from service when the Franklin Fueling Systems Clean Air Separator fails the leak decay test outlined in Exhibit 14.

2. Unless there is maintenance or testing being conducted on the Franklin Fueling Systems Clean Air Separator, the system shall be removed from service when the four ball valves are not locked in the positions shown in **Figure 2B-16** or **2B-16H** for normal Clean Air Separator operation. Figure 2B-16 applies to vertical CAS installations and Figure 2B-16H applies to horizontal CAS installations.

Veeder-Root ISD System Specifications

TLS Console & ISD Software Version Number

The ISD audible alarm shall be installed at a location that is most likely to be occupied by the station attendant during normal station operation (e.g. cash register) to hear the alarm. The TLS console shall be installed in a location that allows the RS232 port to be easily accessible, and if applicable, per district requirements, for use at any time. A vacant RS232 serial port shall always be available to electronically download reports.

The term “TLS Console” used throughout this Exhibit includes but is not limited to TLS-350, TLS-350 Plus, TLS-350-R, Red Jacket ProMax, and Gilbarco EMC consoles, which are also referenced in Exhibit 1.

The presence of ISD and the ISD software version number can be verified on the TLS Console LCD screen by using the <STEP> key or by using the TLS Console <PRINT> key to print and review the latest ISD Daily Report. **See Figures 2B-5** and **2B-6** for TLS Console and ISD verification instructions.

The TLS Console must have a printer as well as an RS232 interface port.

If the TLS Console is equipped with security features which prohibit access to the TLS Console, instructions to override these security features shall be maintained on site in accordance with air district requirements and shall be available to the air district upon request. If Veeder-Root’s “Maintenance Tracker” is installed and enabled, access to the “diagnostic mode” and “set-up mode” of the TLS Console is prohibited unless a Maintenance Tracker Technician Key or personal computer equipped with Veeder-Root’s ISD Setup Tool Software Version 1.09 or higher is made available. Maintenance Tracker is an optional security device designed to prevent unauthorized tampering and clearing of Veeder-Root tank monitoring and ISD alarms. Maintenance Tracker resides within the TLS console and when enabled, a message will appear on the two line display of the TLS console. For additional instructions on how to access the desired parameters to complete this test procedure, see Exhibit 18; “Accessing PMC and ISD Parameters at Gasoline Dispensing Facilities (GDFs) with Veeder-Root’s “Maintenance Tracker” Security Feature Installed & Enabled”.

Operability Test Procedure

The Veeder-Root ISD operability test procedure provided in Exhibit 10 and Exhibit 17, and in section 12 of the ***ARB Approved Installation, Operation and Maintenance Manual*** (IOM), shall be used at GDF sites to determine the operability of the Veeder-Root ISD system to comply with applicable performance standards and performance specification in CP-201. Testing the ISD equipment in accordance with this procedure will verify the proper selection, setup and operation of the TLS Console sensors and interface modules.

The Vapor Flow Meter

The Veeder-Root ISD system requires one Vapor Flow Meter per dispenser installed in accordance with Section 15 **of *ARB Approved IOM* (*Veeder-Root ISD Balance Vapor Flow Meter Manual Installation Guide (577013-916, Rev. B)) for the Veeder-Root ISD System***. The Vapor Flow Meter is an intrinsically safe sensor that is wired to the TLS Console Smart Sensor Module via a conduit dedicated to TLS Console low-voltage sensors. **Figure 2B-7** shows the ISD Vapor Flow Meter. **Figures 2B-12, 2B-13, and 2B-14** show the installation configuration.

The Vapor Pressure Sensor

The Veeder-Root ISD system requires one Vapor Pressure Sensor per GDF installed into one of the dispensers located closest to the tanks (If a row of dispensers are equal distance from the tank pad and within 10' of each other, any dispenser can be used) in accordance with Section 13 of the ***ARB Approved IOM Manual***. For vapor vent stack installation, determine which vapor vent stack line is closest to the tank being monitored. Select this line for the addition of the pressure sensor. The connection must be BELOW the Veeder-Root Carbon Canister if equipped in accordance with Section 13 of the **ARB Approved IOM Manual**. **Caution:** Installation of the pressure sensor on the vapor vent stack is only allowed at facilities equipped with a Veeder-Root Vapor Polisher or Franklin Fueling/Healy Clean Air Separator. The Vapor Pressure Sensor is an intrinsically safe sensor that is wired to the TLS Console Smart Sensor Module via a conduit dedicated to TLS Console low-voltage sensors. **Figure 2B-8** shows an ISD Vapor Pressure Sensor illustration. **Figures 2B-12** and **2B-13** show the dispenser installation configuration. **Figure 2B-15** shows the vapor vent stack installation configuration. **Figure 2B-19** shows the wireless vapor pressure sensor vapor vent stack installation configuration.

Dispenser Interface Module (DIM)

Existing Dispenser Interface Modules or DIM communication cards are used to interface to the dispenser Point of Sale (POS) or controller system to gather fuel transaction data. The ISD Operability Test Procedure provided in Exhibit 10 and Exhibit 17 and in Section 4 of the Veeder-Root ISD Install, Setup and Operation Manual for VST ECS Membrane Processors can be used to verify the proper selection and setup of the Dispenser Interface Module. See **Figure 2B-9** for a typical Dispenser Interface Module Illustration.

Tank Inventory Probe Sensor

Existing Tank Inventory Probe sensors (one per tank) are used to measure the amount of vapor space in the Underground Storage Tanks (USTs). The ISD Operability Test Procedure can be used to verify the proper selection and setup of the Tank Inventory Probes. See **Figure 2B-10** for a typical Tank Inventory Probe Sensor.

Shutdown Control

The TLS Console must be wired per the ***Veeder-Root ISD Install, Setup and Operation Manual 577013-937 Rev. D*** of the ***ARB Approved Installation, Operation and Maintenance Manual for the Balance Phase II EVR Systems Including the Veeder-Root ISD System*** such that it shall automatically prohibit the dispensing of individual dispensers or through shutdown of all the gasoline turbine pumps during a CP-201 ISD failure alarm. It shall also automatically prohibit the dispensing of all dispensers during a TLS Console ISD system power loss.

TLS Console Modules

The ISD Operability Test Procedure in Exhibit 10 and Exhibit 17 and in section 12 of ***ARB Approved IOM Manual*** (Section 4 of the Veeder-Root ISD Install, Setup, and Operation Manual for VST ECS Membrane Processors) shall be used to verify the proper selection and setup of the TLS Console Modules.

RF Wireless Components

The Veeder-Root wireless components must be installed in accordance with **Section 19: TLS RF Wireless 2 System (W2) Installation and Maintenance Guide of the ARB Approved IOM.** The wireless system consists of the following devices (**Figure 2B-11**):

a. TLS RF Console-2 Box
b. RF Transmitter-2
c. RF Transmitter Battery Pack
d. RF Repeater-2
e. RF Receiver-2

The transmitter automatically identifies the type of sensor (e.g. Carbon Canister or Flow Meter) connected to it and polls it periodically. The collected data is converted to radio format and transmitted through air to receiver. The TLS RF provides this data to TLS Console on next poll by TLS Console. To prevent adjacent GDF with wireless equipment from interfering with each other's transmissions, dip switches on the Transmitter and Receiver are used to configure a site ID. The Repeater is not required, but may be installed as needed to provide a second path for the wireless signal traveling from Transmitter to Receiver.

Maintenance Tracker Kit

The Maintenance Tracker Kit consists of the following devices:

- Key (Figure 2B-28)
- Interface Module RS232/485 Dual Module with DB9 Converter or Single Port Module with DB 25 converter (Figure 2B-29)
- Manual

Training Program

All Veeder-Root contractors must successfully complete the applicable Veeder-Root training program before they can install, startup, and service TLS Console equipment as shown in the following table:

Veeder-Root Contractor Training Certification Requirement Table

Veeder-Root Contractor Certification Requirements	Installer Certification[6]	ATG Technician Certification[7]	VR Vapor Products Certification[8]
Install[1] ISD	√	√	√
Install PMC	√	√	√
Install CCVP	√	√	√
Install Wireless ISD/PMC	√	√	√
Installation Checkout[2]		√	√
ATG Startup[3] / Training[4] / Service[5]		√	√
ISD Startup / Training / Service			√
PMC Startup / Training / Service			√
CCVP Startup / Training / Service			√
Wireless ISD/PMC Startup / Training / Service			√
Install Pressure Sensor (ATG)	√	√	√
Maintain Pressure Sensor (ATG)		√	√
Calibrate Pressure Sensor (ATG)		√	√
Clear ATG Pressure Sensor Alarm (ATG)		√	√
Clear ISD/ PMC alarms (ISD/PMC)			√

[1]Perform wiring and conduit routing; equipment mounting
[2]Inspect wiring and conduit routing; equipment mounting
[3]Turn power on, program and test the systems
[4]Provide supervised field experience in service techniques and operations
[5]Troubleshoot and provide routine maintenance as specified in the IOM
[6]UST Monitoring Systems – Installer (Level 1)
[7]Certified UST Monitoring Technician
[8]VR Vapor Products

Note: A current Veeder-Root Installer Certification is a prerequisite for the ATG Technician Certification course.

The schedule, fee, and registration information for the Authorized Service Contractor (ASC) training program can be found at http://www.Veeder.com. To confirm TLS Console or ISD training a regulator should send an email to technicaltraining@gilbarco.com with the name (and company) of the ASC to obtain verification of the ASC TLS Console/ISD training status or call 800-997-7725 and press “4” to get to the Veeder-Root menu and then “*” to speak to a representative or sign on to the Gilbarco Learning Suite at http://wise.gilbarco.com.

Maintenance

The TLS console, including interface modules, does not require scheduled maintenance. ISD System Self-Test Monitoring algorithms are designed to verify proper selection, setup and operation of the TLS console and sensors.

There is no recommended maintenance, inspection nor calibration for the Vapor Flow Meter or the Vapor Pressure Sensor. Servicing should be performed in response to warning or alarm conditions.

INCON ISD System Specifications

Console & VRM Software Version Number

The ISD audible alarms shall be installed at a location that is most likely to be heard by the station attendant during normal station operation (e.g., cash register). The console shall be installed in a location that allows the Ethernet or RS232 port (COMM 1) to be easily accessible, and if applicable, per district requirements, for use at any time. A vacant RS232 serial port (COMM 1) shall always be available to electronically download reports.

The presence of VRM and the VRM software version number can be verified on the Console touchscreen screen by pressing the VRM Icon key or by printing a VRM Daily or Monthly Report. See **Figure 2B-21** for the verification instructions.

The Console must have a printer.

The Console is equipped with password security features which prohibit the ability to make changes to the system. Instructions and passwords shall be maintained on site in accordance with air district requirements and shall be available to the air district upon request.

The INCON ISD System software version 1.3.0 does not support multi-hose (six pack) dispenser configurations and is therefore limited for use with unihose dispensers.

Operability Test Procedure

The INCON VRM operability test procedures are provided in Exhibits 19 and 20, and in the VRM Operability Testing section of the **ARB Approved Installation, Operation and Maintenance Manual**, shall be used at GDF sites to determine the operability of the INCON VRM system to comply with applicable performance standards and performance specification in CP-201. Testing the VRM equipment in accordance with this procedure will verify the proper selection, setup and operation of the Console sensors and interface modules.

Vapor Flow Meter

The INCON VRM system requires one Vapor Flow Meter per dispenser installed via the ARB Approved Vapor Flow Meter Manual 000-2144, Rev. A. The Vapor Flow Meter shall be installed into dispensers listed in Exhibit 1 of this Executive Order in accordance with the **ARB Approved Installation, Operation and Maintenance Manual**. The Vapor Flow Meter is an intrinsically safe sensor that is wired to the Console Probe Module via a conduit dedicated to low-voltage sensors. **Figure 2B-23** shows the Vapor Flow Meter. **Figure 2B-25** shows the installation configuration.

Vapor Pressure Sensor

The INCON VRM system requires one Vapor Pressure Sensor per GDF installed into one of the dispensers located with the shortest run to the underground storage tanks (if a row of dispensers are equal distance from the tank pad, any dispenser can be used) in accordance with the **ARB Approved Installation, Operation and Maintenance Manual**. The Vapor Pressure Sensor shall be installed into dispensers listed in Exhibit 1 of this Executive Order. The Vapor Pressure Sensor is an intrinsically safe sensor that is wired to the Console's 4-20mA Module via a conduit dedicated to low-voltage sensors. **Figure 2B-24** shows a Vapor Pressure Sensor illustration. **Figure 2B-26** shows the

installation configuration.

Dispenser Interface Module (DIM)

Existing Dispenser Interface Modules or DIM communication cards are used to interface to the dispenser Point of Sale (POS) or controller system to gather fuel transaction data. The ISD Operability Test Procedure provided in Exhibit 19 and in the **ARB Approved Installation, Operation, and Maintenance Manual** can be used to verify the proper selection and setup of the Dispenser Interface Module.

Tank Inventory Probe Sensor

Existing Tank Inventory Probe sensors (one per gasoline storage tank) are used to measure the amount of vapor space in the Underground Storage Tanks (USTs). The ISD Operability Test Procedure can be used to verify the proper selection and setup of the Tank Inventory Probes. See **Figure 2B-27** for a typical Tank Inventory Probe Sensor.

Shutdown Control

The Console must be wired per the INCON VRM Installation, Operation, and Maintenance Manual 000-2058, Rev. C of the **ARB Approved Installation, Operation and Maintenance Manual** such that it shall automatically prohibit the dispensing of fuel through shutdown of individual dispensers during a CP-201 ISD failure alarm.

Console Modules

The VRM Operability Test Procedure in Exhibit 19 and in the INCON VRM Installation, Operation, and Maintenance Manual 000-2058, Rev C of the **ARB Approved Installation, Operation, and Maintenance Manual** shall be used to verify the proper selection and setup of the Console Modules.

Training Program

All INCON contractors must successfully complete the applicable Franklin Fueling Systems training program before they can install, startup, and service INCON Console equipment. Contractors must have up-to-date Level 1 & 2 certifications to install and startup the TS Console. Contractors must have an up-to-date Level 5 certification to install, startup and service the VRM system. The schedule, fee and registration information for the Authorized Service Contractor (ASC) training program can be found at http://www.franklinfueling.com.

A list of certified contractors with current console and VRM training will be available at the Franklin Fueling web page, www.franklinfueling.com.

Maintenance

The console, including interface modules, does not require scheduled maintenance. The VRM System uses a Self-Test Monitoring feature that is designed to verify proper selection, setup and operation of the console and sensors. There is no recommended maintenance, inspection nor calibration for the Vapor Flow Meter or the Vapor Pressure Sensor. Servicing should be performed in response to warning or alarm conditions.

Figure 2B-1
Model VST-EVR- NB Nozzle

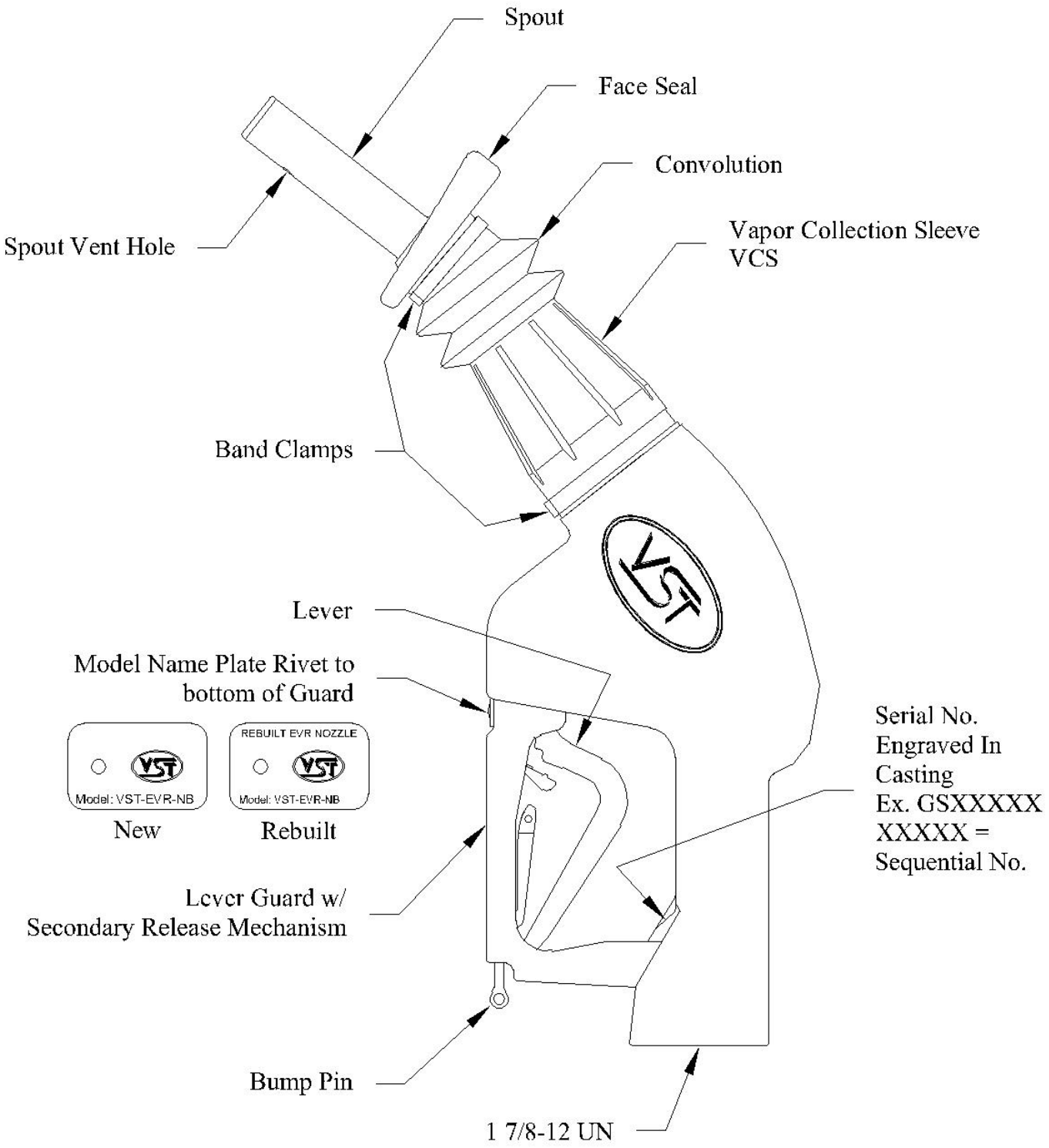


Figure 2B-2
EMCO Model A4005EVR Nozzle

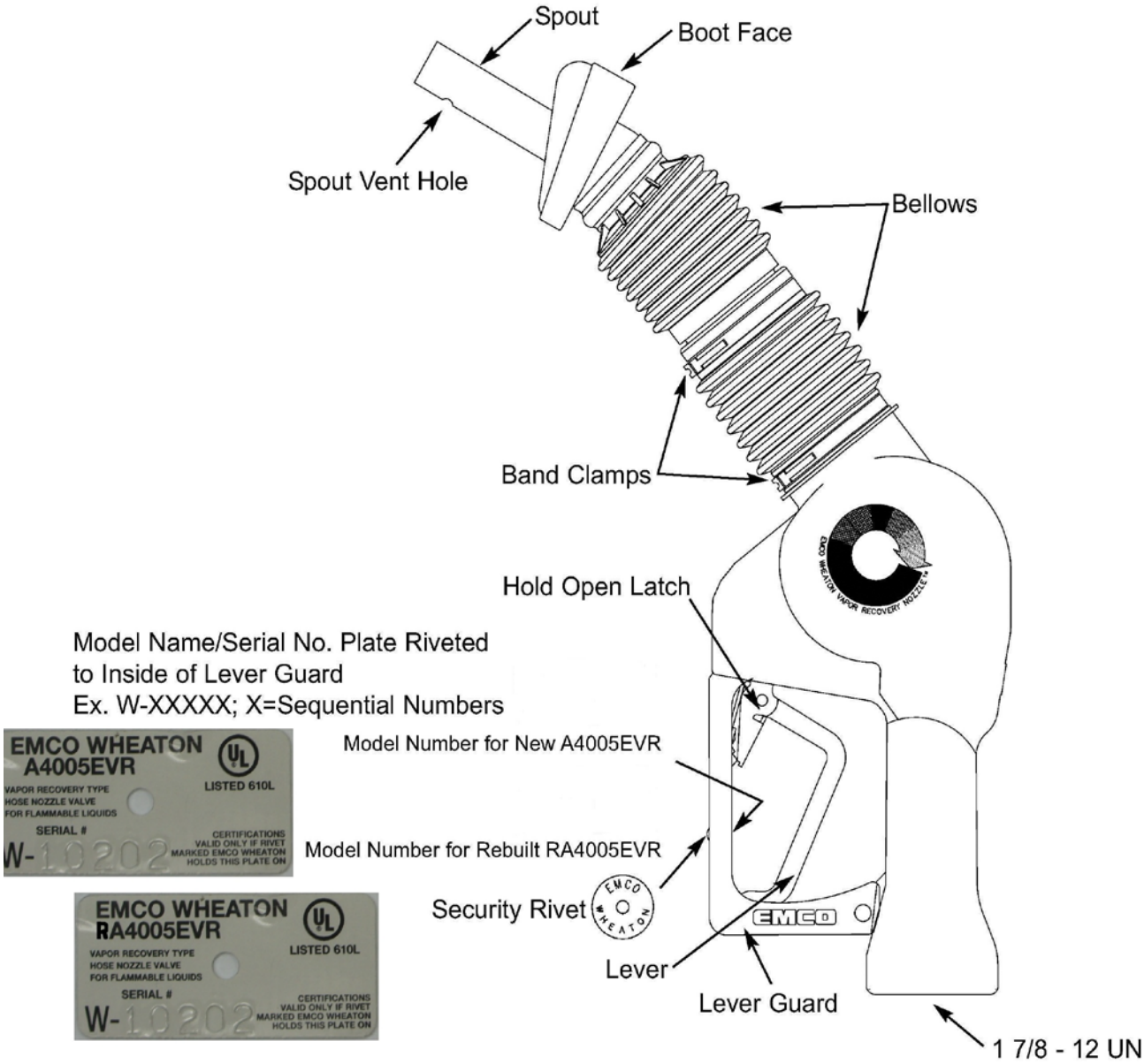


Figure 2B-3
Typical VST-ECS-CS3 Membrane Processor

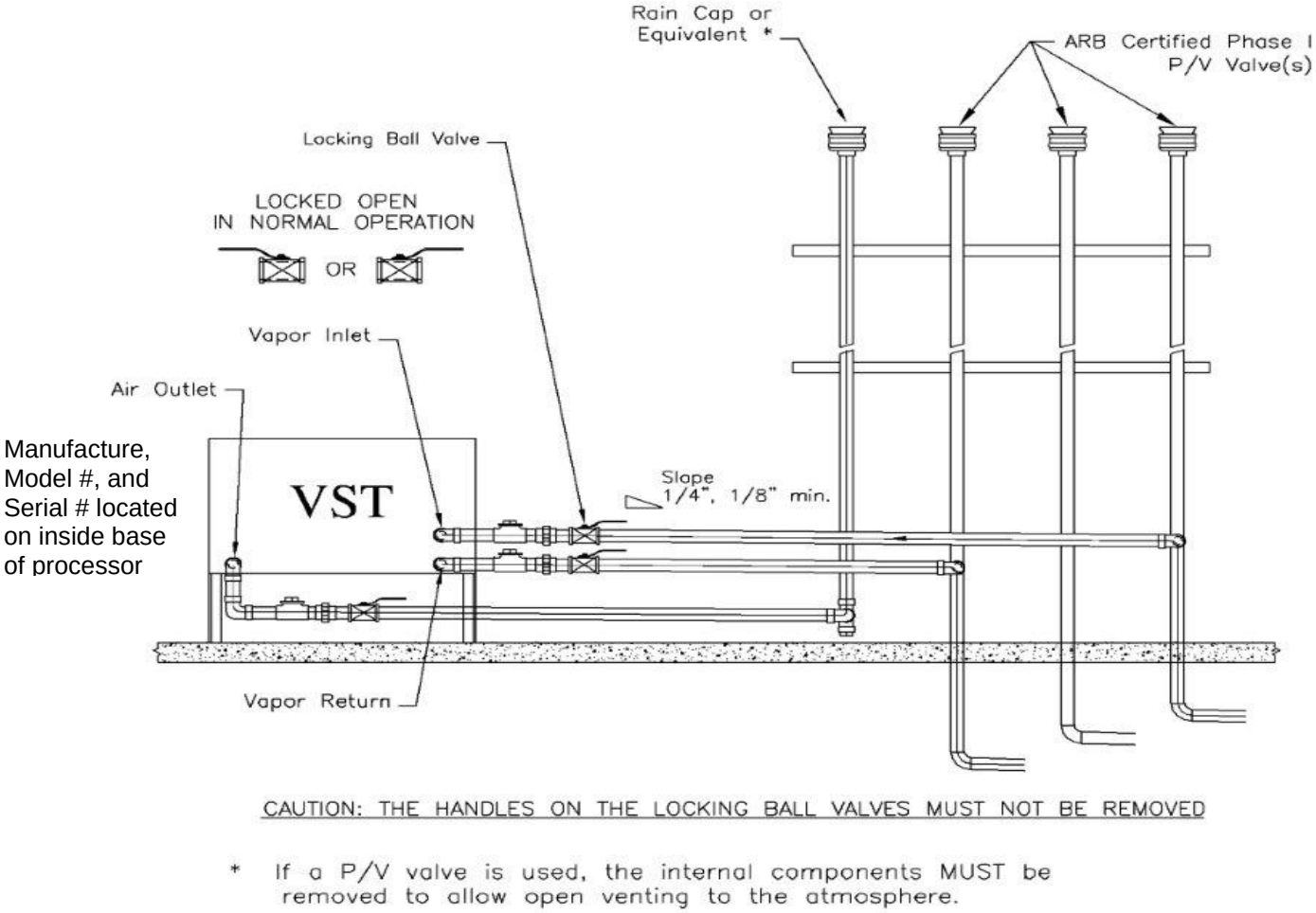


Figure 2B-4
Typical Veeder-Root Vapor Polisher

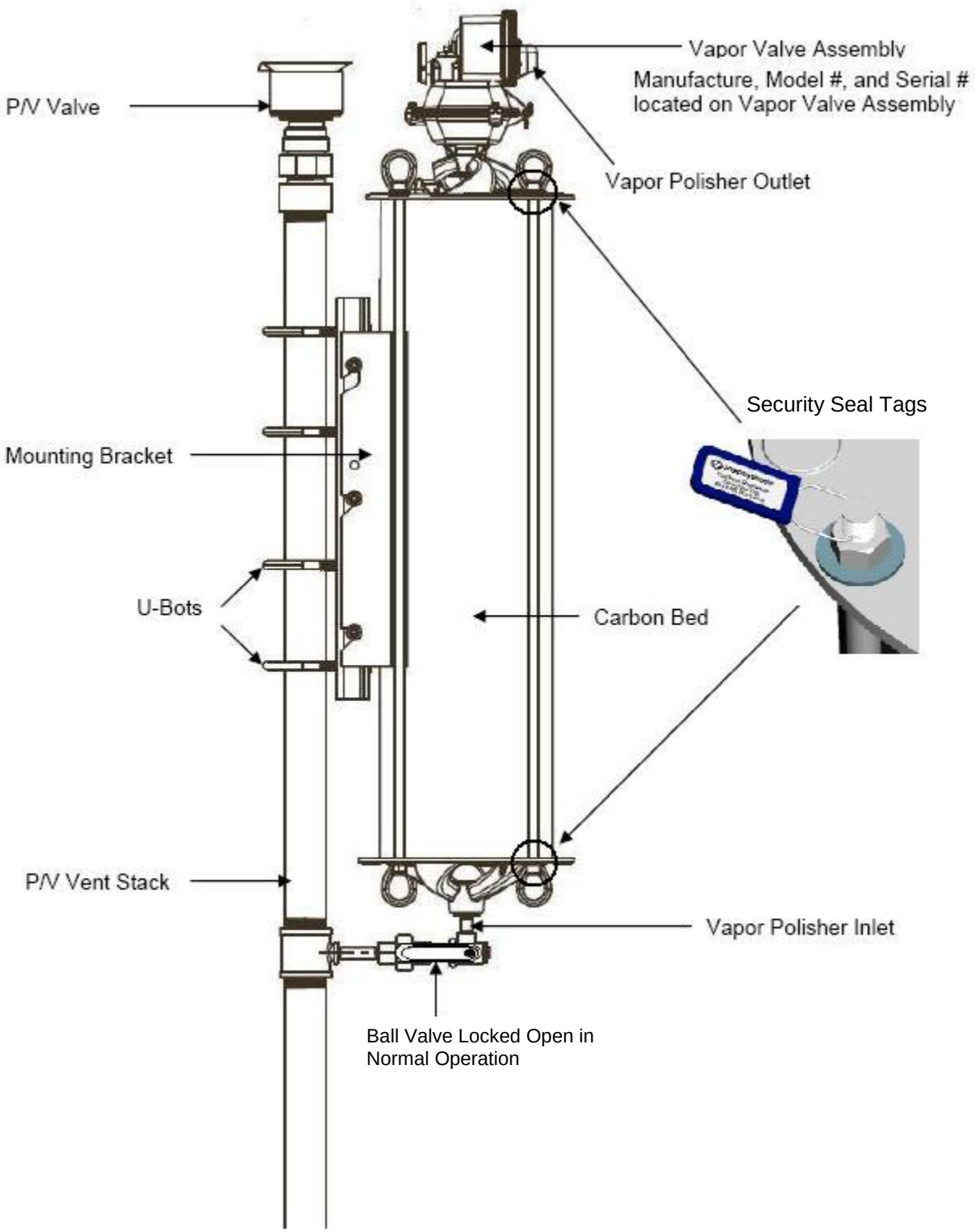
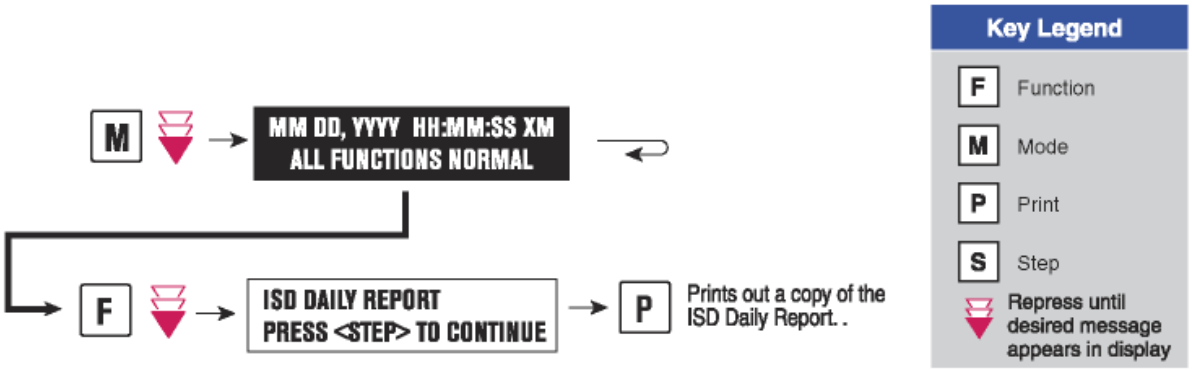
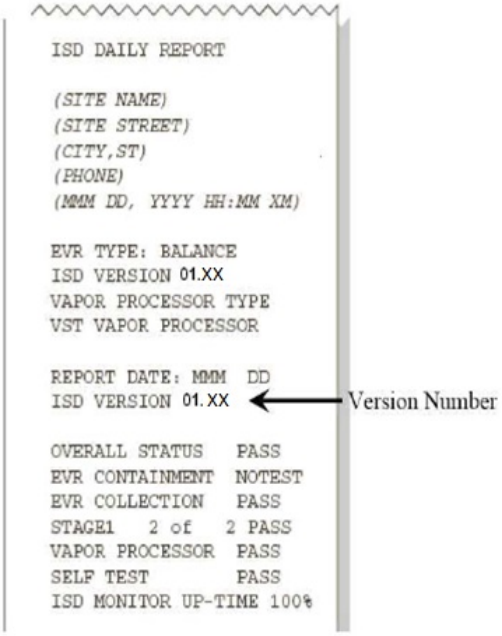


Figure 2B-5
Finding Veeder-Root ISD Version Number

Use the TLS Console <FUNCTION> key to find the ISD Daily Report menu:



The ISD version number can be verified on the TLS Console LCD screen using the <STEP> key or by using the TLS Console <PRINT> key to print and review the latest ISD Daily Report:



Presence of the ISD Daily Report menu and correct ISD software version number is evidence that ISD is installed and activated in the TLS Console.

Figure 2B-6
Standard TLS Console

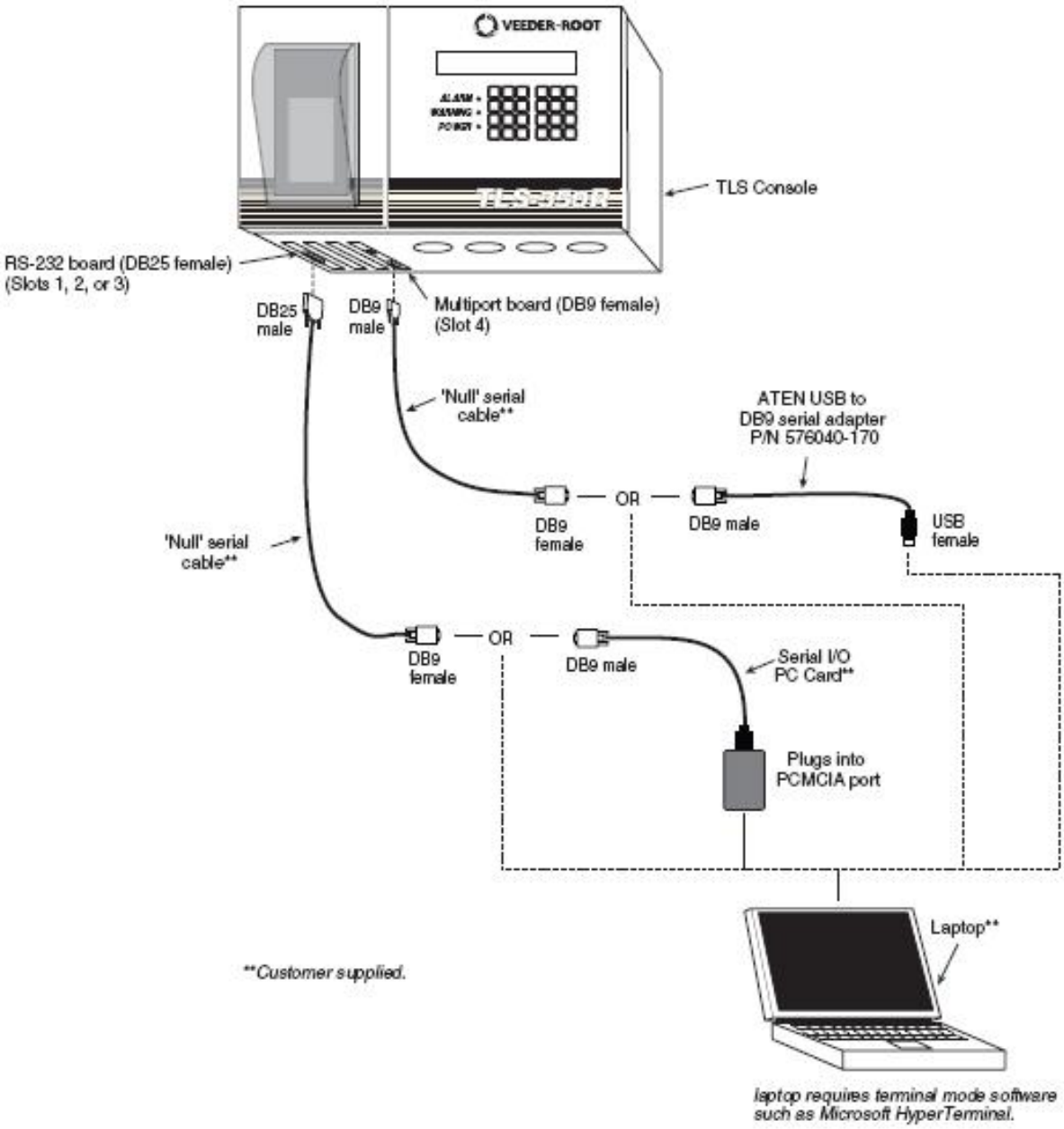
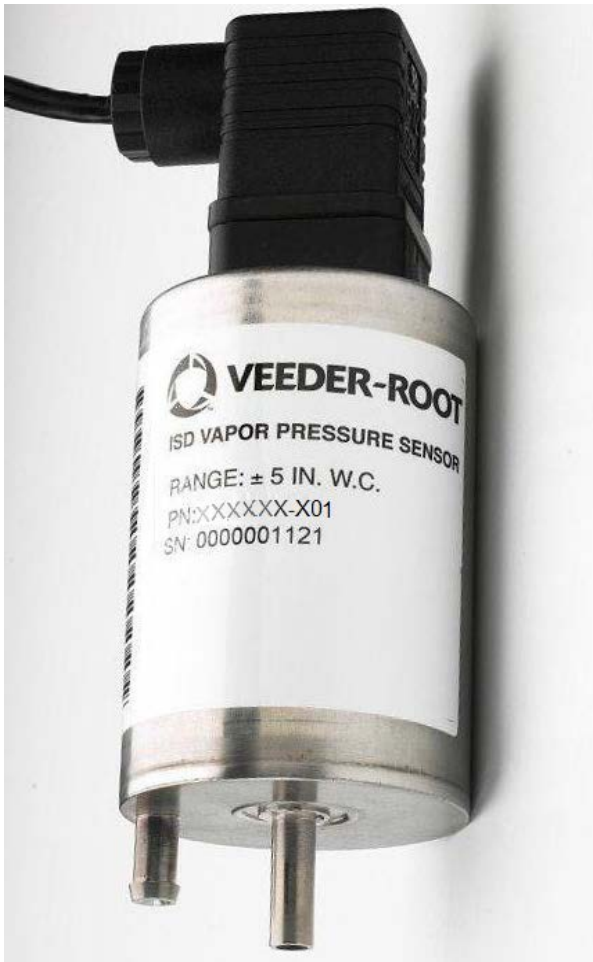


Figure 2B-7
Veeder-Root 332374-XXX
Vapor Flow Meter

Figure 2B-8
Veeder-Root Vapor Pressure Sensors



Veeder-Root Model # XXXXXX-XXX

Where X=	
Wired	331946-001
Low Powered Wireless	861190-201

Veeder-Root Model #330020-717 Dryer Tube

Figure 2B-9
Veeder-Root DIM Series
Dispenser Interface Module (DIM)

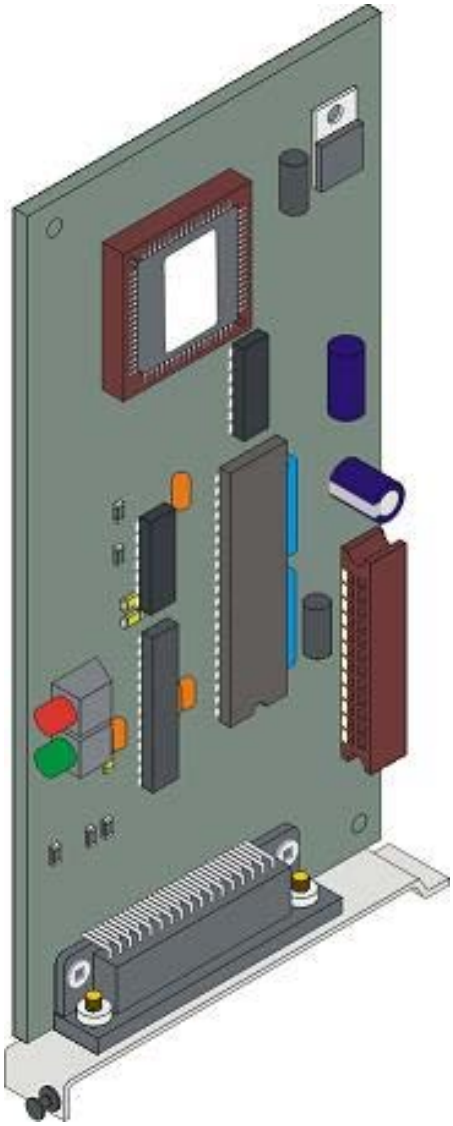


Figure 2B-10
Tank Inventory Probe Sensor

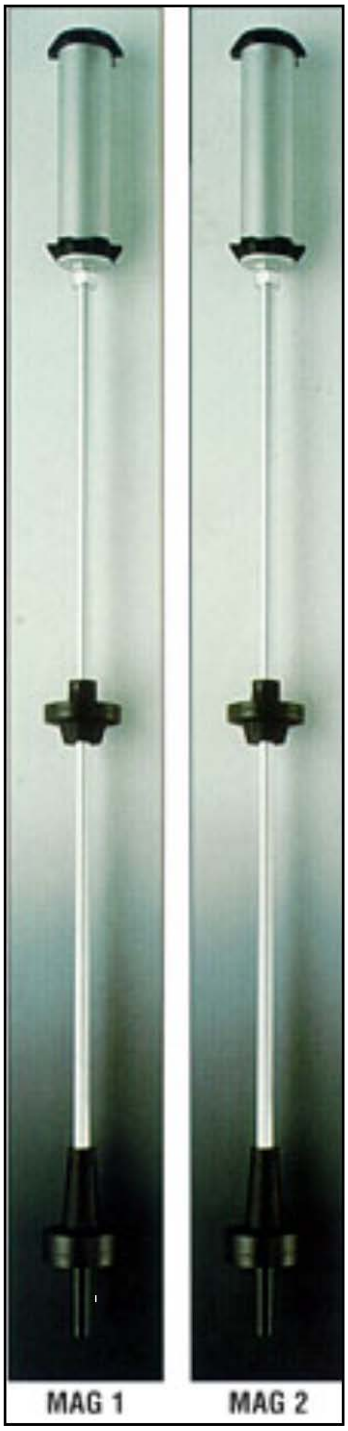


Figure 2B-11
Veeder Root's RF Wireless Components

Wireless TLS RF Console

Wireless Receiver

Wireless Repeater

Wireless Transmitter

Wireless Battery Pack

Wireless Enclosure

Figure 2B-12
Typical Installation of the Veeder-Root Vapor Pressure Sensor & Vapor Flow Meter Above Vapor Shear Valve

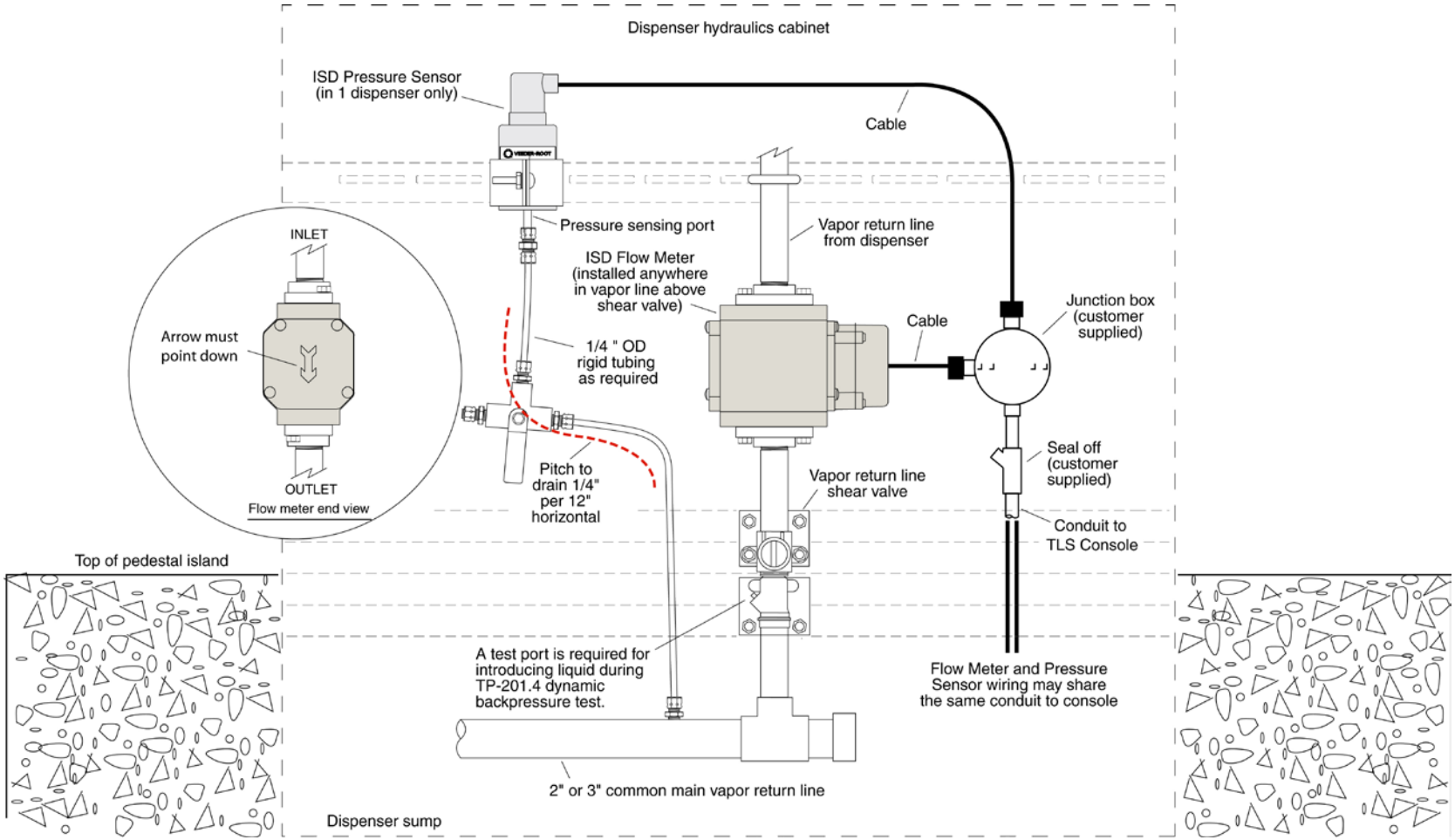


Figure 2B-13
Typical Installation of the Veeder-Root Vapor Pressure Sensor and Vapor Flow Meter Below Vapor Shear Valve

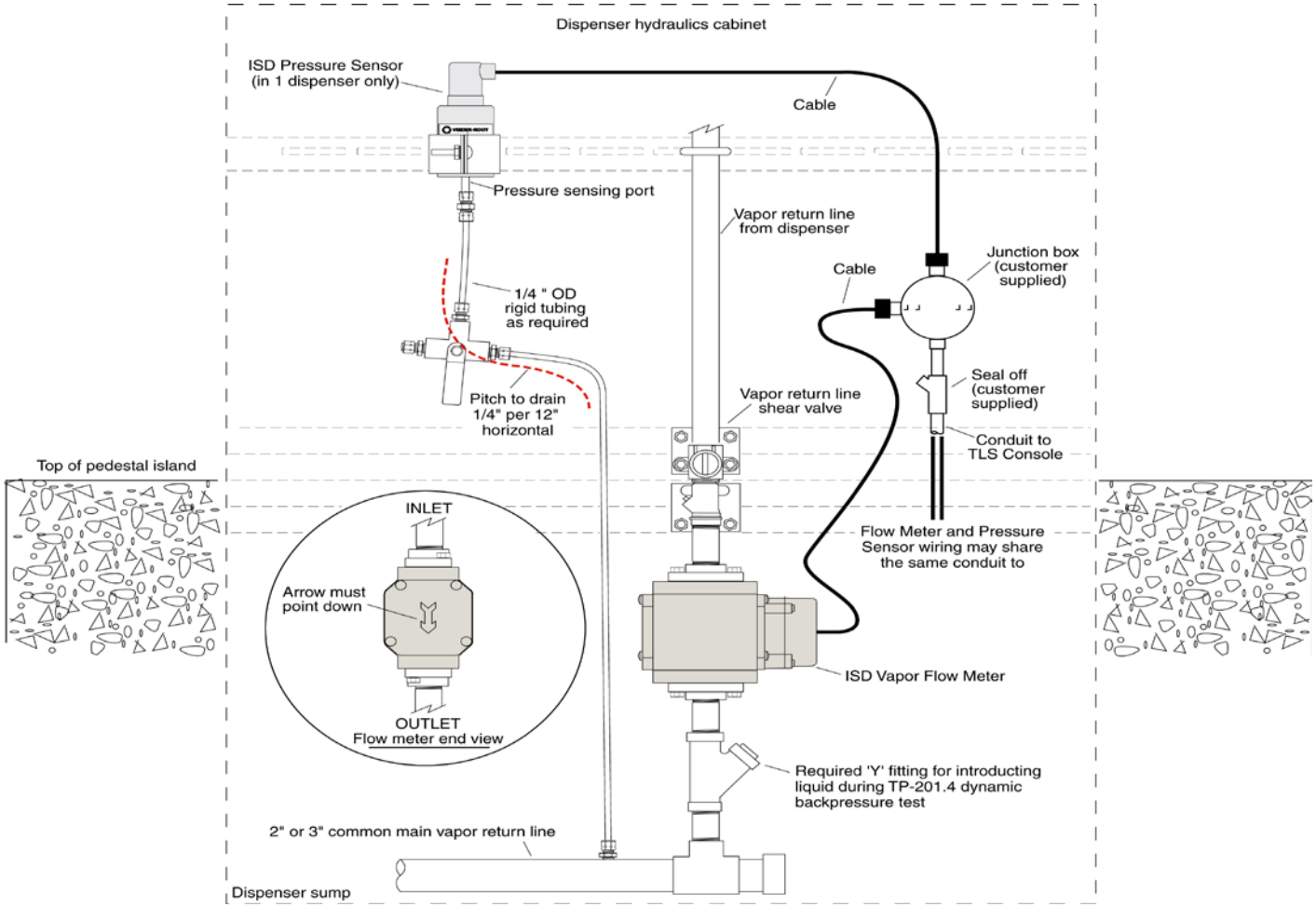
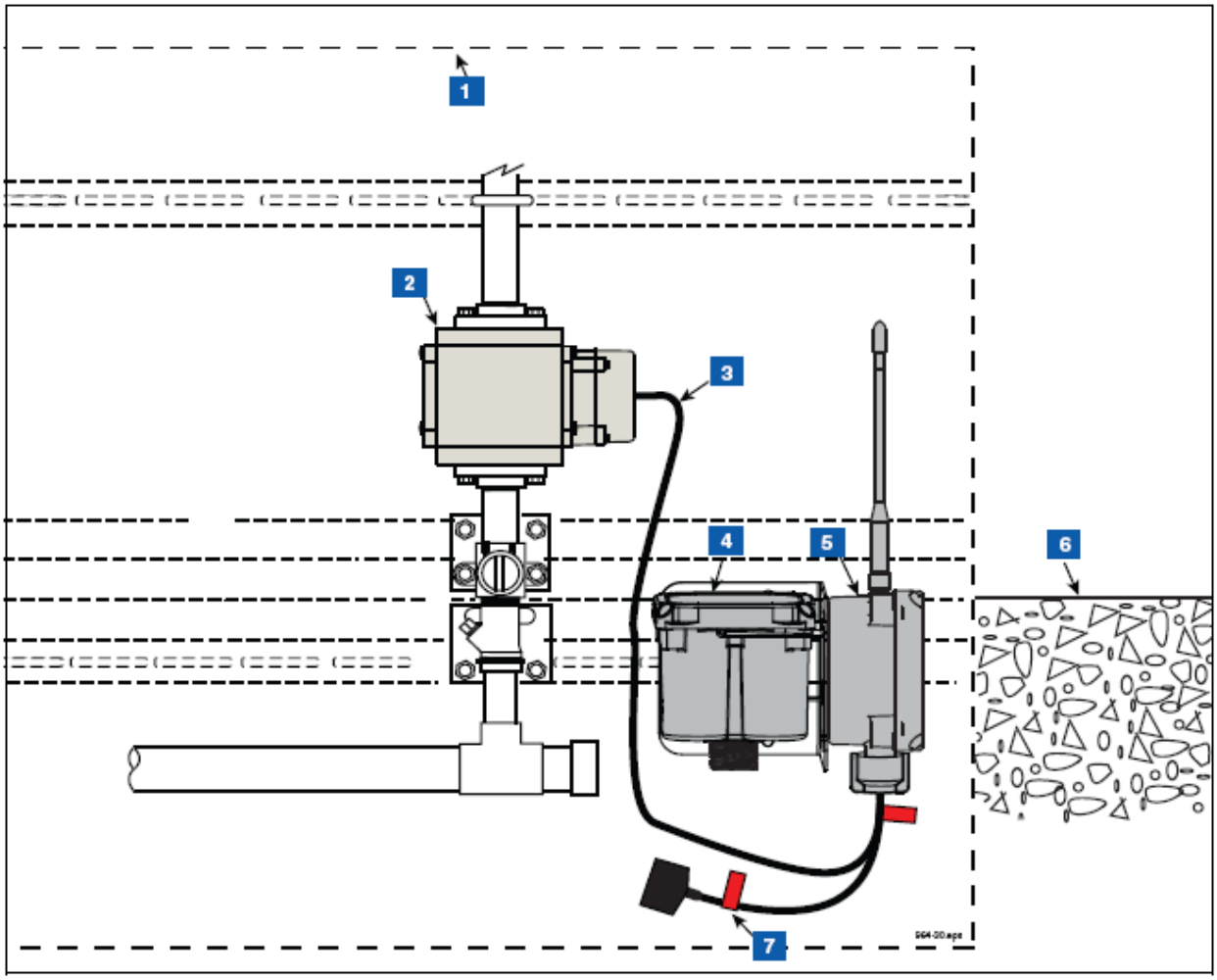


Figure 2B-14
Typical Installation of the Veeder-Root Wireless Vapor Flow Meter with VFM Transmitter in Dispenser



LEGEND FOR NUMBERED BOXES IN Figure 14	
1. Base of dispenser cabinetVFMTransmitter	5. Transmitter
2. VFM	6. top of dispenser pedestal
3. VFM cable	7. Battery caution label attached to battery cable (2 places)
4. Battery pack	

Figure 2B-15
Typical Installation of the Veeder-Root Vapor Pressure Sensor On Vapor Vent Stack

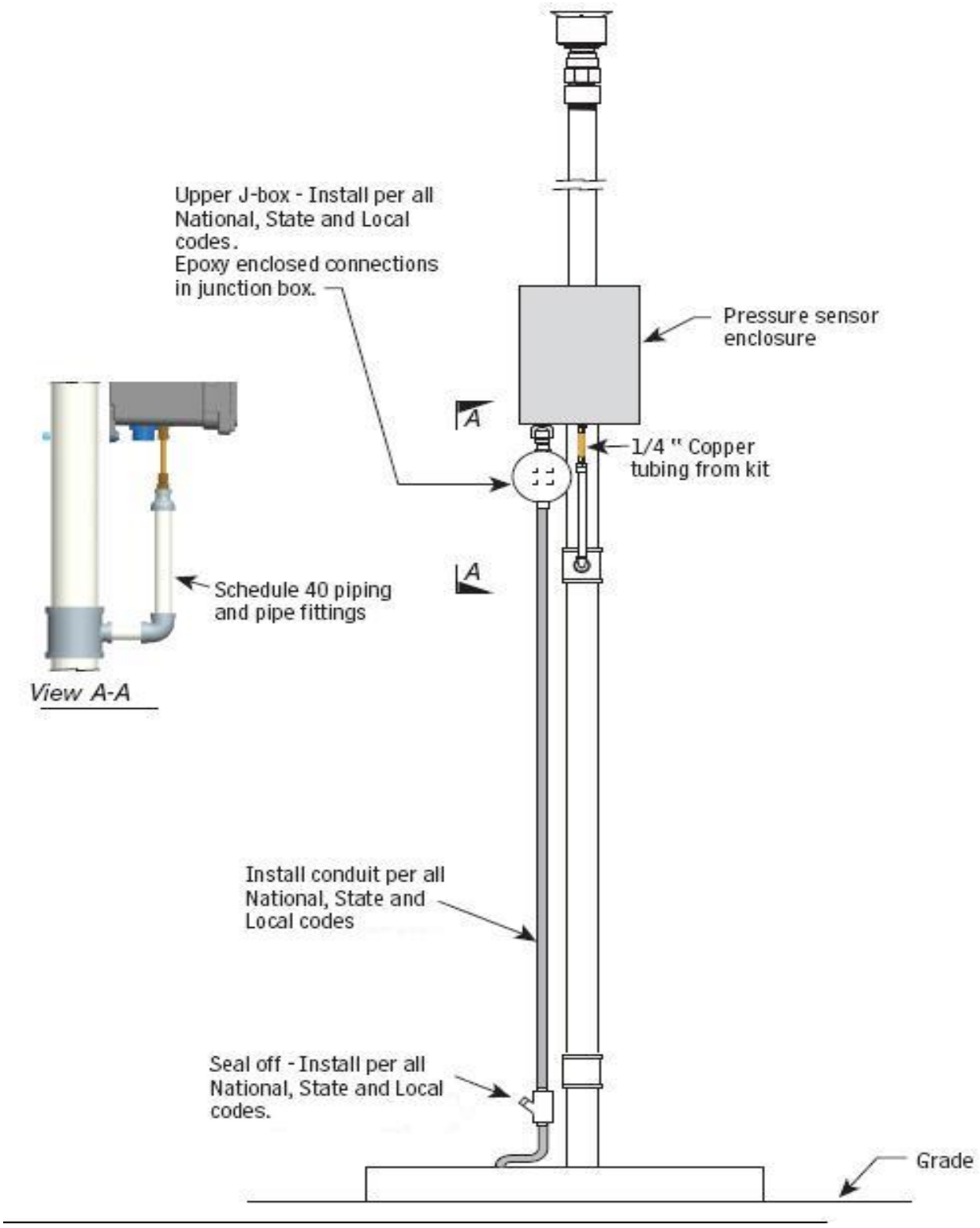


Figure 2B-16
Clean Air Separator Normal Operation Configuration

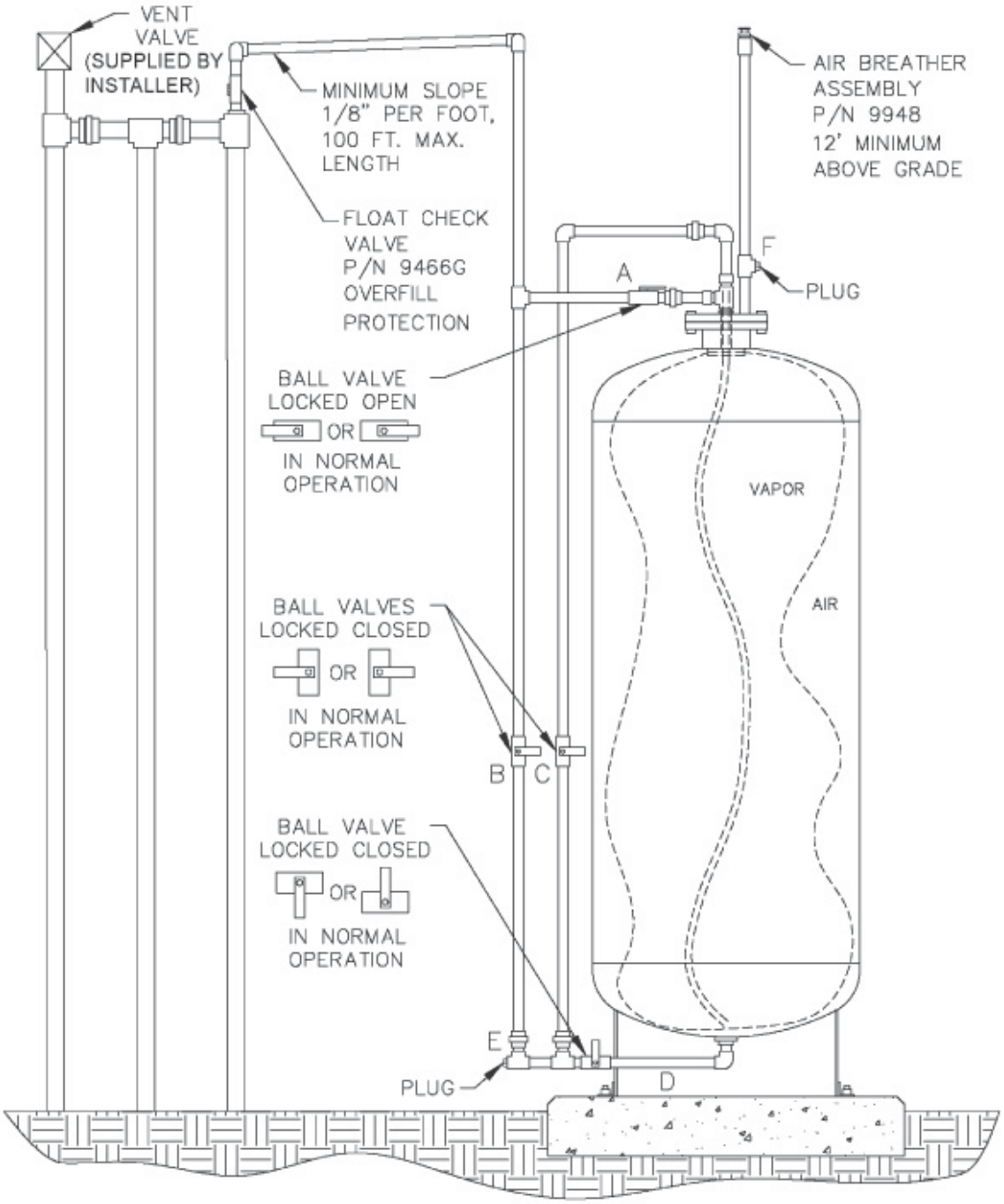


Figure 2B-16H
Clean Air Separator Normal Operation Configuration

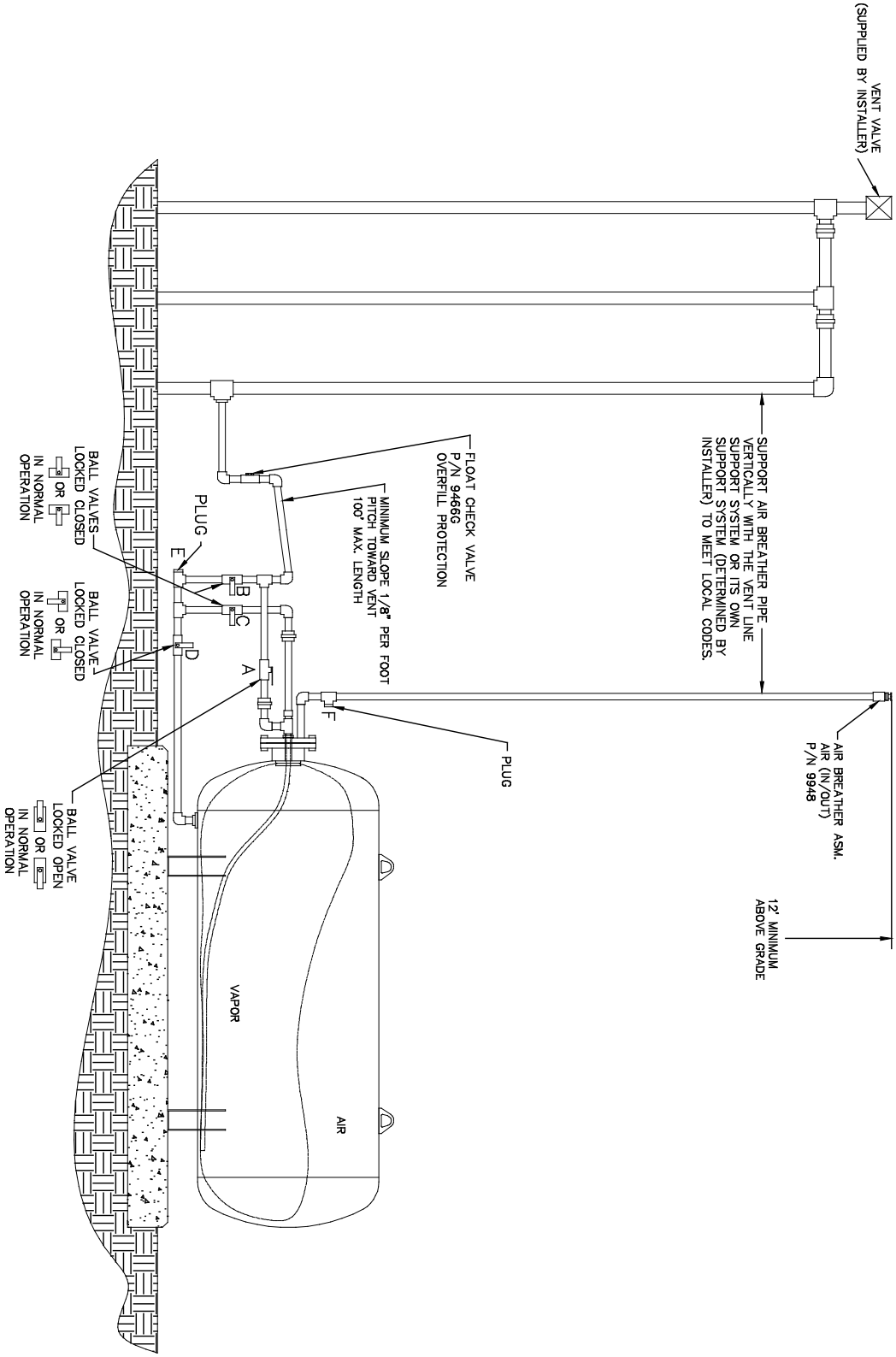


Figure 2B-17
Hirt VCS 100 Thermal Oxidizer
(shown in normal operation)

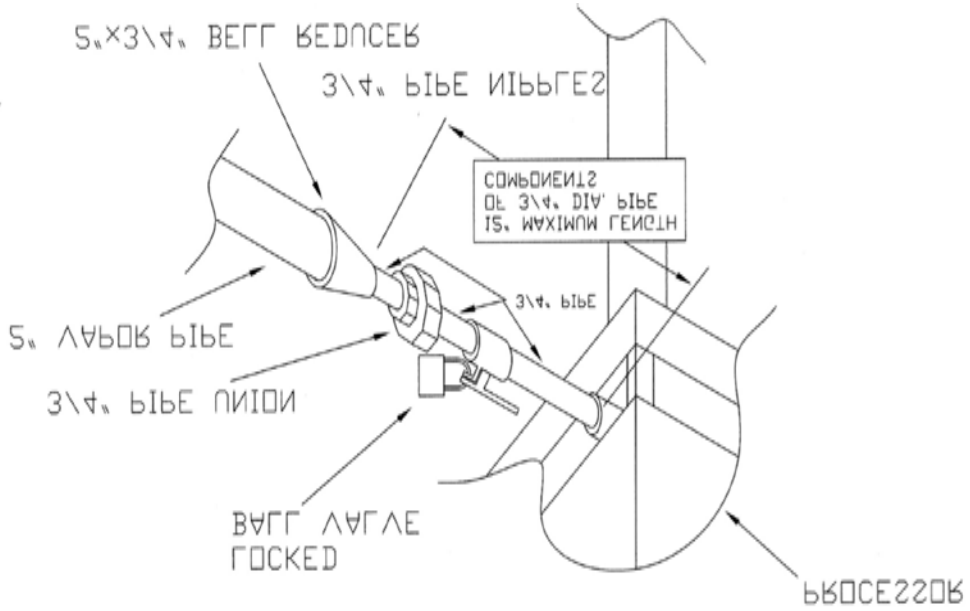
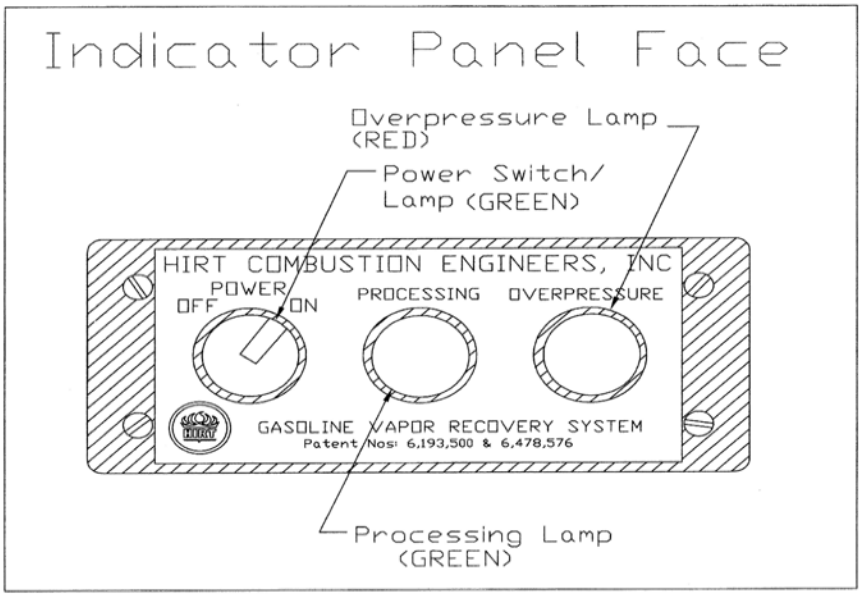


FIGURE 5: TYPICAL PIPING CONNECTION TO PROCESSOR

Figure 2B-18
Hirt VCS 100 Thermal Oxidizer
(3-Way Valve shown in normal operation)



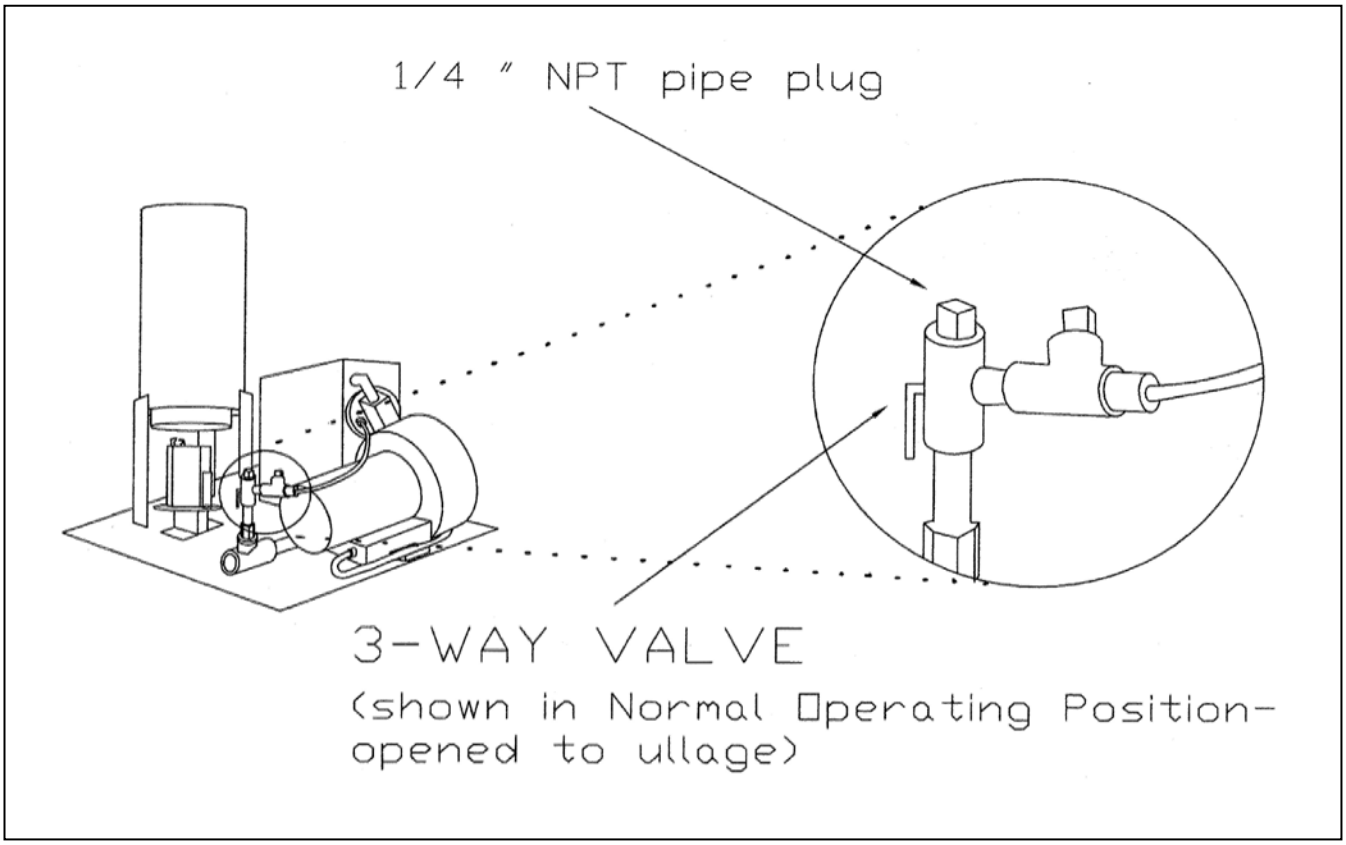
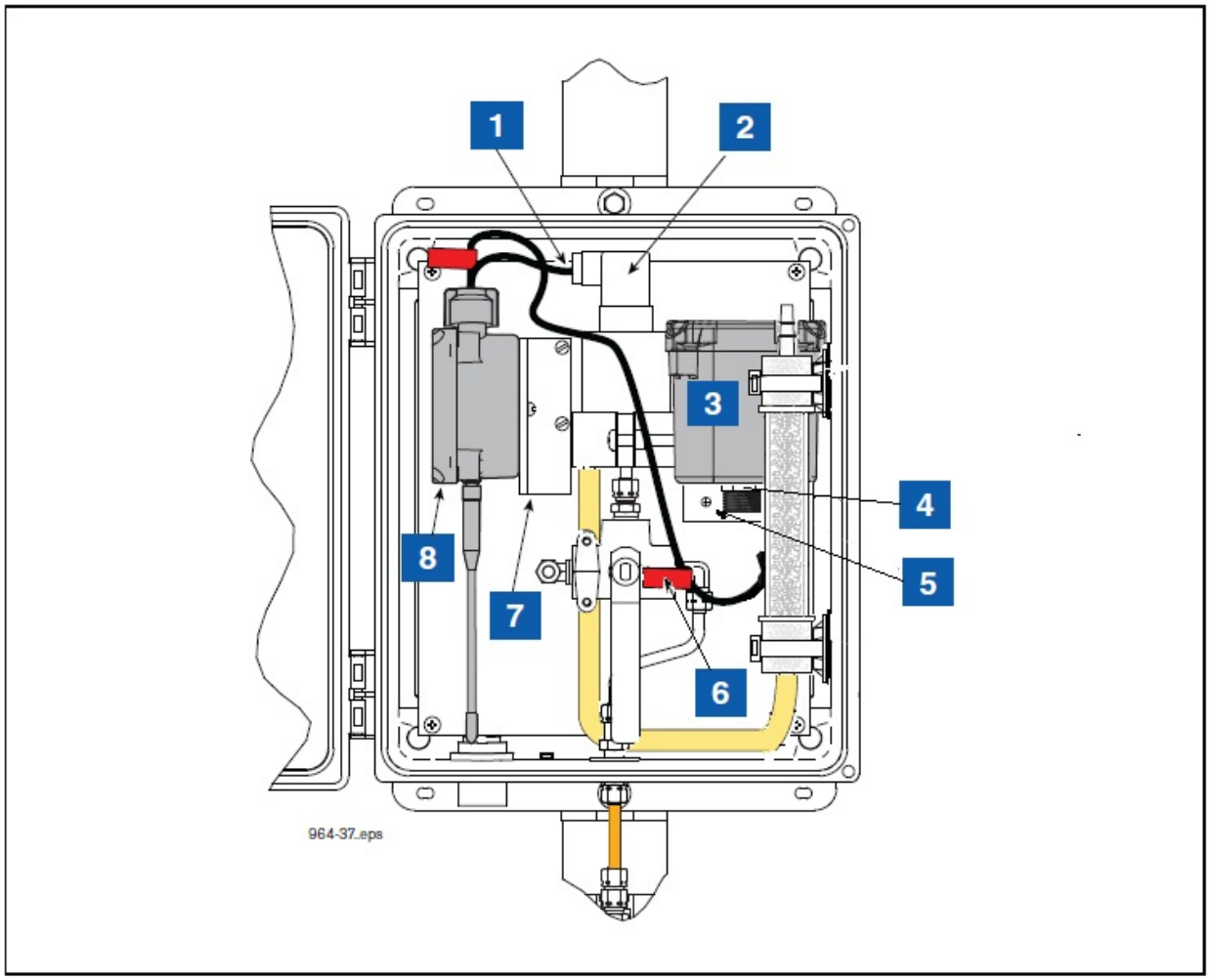


Figure 2B-19
Wireless Vapor Pressure Sensor - Vapor Vent Stack Installation Configuration



Example VRPS transmitter/battery pack installation in vent stack enclosure

LEGEND FOR NUMBERED BOXES	
1. VRPS cable	5. Attach Battery L bracket using two #10 taptite screws
2. VRPS	6. Battery caution label attached to battery cable (2 places)
3. Battery pack	7. Attach Transmitter L bracket using two #10 taptite screws
4. Thin hex nut	8. Transmitter

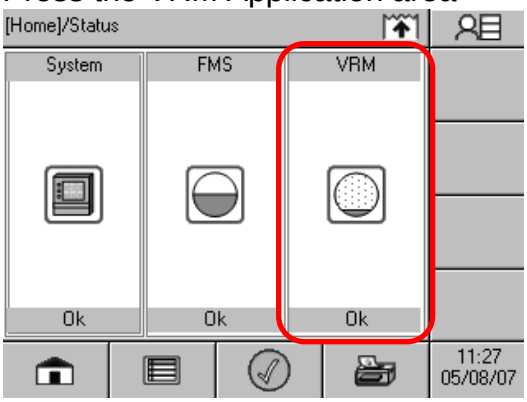
Figure 2B-20
Example of a GDF Maintenance and Alarm History Form

Date of Maintenance/ Test/Inspection/Failure/ alarm history (including date and time of maintenance call)	Repair Date To Correct Test Failure	Maintenance/Test/Inspection Performed and Outcome/Action Taken in Response to Alarm	Affiliation	Name and Technician ID Number of Individual Conducting Maintenance or Test	Telephone Number

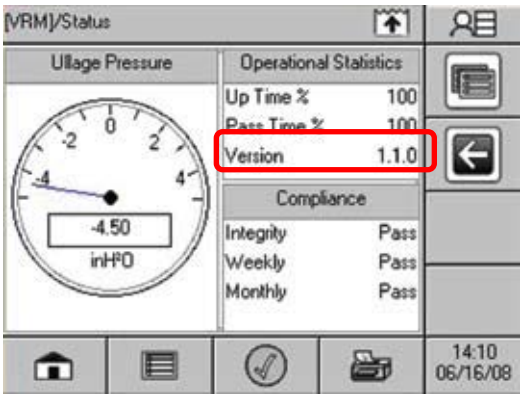
Figure 2B-21
Finding the INCON VRM Version Number

To Locate Version number on the LCD Screen

Press the VRM Application area

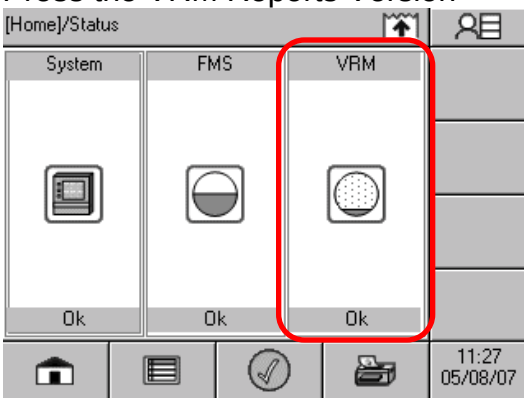


Version Number

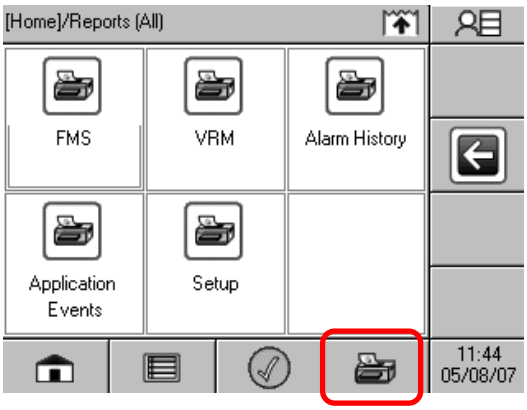


To Locate Version Number on the VRM Daily Report or Monthly Report:

Press the VRM Reports Version



Press Print Icon



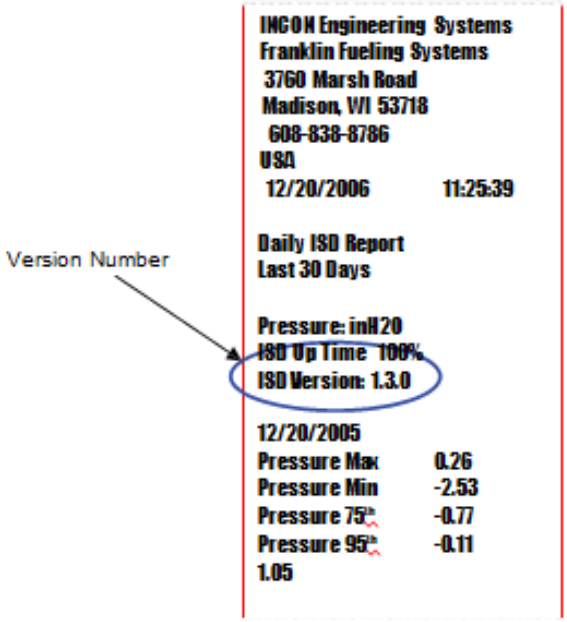


Figure 2B-22
Standard Tank Sentinel Console

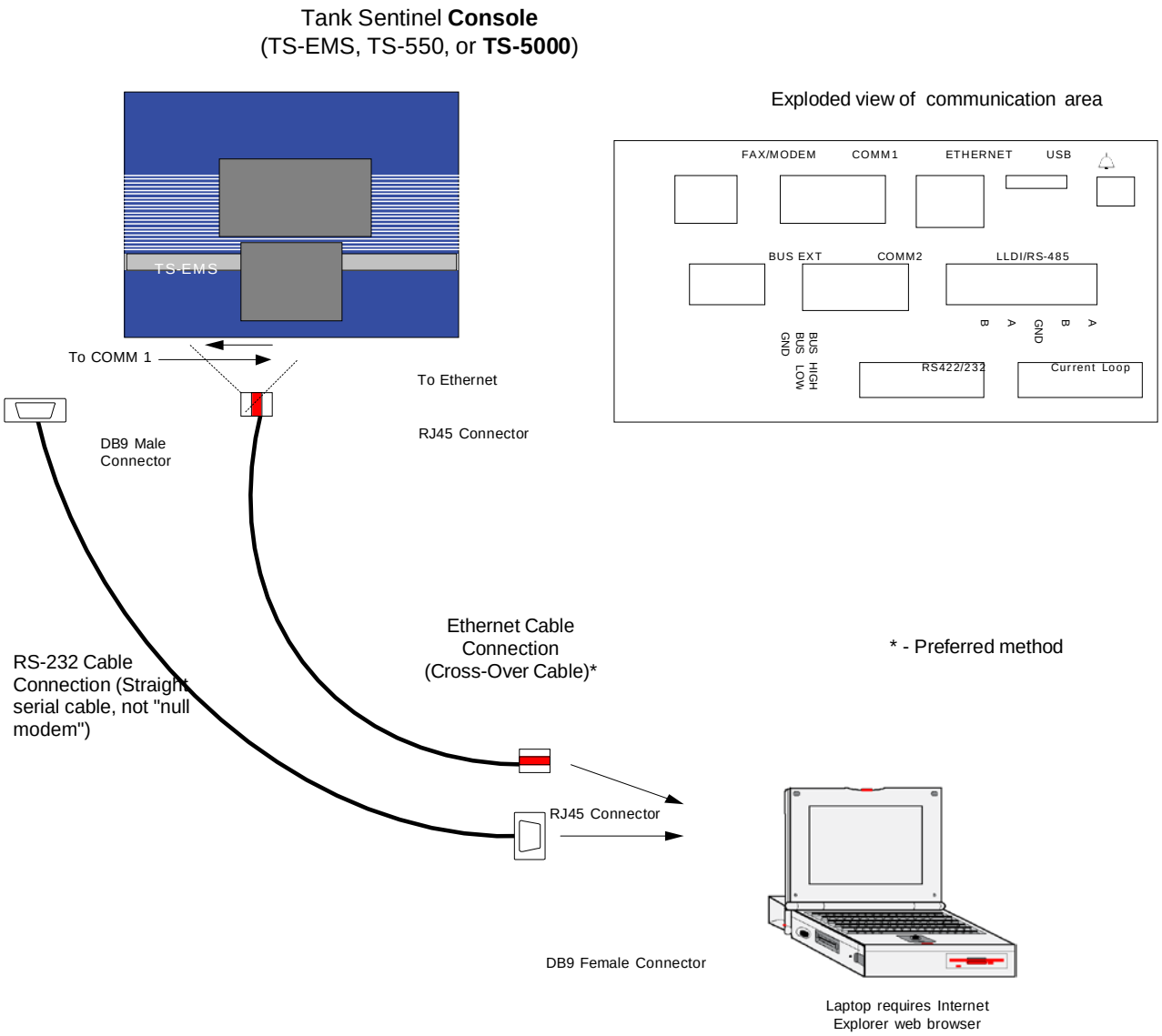
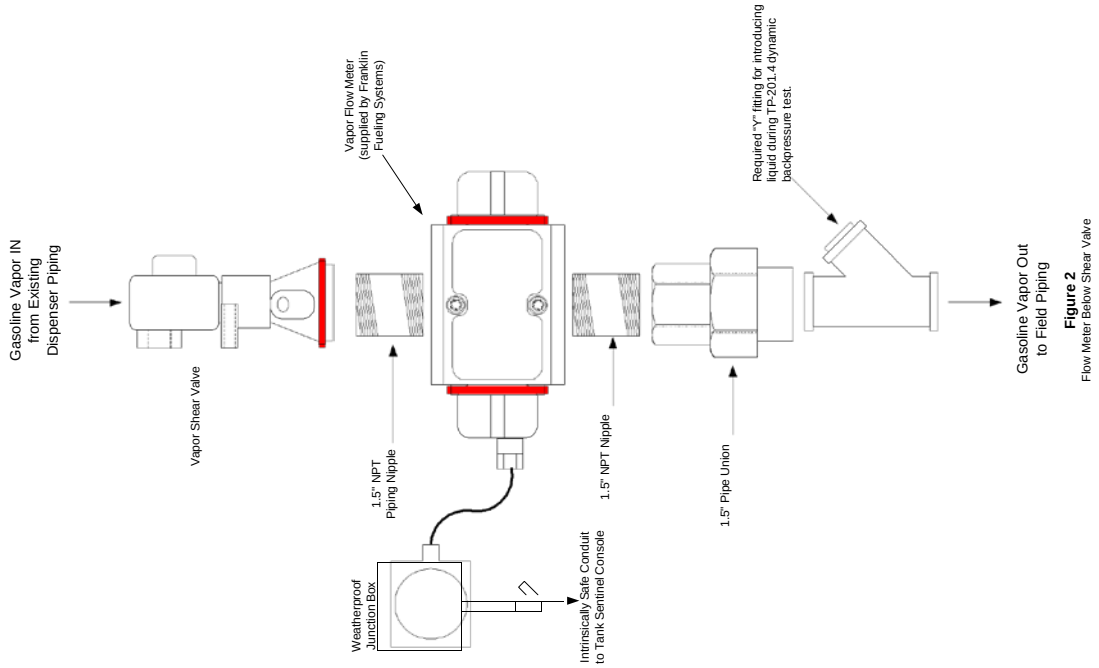


Figure 2B-23
INCON TS-VFM
Vapor Flow Meter

Figure 2B-24
INCON TS-VPS
Vapor Pressure Sensor

Figure 2B-25
Typical Installation of the INCON Vapor Flow Meter



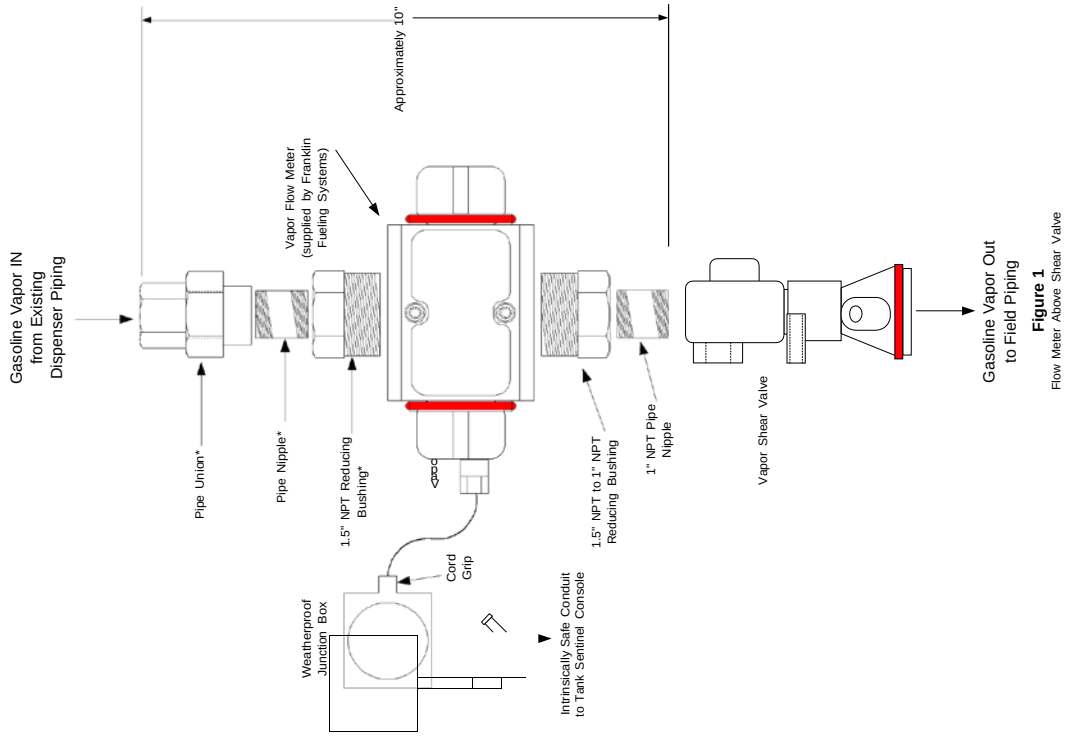


Figure 2B-26
Typical Installation of the INCON Vapor Pressure Sensor

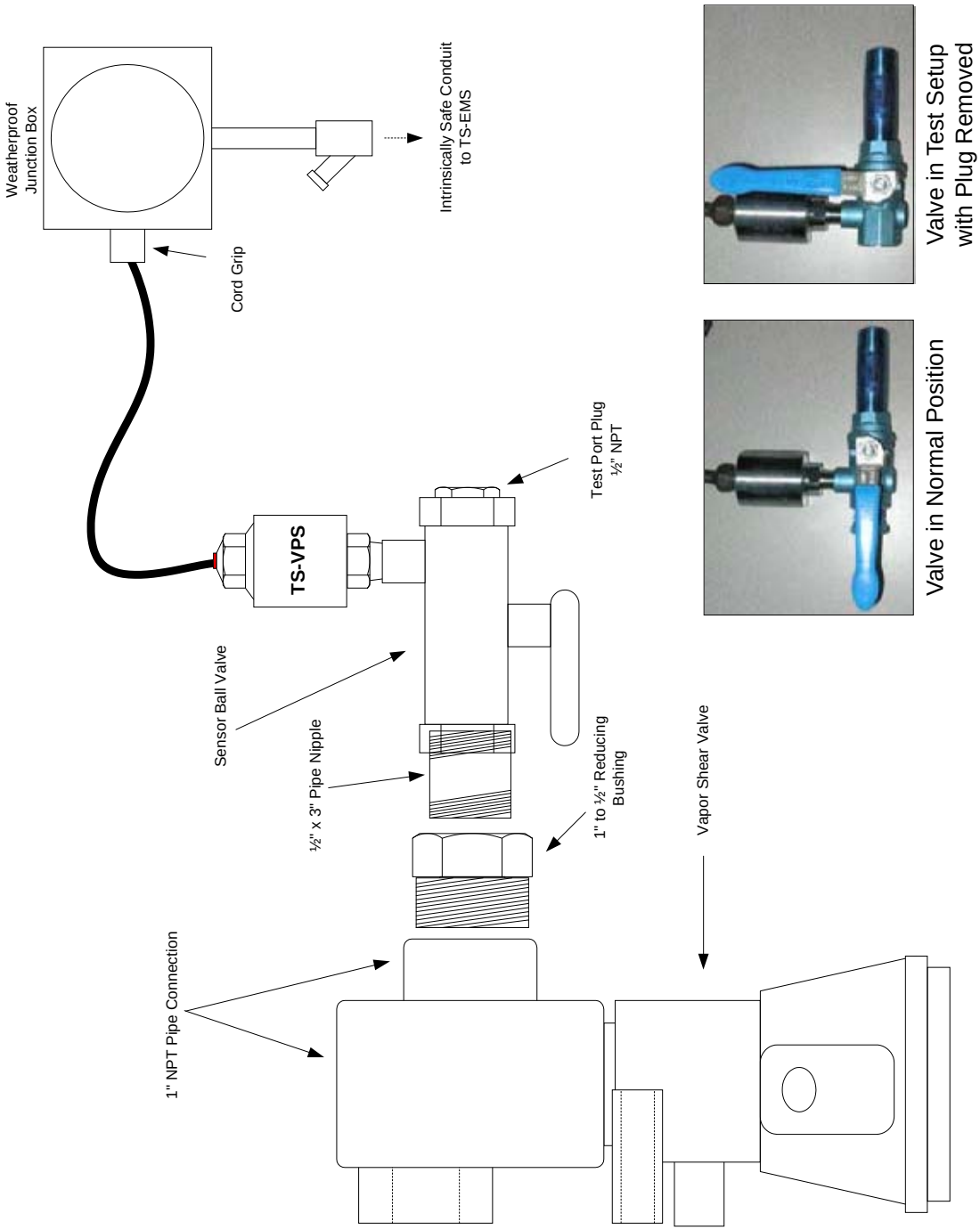


Figure 2B-27
Typical Tank Inventory Probe Sensor

Figure 2B-28
Veeder-Root
Maintenance Tracker Technician Key

Figure 2B-29
Veeder-Root
RS232 Interface Modules
Required for Maintenance Tracker

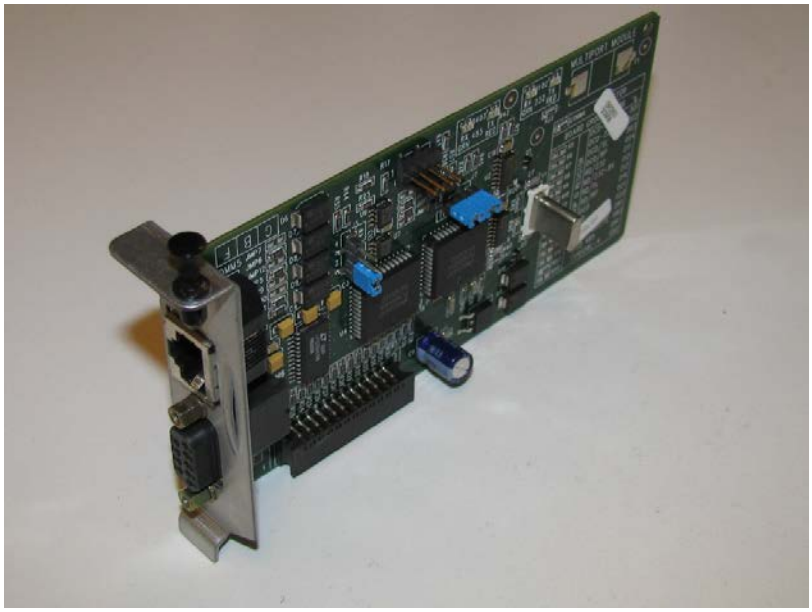


Figure 2B-30
Typical VST-GM-CS1-100 Green Machine Installation

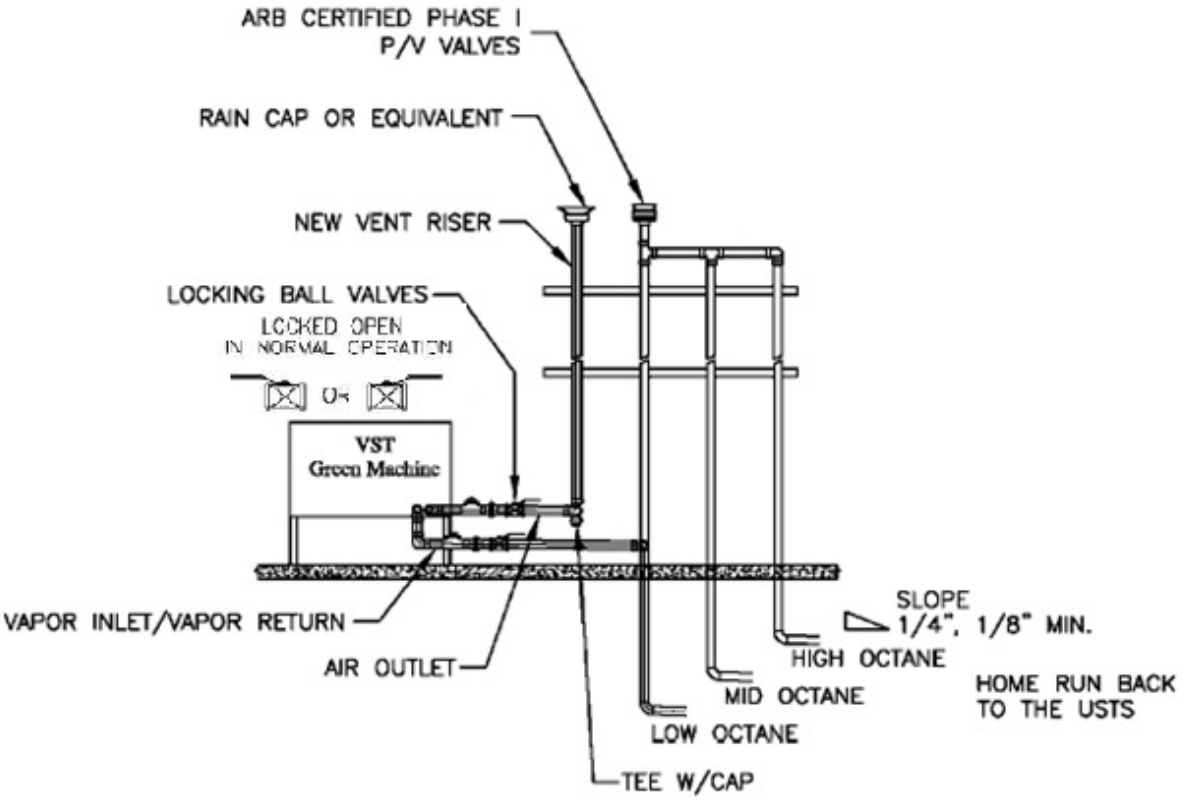


EXHIBIT 3

Manufacturing Performance Specifications and Warranties

The Phase II EVR Systems and all components shall be manufactured in compliance with the performance standards and specifications in CP-201 (amended January 9, 2013), as well as the requirements specified in this Executive Order. All components (Exhibit 1) shall be manufactured as certified; no change to the equipment, parts, design, materials or manufacturing process shall be made unless approved in writing by the Executive Officer or Executive Officer delegate. Unless specified in Exhibit 2 or in the ***ARB Approved Installation, Operation and Maintenance Manual***, the specifications listed below apply to the manufacturing process and are not appropriate for determining the compliance status of a gasoline dispensing facility.

This exhibit also includes the manufacturer warranties for all components listed in Exhibit 1, including replacement parts and subparts. The manufacturer warranty tag, included with each component, shall be provided to the service station owner/operator at the time of installation.

PART Ia - VST Manufacturing Performance Specifications

1. NOZZLES

a. The vapor valve leak rate of every nozzle shall not exceed 0.07 cubic feet per hour (CFH) at a pressure of +2 inches water column (WC) when tested in accordance with the latest version of TP-201.2B, “Flow and Pressure Measurement of Vapor Recovery Equipment”.

b. The automatic shut off feature of every nozzle is tested at all service clip settings as well as handheld in accordance with Underwriters Laboratories (UL) Standard 842.

c. The primary and secondary shut-off mechanism of every nozzle shall be identical to the design that passed the California Department of Food and Agriculture Division of Measurement Standards Article 2 (DMS 6-6-97).

d. Every nozzle is manufactured to the specifications that passed all tests conducted during the ARB certification for the following:

TP-201.2C -	Spillage from Phase II Systems
TP-201.2D -	Post-Fueling Drips from Nozzles
TP-201.2E -	Gasoline Liquid Retention in Nozzles and Hoses
TP-201.2J -	Pressure Drop Bench Testing of Vapor Recovery Components

e. Every nozzle vapor collection boot is manufactured such that the force necessary to compress the nozzle bellows 0.5 inches is in the range of 10-16 pounds force.

f. The terminal end of every nozzle shall be manufactured in accordance with the specifications referenced in Section 4.7.3 of CP-201.

2. COAXIAL HOSES

a. Every coaxial hose is tested for continuity and pressure tests in accordance with UL Standard 330.

b. Every coaxial hose is manufactured to the standards and specifications that passed all tests conducted during the ARB certification for the following:

Exhibit 5 - Liquid Removal Test Procedure
TP-201.2J - Pressure Drop Bench Testing of Vapor Recovery Components

3. BREAKAWAY COUPLINGS

a. Every breakaway coupling is tested for continuity and pressure tests in accordance with UL Standard 567.

b. Every breakaway coupling is manufactured to the standard that passed all tests conducted during the ARB certification for the following:

TP-201.2J - Pressure Drop Bench Testing of Vapor Recovery Components

4. VST ECS MEMBRANE PROCESSOR

a. Every ECS Membrane Processor is subjected to a VST Pressure Decay Test to verify pressure integrity. The ECS Processor is factory checked for leak integrity per section 5 of IOM 10 (VR-203,204).

b. Every ECS Membrane Processor is subjected to a VST Heat Trace Cable Continuity Test to ensure proper connections. A heat trace continuity test is conducted per section 3.6 of IOM 11 (VR-203,204).

c. Every ECS Membrane Processor is subjected to a VST operability test to ensure proper rotation and operation of the blower motor and vacuum pump. The motor rotation test is conducted per section 3.5 of IOM 11 (VR-203,204).

5. VST GREEN MACHINE PROCESSOR

a. Every *Green Machine* is subjected to a Functionality Test to verify the function of the vacuum pump. The *Green Machine* is factory checked for functionality per section 14.3 of IOM 18.

b. Every *Green Machine* is subjected to a Leak Test to verify the integrity of each connection. The *Green Machine* is factory checked for leak integrity per section 15 of IOM 18.

c. Every *Green Machine* is subjected to a Dielectric Test to verify the integrity of the junction box wiring and the wiring insulation. The *Green Machine* is factory checked for wire integrity per Intertek requirements.

CUSTOMER COPY

To be left at gasoline dispensing facility, GDF, at time of installation

Manufacturing Date:

Serial Number: (Fill in at time of installation)

PART Ib – VST Warranty Statement

This limited warranty is given by Vapor Systems Technologies, Inc. (hereinafter VST) to the initial purchaser, and any subsequent purchasers of new equipment, within the warranty period of products manufactured by VST. VST products:

- Are factory tested and meet all applicable performance standards and specifications.
- Should be used in compliance with all applicable federal, state, and local laws and regulations to which they were certified.
- Are warranted to be free from defect in material and workmanship with ongoing compliance to all applicable performance standards and specifications under normal use, service, proper installation, inspections, and maintenance practices per manufacturer specifications.

VST warrants the materials and workmanship to be free from defects in accordance with the following provisions:

1. This warranty does not apply to any products that have:
   - Been subject to misuse, abuse, tampering, negligence, accident, or irreparable drive off damage.
   - Been misapplied, improperly installed, or not installed per VST's instructions and specifications.
   - Been modified, altered, rebuilt or repaired by unauthorized persons or outside the criteria of VST specifications.
   - Been improperly maintained and/or improperly inspected in accordance with the system's or product's periodic maintenance schedule, and any inspection and/or maintenance requirements imposed by the State or any government agency.
   - Been exposed to contact with fuels containing greater than 5% methanol, 10% ethanol, or 15% MTBE by volume or any exposure to M85/E85 fuel.
   - Been subject to damage resulting from acts of God.
2. This warranty does not cover and VST is not responsible or liable for:
   - Incidental, consequential and/or indirect damages or loss including, but not limited to, personal injury, death, property damage, environmental damage, cost of labor, clean-up, downtime, installation and removal, product damage, and loss of product, revenue or profits.
   - Any claims or lawsuits against the purchaser and/or distributor.
   - Labor or materials necessary to disconnect or connect the warranted product for return to VST.

VST products used on systems that have not been listed by a nationally-recognized testing laboratory (NRTL) or use that falls outside intended field of use voids all warranties.

The duration of this warranty is TWELVE (12) MONTHS from the time of installation provided timely valid proof of installation is submitted to VST. Valid proof of installation options include, but are not limited to:

- VST Product Warranty Registration Card is properly completed and returned to VST at time of installation and within (6) SIX MONTHS from the date of manufacture.

  OR

- In lieu of a legitimate, completed and returned VST Product Warranty Registration Card within the first (6) SIX MONTHS from the date of manufacture, VST requires the following:

  1. A completed gasoline dispensing facility (GDF) monthly maintenance log from the month in which the VST equipment was installed and documented, **AND**
  2. One of the following documents that may be used as a reference installation date:
     - A valid distributor invoice
     - A valid contractor invoice

The above options must be clearly marked with:

- All VST product serial numbers
- Product sale date and/or installation date
- Purchaser name, address, and phone number

If valid proof of installation is not received by VST, as noted above, the warranty period is TWELVE (12) MONTHS from the VST date of manufacture.

In the event of a warranty claim:

- The purchaser/distributor must obtain a copy of a Return Goods Authorization (RGA) from VST prior to returning product so as to ensure proper processing. All warranty claim returns must be shipped freight prepaid by the purchaser and/or distributor.
- Warranty status will be determined upon inspection at VST's facility within THIRTY (30) DAYS of receipt by VST of the warranted products. All returned merchandise deemed *Not Under Warranty*; will be held by VST for SEVEN (7) BUSINESS DAYS prior to disposal. Return of this product to the purchaser/distributor will require purchaser/distributor to issue a call tag within SEVEN (7) BUSINESS DAYS of notification.
- Repair or replacement of the warranted product is the **EXCLUSIVE REMEDY** under the terms of this warranty. No other warranty exists.

VST, as to each defect, shall be relieved of all obligations and liabilities under this Limited Warranty if the products have been operated with any accessory, equipment, or a part not specifically approved by VST and the appropriate governing regulatory agencies.

THIS LIMITED WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ALL OTHER WARRANTIES. VST MAKES NO OTHER WARRANTIES (WHETHER WRITTEN OR ORAL), EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE, AND ANY OTHER SUCH WARRANTIES ARE HEREBY DISCLAIMED.

VST NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON OR ENTITY TO ASSUME FOR IT OR BIND IT TO ANY OTHER LIABILITY OR OBLIGATION RELATED TO OR IN CONNECTION WITH THIS LIMITED WARRANTY.

VST reserves the right to make changes at any time to prices and designs, or make additions or improvements with respect to its products, without incurring any obligation to modify or install same on previously manufactured products.

PART IIa – EMCO Wheaton Retail Manufacturing Performance Specifications

1. NOZZLES

a. The vapor valve leak rate of every nozzle shall not exceed 0.07 cubic feet per hour (CFH) at a pressure of +2 inches water column (WC) when tested in accordance with the latest version of TP-201.2B, “Flow and Pressure Measurement of Vapor Recovery Equipment”.

b. The automatic shut off feature of every nozzle is tested at all service clip settings as well as handheld in accordance with Underwriters Laboratories (UL) Standard 842.

c. The primary and secondary shut-off mechanism of every nozzle shall be identical to the design that passed the California Department of Food and Agriculture Division of Measurement Standards Article 2 (DMS 6-6-97).

d. Every nozzle is manufactured to the specifications that passed all tests conducted during the ARB certification for the following:

TP-201.2C -	Spillage from Phase II Systems
TP-201.2D -	Post-Fueling Drips from Nozzles
TP-201.2E -	Gasoline Liquid Retention in Nozzles and Hoses
TP-201.2J -	Pressure Drop Bench Testing of Vapor Recovery Components

e. The terminal end of every nozzle shall be manufactured in accordance with the specifications referenced in Section 4.7.3 of CP-201.

2. SAFE BREAK VALVES

a. Every safe break valve is tested for continuity and pressure tests in accordance with UL Standard 567.

b. Every safe break valve is manufactured to the standard that passed all tests conducted during the ARB certification for the following:

TP-201.2J -	Pressure Drop Bench Testing of Vapor Recovery Components

PART IIb – EMCO Wheaton Retail California EVR Warranty

Emco Wheaton Retail Corporation service station products are warranted to be free from defects in material and workmanship under normal use and service. Emco Wheaton Retail Corporation warrants its California enhanced vapor recovery (EVR) components for a period of one (1) year from date of installation. The EVR components are warranted to meet the performance standards and specifications to which it was certified by the California Air Resources Board (CARB) for the duration of the warranty period. This warranty extends to the purchaser and any subsequent purchaser of the Emco Wheaton Retail components during the warranty period.

Emco Wheaton Retail Corporation shall, at its option, repair or replace that part which proves to be defective. Repaired or replacement nozzles are warranted for the balance of the original warranty period. This warranty is void unless the purchaser returns the claimed defective item to Emco Wheaton Retail Corporation for inspection to determine whether the claimed defect is covered by this warranty.

The exclusive and sole remedy under this warranty is repair or replacement of the defective part. Emco is not responsible for claims for damage caused by improper installation or maintenance; corrosive fluids; misuse of the product or use the product for other than its intended purpose; or accident, acts of God, or natural phenomena. Emco will not pay for labor or related expenses, nor shall Emco be liable for any incidental, consequential or exemplary damages. This warranty is void if the Emco Wheaton Retail Corporation product has been previously repaired with parts not approved by Emco Wheaton Retail Corporation, or if a nozzle bears the mark or imprint of a company other than Emco Wheaton Retail Corporation, indicating the nozzle has been rebuilt or repaired by a company other than Emco Wheaton Retail Corporation.

EMCO WHEATON RETAIL CORPORATION MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, (WHETHER WRITTEN OR ORAL), INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

In the event a nozzle is returned to Emco Wheaton Retail Corporation within the warranty period described above, and when tested is found to be functional and without defect, Emco Wheaton Retail Corporation reserves the right to return the nozzle to the customer or apply a Core Credit (see Nozzle Core Return Program), at Emco Wheaton Retail Corporation's discretion.

In the event of failure within the warranty period, call the Customer Service Department at **(800) 234-4394**. Describe the problem and provide the product date stamp information to the customer service representative. In the case of a nozzle, provide the serial number. The customer service representative will provide a product complaint number, if applicable. Ship the defective equipment **PREPAID**, to Emco Wheaton Retail Corporation for repair or replacement. Warranty issue is contingent upon proof of installation to establish that the product falls within the warranty period. Proof on installation shall be: 1) warranty information completed by the certified contractor (warranty card), 2) contractor invoice, 3) end-user sales receipt, or 4) copy of the appropriate log book entry from the gasoline dispensing facility. Nozzle serial number must be included on proof of installation document.

Emco Wheaton Retail Corporation products should be used in compliance with applicable federal, state and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and material to be handled. All illustrations and specifications are based on the latest product information available at the time of publication. Emco Wheaton Retail Corporation reserves the right to make changes at any time in prices without notice or obligation. Emco Wheaton Retail Corporation reserves the right to make changes at any time in materials, specifications and models upon CARB approval.

EMCO®
WHEATON RETAIL (252) 243-0150

Phase II EVR Warranty Tag

Emco Wheaton Retail warrants its California enhanced vapor recovery (EVR) components for a period of one (1) year from date of installation.

This component was factory tested to and met all applicable performance standards and specifications to which it was certified by the California Air Resources Board (ARB). The performance standards and specifications are listed in the applicable ARB Executive Orders and Certification Procedure 201.

IMPORTANT: Leave this warranty tag with the station owner and/or operator.

Emco Wheaton Retail Corp.
2300 Industrial Park Dr., Wilson, NC 27893 p/n 570866

Serial Number: _____
Replacement Serial Number: _____
Manufacture Date: _____
Name of Contractor: _____
Name of Technician: _____
Technician Signature: _____
Technician Certification Number: _____
Installation Date: _____
Installation Site: _____
Distributor Name: _____
Branch Location: _____
Component:
- ☐ A4005EVR Nozzle
- ☐ A4110EVR Hose Swivel
- ☐ A4119EVR Safe Break Valve

Reason for returning product: Please select appropriately.
Important: Failure to complete accurately may cause delays processing warranty claim.

- ☐ Does not shut-off
- ☐ Experiencing premature shut-off
- ☐ Does not flow fuel with bellows compressed and lever engaged
- ☐ Flows fuel when bellows is not compressed
- ☐ Leaks fuel around spout or bellows area
- ☐ Leaks fuel around lever and latch area
- ☐ Causing meter creep
- ☐ Bad Inlet or outlet threads
- ☐ Fails Leak Decay Test CARB TP-201.3
- ☐ Fails Dynamic Back Pressure Test CARB TP-201.4

Comments _____

_____

_____

PART IIIa – Veeder-Root Manufacturing Performance Specifications

1. VEEDER-ROOT VAPOR POLISHER

a. The pressure drop across the Veeder Root Vapor Polisher is measured at a fixed flow rate as specified in section 8.2 of Exhibit 11.

b. The Veeder-Root Vapor Polisher is tested for leaks as specified in section 7.1 of Exhibit 11.

c. The Veeder-Root Vapor Polisher Vapor Valve Smart Sensor communication is tested using Veeder-Root Smart Sensor control protocol (factory test).

d. The Veeder-Root Vapor Polisher Vapor Valve Smart Sensor electro-mechanical valve open and close operation is tested using Veeder-Root Smart Sensor control protocol (factory test).

e. The Veeder-Root Vapor Polisher Vapor Valve Smart Sensor electro-mechanical valve feedback control loop is tested for accurate reporting of the valve position using Veeder-Root Smart Sensor control protocol (factory test).

PART IIIb – Veeder-Root 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-350R, TLS-350 PLUS, TLS-350J AND TLS-300I/C, AND TLS2 MONITORING SYSTEMS
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.

CARBON CANISTER VAPOR POLISHER
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 twenty-four (24 months) from the 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. The user must contact the Veeder-Root Customer Service for specific detailed information concerning the failed component return to ensure proper processing. **LAMPS, FUSES, AND LITHIUM BATTERIES ARE NOT COVERED UNDER THIS WARRANTY**.

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**.

Warranty Card Language

EQUIPMENT WARRANTY

VEEDER-ROOT

Veeder-Root warrants 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 date of installation when proof of the date of install is provided, or either twenty-four (24) months or fifteen (15) months from date of manufacture (see terms below) when proof of date of installation is not provided.

Date of manufacture:
*Product S/N:_____
*Date of installation:_____
*Technician number:_____
*Required Information

*Installation Address:
Street:_____
City:_____ State:_____
Phone: _____-_____-_____

This component was tested at the time of manufacture and meets all the applicable performance standards and specification to which it was certified: E.O. VR-202, VR203 and VR-204.

For detailed warranty terms see EO warranty exhibits (VR-202 Exhibit 6, VR-203/VR-204 Exhibit 3) on the ARB Web site at *http://www.arb.ca.gov/vapor/eo-evrphasell.htm*

577013-868, Rev. G

PART IVa – Goodyear Manufacturing Performance Specifications

1. COAXIAL HOSES

a. Every coaxial hose is tested for continuity and pressure tests in accordance with UL Standard 330.

b. Every coaxial hose is manufactured to the standards and specifications that passed all tests conducted during the ARB certification for the following:

Exhibit 5 -	Liquid Removal Test Procedure
TP-201.2J -	Pressure Drop Bench Testing of Vapor Recovery Components

PART IVb – Goodyear Maxxim Premier™ Plus Hose Warranty

WARRANTY FOR VAPOR RECOVERY SYSTEMS EQUIPMENT USED IN CALIFORNIA: Seller warrants Product(s) consisting of vapor recovery system equipment used in California ("California Vapor Recovery Product(s)") to meet the performance standards and specifications to which such Product(s) were certified by the California Air Resources Board for a period of one (1) year from the date of installation. This warranty extends to Buyer and any subsequent Buyer of the California Vapor Recovery Product(s). **SELLER MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND WITH RESPECT TO PRODUCT(S), EXPRESS OR IMPLIED, EXCEPT AS EXPRESSLY PROVIDED ABOVE.**

GOODYEAR ENGINEERED PRODUCTS WARRANTY TAG

PART #:_____
INSTALLATION DATE:_____ NAME OF INSTALLER:_____
LOCATION:_____

This hose was factory tested to and met all applicable performance standards & specifications to which it was certified: Reference all applicable CARB Executive Orders, CARB Test Procedures, Exhibits, and UL Standard 330.

The manufacture date is represented by a 4 digit julian date code stamped on the hose fitting. Example: "1021" represents the 102nd day of 2011.

1. **Complete warranty tag at time of installation.**
2. **Return warranty tag or other evidence of purchase and installation with hose for any necessary warranty claims.**

WARRANTY FOR VAPOR RECOVERY SYSTEMS EQUIPMENT USED IN CALIFORNIA: Seller warrants Product(s) consisting of vapor recovery system equipment used in California ("California Vapor Recovery Product(s)") to meet the performance standards and specifications to which such Product(s) were certified by the California Air Resources Board for a period of one (1) year from the date of installation. This warranty extends to Buyer and any subsequent Buyer of the California Vapor Recovery Product(s). **SELLER MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND WITH RESPECT TO PRODUCT(S), EXPRESS OR IMPLIED, EXCEPT AS EXPRESSLY PROVIDED ABOVE.**

VEYANCE TECHNOLOGIES

PART Va – Hirt Manufacturing Performance Specifications

1. HIRT VCS 100 THERMAL OXIDIZER

a. The VCS 100 processor is subjected to an assembly quality check.

b. The VCS 100 processor is visually inspected to verify identification, caution/warning, electrical, and other Agency labels are in place.

c. The VCS 100 processor is subjected to vacuum and pressure leak tests.

d. The VCS 100 processor is subjected to the following functional tests:

i. Power test;
ii. Verify set point of vacuum sensor switch;
iii. Verify operation of main vapor valve;
iv. Verify flow rate of pilot and main vapor valves; and
v. Dielectric test.

PART Vb –HIRT COMBUSTION ENGINEERS, INC. (HCE) VCS 100 THERMAL OXIDIZER WARRANTY POLICY

- This product has a 12 month warranty, which becomes effective at time of installation. This warranty applies to the initial purchaser and any subsequent purchasers, during the warranty period.
- This product is warranted to meet all the applicable performance standards and specifications, for the duration of the warranty period.
- Liability under any implied or expressed warranty is limited to replacement of the product.
- HCE is not responsible for improperly installed or misuse of the product.
- HCE cannot be held responsible for damage to the product or its equipment due to acts of nature, vandalism, or neglect.
- HCE products are warranted to be free of defects in material and workmanship.
- In the event of a warranty claim, the purchaser must obtain a Return Authorization Number prior to returning product. All shipping costs are the responsibility of the customer.
- HCE shall repair or replace, at its option, any HCE component which proves to be defective.
- The cost of labor for any field repair, removal, replacement, or diagnosis is not covered by this warranty.
- The liability of HCE is limited solely and specifically to this warranty.

- HCE shall not be liable for any special, collateral, or consequential damages arising from this warranty, the use of this equipment or from any order accepted pursuant thereto.
- The use of parts not authorized by HCE voids the warranty.
- Installation, start-up, service, or repairs of this product by personnel not certified HCE voids the above described warranty.

The following warranty card will be shipped with the Hirt VCS 100 Thermal Oxidizer:

PRODUCT WARRANTY CARD

Hirt Combustion Engineers, Inc.
Tel: (562) 692-1490 Email: HirtVCS@aol.com

IMPORTANT: INSTALLER TO COMPLETE CARD AND GIVE TO STATION OPERATOR.

HCE warrants its California Enhanced Vapor Recovery (EVR) components for a period of one (1) year from date of installation.

Serial Number:_____ Mfg. Date:_____
Name of Contractor:_____
Name of Technician:_____
Technician Signature:_____
Technician Certification Number:_____
Installation Date:_____
Facility Address:_____
_____

The processor was factory tested to and met all applicable performance standards and specifications to which it was certified by the Calfironia Air Resources (ARB). The performance standards and specifications are listed in the applicable ARB Executive Orders and Cerfification Procedure 201.

PART VIa – Franklin Fueling Systems Manufacturing Performance Specifications

The Clean Air Separator tank is designed, constructed, tested, inspected and stamped per the American Society of Mechanical Engineers (ASME) Code Section VIII, Division 1, 2001 Edition, 2003 Addendum. Every Clean Air Separator bladder is performance and pressure tested using the **Clean Air Separator Performance Test** to ensure its integrity.

PART VIb – FRANKLIN FUELING SYSTEMS ENHANCED VAPOR RECOVERY LIMITED WARRANTY

Franklin Fueling Systems (FFS) Enhanced Vapor Recovery (EVR) products are offered for sale under the brand names of Healy, INCON, Phil-Tite, EBW, and Franklin Fueling Systems (collectively referred to as "FFS EVR products"). FFS EVR products are fully tested at the time of manufacture to meet the applicable performance standards and specifications to which it was certified by the California Air Resource Board (CARB) for the duration of the warranty period, as indicated in the related CARB Executive Order (EO). Performance standards and specifications are listed in Exhibit 2 (System/Compliance Specifications) and Exhibit 3 (Manufacturing Performance Standards) in the related CARB EO.

FFS warrants that FFS EVR products installed in California will conform to the warranty terms and conditions required by the California Certification Procedure for Vapor Recovery Systems at Gasoline Dispensing Facilities (CP-201) with respect to (a) transferability of warranties for FFS EVR products, (b) design changes to FFS EVR products, (c) performance specifications of the FFS EVR products, and (d) duration of the warranty period of FFS EVR products.

FFS EVR products are warranted to the initial purchaser, and any subsequent purchaser within the warranty period, for workmanship, performance, and materials when properly installed, used and maintained in accordance with the CARB Approved Installation, Operation, and Maintenance Manuals by certified technicians or an owner/operator as defined in the related CARB EO and to generally accepted industry standards.

FFS reserves the right to make changes in the design or to make additions or improvements with respect to FFS EVR products without incurring any obligation to modify or install same on previously manufactured products, upon written approval from CARB.

FFS reserves the right to change or cancel all or any part of this limited warranty, upon written approval from CARB. Any such change or cancellation will be effective for products sold by FFS after the date of such change or cancellation. No agents, distributors, dealers, or employees of FFS are authorized to make modifications to this warranty or to make additional warranties with respect to any FFS EVR products. Accordingly, any statements made by individuals, whether oral or written, shall not constitute a warranty of FFS and shall not be relied upon.

FFS warrants the workmanship and materials of FFS EVR products to be free of defects, at the time of sale by FFS, for a period of one year (12 months) from the date of installation. When warranty for FFS EVR products cannot be verified to date of installation, claims will be honored for a period of fifteen (15) months from the date of purchase. When warranty for FFS EVR product cannot be verified to date of installation or date of purchase, claims will be honored for a period of eighteen (18) months from date of manufacture by FFS (for location of date of manufacture on components, see related CARB EO Exhibit 1 – Equipment List). In all cases, installation date or purchase date will require providing formal documentation to FFS as

evidence of applicable warranty coverage or date of manufacture will be used to determine duration of warranty period. Formal documentation may include, but is not limited to, FFS authorized service company and distributor work orders, startup/installation documentation, maintenance logs, and/or sales receipts.

FFS shall not be liable for any loss or damage whatsoever, including, without limitation, loss in profits, loss in sales, loss of fuel or other products, loss of use of equipment, facilities or service, costs of environmental remediation, diminution in property value, or any other special, incidental or consequential damages of any type or nature, and all such losses or damages are hereby disclaimed and excluded from this limited warranty.

Use of non-FFS replacement parts, the unauthorized addition of non-FFS items to FFS EVR products, and the unauthorized alteration of FFS EVR products will void warranty. FFS shall, as to each defect, be relieved of all obligations and liabilities under a components warranty if the FFS EVR products have been operated with any accessory, equipment, or a part not specifically approved by FFS and not manufactured by FFS to FFS design and specifications.

FFS EVR product warranty shall not apply to any products which have been mishandled, incorrectly installed or applied, altered in any way, which has been repaired by any party other than qualified technicians, or when such failure is due to misuse or conditions of use (such as, but not limited to, blown fuses, sheared breakaway screws, corrosion damage, negligence, accidents, or normal wear of plastic/rubber parts including scuff guards and seals). FFS EVR product warranty shall not apply to acts of terrorism, acts of war, or acts of God (such as, but not limited to, fire, flood, earthquake, or explosion). Unless otherwise expressly provided in a specific FFS written warranty, FFS does not provide coverage for labor or shipping charges, shall not be liable for any costs or charges attributable to any product testing, maintenance, installation, repair or removal, or any tools, supplies, or equipment need to install, repair, or remove any FFS EVR product.

Other than those FFS EVR products specifically designated for fuel concentrations of 85% ethanol with 15% gasoline (E85), FFS EVR product warranty shall not cover any components that have been in contact with fuel concentrations greater than 15% ethanol or 15% methanol by volume (up to E15/M15).

Claims for FFS EVR product warranty must be submitted in writing promptly after discovery of a defect with a Returned Goods Authorization (RGA) Number from FFS. FFS will honor warranty claims processed through FFS authorized service companies and distributors only. FFS will honor warranty claims submitted no more than thirty (30) days after the end of the applicable warranty period. Product returned for warranty inspection must be shipped freight prepaid to FFS's facilities, with the RGA Number indicated on the returned product, to the following address for inspection:

INCON branded products:
Franklin Fueling Systems, Inc.
ATTN: Warranty Department
34 Spring Hill Road
Saco, ME 04072 USA

All other FFS EVR Products:
Franklin Fueling Systems, Inc.
ATTN: Warranty Department
3760 Marsh Road
Madison, WI 53718 USA

Franklin Fueling Systems, upon inspection and after determination of a warranty defect, will at its option, repair or replace defective parts returned to FFS's facility or where the product is in use. Repaired or replaced parts will be returned freight prepaid by FFS.

A copy of this limited warranty is to be retained with the equipment, on-site with the facility owner/operator.

Component Model Number: _____

Component Date of Manufacturer: _____

Component Install Date: _____

Facility Name: _____

Facility Address: _____

Installer Name: _____

Installer Signature: _____

PART VIIa – OPW Manufacturing Performance Specifications

BREAKAWAY COUPLINGS

a. Every breakaway coupling is tested for continuity and pressure tests in accordance with UL Standard 567.

b. Every breakaway coupling is factory tested per the protocol identified in UL file MH17834, volume 2, section 3

PART VIIb – OPW Warranty Standard Product Warranty Tag

Notice: FlexWorks by OPW, Inc., VAPORSAVER™ and all other OPW products must be used in compliance with all applicable federal, state, provincial and local laws, rules and regulations. Product selection is the sole responsibility of the customer and/or its agents and must be based on physical specifications and limitations, compatibility with the environment and material to be handled. All illustrations and specifications in this literature are based on the latest production information available at the time of publication. Prices, materials and specifications are subject to change at any time, and models may be discontinued at any time, in either case, without notice or obligation.

OPW warrants solely to its customer (the initial purchaser and any subsequent purchasers within the warranty period) that the following products sold by OPW will be free from defects in materials and workmanship under normal use and conditions for the periods indicated:

PRODUCT	WARRANTY PERIOD
FlexWorks Primary Pipe	10 years from date of manufacture
All Products and replacement parts installed in the State of California Certified to California CP-201 and/or CP-206 Standards*	1 year from-date of installation (proof of purchase from certified contractors/technicians required) OPW warrants ongoing compliance with the standards and specifications for the duration of the warranty period required by the State of California; this limited warranty is under the condition the equipment was installed and maintained by trained and certified contractors/technicians unless noted in Installation Manual
All other Products and replacement parts	1 year from date of manufacture**
*Products certified to California CP-201 and/or CP-206 Standards have been factory tested and met all applicable performance standards and specifications and will have an OPW registration card enclosed/attached to the product	

OPW's exclusive obligation under this limited warranty is, at its option, to repair, replace or issue credit (in an amount not to exceed the list price for the product) for future orders for any product that may prove defective within the applicable warranty period. (Parts repaired or replaced under warranty are subject to prorated warranty coverage for remainder of the original warranty period). Complete and proper warranty claim documentation and proof of purchase required. All warranty claims must be made in writing and delivered during the applicable warranty period to OPW at OPW 9393 Princeton-Glendale Road Hamilton, Ohio, USA 45011, Attention: Customer Service Manager. No products may be returned to OPW without its prior written authority.

This limited warranty shall not apply to any FlexWorks or VAPORSAVER™ product unless it is installed by an OPW attested installer and all required site and warranty registration forms are completed and received by OPW within 60 days of installation. This limited warranty also shall not apply to any FlexWorks, VAPORSAVER™ or other OPW product: unless all piping connections are installed with a nationally-recognized or state-approved leak detection device in each tank and dispenser sump (which are not for storage and from which all discharge hydrocarbons must be removed, and the systems completely cleaned, within 24 hours); unless testable sumps utilize FlexWorks pipe and access fittings; unless a sump inspection log or an EPA recommended/required checklist is maintained and the results are furnished to OPW upon request; and unless OPW is notified within 24 hours of any known or suspected product failure and is provided with unrestricted access to the product and the site. This limited warranty also shall not apply to any product which has been altered in any way, which has been repaired by anyone other than a service representative authorized by OPW, or when failure or defect is due to: improper installation or maintenance (including, without limitation, failure to follow FlexWorks Quick Reference Manual Installation Guide and all product warning labels); abuse or misuse; violation of health or safety requirements; use of another manufacturer's, or otherwise unauthorized, substances or components; soil or other surface or subsurface conditions; or fire, flood, storm, lightning, earthquake, accident or any other conditions, events or circumstances beyond OPW's control.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND ALL OTHER WARRANTIES INCLUDING, WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY EXCLUDED.

OPW shall have no other liability whatsoever, whether based on breach of contract, negligence, gross negligence, strict liability or any other claim, including, without limitation, for special, incidental, consequential or exemplary damages or for the cost of labor, freight, excavation, clean-up, downtime, removal, reinstallation, loss of profit, or any other cost or charges. No person or entity is authorized to assume on behalf of OPW any liability beyond this limited warranty. This limited warranty is not assignable.

** Date of manufacture on this product is located (*location will be specific to each component)*

OPW
A DOVER COMPANY

North America Toll Free - TELEPHONE: (800) 422-2525
Fax: (800) 421-3297 - Email: domesticsales@opw-fc.com

9393 Princeton-Glendale Road
Hamilton, Ohio 45011

International – TELEPHONE: (513) 870-3315 or
(513) 870-3261 - Fax: (513) 870-3157
Email: intlsales@opw-fc.com
www.opwglobal.com

EXHIBIT 4

Required Items in Conducting TP-201.3

The instructions below are required when conducting TP-201.3 for the Balance Phase II EVR system with the VST ECS Membrane Processor, VST Green Machine Processor, the Veeder-Root Vapor Polisher, Franklin Fueling Systems Clean Air Separator, and Hirt VCS 100 Processor. The tester shall document that each step was followed as indicated below and shall include the page of this Exhibit with the submission of TP-201.3 test results. **See footnote regarding testing of pressure/vacuum vent valve**[1]. Note that districts may require use of an alternate form to meet these requirements, provided the alternate form includes the same minimum parameters.

<u>VST ECS Membrane or Green Machine Processor Installed</u>

1. Prior to conducting TP-201.3, the ball valves on the VST Membrane Processor or VST Green Machine Processor shall be open, as shown in Figure 1A and Figure 1B.

2. The VST Membrane Processor or VST Green Machine Processor shall be turned off. Refer to the ARB Approved Installation, Operation, and Maintenance Manual for instructions on turning off the processor. Not turning off the processor will bias the test toward failure.

   Note: If Veeder-Root's "Maintenance Tracker" is installed and enabled, access to the "diagnostic mode" and "set-up mode" of the TLS Console is prohibited unless a Maintenance Tracker Technician Key or personal computer equipped with Veeder-Root's ISD Setup Tool Software Version 1.09 or higher is made available. Maintenance Tracker is an optional security device designed to prevent unauthorized tampering and clearing of Veeder-Root tank monitoring and ISD alarms. Maintenance Tracker resides within the TLS console and when enabled, a message will appear on the two line display of the TLS console. For additional instructions on how to access the desired parameters to complete this test procedure, see Exhibit 18; "Accessing PMC and ISD Parameters at Gasoline Dispensing Facilities (GDFs) with Veeder-Root's "Maintenance Tracker" Security Feature Installed & Enabled".

3. After conducting TP-201.3, leave the three ball valves in the open locked position. Turn the VST Membrane Processor or VST Green Machine Processor back on.

[1] **Note: If the P/V vent valve is required to be tested by the local District, then the P/V vent valve shall be tested prior to conducting Exhibit 4**

Required Steps	Verification (please circle)
1. All ball valves are in the open locked position before conducting TP-201.3?	Yes No
2. Processor is turned off before conducting TP-201.3?	Yes No
3. All ball valves in the open locked position and Processor is turned back on after conducting TP-201.3?	Yes No

Test Company: _____ Facility Name:_____

_____

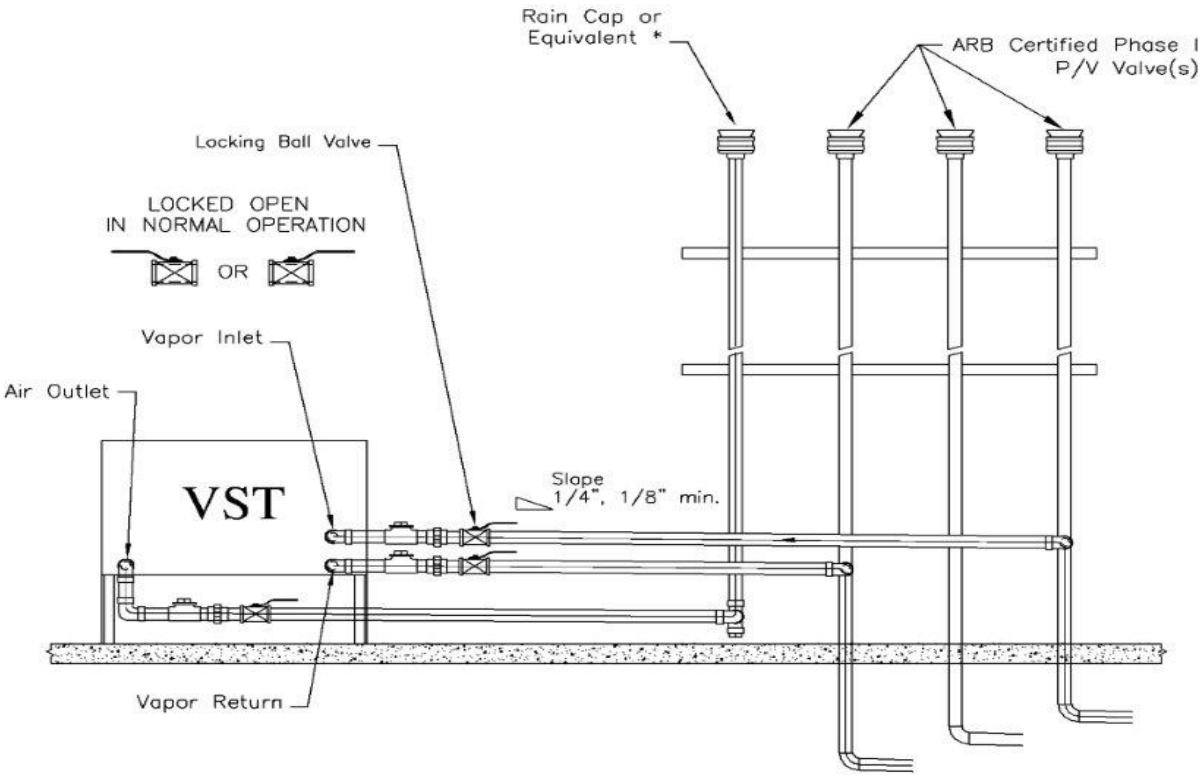
Print Name (Technician) Signature Date

_____

Technician Certification Number and Expiration Date
(ICC or District Training Certification, as applicable)

Figure 1A

Configuration of VST Membrane Processor to Conduct TP-201.3

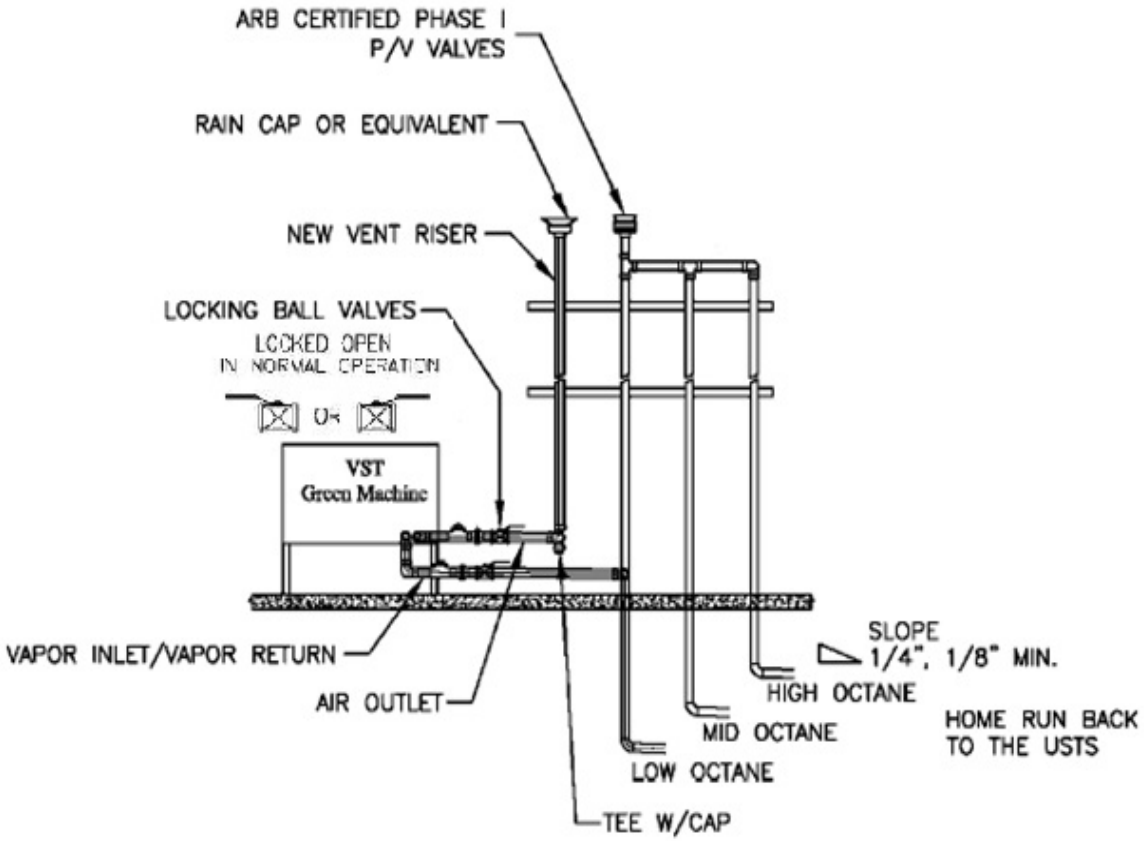


CAUTION: THE HANDLES ON THE LOCKING BALL VALVES MUST NOT BE REMOVED

* If a P/V valve is used, the internal components MUST be removed to allow open venting to the atmosphere.

Figure 1B

Configuration of VST Green Machine Processor to Conduct TP-201.3



Veeder-Root Vapor Polisher Installed

1. Prior to conducting TP-201.3, the ball valve on the inlet of the Veeder-Root Vapor Polisher shall be open, as shown in Figure 2. At the TLS Console, manually close the processor vapor valve in the PMC Diagnostic menu as described in VR-203 IOM Section 15; PMC Diagnostic Menus, or VR-204 IOM Section 12; PMC Diagnostic Menus.

   Note: If Veeder-Root's "Maintenance Tracker" is installed and enabled, access to the "diagnostic mode" and "set-up mode" of the TLS Console is prohibited unless a Maintenance Tracker Technician Key or personal computer equipped with Veeder-Root's ISD Setup Tool Software Version 1.09 or higher is made available. Maintenance Tracker is an optional security device designed to prevent unauthorized tampering and clearing of Veeder-Root tank monitoring and ISD alarms. Maintenance Tracker resides within the TLS console and when enabled, a message will appear on the two line display of the TLS console. For additional instructions on how to access the desired parameters to complete this test procedure, see Exhibit 18; "Accessing PMC and ISD Parameters at Gasoline Dispensing Facilities (GDFs) with Veeder-Root's "Maintenance Tracker" Security Feature Installed & Enabled".

2. After conducting TP-201.3, enter the PMC Diagnostic Menu at the TLS Console and set the vapor valve to automatic mode.

3. The ball valve on the inlet of the Veeder-Root Vapor Polisher shall remain opened and locked.

Required Steps	Verification (please circle)
1. Inlet ball valve is open and vapor valve is closed before conducting TP-201.3?	Yes No
2. Vapor valve is in the automatic mode after conducting TP-201.3?	Yes No
3. Inlet ball valve is in the open locked position after conducting TP-201.3?	Yes No

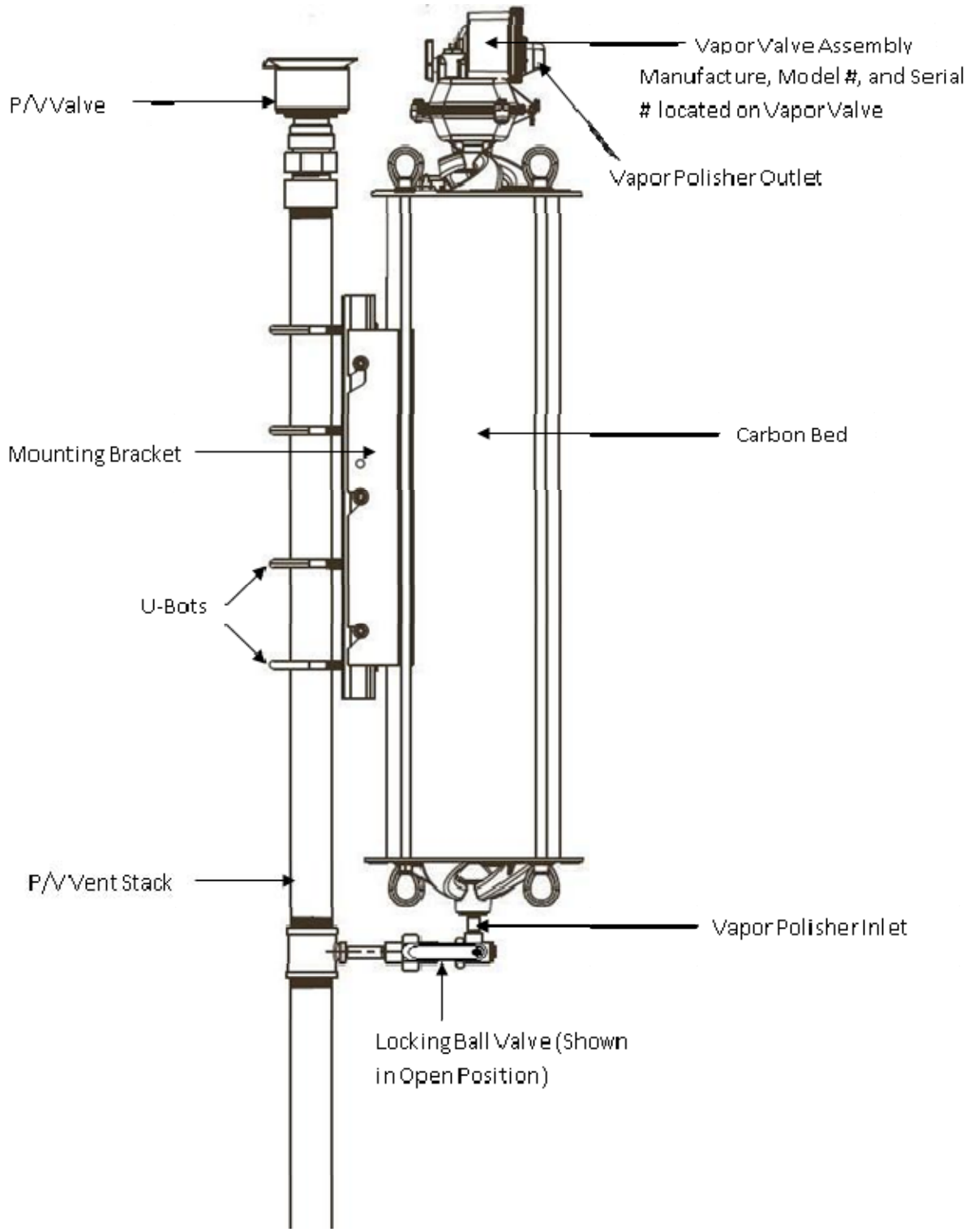
Test Company: _____ Facility Name:_____

_____
Print Name (Technician) Signature Date

_____
Technician Certification Number and Expiration Date
(ICC or District Training Certification, as applicable)

Figure 2

Configuration of Veeder-Root Vapor Polisher to Conduct TP-201.3



Franklin Fueling System Clean Air Separator Installed

1. Prior to conducting TP-201.3, all four ball valves on the CAS shall be closed, as shown in Figure 3 or Figure 3H, to isolate it from the UST system to permit the pressurization of the UST system.

2. After conducting TP-201.3, the four ball valves on the Healy Clean Air Separator (CAS) shall be locked in their normal operating positions as shown in Figure 2B-16 or Figure 2B-16H, Exhibit 2.

Required Steps	Verification (please circle)
1. All four CAS ball valves closed before conducting TP-201.3	Yes No
2. All four CAS ball valves in normal operating positions after conducting TP-201.3.	Yes No

Test Company: _____ Facility Name:_____

_____

Print Name (Technician) Signature Date

_____

Technician Certification Number and Expiration Date
(ICC or District Training Certification, as applicable)

Figure 3

Configuration of Healy Clean Air Separator to Conduct TP-201.3

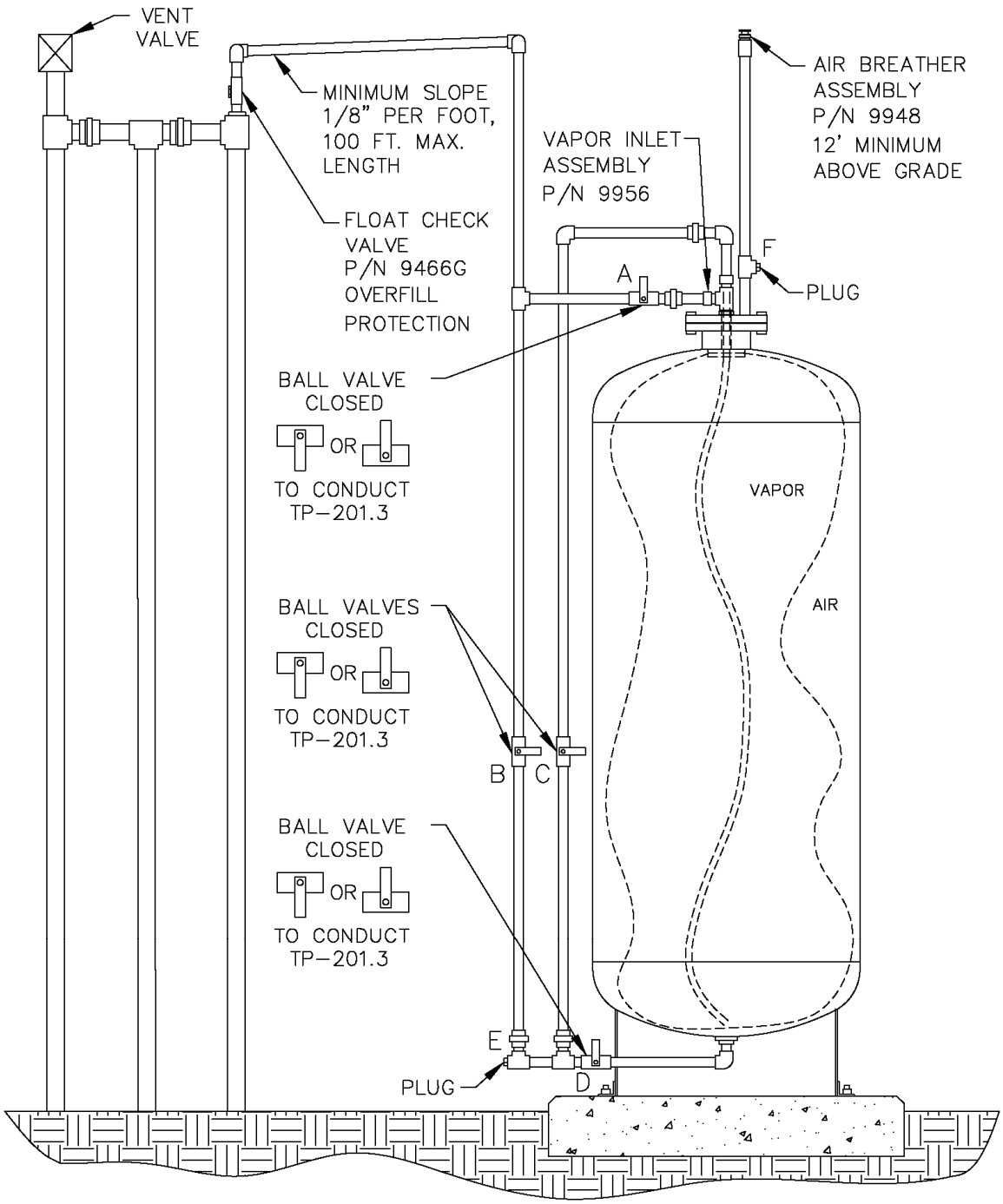
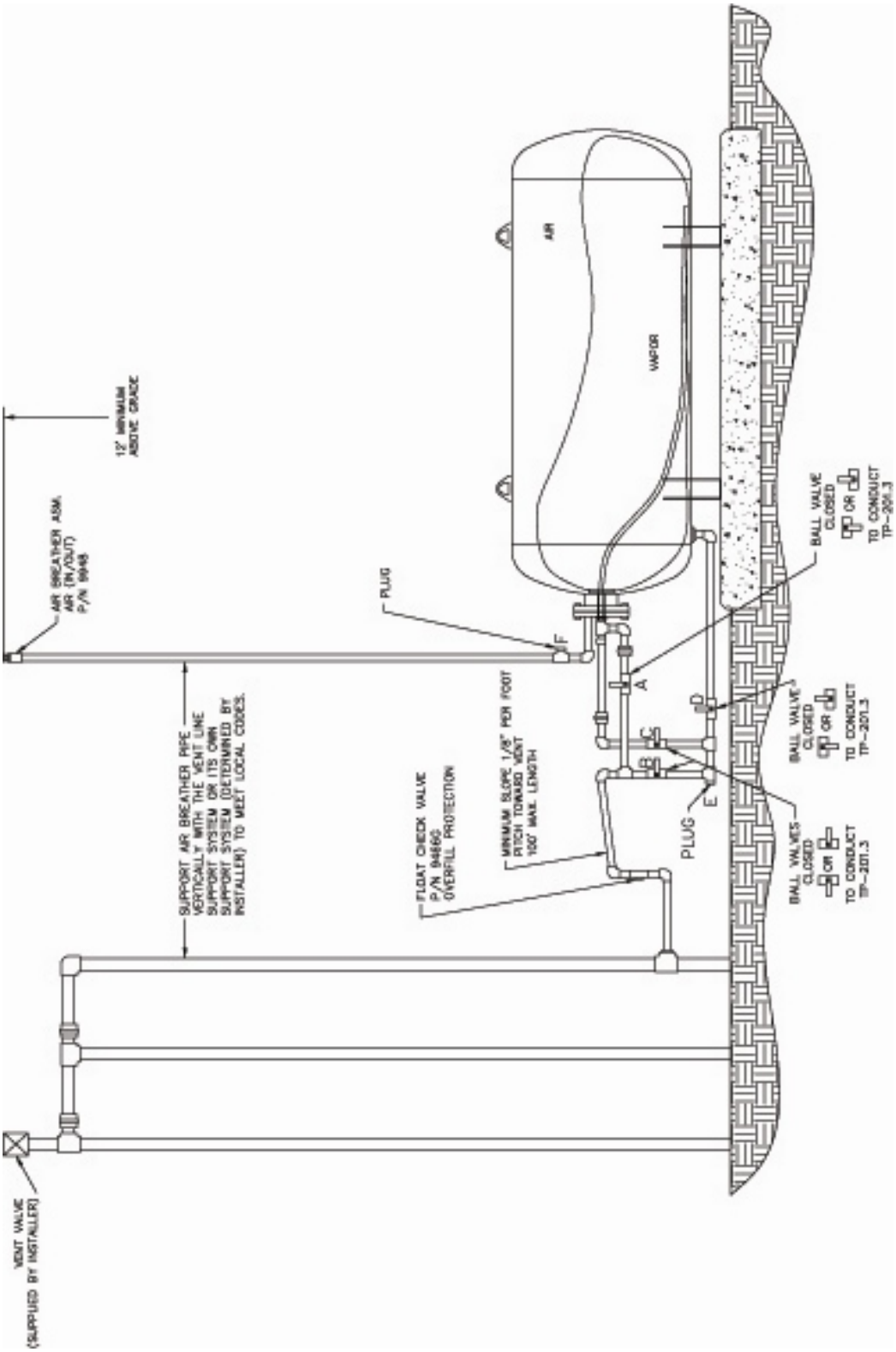


Figure 3H

Configuration of Healy Clean Air Separator to Conduct TP-201.3



Hirt VCS 100 Thermal Oxidizer Installed

1. Prior to conducting TP-201.3, the ball valve on the inlet of the Hirt VCS 100 processor shall be Open (Open to UST Ullage), as shown in Figure 4. At the Hirt Indicator Panel, turn the Power Switch to the "Off" position.

2. After conducting TP-201.3, turn the Power Switch to the "On" position.

3. The ball valve on the inlet of the Hirt VCS 100 processor shall remain opened and locked.

Required Steps	Verification (please circle)
1. Inlet ball valve is open and Power Switch is in "Off" position before conducting TP-201.3?	Yes No
2. Power Switch is in "On" position after conducting TP-201.3?	Yes No
3. Inlet ball valve is in the open locked position after conducting TP-201.3?	Yes No

Test Company: _____ Facility Name:_____

_____
Print Name (Technician) Signature Date

_____
Technician Certification Number and Expiration Date
(ICC or District Training Certification, as applicable)

Note: The Hirt Processor Operability Test (if required by the local District), shall be performed prior to conducting Exhibit 4.

Figure 4

Configuration of Hirt VCS 100 Thermal Oxidizer to Conduct TP-201.3

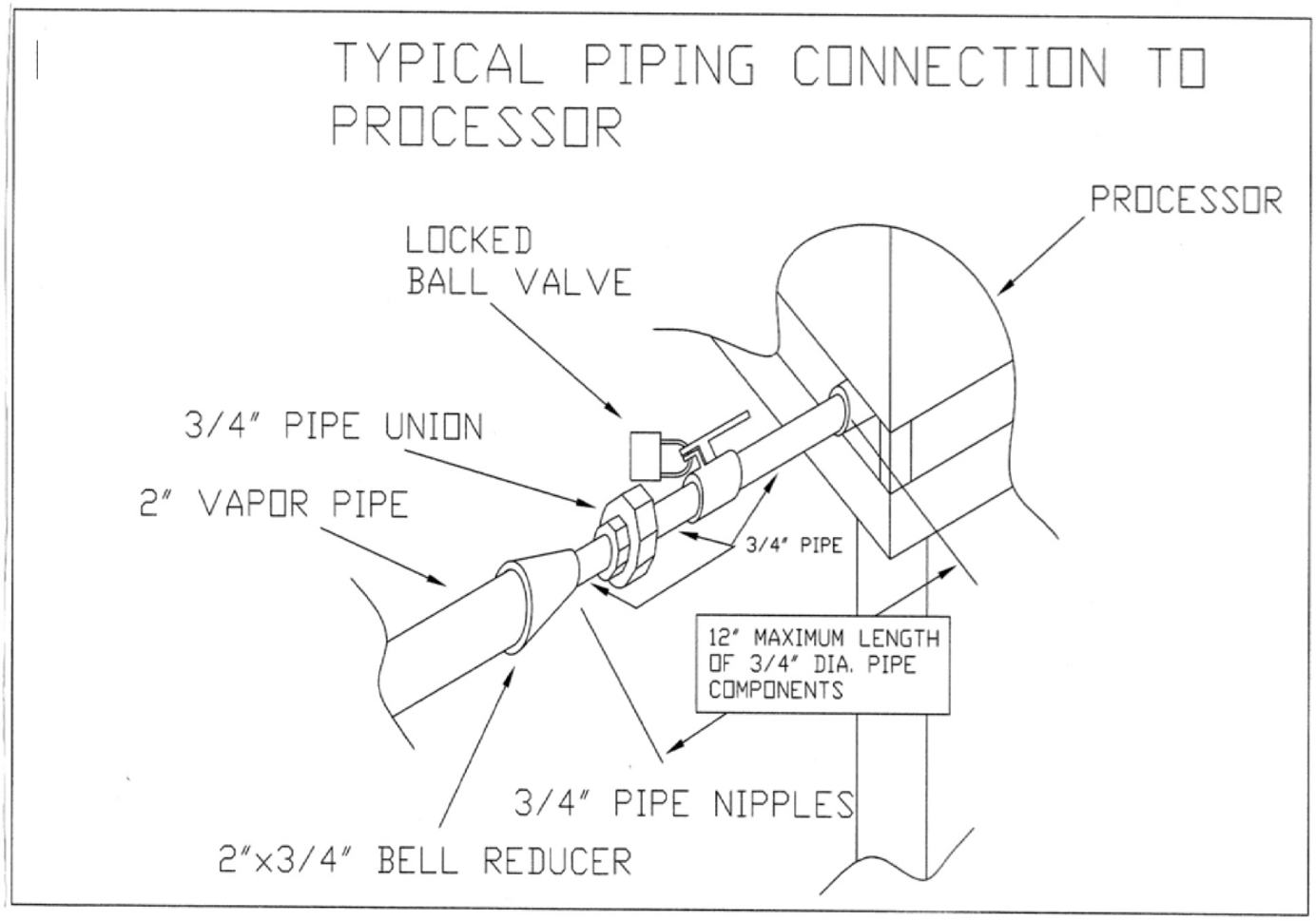


EXHIBIT 5

Liquid Removal Test Procedure

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the ARB Executive Officer or his or her authorized representative or designate.

1. PURPOSE AND APPLICABILITY

1.1 This procedure is used to quantify the removal rate of liquid from the vapor passage of a Phase II balance system hose equipped with a liquid removal device. This procedure provides a method to determine compliance with the liquid removal requirements specified in ARB Executive Orders VR-203 and VR-204 and any subsequent amendments or revisions.

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

2.1 This test procedure provides two options to determine the compliance of liquid removal devices. Under option 1 (short version), liquid in the vapor path of a coaxial hose is drained and measured. If the volume of liquid drained equals or exceeds 25 ml, a liquid removal test is conducted. For those hoses with less than 25 ml drained, no further testing is required. Under option 2 (long version), all hoses are evaluated regardless of the volume of liquid drained. Option 2 includes a prewetting and wall adhesion step. Both options test the liquid removal device by introducing gasoline into the vapor path of the coaxial hose through the nozzle bellows. After 7.5 gallons of gasoline is dispensed, the amount of gasoline remaining in the hose is measured and the liquid removal rate is determined. The district shall specify which testing option is to be used.

Caution: When draining gasoline from the vapor side of the hose, make sure the dispenser is not activated. Gasoline is drained from the vapor side of the hose by compressing the bellows and engaging the fuel lever (note the nozzle vapor valve is on the same stem as the fuel valve). If the dispenser is activated, gasoline in the fuel hose may be pressurized when engaging the fuel lever.

3. BIASES AND INTERFERENCES

3.1. Slits or tears in the hose or nozzle vapor path may bias the results towards compliance.

3.2. This test shall not be conducted on any fueling point where the hanging hardware is defective as identified in Exhibit 2.

3.3. Any spillage of gasoline invalidates the test for any volumes that are required to be measured or recorded.

3.4. A breach of the inner product hose may introduce additional gasoline into the outer vapor path resulting in a larger volume drained than introduced.

3.5. Not having the liquid extraction device (indicated by the mark on the outside of the house) at the bottom of the hose loop during liquid removal testing, as shown in Figure 1, will bias the results towards failure.

3.6. If testing a fueling point with a VST Model VST-EVR-NB nozzle, the test procedure requires the use of VST's nozzle spout plug, P/N VST-STP-100 as shown in Figure 2. If testing a fueling point with a EMCO Model A4005EVR nozzle, the test procedure requires the use of EMCO's nozzle spout plug, P/N 494635EVR as shown in Figure 3. This tool is used to plug the spout when draining liquid from the vapor side of the hose. Not plugging the spout may bias the results towards failure. Nicks, cuts, or tears in the plug o-rings will bias the results towards failure.

3.7. Dispensing rates not between 6.0 and 10.0 gallons per minute (GPM) invalidates the test.

4. SENSITIVITY, RANGE, AND PRECISION

4.1 The range of measurement of the liquid removal rate is dependent upon the range of the graduated cylinder used for testing.

4.2 To ensure precision, graduated cylinder readings shall be measured at the liquid level meniscus.

5. EQUIPMENT

5.1. Nozzle Spout Plug: If testing a fueling point with a VST Model VST-EVR-NB nozzle, use VST's spout plug, P/N VST-STP-100 (Figure 2). If testing a fueling point with a EMCO Model A4005EVR nozzle, use EMCO's nozzle spout plug, P/N 494635EVR as shown in Figure 3.

5.2. Stopwatch. Use a stopwatch accurate to within 0.2 seconds.

5.3. Funnels. Large and small gasoline compatible, non-breakable, funnels with dimensions similar to those as shown in Figure 4, or equivalent.

5.4. Graduated Cylinders. Gasoline compatible, non-breakable 0-25ml, 0-100ml, 0-250 ml, and 0-500 ml graduated cylinders with stable base plates. The 25ml cylinder may be necessary to quantify volumes of liquid less than 20 ml.

5.5. Gasoline Test Tank. (Optional) A portable tank, meeting fire safety requirements for use with gasoline, may be used to receive the gasoline dispensed during testing. The tank shall have sufficient volume so that at least 10.0 gallons may be dispensed prior to activating the primary shutoff mechanism of the nozzle. **When using a gasoline test tank, ensure that a ground strap is used and that it is properly connected to an acceptable ground.** To minimize testing-related emissions, vehicle refueling events should be used for this procedure whenever feasible.

5.6. Traffic Cones. Use traffic cones to encircle the area where testing is conducted.

5.7. Field Data Sheet. Use the appropriate data sheet to record liquid removal test information. Forms 1 and 2 serve as examples; districts may require modified versions.

5.8. Gasoline Container. Use a portable fuel container equipped with a tight fitting cap, of at least 1.0 gallon capacity.

NOTE: THIS TEST PROCEDURE PROVIDES TWO OPTIONS TO DETERMINE COMPLIANCE OF LIQUID REMOVAL DEVICES. THE DISTRICT SHALL SPECIFY WHICH TESTING OPTION IS TO BE USED

6. OPTION 1 (SHORT VERSION)

PRE-TEST PROCEDURE

6.1 Verify that the 500 ml graduated cylinder is empty. Position the large funnel into the graduated cylinder.

6.2 Remove the nozzle from the dispenser. **Do not activate dispenser!** If testing a fueling point with a VST Model VST-EVR-NB nozzle, install VST's spout plug, P/N VST-STP-100 in the tip of the spout (Figure 2). If testing a fueling point with an EMCO Model A4005EVR nozzle, install EMCO's nozzle spout plug, P/N 494635EVR in the tip of the spout (Figure 3). Carefully tilt the spout into the funnel/graduated cylinder assembly.

6.3 Lower the nozzle and funnel/graduated cylinder assembly as close to the ground as possible. "Walk out" the hose while keeping the nozzle lowered and hose fully extended. The hose shall slope downward from the dispenser toward the nozzle.

6.4 **Do not activate dispenser!** Open the nozzle's vapor check valve by compressing the bellows and engaging the fuel lever. Allow 20 seconds for all liquid to drain. Use caution to avoid spillage.

6.5 Remove VST's or EMCO's spout plug and return the nozzle to the dispenser and measure the volume of liquid drained. If the volume drained is less than 200 ml, transfer the liquid into an appropriately sized graduated cylinder. For example, if 40 ml of liquid was drained, use the 100 ml graduated cylinder to take the measurement.

6.6 Record the amount of liquid drained on Form 1 ("PRE-TEST").

6.7 If the volume drained is greater than or equal to 25 ml, proceed to Section 6.8 of the procedure. Hoses with greater than 25 ml drained are considered to be pre-wetted. If the amount drained is less than 25 ml, proceed to the next nozzle/hose to be evaluated and repeat Section 6.1-6.6

TEST PROCEDURE (FOR HOSES WITH GREATER THAN 25 ML DRAINED)

6.8 Pour 150 ml to 175 ml of gasoline into the 250 ml graduated cylinder. Measure and

record this volume on Form 1 (VI).

6.9 Remove the nozzle from the dispenser and position the nozzle upright so that the spout is in a vertical position. **Do not activate dispenser!**

6.10 Open the nozzle's vapor check valve by compressing the bellows and engaging the fuel lever. Carefully insert the stem of the small funnel between the bellows and nozzle spout.

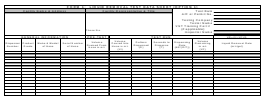
6.11 Pour the measured volume into the vapor path of the hose. Use caution not to spill the gasoline. Remove the small funnel after the gasoline has been introduced.

6.12 Insert the nozzle into a vehicle or test tank fill pipe.

6.13 Find the mark on the outside of the hose which indicates the location of the liquid pick-up device. Ensure the mark is at the bottom of the hose loop when dispensing as shown in Figure 1. This can be accomplished by lifting up the back of the hose, adjusting nozzle position, or adjusting the test tank position.

6.14 Dispense 7.5 (±0.5) gallons at the highest possible flow rate by holding the nozzle lever in the maximum handheld position. Use a stopwatch to measure the time elapsed while dispensing. Record the volume of fuel dispensed (G) and the elapsed time (T) on Form 1. Return nozzle to the dispenser.

6.15 Calculate the dispensing rate using the equation below. If the dispensing rate is not between 6.0 and 10.0 gallons per minute (GPM), the test results are invalid.



Where:

GPM	=	dispensing rate (in gallons per minute)
G	=	gallons of fuel dispensed
T	=	number of seconds required to dispense

6.16 Using the 250 ml graduated cylinder and large funnel, carefully drain the remaining liquid from the vapor path of the hose as described in Section 6.1 through 6.5 **(make sure dispenser is not activated and spout plug is installed before draining liquid!)**. Record this quantity on Form 1 (VF).

6.17 Use Equation 9.1 to calculate the liquid removal rate for all the applicable hoses tested.

6.18 If the liquid removal rate is less than 5.0 ml/gallon, but greater than or equal to 4.5 ml/gallon, repeat the test two additional times and average the three results.

7. OPTION 2 (LONG VERSION)

PRETEST PROCEDURE

7.1 Carefully pour 150 ml of gasoline into the 250 ml graduated cylinder.

7.2 Remove the nozzle from the dispenser. **Do not activate dispenser!** If testing a fueling point with a VST Model VST-EVR-NB nozzle, Install VST's spout plug, P/N VST-STP-100 in the tip of the spout as shown in Figure 2. If testing a fueling point with an EMCO Model A4005EVR nozzle, install EMCO's nozzle spout plug, P/N 494635EVR in the tip of the spout (Figure 3). Position the nozzle upright so that the spout is in a vertical position.

7.3 Open the nozzle's vapor check valve by compressing the bellows and engaging the fuel lever. Carefully insert the stem of the small funnel between the bellows and nozzle spout.

7.4 Pour the gasoline from the 250 ml graduated cylinder into the vapor path of the hose. Use caution not to spill the gasoline. Remove the small funnel after the gasoline has been introduced.

7.5 Verify that the 500 ml graduated cylinder is empty. Position the large funnel into the graduated cylinder.

7.6 Carefully tilt the spout into the funnel/graduated cylinder assembly. **Make sure VST's or EMCO's spout plug is installed and the dispenser is deactivated.**

7.7 Lower the nozzle and funnel/graduated cylinder assembly as close to the ground as possible. "Walk out" the hose while keeping the nozzle lowered and hose fully extended. The hose shall slope downward from the dispenser toward the nozzle.

7.8 Open the nozzle's vapor check valve by compressing the bellows and engaging the fuel lever. Allow 20 seconds for all liquid to drain. Use caution to avoid spillage. If necessary, drain full graduated cylinders into a portable gas can until the hose is empty.

7.9 Remove VST's or EMCO's spout plug and return the nozzle to the dispenser.

TEST PROCEDURE

7.10 Pour 150 ml to 175 ml of gasoline into the 250 ml graduated cylinder. Measure and record this volume on Form 2 (VI).

7.11 Remove the nozzle from the dispenser. **Do not activate dispenser!** Position the nozzle upright so that the spout is in a vertical position.

7.12 Open the nozzle's vapor check valve by compressing the bellows and engaging the fuel lever. Carefully insert the stem of the small funnel between the bellows and

nozzle spout.

7.13 Pour the measured volume into the vapor path of the hose. Use caution not to spill the gasoline. Remove the small funnel after the gasoline has been introduced.

7.14 Insert the nozzle into a vehicle or test tank fill pipe.

7.15 Find the mark on the outside of the hose which indicates the location of the liquid pick-up device. Ensure the mark is at the bottom of the hose loop when dispensing as shown in Figure 1. This can be accomplished by lifting up the back of the hose, adjusting nozzle position, or adjusting the test tank position.

7.16 Dispense 7.5 (±0.5) gallons at the highest possible flow rate by holding the nozzle lever in the maximum handheld position. Use a stopwatch to measure the time elapsed while dispensing. Record the volume of fuel dispensed (G) and the elapsed time (T) on Form 2. Return nozzle to the dispenser.

7.17 Calculate the dispensing rate using the equation below. If the dispensing rate is not between 6.0 and 10.0 gallons per minute (GPM), the test results are invalid.

$$GPM = 60 \times \left(\frac{G}{T}\right)$$

Where:

GPM	=	dispensing rate (in gallons per minute)
G	=	gallons of fuel dispensed
T	=	number of seconds required to dispense

7.18 Using the 250 ml graduated cylinder and large funnel, carefully drain the remaining liquid from the vapor path of the hose as described in Section 7.5 through 7.8 **(make sure dispenser is deactivated and spout plug is installed before draining liquid!)**. Record this quantity on Form 2 (VF).

7.19 Open the nozzle's vapor check valve by compressing the bellows and engaging the fuel lever. **Do not activate dispenser!** Carefully insert the stem of the small funnel between the bellows and nozzle spout

7.20 Use the 250 ml graduated cylinder and small funnel to pour 150 ml of gasoline into the vapor passage of the hose. Dispense no gasoline.

7.21 Using the 250 ml graduated cylinder and large funnel, completely drain the gasoline from the vapor passage back into the graduated cylinder as described in Section 7.5 through 7.9 **(make sure dispenser is deactivated and spout plug is installed before draining liquid!)**.

7.22 Subtract the volume drained (value from Section 7.21) from the volume added (value from Section 7.20). This value represents the volume of gasoline lost due to wall adhesion. The purpose of the wall adhesion value is to quantify the amount of gasoline lost to evaporation from transfer to and from the graduated cylinders and

adhesion of liquid to vapor passage surfaces in previous measurements. Record this quantity on Form 2 (VW).

7.23 Use Equation 9.2 to calculate the liquid removal rate for all the applicable hoses tested.

7.24 If the liquid removal rate is less than 5.0 ml/gallon, but greater than or equal to 4.5 ml/gallon, repeat the test two additional times and average the three results.

8. POST TEST PROCEDURES

8.1. Ensure nozzle spout plug(s) is removed and nozzle is hung in dispenser cradle.

8.2. Empty all containers and return any excess gasoline to the underground storage tank.

8.3. Remove the traffic cones from the testing area.

9. CALCULATING RESULTS

9.1 If using OPTION 1(short version), the liquid removal rate shall be calculated as follows:

$$VR = \frac{VI - VF}{G}$$

Where:

VR	=	Gasoline removed per gallon dispensed, milliliters/gallon
VI	=	Total initial volume poured into hose vapor passage, milliliters
VF	=	Volume of gasoline remaining in the hose vapor passage after dispensing, milliliters
G	=	Total dispensed, gallon

9.2 If using OPTION 2 (long version), the liquid removal rate shall be calculated as follows:

$$VR = \frac{(VI - VW) - VF}{G}$$

Where:

VR	=	Gasoline removed per gallon dispensed, milliliters/gallon
VI	=	Total initial volume poured into hose vapor passage, milliliters
VW	=	Volume of liquid lost due to wall adhesion, milliliters
VF	=	Volume of gasoline remaining in the hose vapor passage after dispensing, milliliters
G	=	Total dispensed, gallons

10. REPORTING RESULTS

10.1. Record all applicable liquid removal rate information on the appropriate form as shown in Form 1 and 2. Districts may require the use of alternate forms provided that the alternate forms include the same parameters as identified in Forms 1 and 2.

10.2. If the calculated liquid removal rate is greater than or equal to 5 milliliters/gallon, the

liquid removal device has demonstrated compliance.

10.3. If the calculated liquid removal rate is less than 5 milliliters/gallon, the liquid removal device is not in compliance.

11. ALTERNATIVE TEST PROCEDURES

This procedure shall be conducted as specified. Modifications to this test procedure shall not be used to determine compliance unless prior written approval has been obtained from the Executive Officer, pursuant to Section 14 of Certification Procedure CP-201.

Figure 1
Position of Liquid Removal Device
When Conducting Liquid Removal Testing

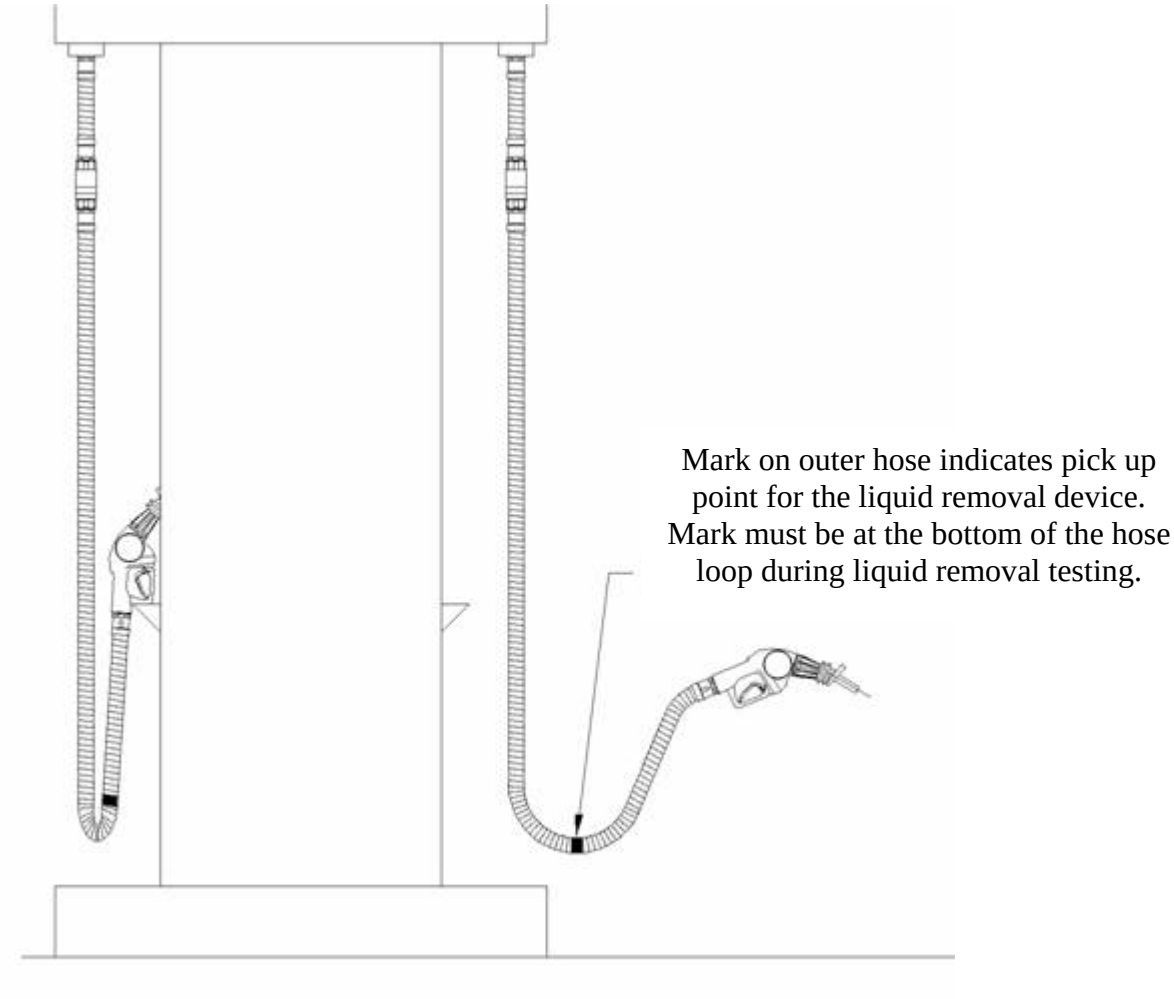
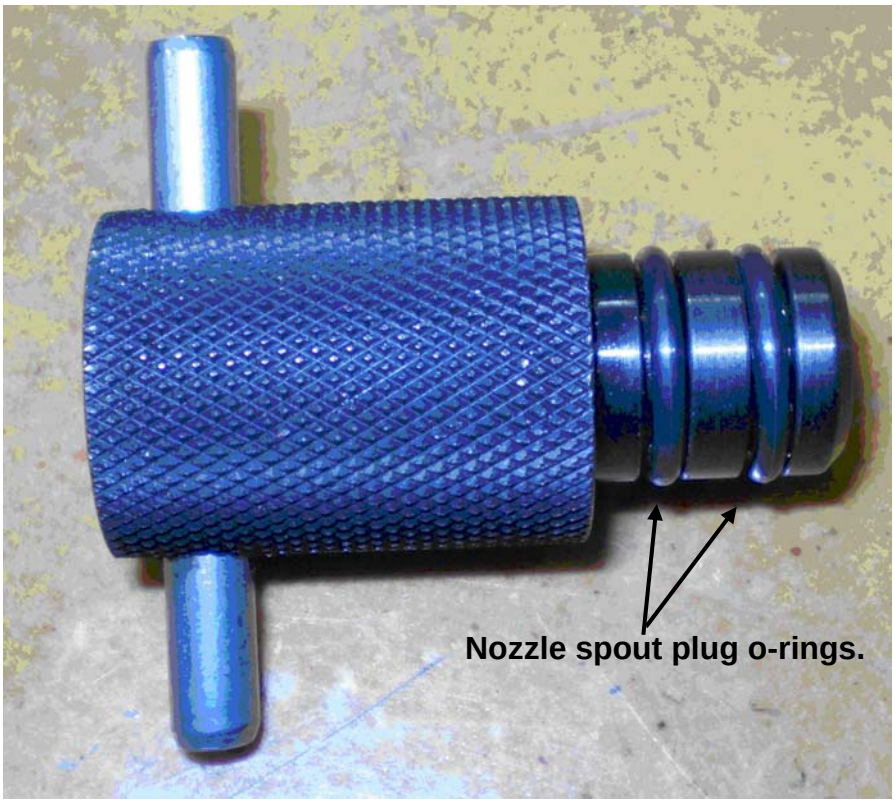
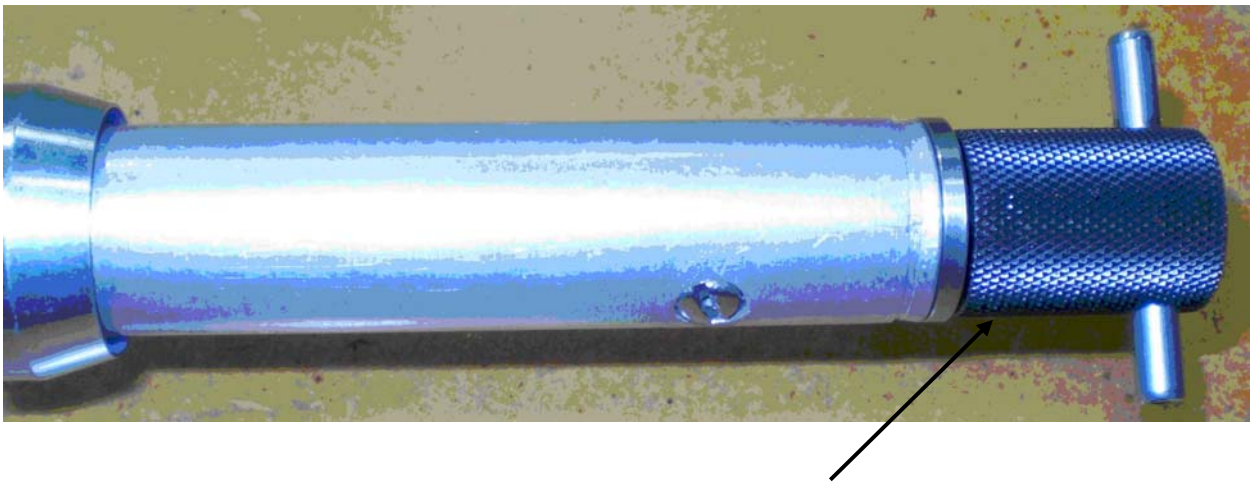


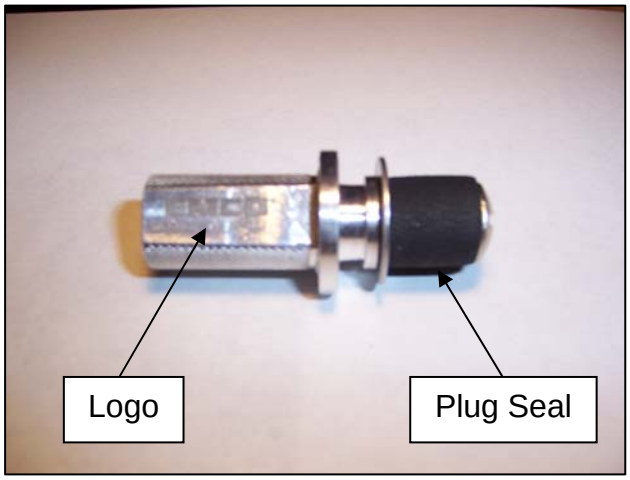
Figure 2
VST Nozzle Spout Plug P/N VST-STP-100





Plug properly inserted into nozzle spout.
Both plug o-rings seated into nozzle spout.

Figure 3
EMCO Nozzle Spout Plug P/N 494635EVR



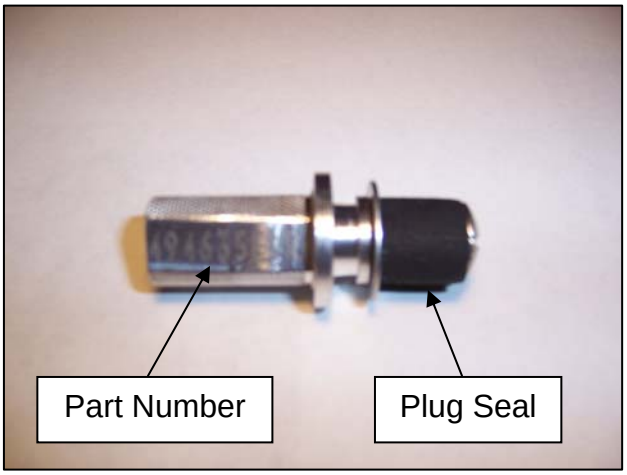
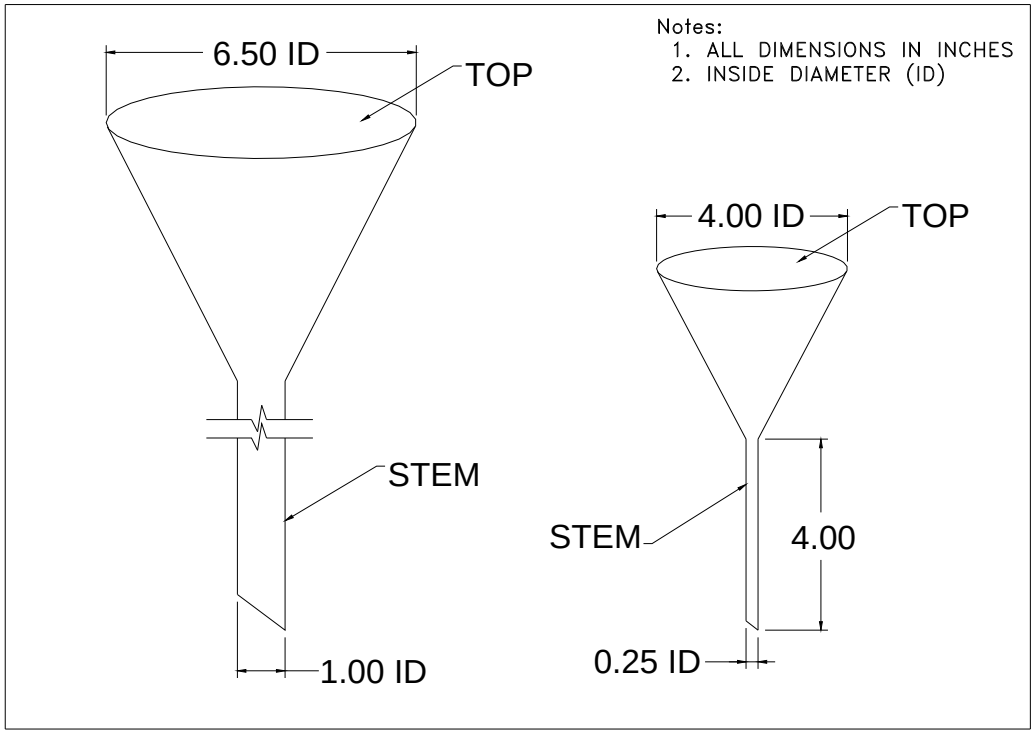


Figure 4
Recommended FUNNEL SPECIFICATIONS



FORM 1: LIQUID REMOVAL TEST DATA SHEET (OPTION 1)

Facility Name & Address	Facility Representative & Title	
	Phone No.	Test Date A/C or Permit No. Testing Company Tester Name VST Training Cert # (if applicable) Inspector Name

GENERAL INFORMATION				PRE-TEST	TEST RUN					VR=(VI-VF)/G
Dispenser Number	Product Grade	Make & Model of Hose	Serial Number of Hose	Volume Drained From Hose in mL	Volume Poured Into Hose in mL (VI)	Gallons Dispensed (G)	Seconds to Dispense (T)	Dispensing Rate (60*(G/T))	Volume Remaining in mL (VF)	Liquid Removal Rate (mL/gal)

FORM 2: LIQUID REMOVAL TEST DATA SHEET (OPTION 2)

Facility Name & Address	Facility Representative & Title	
	Phone No.	Test Date _____ A/C or Permit No. _____ Testing Company _____ Tester Name _____ VST Training Cert # (if applicable) _____ Inspector Name _____

GENERAL INFORMATION				PRE-TEST	TEST RUN					VR=((VI-VW)-VF)/G
Dispenser Number	Product Grade	Make & Model of Hose	Serial Number of Hose	Volume Poured into Hose in mL (VI)	Gallons Dispensed (G)	Seconds to Dispense (T)	Dispensing Rate (60*(G/T))	Volume Remaining in mL (VF)	Volume Lost to Wall Adhension in mL (VW)	Liquid Removal Rate (mL/gal)

EXHIBIT 6

Required Items for Conducting TP-201.4

The instructions below are required when conducting TP-201.4 for the Balance Phase II EVR systems. The tester shall document that each step was followed as indicated below and shall include this page of the Exhibit with the submission of TP-201.4 test results. Note that districts may require use of an alternate form to meet these requirements, provided the alternate form includes the same minimum parameters.

The VST Model VST-EVR-NB nozzle and EMCO Model A4005EVR nozzle incorporate a lever-actuated vapor valve. The vapor valve is on the same stem as the fuel valve. When conducting TP-201.4, the nozzle lever must be actuated to open the vapor valve and allow vapor to flow from the nozzle to the underground storage tank. The following steps must be taken when conducting Methodology 1 of TP-201.4:

1. The dispenser shall not be activated. If the dispenser is activated, gasoline in the fuel hose may be pressurized when engaging the fuel lever.
2. *If the Hirt VCS 100 Thermal Oxidizer is installed, turn it off. At the Hirt Indicator Panel, turn the Power Switch to the "Off" position.*
3. Prior to inserting the VST or EMCO EVR nozzle into the fill pipe of the Dynamic Back Pressure Test Unit in step 7.1 of TP-201.4, completely drain any gasoline in the nozzle and vapor path of the hose. The dispenser must be deactivated and the nozzle lever and bellows shall be fully engaged.
4. When flowing nitrogen per step 7.1.2, fully engage the nozzle lever to allow vapor flow from the nozzle to the UST.
5. *If the Hirt VCS 100 Thermal Oxidizer is installed, after conducting TP-201.4, turn the Hirt VCS 100 Power Switch to the "On" position.*

Required Steps For Each Nozzle Tested	Verification (please circle)
1. Is dispenser deactivated?	Yes No
2. Is Hirt VCS 100 Thermal Oxidizer turned off? (if installed)	*Yes No NA*
3. Are nozzle and hose completely drained of gasoline prior to inserting nozzle into Dynamic Back Pressure Unit?	Yes No
4. Is nozzle lever fully engaged when conducting flow test?	Yes No
5. Is Hirt VCS 100 Thermal Oxidizer turned on? (if installed)	*Yes No NA*

Test Company: _____ Facility Name:_____

_____

Print Name (Technician) Signature Date

_____

Technician Certification Number and Expiration Date
(ICC or District Training Certification, as applicable)

EXHIBIT 7

Nozzle Bag Test Procedure

Verification of the integrity of the VST or EMCO EVR nozzle vapor valve shall be performed on installed nozzles by use of the following test.

1. If there is little or no pressure or vacuum in the headspace of the underground storage tank(s), a defective nozzle vapor valve may not be evident. Therefore, it is recommended that this test be conducted while the pressure in the underground storage tanks in not equal to zero, preferably greater than positive one inch of water column (+1.0”WC) or less than negative one inch of water column (-1.0”WC) vacuum.

2. Seal nozzle(s) at the gasoline dispensing facility (GDF) in a plastic bag, using tape or other means to secure the bag around the base of the nozzle (see Figure 1). Any plastic bag large enough to enclose the nozzle and having a thickness of no greater than 2 mils can be used.

2. Observe the bagged nozzle(s) for 30 seconds.

3. Any nozzle where the bag can be seen visually expanding or collapsing has a defective vapor valve and is not in compliance with Exhibit 2.

4. Record the test results on the “Nozzle Bag Test Results” form provided in this Exhibit. Districts may require use of an alternate form, provided that the alternate form includes the same minimum parameters.

5. Remove the bags from all the nozzles and return the nozzles to the dispenser holsters.

Figure 1: Example of Bagged Nozzle

NOZZLE BAG TEST RESULTS

SOURCE INFORMATION		TEST COMPANY INFORMATION	
Facility (DBA)/Site Address:	Facility Representative/Title:	Test Company Name	# of Nozzles:_____ # Nozzles Tested: _____ # Nozzles Passed: _____ # Nozzles Failed: _____ # Nozzles not Tested: _____
Print Name	Print Name	Print Name of Tester	
Street Address	Title ( )	Street Address	
City Zip	Phone No.	City Zip	
District Inspector:	☐ P/O ☐ S/A ☐ A/C Number:	Date of Test:	Time of Test:

Dispenser	Gas Grade	Nozzle Type	Bag Expanded or Collapsed after 30 Seconds
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No

EXHIBIT 8

VST ECS Hydrocarbon Sensor Verification Test Procedure

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board, and the term "ARB Executive Officer" refers to the Executive Officer of the ARB or his or her authorized representative or designate.

1. PURPOSE AND APPLICABILITY

1.1 This procedure will determine the accuracy of the VST Hydrocarbon (HC) Non-Dispersive Infrared sensor (HC sensor) using known hydrocarbon concentrations (propane) calibration gases at gasoline dispensing facilities (GDFs).

1.2 This procedure is applicable for compliance testing.

1.3 The term “TLS Console” used throughout this Exhibit includes but is not limited to TLS-350, TLS-350 Plus, TLS-350R, Red Jacket ProMax, Gilbarco EMC consoles which are also referenced in Exhibit 1.

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

Known concentrations of certified calibration gases are passed through the HC sensor as illustrated in Figure 1 or 2, and then compared with the HC average concentration as determined from the PMC Percent Hydrocarbon Diagnostic Report. The Percent Hydrocarbon Diagnostic report can be downloaded onto a laptop computer via the TLS Console RS-232 connection. Sampling is conducted for a minimum of five (5) minutes period for each certified test gas. To prevent any HC sensor biases, this test shall be conducted with the processor in the manually “off” mode from the TLS Console control panel for the duration of the test. This test can be performed while product is being dispensed into motor vehicles.

3. EQUIPMENT AND SUPPLIES

3.1 Gas Cylinder Regulator

Use a two stage pressure regulator with gauges indicating cylinder pressure and supply line pressure. Supply line pressure shall be set between 5 and 10 pounds per square inch gauge (psig). A Mesa Model 400 or equivalent preset flow regulator with a fixed flow rate of one (1) liter per minute (LPM) can be used as an alternative to the above two stage regulator.

3.2 Flow Meter

Use a Dwyer Model RMA, or equivalent flow meter capable of reading a gas flow rate at one (1) liter per minute (LPM). A flow meter is not required if using a fixed rate regulator as specified in step 3.1.

3.3 Calibration Gases

Cylinders of calibration gases using propane in nitrogen listed below.

(1) High-Range Gas: Concentration between 10-14% by volume.
(2) Mid-Range Gas: Concentration between 2-5% by volume.
(3) Zero Gas: Nitrogen with a hydrocarbon concentration less than 0.25% by volume.

3.4 Laptop, associated cables, and software are required for RS232 connection to the TLS Console (reference Section 16 “Pressure Management Control” of the ARB Approved Installation, Operation and Maintenance Manual for hardware and software requirements).

4. CALIBRATIONS

The calibration gases must be certified according to the following:

To an analytical accuracy of ± 2%, traceable to a reference material approved by the National Institute of Standards and Technology (NIST) and recertified at least every two years.

Information on calibration gas cylinders shall be entered into a log identifying each cylinder by serial number. Documentation of certification shall be maintained with the gas cylinders at all times and shall also be attached to Form 1. The calibration gas log shall be maintained with the gas cylinders at all times and made readily available to the district upon request. Sufficient information shall be maintained to allow a determination of the certification status of each calibration gas and shall include: (1) the date put in service, (2) assay result, (3) the dates the assay was performed, and (4) the organization and specific personnel who performed the assay.

5. PRE-TEST REQUIREMENTS

Install all required testing apparatus as illustrated in Figure 1 through 3. Connect the calibration test gas to the inlet tee of the HC sensor. Install the outlet tubing to the HC sensor outlet tee. This tubing is used to vent of the calibration gas to atmosphere.

6. TEST PROCEDURE

6.1 Manually turn off the VST membrane processor as follows:

6.1.1 Press the ‘mode key’ until screen displays ‘DIAG MODE’ and then use the function and step keys, as shown in Figure 4 to view the ‘VAPOR PROCESSOR MODE’ menu.

6.1.2 From the ‘VAPOR PROCESSOR MODE‘ menu, change the vapor processor mode of operation from automatic to manual mode. From the ‘VAPOR PROCESSOR STATE’ menu, verify the VP STATE is in the “off” mode. The processor shall be in the off mode for the duration of the test.

Note: If Veeder-Root’s “Maintenance Tracker” is installed and enabled, access to the “diagnostic mode” and “set-up mode” of the TLS Console is prohibited unless a Maintenance Tracker Technician Key or personal computer equipped with Veeder-Root’s ISD Setup Tool Software Version 1.09 or higher is made available. Maintenance Tracker is an optional security device designed to prevent unauthorized tampering and clearing of Veeder-Root tank monitoring and ISD alarms. Maintenance Tracker resides within the TLS console and when enabled, a message will appear on the two line display of the TLS console. For additional instructions on how to access the desired parameters to complete this test procedure, see Exhibit 18; “Accessing PMC and ISD Parameters at Gasoline Dispensing Facilities (GDFs) with Veeder-Root’s “Maintenance Tracker” Security Feature Installed & Enabled”.

6.2 Record the start time from the TLS Console, on Form 1. The testing technician shall synchronize his/her watch with the clock on the TLS Console.

6.3 Isolate the VST HC sensor by closing the in-line ball valve upstream of the HC sensor.

6.4 Introduce the zero, mid-range and high-range gases, in that order, into the VST HC sensor sample line at a flow of 1 LPM for five continuous minutes.

6.5 Record the time before and at the end of each five minute test run on Form 1. Districts may require the use of an alternate form, provided it includes the same minimum parameters as identified in Form 1.

6.6 From the TLS Console front panel, return the membrane processor to the automatic run mode.

6.7 Press the <MODE> key to leave the ‘PMC DIAGNOSTIC’ menu.

6.8 Disconnect test apparatus from the VST HC sensor inlet and outlet tees and replace plugs. Return the in-line ball valve to the open position.

7. OBTAIN HC DATA FROM PMC

The HC data can be obtained from the PMC via an RS-232 connection to a laptop computer. Once connected, the HC data can be viewed from the “Percent Hydrocarbon Diagnostic Report”. This report can be printed or saved to a file. A printed copy of this report must be attached to Form 1. Instructions on accessing this report via the RS-232 connection are found in Section 16 “Pressure Management Control” of the ARB Approved Installation, Operation, and Maintenance Manual. This report will provide HC concentration readings at 15 second intervals for each of the 5-minute test runs. Calculate the average HC concentration from the last three minutes of each test run and record on Form 1.

8. CALCULATION

Calculate and record the difference between the average HC concentration from the PMC Percent Hydrocarbon Diagnostic Report (Step 7) and compare with each corresponding calibration gas concentration.

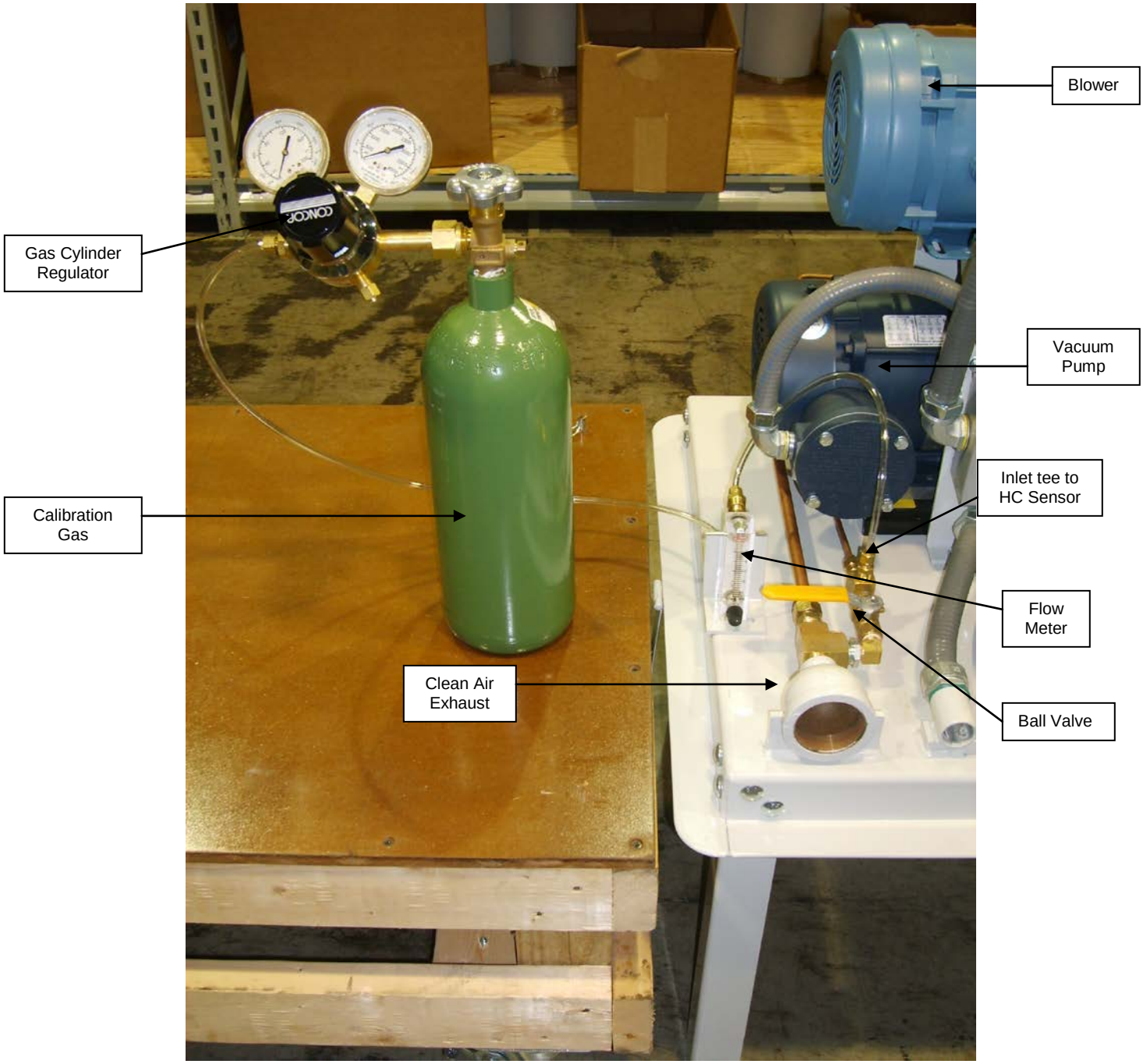
Difference = (Calibrations Gas Concentration (Step 3.3)) – (Average HC Concentration from PMC (Step 7))

The difference shall be within ±1.0% HC concentration from the calibration gas for the zero and mid-range gas and ±2.0% for the high-range gas. Record “Pass” if within specified limits or “Fail” if not within specified limits on Form 1. If any failure is recorded, the VST ECS Processor is not in compliance with Exhibit 2.

9. ALTERNATIVE TEST PROCEDURES

This procedure shall be conducted as specified. Modifications to this test procedure shall not be used to determine compliance unless prior written approval has been obtained from the ARB Executive Officer, pursuant to Section 14 of Certification Procedure CP-201.

Figure 1
Equipment Configuration for Verifying Hydrocarbon Sensor Performance



Note: Two stage pressure regulator configuration

Figure 2
Equipment Configuration for Verifying Hydrocarbon Sensor Performance

Note: Preset flow regulator configuration

Figure 3
Equipment Configuration for Verifying Hydrocarbon Sensor Performance

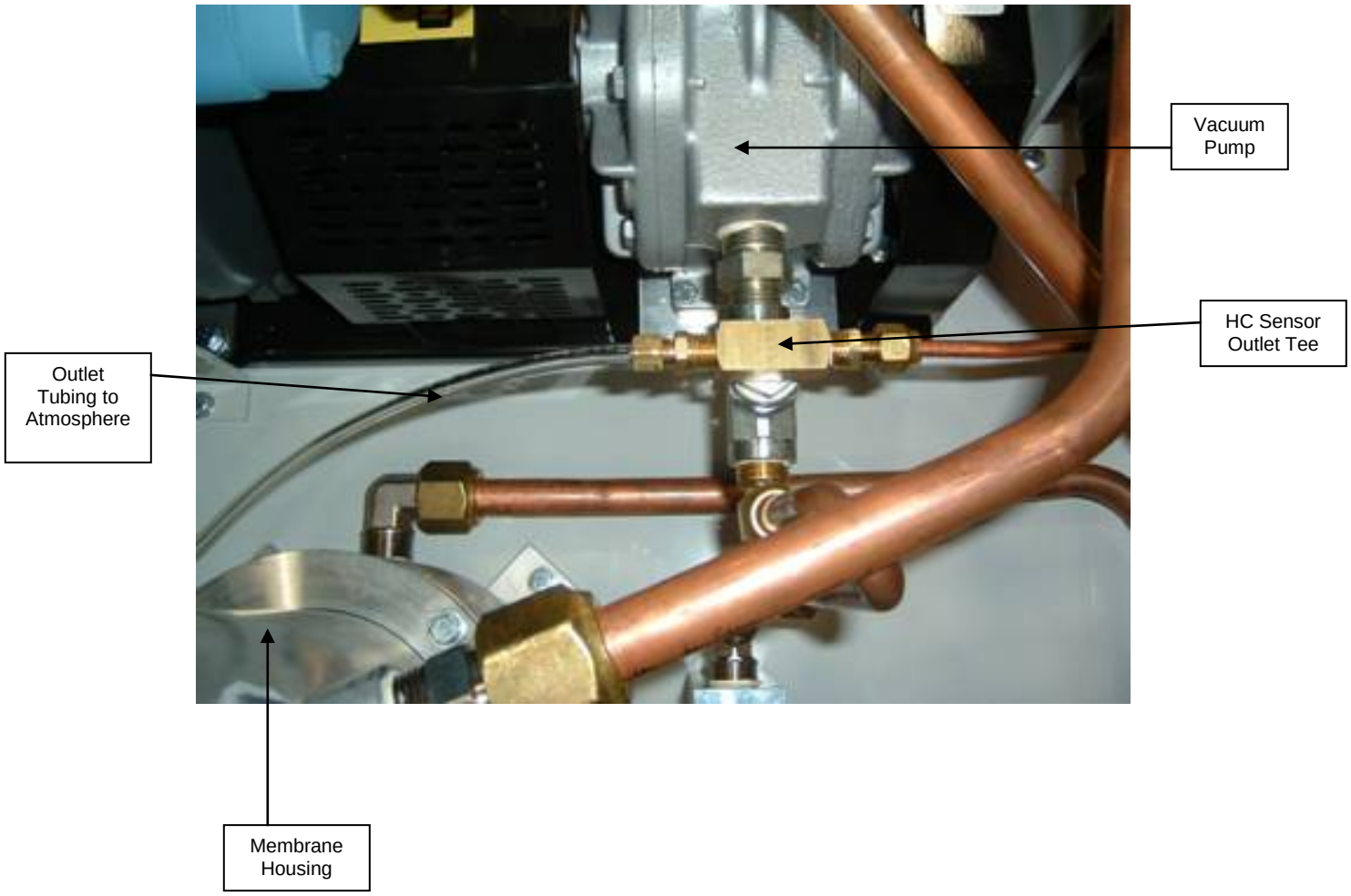
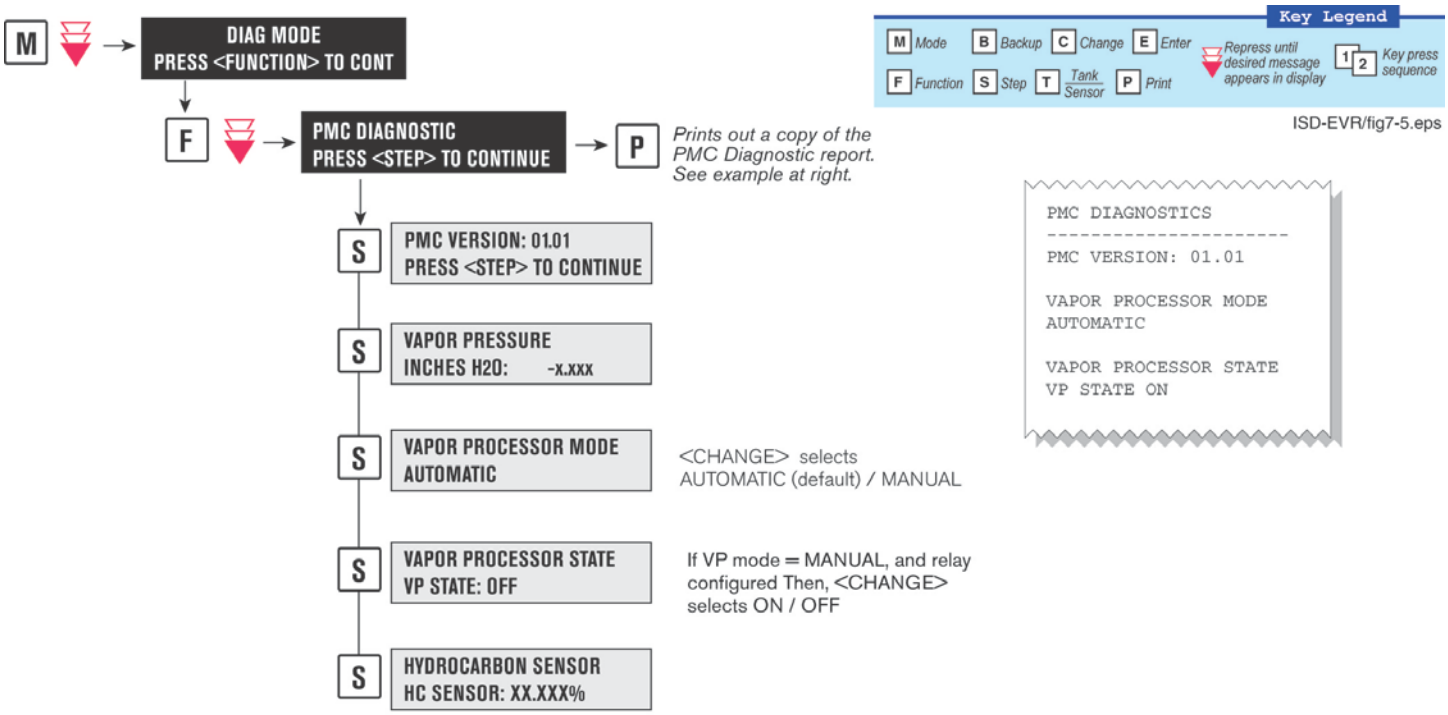


Figure 4
How to access the TLS Console if Maintenance Tracker Is Not Present or Has Been Disabled



Form 1
Hydrocarbon Sensor Verification Data Sheet

Test Data Sheet for Performance Verification of VST NDIR Sensor	
Facility:	Test Company:
Address:	Test Personnel:
City:	VST or Veeder-Root Tech Certification # (as applicable)
State:	
Zip Code:	ICC or District Training Certification (as applicable)

Calibration Gas Concentration (% Propane). Note: Calibration gas information listed in Section 4 of Exhibit 6 shall be attached to this form.		
Zero Gas:	High-Range Gas:	Mid-Range Gas:
Serial #:	Serial #:	Serial #:

Test Results

Start Time	Stop Time	Calibration Gas Percent Concentration (Propane) (step 3.3	Average Percent HC Concentratio n from PMC (step 7)	Percent Difference (Difference shall be within ± 1% for zero and mid-range gas and within ± 2% for high-range gas) (step 8)	Pass/Fail

EXHIBIT 9

VST ECS
Determination of Processor Activation Pressure

Definitions common to all certification and test procedures are in:

D-200 Definition for Vapor Recovery Procedures

For the purpose of this procedure, the term “ARB” refers to the California Air Resources Board, and the term, “ARB Executive Officer” refers to the Executive Officer of the ARB or his or her authorized representative or designee.

1. Purpose and Applicability

1.1 The purpose of this test procedure is to determine compliance with the VST processor activation (e.g. turns on) pressure requirement of Exhibit 2.

1.2 This procedure is applicable for compliance testing.

2. Principle and Summary of Test Procedure

The UST pressure at which the VST processor (Membrane or Green Machine) activates is determined by using a test assembly connected to the vapor pressure sensor as shown in Figure 1 of this procedure (the vapor pressure sensor is located in the dispenser closest to the tanks). The test assembly consists of an oral syringe (or other device capable of introducing low pressures up to approximately 0.5 inches WC) and an electronic pressure measuring device such as a digital manometer connected into a tee at the pressure sensor. This test can be performed while product is being dispensed into motor vehicles.

3. Biases and Interferences

3.1 No transfer of gasoline from any cargo tanks to the USTs shall occur within three hours prior to conducting this test.

3.2 This test shall not be conducted if TP-201.3 was conducted within the last three hours.

3.3 This test shall not be conducted if the processor is operating (audible indication that the processor is running).

3.4 If the GDF is equipped with a wireless vapor pressure sensor (Veeder Root model number 861190-201), the pressure sensor value observed at the TLS console is refreshed on a less frequent basis relative to conventional “wired” vapor pressure sensors due to communication through the wireless components. For wireless vapor pressure sensors, the technician should wait approximately 60 seconds between every 0.1 inch WC interval.

4. Equipment, Range and Accuracy

4.1 Digital Manometer (Electronic Pressure Measuring Device)

A digital (electronic) manometer with 0.01 inches WC, or better resolution. The sensor must have a minimum measuring range of +/- 10 inches WC. The sensor must also be accurate to 0.05 inches WC for any pressure measurement made during the prescribed tests. For a manometer with a +/- 10 inches WC measurement range, this requires a 0.25% basic accuracy.

4.2 Oral Syringe (used in determining processor activation pressure)

Use a 3 cubic centimeter (cc) or 6cc oral syringe or equivalent that is capable of introducing air pressure at approximately 0.1 inches WC increments up to a maximum pressure of 0.5 inches WC (see Figure 1).

5 Calibration Requirements

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

5.2 All electronic pressure measuring devices shall be bench tested for accuracy using a reference gauge, incline manometer or National Institute of Standards and Technology (NIST) traceable standard at least once every 180 consecutive days. Accuracy checks shall be performed, with nitrogen, at a minimum of three (3) points (e.g., 20, 50 and 80 percent of full scale) each for both positive and negative pressure readings. Accuracy shall meet the requirements of Section 4.

6 Pre-Test Procedure

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

6.2 Zero out digital manometer using adjustment pod on top of instrument in accordance with manufacturer's instructions. Drift may be minimized by re-zeroing immediately after use by venting both pressure ports to atmosphere until the display reads exactly zero.

6.3 Prepare test assembly as shown in Figure 1. Lubricate seal of oral syringe plunger with petroleum jelly (or other lubricant). Use Tygon tubing (or equivalent) from the oral syringe (or equivalent) to the pressure sensor and to the digital manometer as shown in Figure 1. Plug or cap the end of the Tygon tubing (used to connect to the tee on the pressure sensor) and pressurize test assembly to approximately 2.0-5.0 inches WC for at least 5 seconds. There shall be no indications of vapor leaks when using liquid leak detection solution.

6.4 Remove the cap from the ambient reference port of the Vapor Pressure Sensor valve and connect the Tygon tubing (or equivalent) of the test assembly to the tee on the Vapor Pressure Sensor Valve as shown in Figure 1.

7 Test Procedure

7.1 Close the ball valve located at the tee to the vapor pressure sensor to isolate the vapor pressure sensor from the UST ullage (see Atmospheric Valve Position in Figure 2).

7.2 Slowly press the oral syringe (or equivalent) until a pressure of 0.10 inches WC is obtained. Maintain this pressure for at least 5 seconds. Does the VST processor activate? If the processor does not activate, continue increasing pressure at 0.1 inches WC intervals and hold for at least 5 seconds per interval or until the processor activates, up to a maximum pressure of 0.5 inches WC.

If the GDF is equipped with a wireless vapor pressure sensor (Veeder Root part number 861190-201), the pressure sensor value observed at the TLS console is refreshed on a less frequent basis relative to conventional “wired” vapor pressure sensors due to communication through the wireless components. For wireless vapor pressure sensors, the technician should hold the desired pressure for approximately 60 seconds between every 0.1 inch WC interval.

NOTE: Listen for audible indication that the processor activated (or turned on).

7.3 Record the VST processor activation pressure on Form 1, Data Form for VST Processor Activation Pressure Test.

7.4 Verify that the processor activation pressure value is less than or equal to 0.4 inches WC. If the pressure value is not less than or equal to 0.4 inches WC, the VST processor is not in compliance with the activation pressure requirements of Exhibit 2.

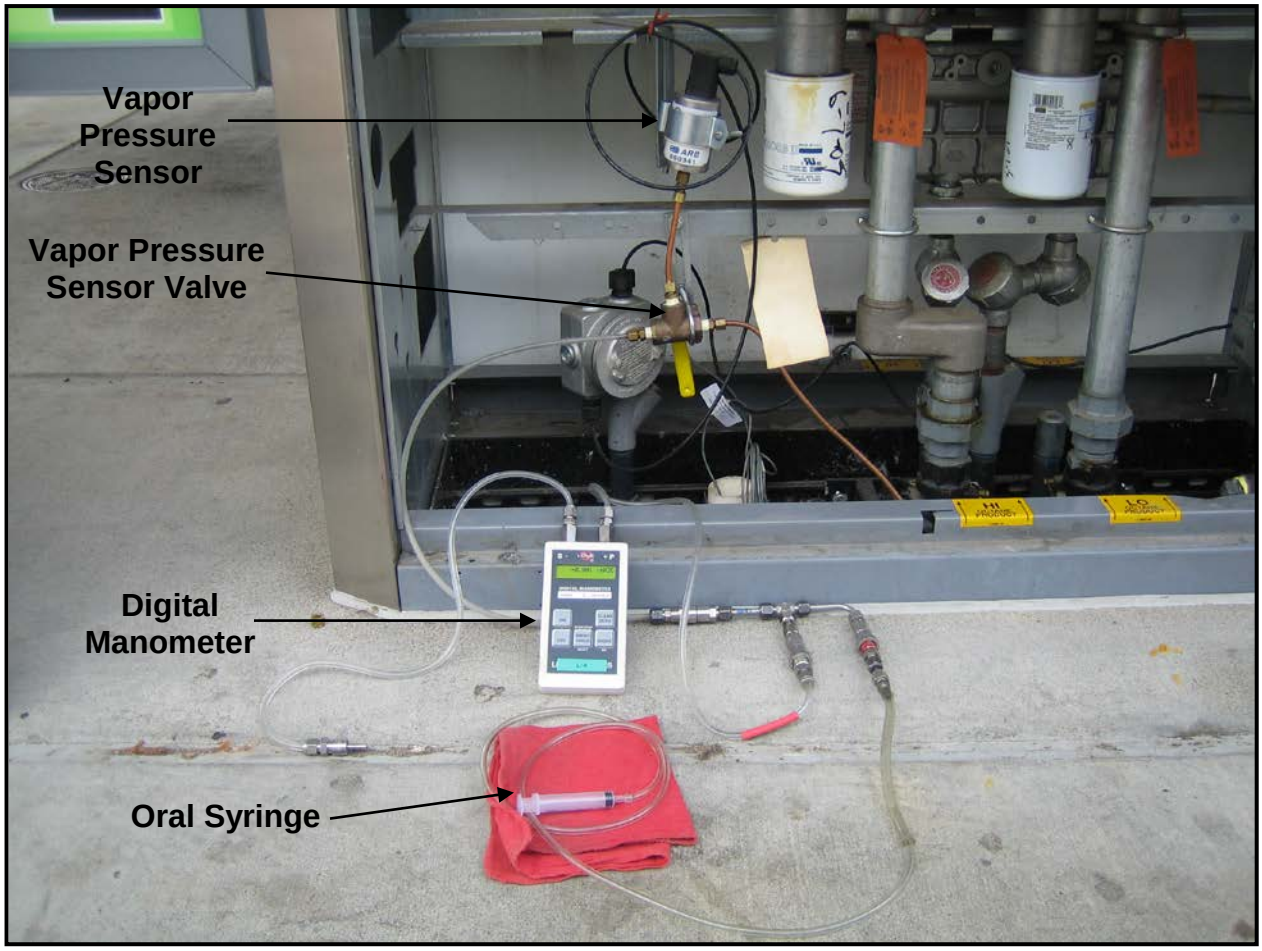
7.5 Replace the cap on the ambient reference port of the Vapor Pressure Sensor valve. Restore the Vapor Pressure Sensor valve by turning it 90 degrees so that the flow arrows point to both the Vapor Pressure Sensor sensing port and the UST vapor space sensing line (see Normal Valve Position in Figure 2).

8 Alternate Procedures and Reporting Forms

8.1 This procedure shall be conducted as specified. Any modifications to this test procedure shall not be used unless prior written approval has been obtained from the ARB Executive Officer, pursuant to Section 14 of CP-201.

8.2 District may require the use of alternate forms, provided they include the same minimum parameters as identified in Form 1.

Figure 1
Typical Field Installation of Test Assembly for Determining VST Processor Activation



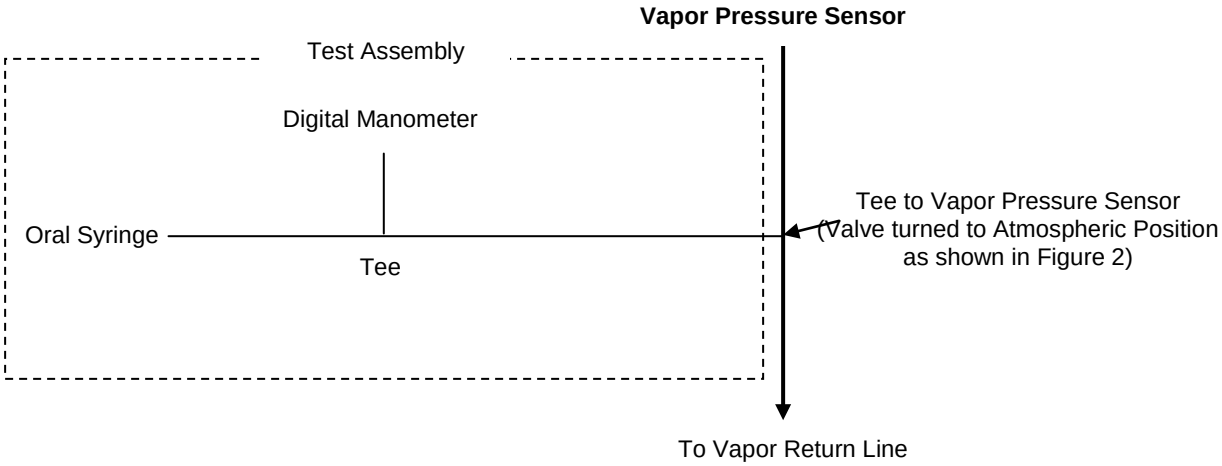
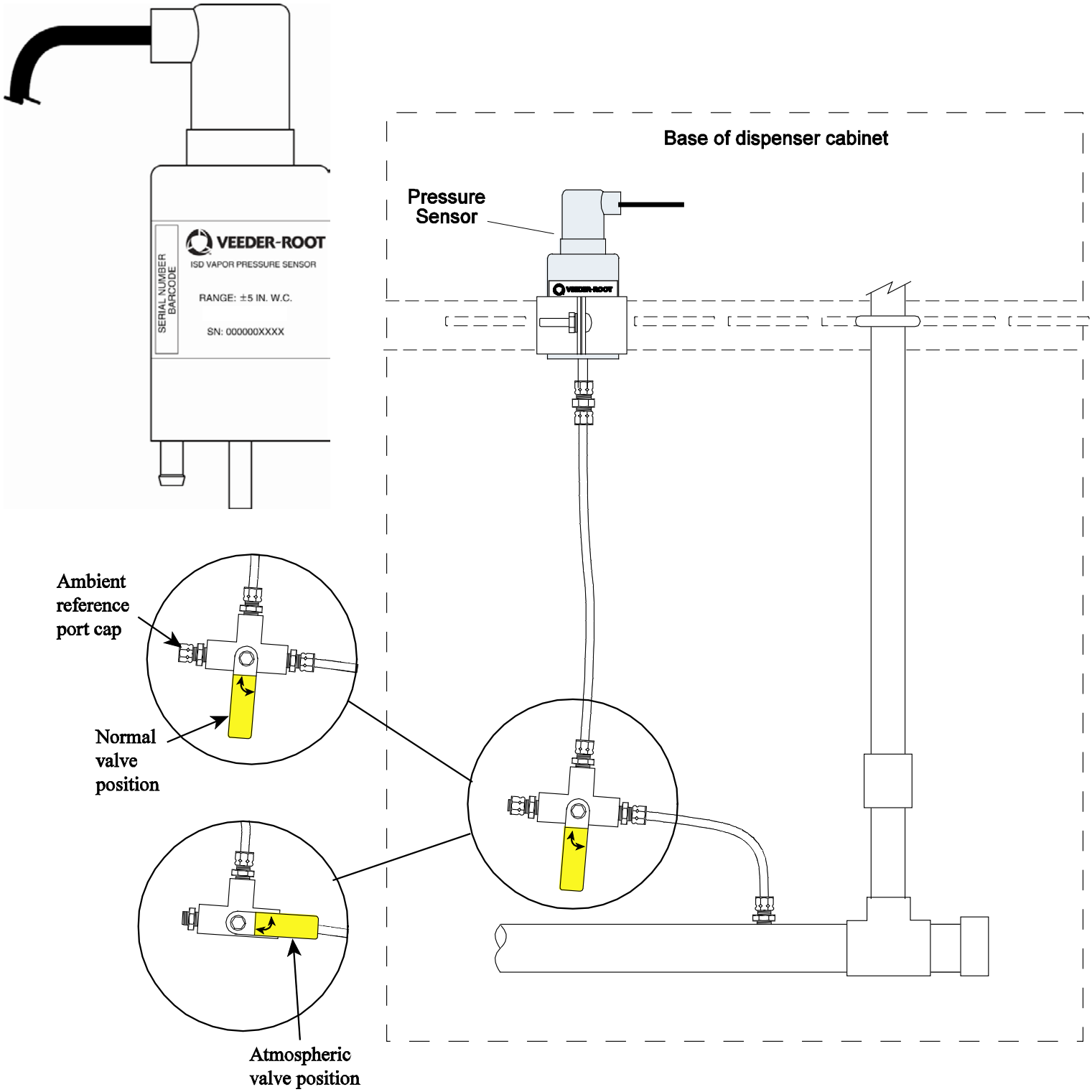


Figure 2
Vapor Pressure Sensor Valve Position



Form 1

Data Form for VST Processor Activation Pressure Test

DATE OF TEST _____

SERVICE COMPANY NAME	**SERVICE COMPANY'S TELEPHONE**
SERVICE TECHNICIAN	**VST or VEEDER-ROOT TECH CERTIFICATION # (as applicable)** **ICC or DISTRICT TRAINING CERTIFICATION (as applicable)**
STATION NAME	**DISTRICT PERMIT #**
STATION ADDRESS **CITY**	**STATE** **ZIP**

PRESSURE SENSOR LOCATION: DISPENSER FUELING POINT (FP) NUMBERS	**FP #_____**	**PRESSURE SENSOR SERIAL NUMBER: _____**

STEP 8.1	**VALVE SET TO ATMOSPHERIC VALVE POSITION (PER FIG. 2)?**	☐
STEP 8.3	**VST PROCESSOR ACTIVATION PRESSURE: _____Inches WC**	
STEP 8.4	**Is the VST Processor Activation Pressure ≤ 0.4 inches WC?** ☐ **Yes** ☐ **No** **IF NO: THE VST PROCESSOR IS NOT IN COMPLIANCE WITH THE ACTIVATION PRESSURE REQUIREMENTS OF EXHIBIT 2.**	
STEP 8.5	**REFERENCE PORT CAP REPLACED?** **VALVE SET TO NORMAL VALVE POSITION (PER FIG 2)?**	☐ ☐

EXHIBIT 10

Veeder Root Vapor Pressure Sensor Verification Test Procedure

Definitions common to all certification and test procedures are in:

D-200 Definition for Vapor Recovery Procedures

For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board, and the term, "ARB Executive Officer" refers to the Executive Officer of the ARB or his or her authorized representative or designee.

1. Purpose and Applicability

1.1 The purpose of this test procedure is to determine if the Veeder-Root Vapor Pressure Sensor (listed in Exhibit 1) is operating in accordance with the pressure sensor requirements of Exhibit 2. This procedure is used:

1.1.1 To determine the measured ullage pressure in underground gasoline storage tanks (USTs) and compare to the Veeder-Root Vapor Pressure Sensor (Vapor Pressure Sensor) reading at the TLS console.

1.1.2 To determine whether the Vapor Pressure Sensor complies with the performance specification when the sensor is exposed to ambient pressure.

1.2 This procedure is applicable for compliance testing.

1.3 The term "TLS Console" used throughout this Exhibit includes but is not limited to TLS-350, TLS-350 Plus, TLS-350R, Red Jacket ProMax, Gilbarco EMC consoles which are also referenced in Exhibit 1.

2. Principle and Summary of Test Procedure

Determining UST Pressure –
If the Vapor Pressure Sensor is installed on the vapor return line of a dispenser closest to the USTs, the pressure of the USTs is determined at the Phase I vapor recovery adaptor (dry break assembly) with a vapor coupler test assembly as shown in Figures 2 and 3 of TP-201.3 (*Determination of 2 Inch WC Static Pressure Performance of Vapor Recovery Systems of Dispensing Facilities*) or a modified dust cap test assembly as shown in Figures 10-1 and 10-2 of this exhibit. The modified dust cap test assembly is equipped with a center probe, which opens the dry break, and a quick connect fitting that is connected to an electronic pressure measuring device or digital manometer. The modified dust cap test assembly should open the dry break with minimal venting of the USTs. This test can be performed while product is being dispensed into motor vehicles.

If the Vapor Pressure Sensor is installed on the vent stack, the pressure of the USTs is determined at the vent stack test port as shown in Figure 10-6. The vent stack test port is equipped with a quick connect fitting that is connected to an electronic pressure measuring device or digital manometer. This test can be performed while product is being dispensed into motor vehicles.

Determining Ambient Pressure - The Vapor Pressure Sensor is subjected to ambient pressure by turning the Vapor Pressure Sensor valve, which is located on the vent stack or in the dispenser closest to the tanks, to the atmospheric valve position as shown in Figure 10-3. This test can be performed while product is being dispensed into motor vehicles.

3. Biases and Interferences

3.1 This test shall not be conducted within 30 minutes following gasoline transfer from a cargo tank.

3.2 This test shall only be conducted when the processor is temporarily disabled. The following table provides instructions on how to disable each processor listed in the Executive Order.

Table 10-1: Instructions for Disabling the Processor

Processor	Instructions
Healy Clean Air Separator (CAS)	To isolate the Healy CAS from the UST system, all four ball valves shall be closed, as shown in Figures 10-9 and 10-10 (for horizontal configurations)
Hirt VCS 100	At the Hirt Indicator Panel, turn the Power Switch to the “Off” position as shown in Figure 10-13
Veeder Root Vapor Polisher	At the TLS Console, manually close the vapor valve in the PMC Diagnostic menu as shown in Figure 10-8
VST Membrane/ VST Green Machine	At the TLS Console, manually turn off the processor in the PMC Diagnostic menu as shown in Figure 10-7

3.3 The range of the Vapor Pressure Sensor is between positive (+5.0) and negative five (-5.0) inches water column. If the headspace of the underground storage tank is under a vacuum of greater than negative five inches water column (i.e.-6, -7, -8, etc.), the results of section 8.4 could be biased toward non compliance. Under such condition, the vacuum level should be relieved to a value between negative five and negative two inches water column by depressing the poppet of the Phase I vapor adaptor. Once an adequate amount of air has been ingested into the headspace, the remaining vacuum must be allowed to stabilize for a minimum of fifteen (15) minutes before taking a reading.

3.4 If the Vapor Pressure Sensor is located at the vapor return line of the dispenser, the UST pressure must be determined at the Phase I vapor adaptor as shown in Figures 10-1 and 10-2 of this exhibit.

3.5 If the Vapor Pressure Sensor is located at the vent stack, the UST pressure must be determined at the vent stack test port as shown in Figure 10-6.

3.6 If Veeder-Root’s “Maintenance Tracker” is installed and enabled, access to the “diagnostic mode” and “set-up mode” of the TLS Console is prohibited unless a Maintenance Tracker Technician Key or personal computer equipped with Veeder-Root’s ISD Setup Tool Software Version 1.09 or higher is made

available. Maintenance Tracker is an optional security device designed to prevent unauthorized tampering and clearing of Veeder-Root tank monitoring and ISD alarms. Maintenance Tracker resides within the TLS console and when enabled, a message will appear on the two line display of the TLS console. For additional instructions on how to access the desired parameters to complete this test procedure, see Exhibit 18; "Accessing PMC and ISD Parameters at Gasoline Dispensing Facilities (GDFs) with Veeder-Root's "Maintenance Tracker" Security Feature Installed & Enabled".

3.7 The vapor pressure sensor value observed at the TLS console is refreshed at the frequency defined in Table 10-2. Prior to simultaneously recording the values observed at the digital manometer and the TLS console, the technician should wait until the value the TLS console is refreshed.

Table 10-2: Vapor Pressure Sensor Refresh Rate

Veeder-Root Vapor Pressure Sensor Configuration	TLS Console Refresh Rate
Wired	~10 seconds
Wireless	~60 seconds

4. Range and Accuracy

4.1 A digital (electronic) manometer with 0.01 inches WC, or better, resolution. The sensor must have a minimum measuring range of +/- 10 inches WC. The sensor must also be accurate to 0.05 inches WC for any pressure measurement made during the prescribed tests. For a manometer with a +/- 10 inches WC measurement range, this requires a 0.25% basic accuracy.

5. Equipment

5.1 If the Vapor Pressure Sensor is located at the vapor return line of the dispenser closest to the USTs, the Phase I vapor adaptor dust cap test assembly shall be modified in the following manner:

5.1.1. Install a probe in the center of the dust cap as shown in Figure 10-1 (one method is to tap and thread probe). The probe shall be of sufficient length to open approximately ½ inch of the dry break while allowing the cap to maintain a leak tight seal on the adaptor.

5.1.2. Install a female quick connect fitting on the top of the dust cap, offset from the center probe as shown in Figure 10-1. A Swagelok, part number SS-QC4-B-4-PM, quick connect fitting or equivalent can be used.

5.1.3. Use “Tygon tubing” or equivalent to connect the manometer to the dust cap (Figure 10-2). Install a male quick connect fitting (Swagelok part number SS-QC4-5-400 or equivalent can be used) on one end of a ferrule stainless steel tube (or equivalent material). Connect one end of the “Tygon tubing” to the stainless steel tube and connect the other end to the digital manometer (Figure 10-2).

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

5.3 If the Vapor Pressure Sensor is installed at the vent stack, the following test assembly is required:

5.3.1 A test port and female quick connect fitting shall be installed on the plumbing fixture below the Vapor Pressure Sensor enclosure as shown in Figure 10-6. A Swagelok, part number SS-QC4-PM, quick connect fitting or equivalent can be used.

5.3.2 Use “Tygon tubing” or equivalent to connect the manometer to the test port (Figure 10-2). Install a male quick connect fitting (Swagelok part number SS-QC4-5-400 or equivalent can be used) on one end of a ferrule stainless steel tube (or equivalent material). Connect one end of the “Tygon tubing” to the stainless steel tube and connect the other end to the digital manometer (Figure 10-2).

5.3.3 Use various pipe fittings to accommodate the ¼ inch test port, including half inch NPT female tee fitting and half inch to quarter inch reducer, as shown in Figure 10-6.

5.4 Digital Manometer (Electronic Pressure Measuring Device)
See the requirements of Section 4.1 above.

6 Calibration Requirements

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

6.2 All electronic pressure measuring devices shall be bench tested for accuracy using a reference gauge, incline manometer or National Institute of Standards and Technology (NIST) traceable standard at least once every 180 consecutive days. Accuracy checks shall be performed at a minimum of three (3) points (e.g., 20, 50 and 80 percent of full scale) each for both positive and negative pressure readings. Accuracy shall meet the requirements of Section 4.

Determining UST Pressure

7 Pre-Test Procedure

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

7.2 Zero out digital manometer in accordance with manufacturer's instructions. Drift may be minimized by re-zeroing immediately after use by venting both pressure ports to atmosphere until the display reads exactly zero.

7.3 If the Vapor Pressure Sensor is located at the vapor return line of the dispenser, attach the male quick connect fitting to the female quick connect fitting on the modified dust cap test assembly.

If the Vapor Pressure Sensor is located at the vent stack, attach the male quick connect fitting to the female quick connect fitting on the vent stack test port.

7.4 Attach digital manometer to open end of Tygon tubing.

7.5 If the Vapor Pressure Sensor is installed at the vapor return line of the dispenser, attach the dust cap or vapor coupler test assembly to the Phase I vapor adaptor (Figure 10-2).

8 Test Procedure

8.1 If the headspace of the underground storage tank is under a vacuum of greater than negative five inches water column (i.e.-6, -7, -8 etc.), the vacuum should be relieved to a value between negative five and negative two inches water column as described in Section 3.3 above.

8.2 For gasoline dispensing facilities equipped with the VST Membrane Processor, VST Green Machine Processor, or Veeder Root Vapor Polisher Processor access the current vapor pressure sensor reading as indicated in Figure 10-4.

For gasoline dispensing facilities equipped with the Franklin Fueling Systems Healy Clean Air Separator or Hirt VCS 100 Thermal Oxidizer access the current vapor pressure sensor reading as indicated in Figure 10-5.

8.3 Simultaneously record the ullage pressure value from the digital manometer and the TLS Console. Record the above information on Form 1 "Data Form for Vapor Pressure Sensor UST Pressure Test." Districts may require the use of an alternate form, provided it includes the same minimum parameters as identified in the Data Form.

Note: The vapor pressure sensor value observed at the TLS console is refreshed at the frequency defined in Table 10-2. Prior to simultaneously recording the values observed at the digital manometer and the TLS console, the technician should wait until the value at the TLS console is refreshed.

8.4 Verify that the pressure reading from the TLS Console is within ±0.2 inches WC from the digital manometer reading. If difference is not within ±0.2 inches WC, the pressure sensor is not in compliance with the pressure sensor requirements of Exhibit 2.

8.5 If the gasoline dispensing facility is equipped with the VST Membrane Processor or the Veeder Root Vapor Polisher Processor, press the <MODE> key to leave the 'PMC DIAGNOSTIC' menu.

If the gasoline dispensing facility is equipped with the Franklin Fueling Systems Healy Clean Air Separator or Hirt VCS 100 Thermal Oxidizer, press the <MODE> key to leave the 'SMARTSENSOR DIAGNOSTIC' menu.

Determining Ambient Pressure

9 Test Procedure for Testing Sensor Under Ambient Pressure

9.1 Access the Vapor Pressure Sensor, which is located on the vent stack or in the dispenser closest to the tanks. Record pressure sensor location and serial number on the data form.

9.2 Remove the cap from the ambient reference port of the Vapor Pressure Sensor valve and open the valve to atmosphere by turning it 90 degrees so that the flow arrows point to both the Vapor Pressure Sensor sensing port and the ambient reference port (see Figure 10-3).

9.3 For gasoline dispensing facilities equipped with the VST Membrane Processor, VST Green Machine Processor, or Veeder Root Vapor Polisher Processor access the current vapor pressure sensor reading as indicated in Figure 10-4.

For gasoline dispensing facilities equipped with the Franklin Fueling Systems Healy Clean Air Separator or Hirt VCS 100 Thermal Oxidizer access the current vapor pressure sensor reading as indicated in Figure 10-5.

9.4 Simultaneously record the ullage pressure value from the digital manometer and the TLS Console. Record the above information on Form 1 "Data Form for Vapor Pressure Sensor UST Pressure Test." Districts may require the use of an alternate form, provided it includes the same minimum parameters as identified in the Data Form.

Note: The vapor pressure sensor value observed at the TLS console is refreshed at the frequency defined in Table 10-2. Prior to simultaneously recording the values observed at the digital manometer and the TLS console, the technician should wait until the value at the TLS console is refreshed.

9.5 Verify that the pressure value is between +0.2 and -0.2 inches WC. If the pressure value is not within this range, the pressure sensor is not in compliance with the pressure sensor requirements of Exhibit 2.

9.6 Replace the cap on the ambient reference port of the Vapor Pressure Sensor valve. Restore the Vapor Pressure Sensor valve by turning it 90 degrees so that the flow arrows point to both the Vapor Pressure Sensor sensing port and the UST vapor space sensing line (ref. Figure 10-3).

9.7 If the gasoline dispensing facility is equipped with the VST Membrane Processor, VST Green Machine Processor, or the Veeder Root Vapor Polisher Processor, press the <MODE> key to leave the 'PMC DIAGNOSTIC' menu.

If the gasoline dispensing facility is equipped with the Franklin Fueling Systems Healy Clean Air Separator or the Hirt VCS 100 Thermal Oxidizer, press the <MODE> key to leave the 'SMARTSENSOR DIAGNOSTIC' menu.

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

10 Post Test Procedure

Upon conclusion of this test, the processor must be re-enabled. The following table provides re-enable instructions for each processor listed in the Executive Order.

Table 10-3: Instructions for Re-Enabling the Processor

Processor	Instructions
Healy Clean Air Separator (CAS)	The four ball valves on the Healy CAS shall be locked in their normal operating positions as shown in Figures 10-11 or 10-12 (for horizontal configuration)
Hirt VCS 100	At the Hirt Indicator Panel, turn the Power Switch to the "On" position as shown in Figure 10-13
Veeder Root Vapor Polisher	At the TLS Console, enter the PMC Diagnostic Menu and set the vapor valve to "automatic mode" as shown in Figure 10-8.
VST Membrane/VST Green Machine	At the TLS Console, enter the PMC Diagnostic Menu and manually turn on the processor as shown in Figure 10-7

11 Alternate Procedures

This procedure shall be conducted as specified. Any modifications to this test procedure shall not be used unless prior written approval has been obtained from the ARB Executive Officer, pursuant to Section 14 of CP-201.

Figure 10-1
Typical Modified Phase I Vapor Adaptor Dust Cap (Bottom View)

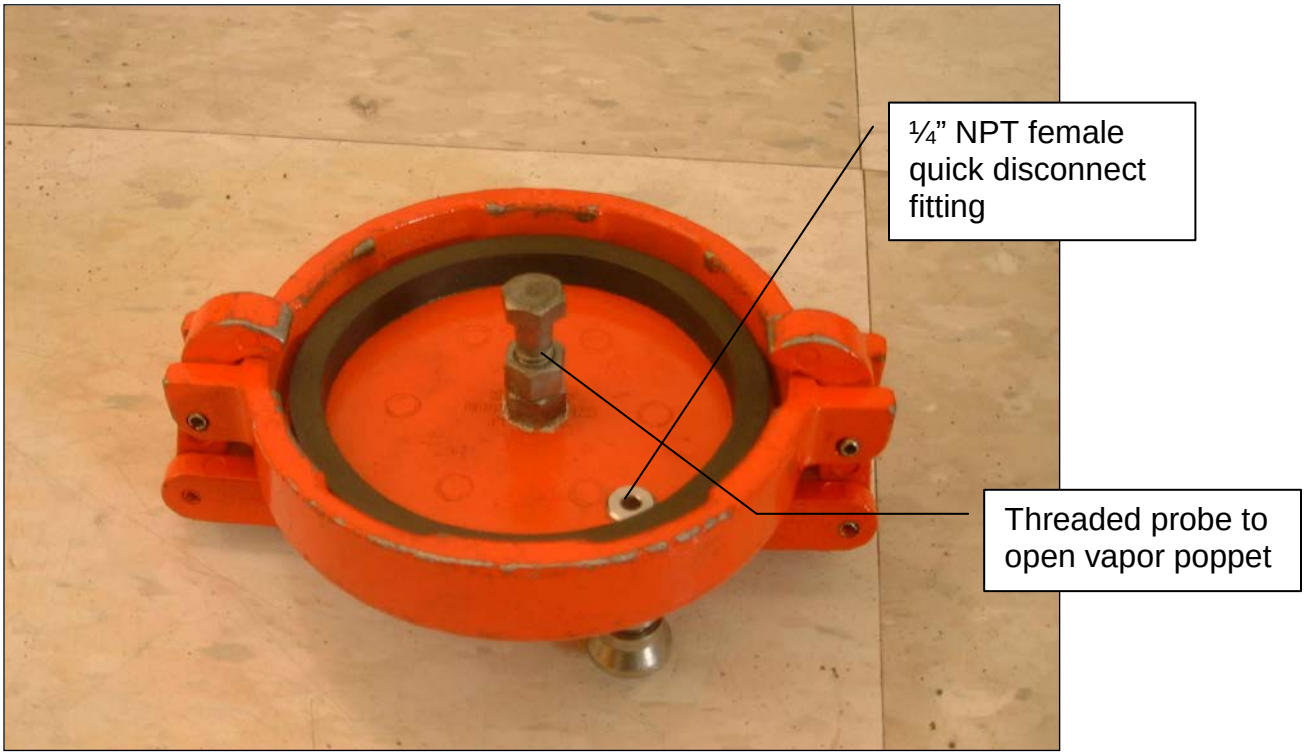


Figure 10-2
Typical Field Installation of UST Pressure Measurement Assembly

Figure10-3
Vapor Pressure Sensor Valve Position

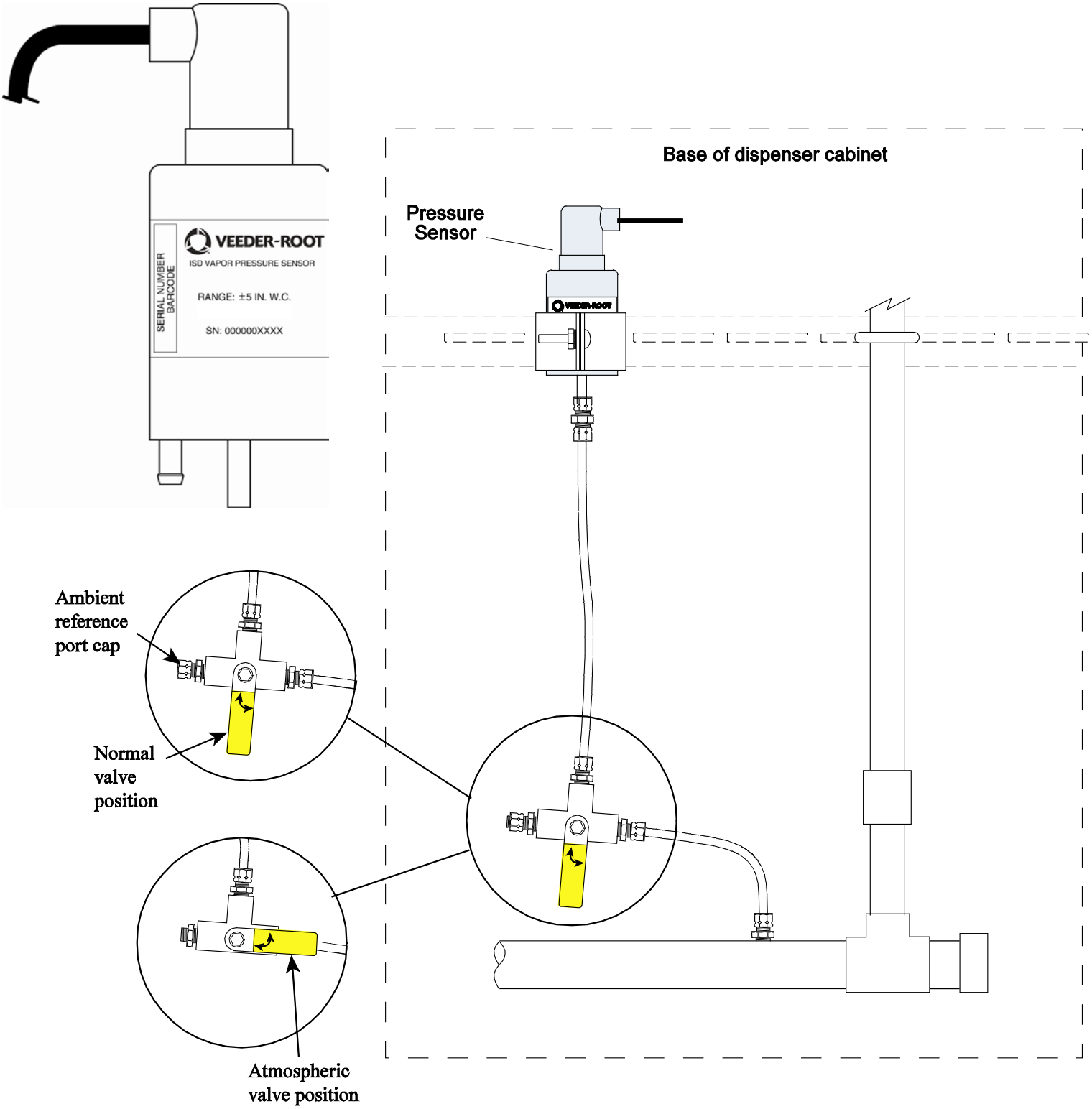


Figure 10-4
Accessing the Vapor Pressure Sensor Reading for GDFs Equipped with the VST Membrane Processor or Veeder Root Vapor Polisher Processor

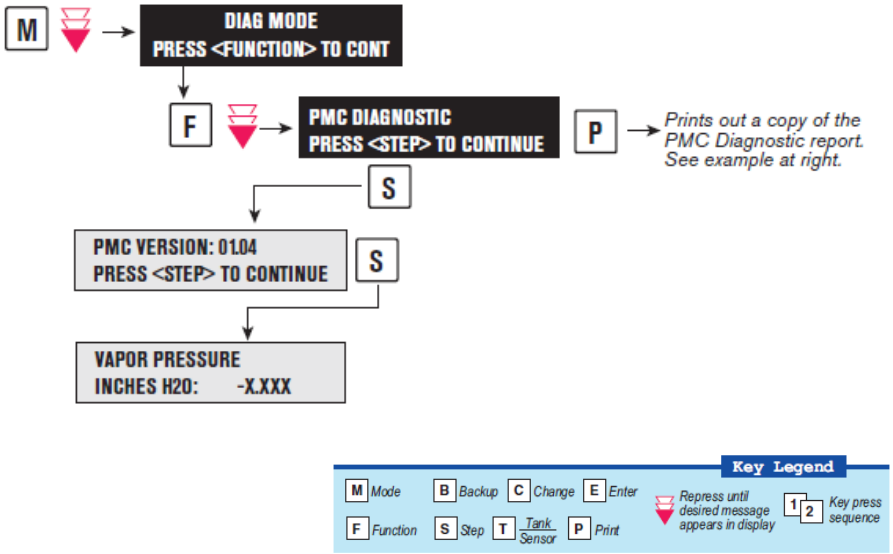


Figure 10-5
Accessing the Vapor Pressure Sensor Reading for GDFs Equipped with the Franklin Fueling Systems Healy Clean Air Separator or Hirt VCS 100 Thermal Oxidizer

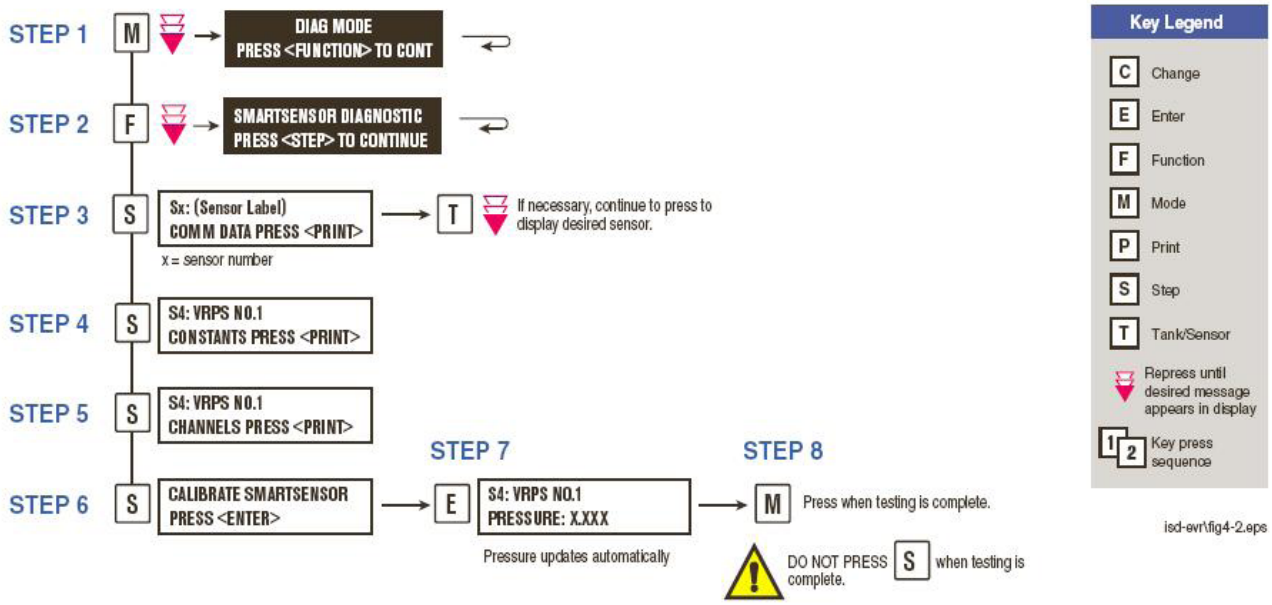


Figure 10-6
Vapor Pressure Sensor Vent Stack Test Port Configuration

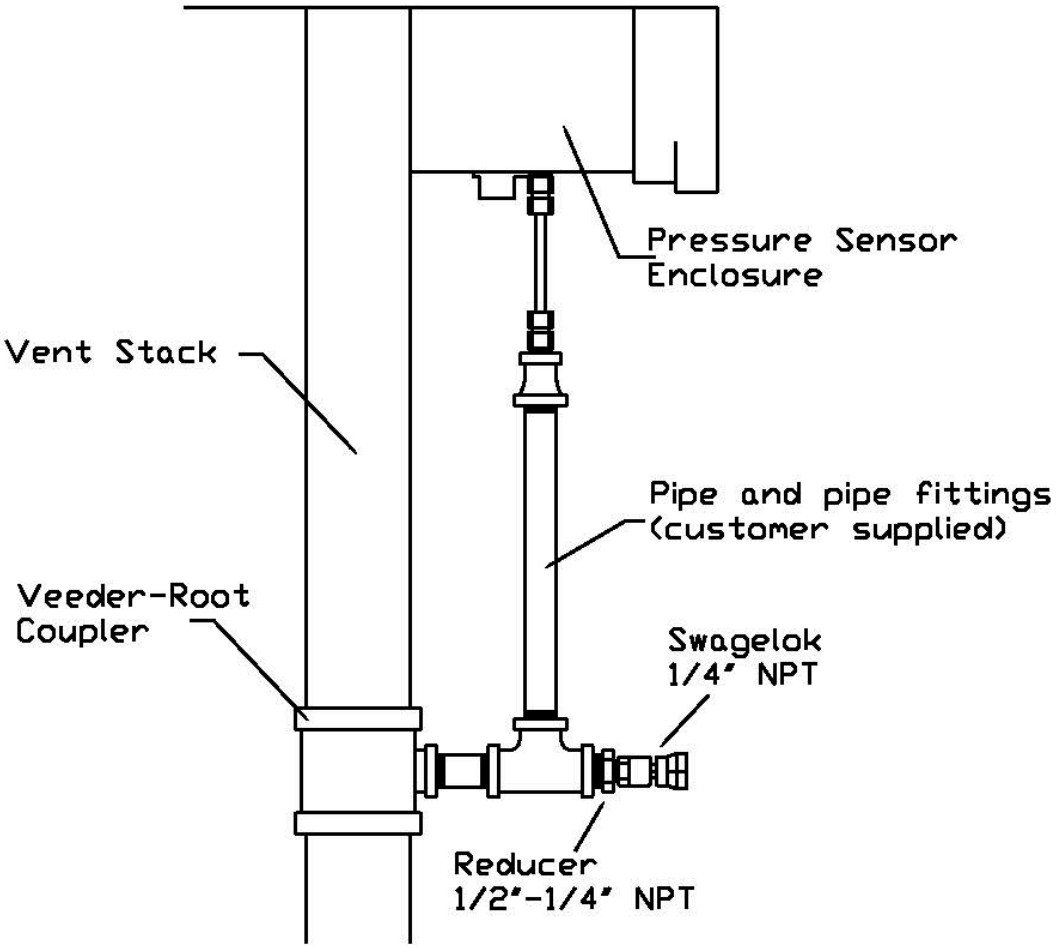


Figure 10-7
How to Disable and Re-enable VST Processors

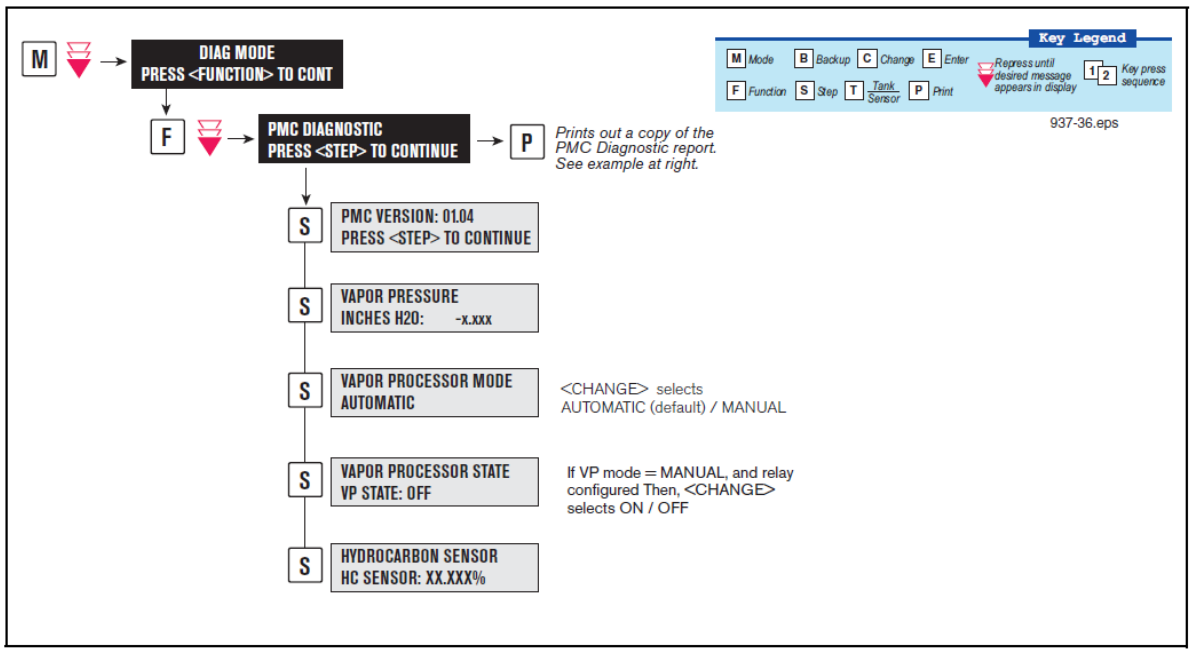


Figure 10-8
How to Disable and Re-enable the Veeder-Root Vapor Polisher

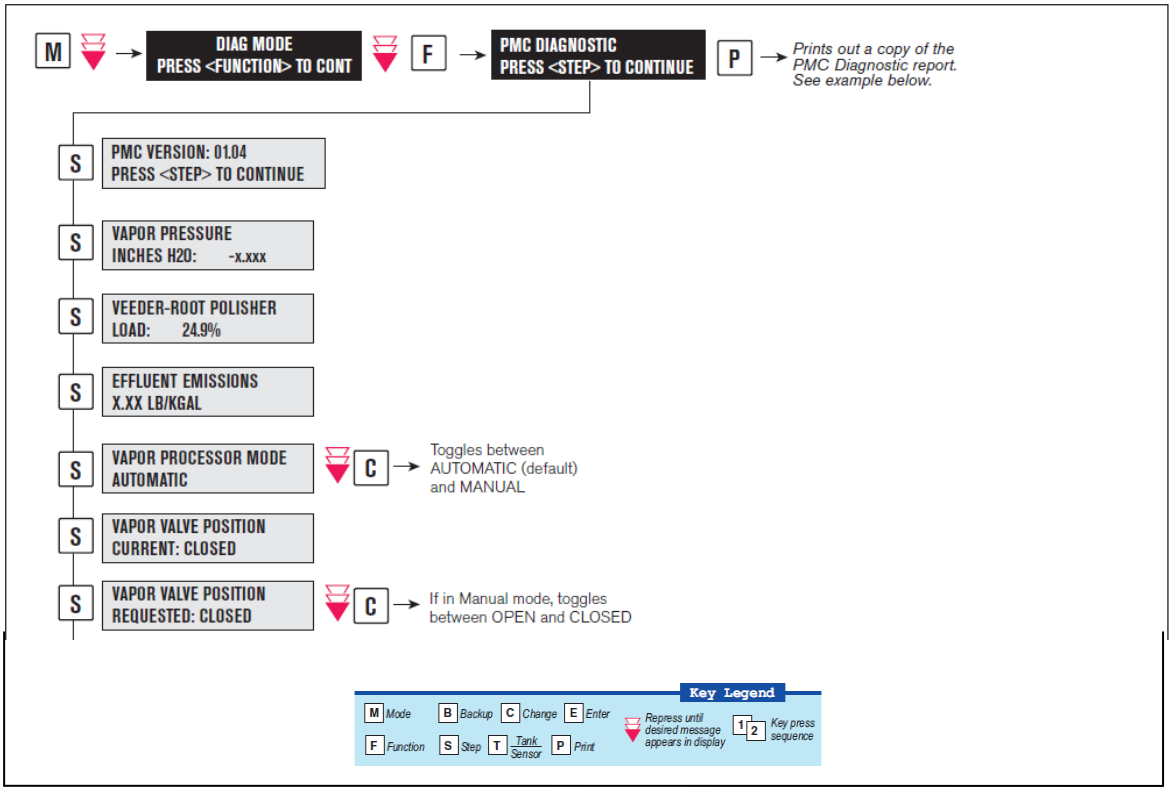


Figure 10-9
How to Disable the Healy Clean Air Separator (CAS)

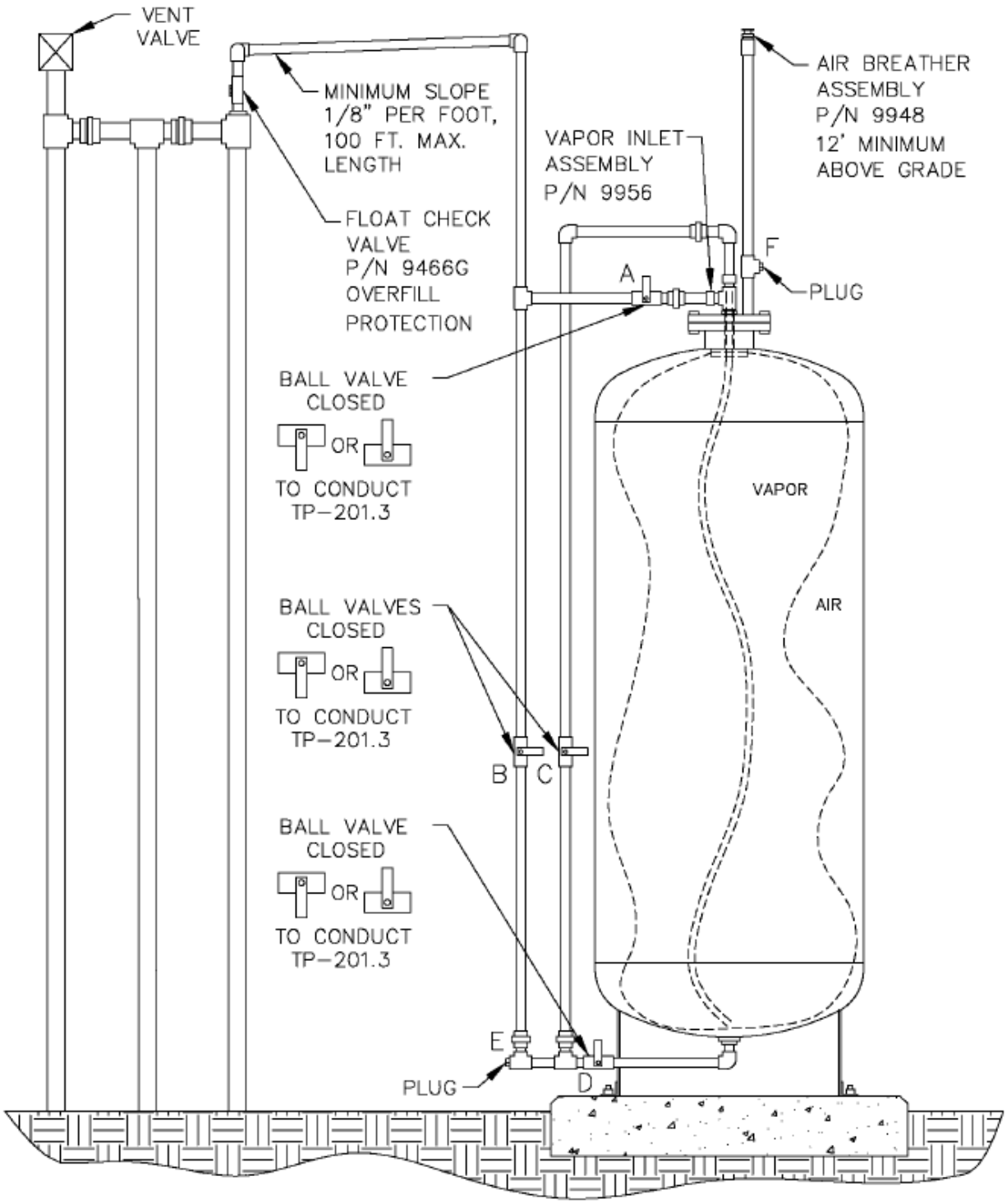


Figure 10-10
How to Disable the Healy Clean Air Separator (CAS)
Horizontal Configuration

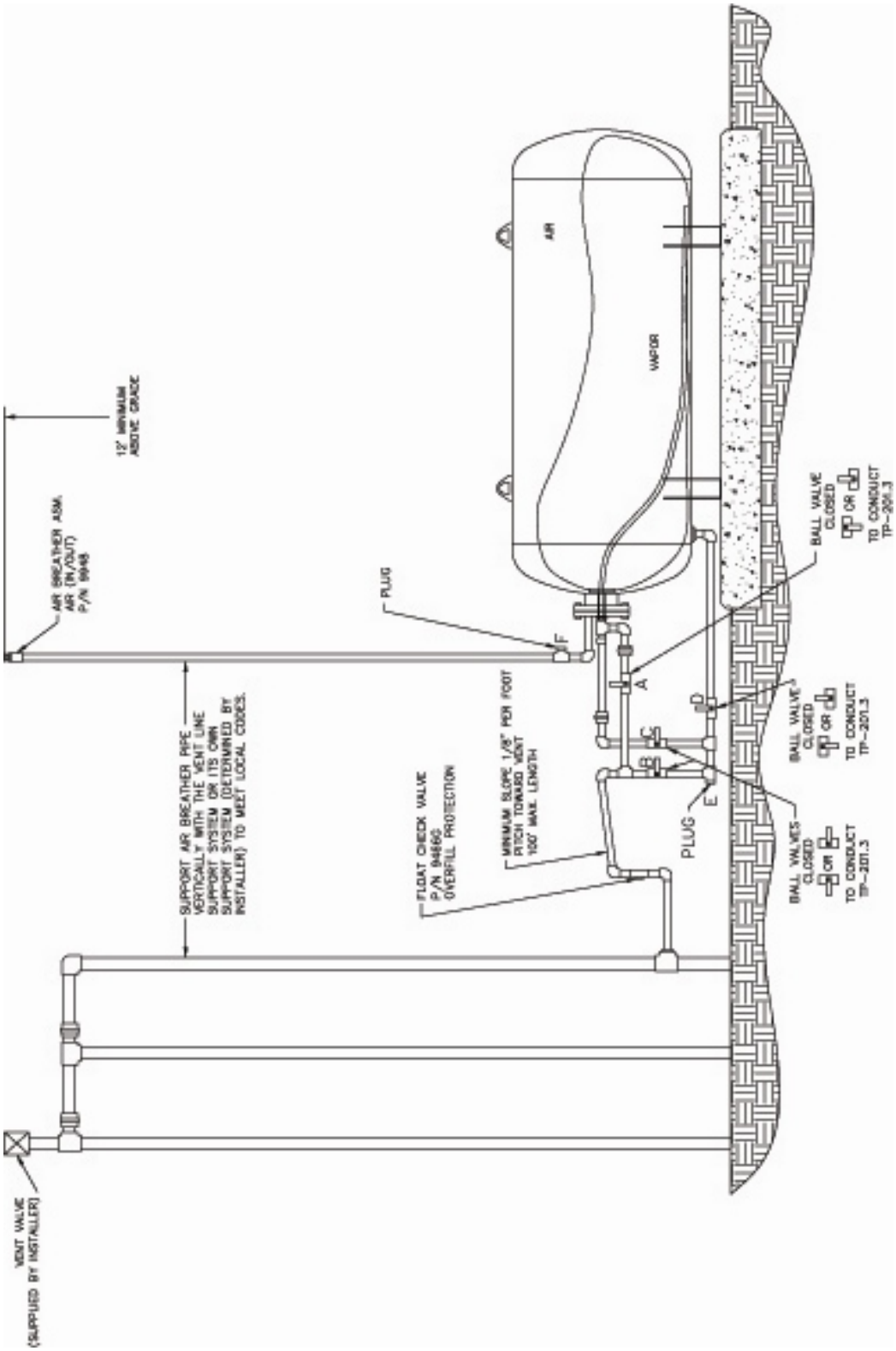


Figure 10-11
How to Re-enable the Healy Clean Air Separator (CAS)

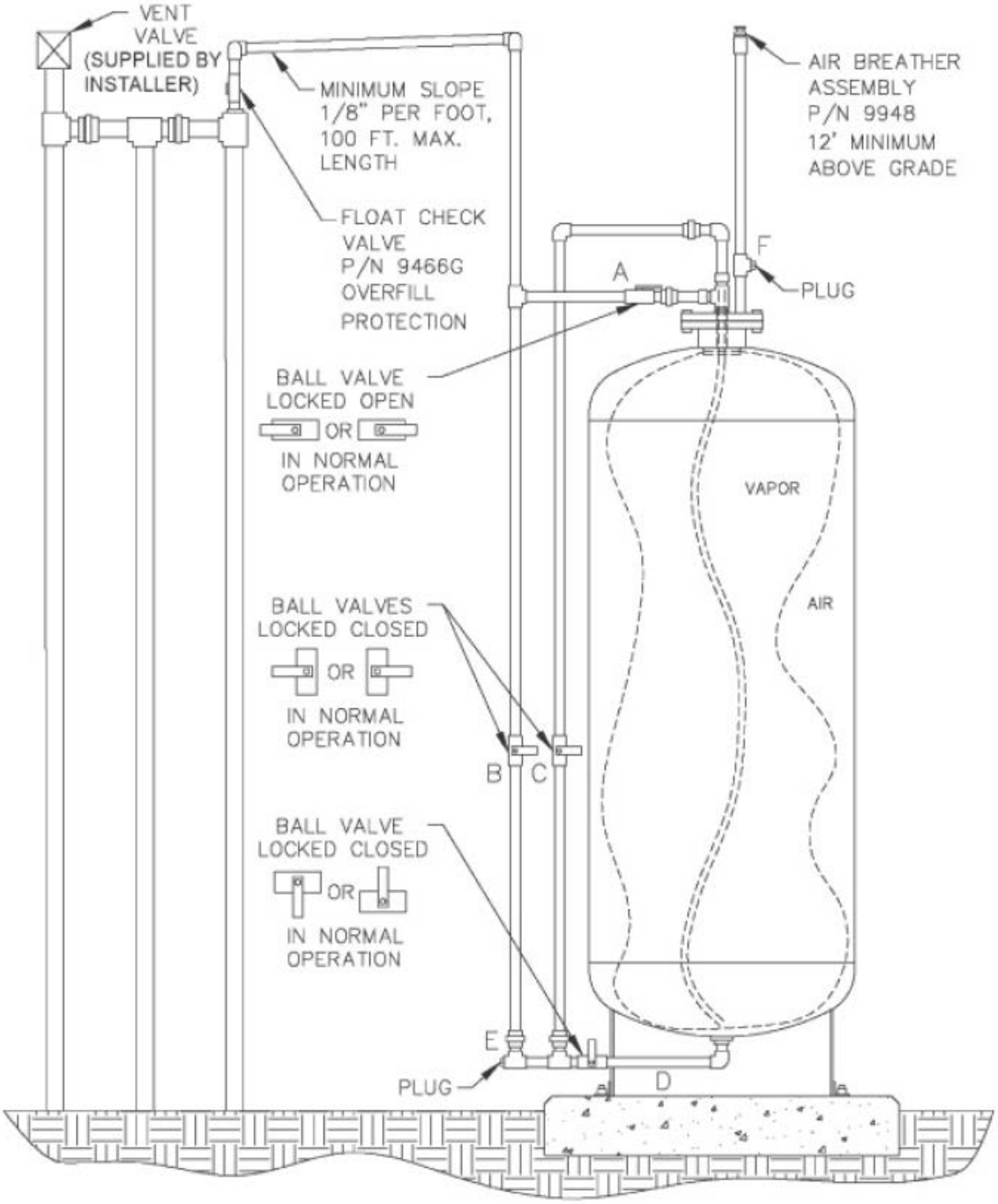


Figure 10-12
How to Re-enable the Healy Clear Air Separator (CAS)
Horizontal Configuration

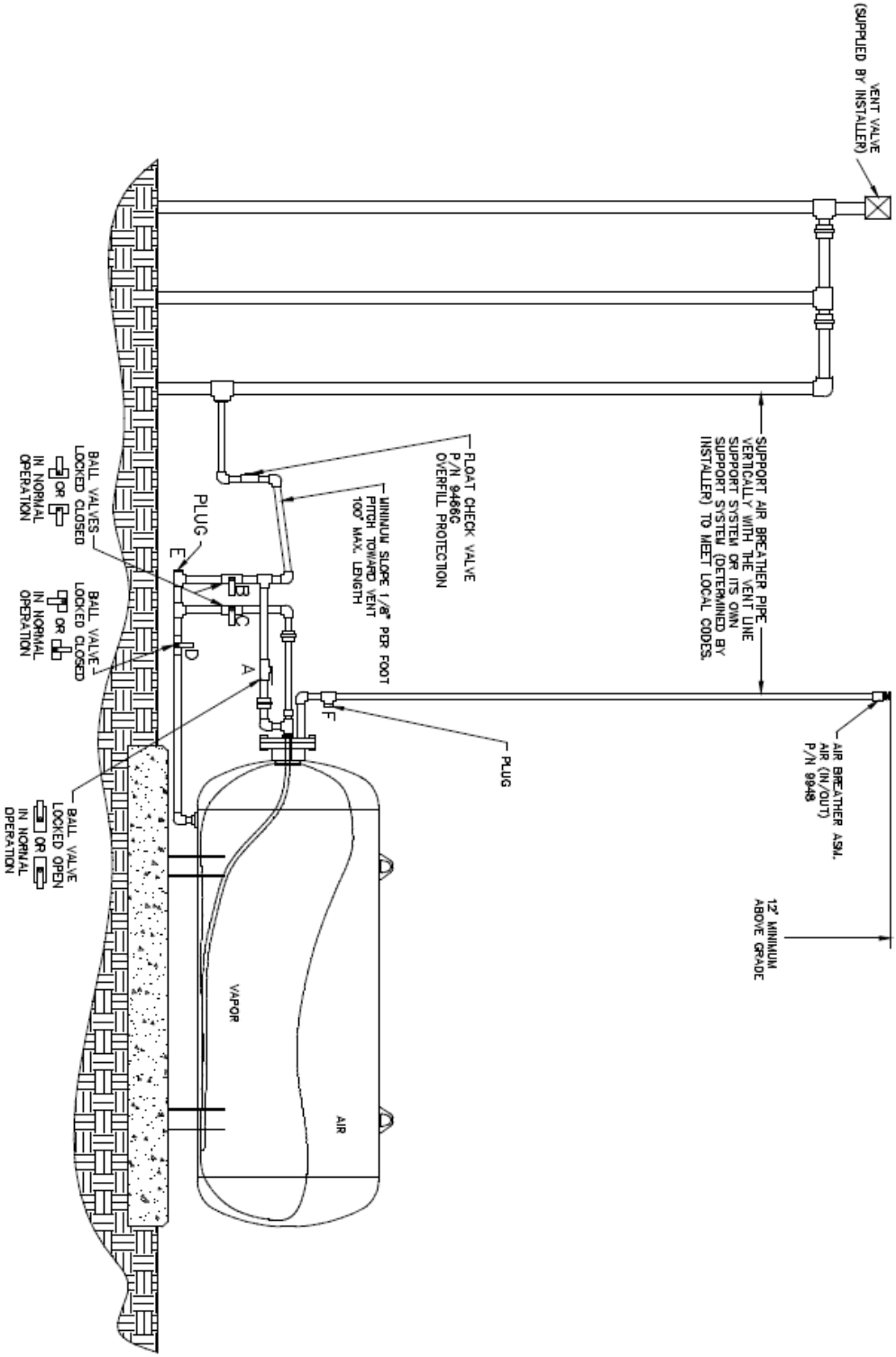
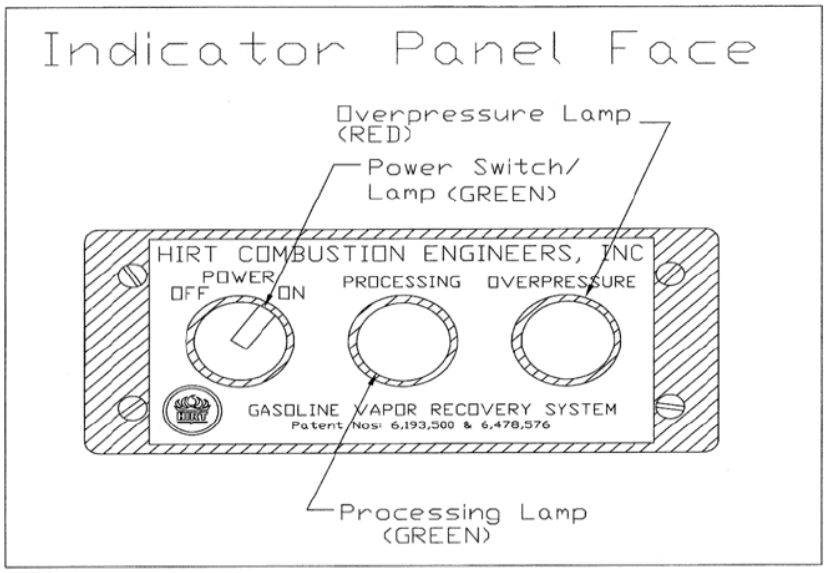


Figure 10-13
How to Disable and Re-enable the Hirt VCS 100 Thermal Oxidizer



Form 1

Data Form for Vapor Pressure Sensor UST Pressure Test

DATE OF TEST _____

SERVICE COMPANY NAME	**SERVICE COMPANY'S TELEPHONE**
SERVICE TECHNICIAN	**VST or VEEDER-ROOT TECH CERTIFICATION # (as applicable)** **ICC or DISTRICT TRAINING CERTIFICATION (as applicable)**
STATION NAME	**DISTRICT PERMIT #**
STATION ADDRESS **CITY**	**STATE** **ZIP**

PRESSURE SENSOR LOCATION: **DISPENSER FUELING POINT (FP) or VENT STACK**	**FP #**_____ ☐ **VENT STACK** ☐	**PRESSURE SENSOR SERIAL NUMBER:** _____

STEP 8.3	**DIGITAL MANOMETER VALUE** _____ **inches WC**
STEP 8.3	**TLS Console SENSOR VALUE** _____ **inches WC** **(OBTAIN VALUE USING TLS CONSOLE KEYPAD SEQUENCE SHOWN IN FIG. 10-4 or FIG. 10-5, Vapor Pressure)**
STEP 8.4	**TLS Console Sensor Value within ±0.2 inches WC of Digital Manometer Value? Yes** ☐ **No** ☐ **IF NO: THE PRESSURE SENSOR IS NOT IN COMPLIANCE WITH THE PRESSURE SENSOR REQUIREMENTS OF EXHIBIT 2.**
STEP 8.5	**MODE KEY PRESSED TO EXIT DIAGNOSTIC MENU?** ☐

Form 2

Data Form for Vapor Pressure Sensor Ambient Reference Test

DATE OF TEST _____

SERVICE COMPANY NAME		**SERVICE COMPANY'S TELEPHONE**	
SERVICE TECHNICIAN		**VST or VEEDER-ROOT TECH CERTIFICATION # (as applicable)** **ICC or DISTRICT TRAINING CERTIFICATION (as applicable)**	
STATION NAME		**DISTRICT PERMIT #**	
STATION ADDRESS	**CITY**	**STATE**	**ZIP**
STEP 9.1	**PRESSURE SENSOR LOCATION:** **DISPENSER FUELING POINT (FP) or VENT STACK**	**FP #** _____ ☐ **VENT STACK** ☐	**PRESSURE SENSOR SERIAL NUMBER:**_____
STEP 9.2	**REFERENCE PORT CAP REMOVED?** ☐ **VALVE SET TO AMBIENT REFERENCE PORT (PER FIG. 10-3)?** ☐		
STEP 9.3	**NON-CALIBRATED SENSOR VALUE** _____**Inches WC** **(OBTAIN VALUE USING TLS CONSOLE KEYPAD SEQUENCE SHOWN IN FIG. 10-4 or FIG. 10-5, Vapor Pressure)**		
STEP 9.4	**PRESSURE BETWEEN +0.20 & -0.20?** **Yes** ☐ **No** ☐ **IF NO: THE PRESSURE SENSOR IS NOT IN COMPLIANCE WITH THE PRESSURE SENSOR REQUIREMENTS OF EXHIBIT 2.**		
STEP 9.5	**REFERENCE PORT CAP REPLACED?** ☐ **VALVE SET TO NORMAL VALVE POSITION (PER FIG 10-3)?** ☐		
STEP 9.6	**MODE KEY PRESSED TO EXIT DIAGNOSTIC MENU?** ☐		

EXHIBIT 11

Veeder-Root Vapor Polisher Operability Test Procedure

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board, and the term "ARB Executive Officer" refers to the Executive Officer of the ARB or his or her authorized representative or designate.

1. PURPOSE AND APPLICABILITY

This test verifies the pressure integrity of the vapor polisher, confirms that the operating pressure is within certification parameters at a known flow rate, and verifies the readings of the various thermometer elements and atmospheric pressure sensor. Proper function of the valve is confirmed during the leakage and flow tests.

The pressure integrity test will identify leaks that can be caused by valve or seal failure, loose fittings, cracking or structural damage. The flow test identifies any restrictions that can be caused by dirty filters, clogged passageways, contaminated carbon or any other restriction or collapse of flow passages. The thermometer test will identify a failed sensor element that could lead to reduced performance in vapor containment or pressure management. The atmospheric pressure sensor test verifies the accuracy of that sensor.

The station may remain open (normal fuel dispensing, deliveries, etc.) while conducting this procedure.

The term “TLS Console” used throughout this Exhibit includes but is not limited to TLS-350, TLS-350 Plus, TLS-350R, Red Jacket ProMax, Gilbarco EMC consoles which are also referenced in Exhibit 1.

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

2.1 <u>Pressure Integrity Test</u>

This test confirms that the vapor polisher is capable of maintaining system pressures within certification limits. The leak tightness of the polisher is checked at 8 inches water column (WC). Proper closure of the vapor valve is verified during this test.

2.2 Flow Test

This test confirms flow characteristics through the vapor polisher are maintained within certification limits. The back-pressure across the polisher is checked at a flow rate of 18.0 standard cubic feet per hour (scfh). Proper opening of the vapor valve is verified during this test.

2.3 Thermometer Test

This test verifies that the temperature sensing elements are functioning correctly and indicating valid temperature readings within acceptable ranges. Thermometers are checked against each other as an indication of valid readings. If criteria are not met, accuracy of the thermometers is checked against a calibrated reference thermometer.

2.4 Atmospheric Pressure Sensor Test

This test verifies that the atmospheric pressure sensing element is functioning correctly and indicating valid readings within an acceptable range. The sensor is checked against a local independent source (e.g., U.S. Weather Service, airports, Districts etc.)

3. BIASES AND INTERFERENCES

3.1 The pressure integrity test should not be conducted within 2 hours of Vapor Polisher loading or purging to minimize affects of thermal decay in the carbon bed. Thermal conditions created by heavy loading of the vapor polisher can cause the test pressure to collapse as it cools.

3.2 The thermometer test should not be conducted within 2 hours after a delivery into any tank that is connected to the vapor recovery system. This allows sufficient time for the fuel and ullage temperatures to equalize in the event that fuel is dropped into the tank at significantly different temperatures from the ambient UST temperature.

3.3 If Veeder-Root's "Maintenance Tracker" is installed and enabled, access to the "diagnostic mode" and "set-up mode" of the TLS Console is prohibited unless a Maintenance Tracker Technician Key or personal computer equipped with Veeder-Root's ISD Setup Tool Software Version 1.09 or higher is made available. Maintenance Tracker is an optional security device designed to prevent unauthorized tampering and clearing of Veeder-Root tank monitoring and ISD alarms. Maintenance Tracker resides within the TLS console and when enabled, a message will appear on the two line display of the TLS console. For additional instructions on how to access the desired parameters to complete this test procedure, see Exhibit 18; "Accessing PMC and ISD Parameters at Gasoline Dispensing Facilities (GDFs) with Veeder-Root's "Maintenance Tracker" Security Feature Installed & Enabled".

4. EQUIPMENT, RANGE and ACCURACY

4.1 Nitrogen tank fitted with a pressure regulator capable of maintaining a 10 inch WC test pressure.

4.2 A flow meter, with flow control valve, with 18.3 scfh full scale range and ± 2% of full scale accuracy. The meter must be accurate within 0.4 scfh for any flow setting made during the prescribed tests.

4.3 A digital (electronic) manometer with 0.01 inches WC, or better, resolution. The sensor must have a minimum measuring range of +/- 10 inches WC. The sensor must also be accurate to 0.05 inches WC for any pressure measurement made during the prescribed tests. For a manometer with a +/- 10 inches WC measurement range, this requires a 0.25% basic accuracy.

4.4 A thermometer with 1° C (1.8^{o} F), or better, resolution and accuracy is required to conduct the alternate thermometer test procedure.

4.5 Gasoline resistant hoses, fittings, connectors as required.

5. CALIBRATION REQUIREMENTS

5.1 A copy of the most current calibration shall be kept with all equipment.

5.2 All flow measuring devices shall be bench tested for accuracy using a reference gauge or National Institute of Standards and Technology (NIST) traceable standard at least once every 180 consecutive days. Accuracy checks shall be performed, with nitrogen, at a minimum of three (3) points (e.g., 20, 50 and 80 percent of full scale) and shall meet the requirements of Section 4.

5.3 All electronic pressure measuring devices shall be bench tested for accuracy using a reference gauge, incline manometer or National Institute of Standards and Technology (NIST) traceable standard at least once every 180 consecutive days. Accuracy checks shall be performed at a minimum of three (3) points (e.g., 20, 50 and 80 percent of full scale) each for both positive and negative pressure readings. Accuracy shall meet the requirements of Section 4.

5.4 Thermometer calibration shall be checked at least once every 180 consecutive days using an ice bath, ambient air, and boiling water. This accuracy check shall be conducted by comparison to a NIST traceable measurement device. Accuracy shall meet the requirements of Section 4.

6. PRE-TEST REQUIREMENTS

Install all required testing apparatus as illustrated in Figure 1. Connect the digital manometer using a tee to the Vapor Polisher inlet test port. Be sure the connection is made in-line with the 3-way valve. Connect the nitrogen tank via the flow control valve and meter to the tee at the polisher inlet test port. Be sure the connection is

made at right angles to the 3-way valve connection so that flow must go through at a 90 degree corner.

7. TEST PROCEDURE

7.1 Pressure Integrity Test: At the TLS console in the GDF kiosk, confirm if the valve has been closed for two hours by checking the date and time when the valve was closed in the IV8000 RS232 command (see example below and VR-203 IOM Section 15, Viewing PMC Reports via RS-232 Connection or VR-204 IOM Section 12, Viewing ISD Reports via RS-232 Connection). Manually close the vapor valve in the PMC Diagnostic menu (VR-203 IOM Section 15, PMC Diagnostic Menus, or VR-204 IOM Section 12, PMC Diagnostic Menus). If the valve had not already been closed for at least two (2) hours then wait two hours before beginning the Pressure Integrity Test. Connect the test apparatus to the vapor polisher inlet by moving the inlet 3-way valve to the test position. Start the nitrogen flow, at 15 to18 scfh, to pressurize the closed polisher system to 8± 0.10 inches WC, then shut off the flow control valve. Wait for at least 1 minute before recording first reading. After 1 minute, record the starting pressure in inches of water column to 2 decimal places and wait for 60 seconds. Record the final pressure 60 seconds after the starting pressure. Record all results on Form 1.

Example IV8000 Command

IV8000
OCT 25, 2008 6:27 PM

VAPOR POLISHER

VALVE EVENT	PRESSURE	
DATE-TIME	"WC	EVENT CODE
8-25-08 2:27PM	-1.528	OPEN EXCESS PURGE
8-25-08 3:03PM	-0.480	CLOSE PURGE Hi P
8-25-08 3:56PM	-1.511	OPEN EXCESS PURGE
8-25-08 4:02PM	-1.330	CLOSE EMPTY

Use leak detection solution to check for leaks at the compression fittings used to connect the bottom of the Vapor Polisher to the inlet 3-way valve during the above pressure integrity test.

7.2 Flow Test: At the TLS console in the GDF kiosk, enter the PMC Diagnostic Menu to manually open the polisher vapor valve (VR-203 IOM Section 15, PMC Diagnostic Menus, or VR-204 IOM Section 12, PMC Diagnostic Menus). After the valve is open, set flow control valve to 18.0± 0.2 scfh. Record pressure at the inlet in inches of water column to 2 decimal places. Turn off flow and set the polisher vapor valve to automatic mode and the inlet test port 3-way valve back to the normal operating position. Record all results on Form 1. Remove test equipment.

7.3 Thermometer Test:

7.3.1 At the TLS console front panel, verify that a delivery had not occurred in the last 2 hours by using the following commands.

```
MM DD YY hh mm ss PM
ALL FUNCTIONS
NORMAL
        <FUNCTION>
        <FUNCTION>
IN TANK INVENTORY
PRESS <STEP> TO CONT    <STEP>   T1: PROBE TYPE MAG1
                                 VOLUME =   10,500 GALS
                                        <STEP>
                                 T1: REG
                                 DELIVERY        5,050
                                 GAL
                                        <PRINT>          Print most recent
                                                         deliveries
                                    <TANK/SENSOR>        Select next Tank
```

7.3.2 At the TLS console, record the Vapor Polisher Ambient temperature and the Outlet Temperature from the Vapor Polisher SMART SENSOR DIAGNOSTIC Menu on the TLS Console. See Table 1 below for procedures to access the diagnostic report. Record all results on Form 1.

7.3.3 At the TLS Console record the gasoline tank thermometer values, T4 and T5, from the IN-TANK DIAGNOSTIC Menu for each gasoline storage tank. See Table 2 below for procedures to access the diagnostic report. Record all the results on Form 1.

7.4 Atmospheric Pressure Sensor Test:

7.4.1 At the TLS Console access the atmospheric pressure reading using the menus outlined below in Table 3 and record on Form 1.

7.4.2 Obtain an atmospheric pressure reading from a local (within 50 miles) independent source (e.g., U.S. Weather Service, airports, Districts, etc.) in inches mercury and record on Form 1. Note: Some sources may give atmospheric pressure values at sea-level and will need to be adjusted to account for altitude. Neglecting to adjust the atmospheric pressure value at higher altitudes may result in differences between the local and TLS Console atmospheric pressure readings greater than 10%.

7.5 Alternative to Form 1: Districts may require the use of an alternate Form, provided it includes the same minimum parameters as identified in Form 1.

Table 1

Accessing Vapor Polisher Ambient and Outlet Temperatures
On the TLS Console

DIAG MODE
PRESS <FUNCTION> TO CONT

<FUNCTION>
<FUNCTION>

SMART SENSOR DIAGNOSTIC
PRESS <STEP> TO CONT

<STEP>

S1: *Valve Label*

TYPE: VAPOR VALVE

<TANK> to change SS device
<PRINT> print report

SMARTSENSOR DIAGNOSTIC
- - - - - - - - - - - -
AUG 20, 2008 4:52 PM
S6:VAPOR VALVE
VAPOR VALVE
SERIAL NUMBER: 111110
VALVE POSITION: OPEN
OPEN CAP: CHARGED
CLOSE CAP: CHARGED
AMBIENT TEMP: 65.08F
OUTLET TEMP **67.11F**
SENSOR FAULT:
NONE

Table 2

Accessing Fuel Thermometer Data on TLS Console

```
DIAG MODE
PRESS <FUNCTION> TO CONT
        <FUNCTION>
        <FUNCTION>
IN-TANK DIAGNOSTIC
PRESS <STEP> TO CONT      <STEP>   T1: PROBE TYPE MAG1
                                   SERIAL NUMBER  XXXXXX
                                   <CHNG> to change tank
                                   <PRINT> print report
                                   IN-TANK DIAGNOSTIC
                                   - - - - - - - - - - -
                                   PROBE DIAGNOSTICS
                                   T 1: PROBE TYPE MAG1
                                   SERIAL NUMBER    000000
                                                 ::
                                                 ::
                                   TEMP SENSOR DATA
                                   T6:   70.998 F
                                   T5:   70.300 F
                                   T4:   68.540 F
                                   T3:   68.998 F
                                   T2:   68.200 F
                                   T1:   65.348 F
```

Table 3

Accessing Atmospheric Pressure on the TLS Console

```
DIAG MODE
PRESS <FUNCTION> TO CONT
        <FUNCTION>
        <FUNCTION>
SMART SENSOR DIAGNOSTIC
PRESS <STEP> TO CONT      <STEP>   S1: ATMP Label
                                   TYPE: ATMP SENSOR
                                        <STEP>
                                        <STEP>
                                   ATMP SENSOR DIAGS
                                   PRESS <ENTER>
                                        <PRINT>
                                   SMARTSENSOR
                                   DIAGNOSTIC
                                   MM DD YY HH MM SS
                                   Sn: ATMP Label

                                   TYPE: ATMP SENSOR
                                   SN: XXXXXXXX
                                   ATM PRESSURE: 0.062 PSI
```

8. RESULTS

8.1 Pressure Integrity Test

Verify that the end pressure is greater than 7.0 inches WC and that the decrease (see Form 1) between the start and end pressures is less than 0.5 inches WC. If not the polisher is not in compliance with the Exhibit 2 leakage requirements. This is equivalent to a leakage of about 0.01 CFH at 2 inches WC. If the decrease in pressure is greater than 0.5 inches WC, then retest (once) to be sure it is not due to thermal loss during the test. Correct valve function (closure and sealing) is confirmed if the pressure decrease between the start and end of the test are less than 0.5 inches WC.

8.2 Flow Test

Verify that the pressure drop across the polisher at 18.0 scfh flow is between 1.69 inches WC and 2.25 inches WC. If not the polisher is not in compliance with the Exhibit 2 back pressure requirements.

8.3 Thermometer Test

8.3.1 Gasoline (UST) Tank Thermometer

8.3.1.1 Subtract T4 from T5 and record the difference on Form 1.

8.3.1.2 If the difference between sensors in 8.3.1.1 exceeds 10° F, then the test procedures specified in Section 9 must be conducted.

8.3.2 Vapor Valve Thermometer

8.3.2.1 From the diagnostic report, compare the canister outlet temperature with the ambient thermometer.

8.3.2.2 If the difference between sensors in 8.3.2.1 exceeds 10° F, then the test procedures specified in Section 9 must be conducted.

8.4 Atmospheric Pressure Sensor Test
If the difference between the local and TLS Console atmospheric readings is greater than 10% of the local reading (see Form 1 for details) then the polisher is not in compliance with the Exhibit 2 atmospheric pressure sensor requirements.

8.5 All TLS Console and PMC reports used to access information to conduct this procedure must be attached to Form 1.

9 ADDITIONAL TEST PROCEDURES

The following tests are run in the event that the tests specified in Section 7.3 and 8.3 do not pass.

9.1. Gasoline (UST) Tank Thermometer -

9.1.1. Remove the tank probe from the tank and carefully lay it down on the forecourt while leaving it connected to the TLS Console. Wait 15 minutes for the probe to equalize with ambient temperature. Using the calibrated thermometer, obtain the ambient temperature near the probe. Access the Gasoline Tank Temperature T5 using Table 2. Record T5 and the calibrated thermometer reading (cal) on Form 1.

9.1.2. Compare the In-Tank Probe Diagnostic printout temperature T5 with the calibrated thermometer. If the difference between the two temperatures is greater than 10° F then the T5 thermometer does not meet the specifications set forth in Exhibit 2.

9.2. Vapor Valve Thermometer -

9.2.1. Using the setup described in Figure 1, introduce nitrogen flow (18 SCFH) into the canister for 2 minutes. Note: Pressure readings from the Vapor Polisher inlet do not need to be recorded if the canister has already passed the flow test.

9.2.2. Print the diagnostic Smart Sensor Vapor Valve Diagnostic report and record the Vapor Polisher outlet and ambient temperatures on Form 1.

9.2.3. If the difference between the canister outlet and ambient sensors is less than 10 degrees F, both sensors are operating properly. Otherwise, proceed to the next step.

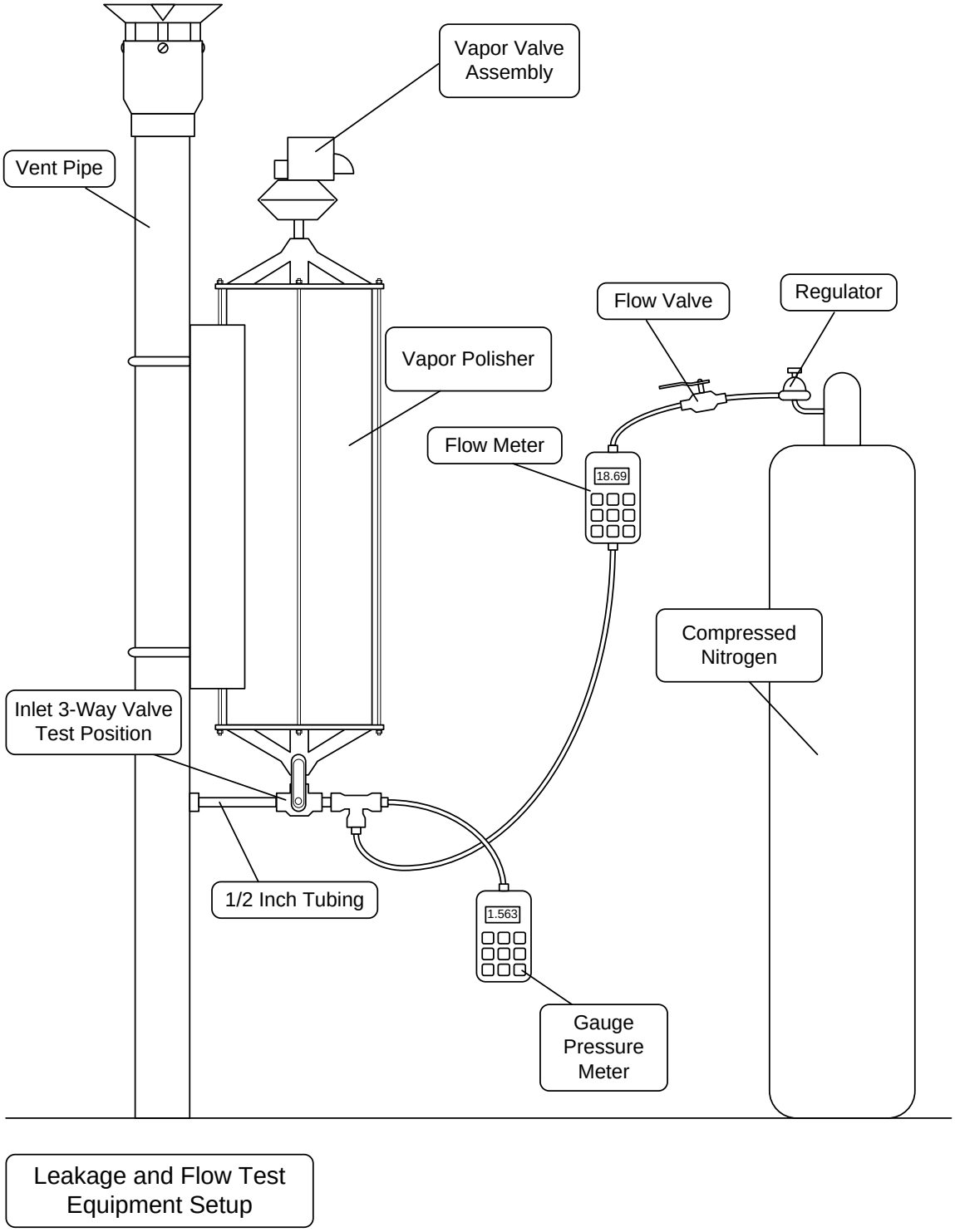
9.2.4. Remove the Vapor Polisher outlet temperature probe from the canister, according to IOM Section 14, Canister Thermal Probe Replacement, and let it sit for 15 minutes to allow the sensor to equalize with ambient temperature. Record the ambient and outlet temperature readings on Form 1.

9.2.5. Using the calibrated thermometer (cal), record the ambient temperature taken near the probe on Form 1.

9.2.6. Compare the Smart Sensor Vapor Valve Diagnostic printout Outlet Temp with the calibrated thermometer. If the difference between the two temperatures is greater than 10° F then the outlet thermometer does not meet the specifications set forth in Exhibit 2.

9.2.7. Compare the Smart Sensor Vapor Valve Diagnostic printout ambient Temp with the calibrated thermometer. If the difference between the two temperatures is greater than 10° F then the outlet thermometer does not meet the specifications set forth in Exhibit 2.

Figure 1
Pressure Integrity and Flow Test Equipment Setup



FORM 1:
VEEDER ROOT VAPOR POLISHER OPERABILTY TEST

DATE OF TEST:

SERVICE COMPANY NAME	SERVICE COMPANY'S TELEPHONE
SERVICE TECHNICIAN	VEEDER-ROOT TECH CERTIFICATION #(as applicable) ICC or DISTRICT TRAINING CERTIFICATION (as applicable)
STATION NAME	DISTRICT PERMIT #

STATION ADDRESS	**CITY**	**STATE ZIP**

STEP 7.1	**3-WAY VALVE IN CORRECT POSITION (PER FIG. 1)?** ☐ **START PRESSURE:** _____ **FINAL PRESSURE:** _____ **DIFFERENCE:** _____
STEP 8.1	**1. IS THE FINAL PRESSURE > 7.0 INCHES WC?** **Yes** **No** **2. IS THE FINAL PRESSURE > THE START PRESSURE** **Yes** **No** **3. IF NO TO #2, IS THE <u>DECREASE</u> in PRESSURE <0.5 INCHES WC? Yes** **No** (IF NO TO QUESTION 1 OR 3 ABOVE: THE VR POLISHER IS NOT IN COMPLIANCE WITH THE LEAKAGE REQUIREMENTS OF EXHIBIT 2.)
STEP 7.2	**VAPOR CONTROL VALVE OPEN?** ☐ **FLOW RATE:** _____ **PRESSURE:** _____
STEP 8.2	**IS THE PRESSURE BETWEEN 1.69 AND 2.25 INCHES WC?** **Yes** **No** (IF NO: THE VAPOR POLISHER IS NOT IN COMPLIANCE WITH THE BACK PRESSURE REQUIREMENTS OF EXHIBIT 2.)

STEP 7.3

IS THE DIFFERENCE BETWEEN SENSORS LESS THAN 10º F? **Yes** **No** ☐
(IF NO: THE VAPOR POLISHER IS NOT IN COMPLIANCE WITH THE TEMPERATURE RANGE REQUIREMENTS OF EXHIBIT 2.)

Test	**7.3.1**	**9.2.2**	**9.2.4&5**	**Tank 1**	**7.3.2**	**9.1**
Ambient				**T5**		
Outlet				**T4**		
Cal				**T5 - T4**		
Diff				**Cal**		
Diff Outlet & Cal (9.2.6)				**T5 - Cal**		
Diff Ambient & Cal (9.2.7)				**Tank 2**	**7.3.2**	**9.1**
				T5		
				T4		
				T5 - T4		
				Cal		
				T5 - Cal		
				Tank 3	**7.3.2**	**9.1**
				T5		
				T4		
				T5 - T4		
				Cal		
				T5 - Cal		

STEP 7.4

TLS Console ATM Pressure Reading _____ psi
Convert PMC pressure reading which is in term of psi value to atmospheric pressure in inches mercury: (psi +14.7) x 2.036 = _____
Atmospheric pressure from local source _____ inches mercury
Difference between Local and TLS Console = _____ A
0.10 x Local = _____ B

IS A < B? **Yes** **No**
(IF NO: THE VR POLISHER IS NOT IN COMPLIANCE WITH THE ATMOSPHERIC TEST REQUIREMENTS OF EXHIBIT 2.)

EXHIBIT 12

Veeder-Root Vapor Polisher
Hydrocarbon Emissions Verification Test Procedure

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board, and the term "ARB Executive Officer" refers to the Executive Officer of the ARB or his or her authorized representative or designate.

1. PURPOSE AND APPLICABILITY

This test procedure is used to verify the proper performance of the Veeder-Root Vapor Polisher. The test determines hydrocarbon (HC) emissions under iso-butane vapor loading conditions.

The station may remain open (normal fuel dispensing, deliveries, etc.) while conducting this procedure.

The term “TLS Console” used throughout this Exhibit includes but is not limited to TLS-350, TLS-350 Plus, TLS-350R, Red Jacket ProMax, Gilbarco EMC consoles which are also referenced in Exhibit 1.

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

This procedure is used to verify proper performance of the Veeder-Root Vapor Polisher in meeting the hydrocarbon (HC) emission specification listed in Exhibit 2. A 10% iso-butane compressed gas standard is used as the inlet test gas (i.e., to provide HC flow at the Vapor Polisher inlet) while monitoring HC emissions from the Vapor Polisher exhaust using a portable non-dispersive infrared (NDIR) analyzer calibrated to iso-butane. The flow through the Vapor Polisher and HC monitoring is maintained for six (6) minutes.

3. BIASES AND INTERFERENCES

3.1 This test shall not be conducted if the Vapor Polisher percent load is greater than 80% (VR-203 IOM Section 15, PMC Diagnostic Menu, or VR-204 IOM Section 12, PMC Diagnostic Menu). If load is greater than 80% then conduct the manual purge procedure in Appendix A.

3.2 Exhibit 11 (Vapor Polisher operability tests) must be conducted prior to conducting the Exhibit 12 test to assure valid results.

3.3 Catalytic bead HC sensors shall not be used for this test due to the absence of air in the inlet test gas.

3.4 Values measured at less than or greater than 9,000 ppm (0.9% by volume) should not be considered as quantitative results since accuracy and calibration checks are not required by this test at those levels.

3.5 If Veeder-Root's "Maintenance Tracker" is installed and enabled, access to the "diagnostic mode" and "set-up mode" of the TLS Console is prohibited unless a Maintenance Tracker Technician Key or personal computer equipped with Veeder-Root's ISD Setup Tool Software Version 1.09 or higher is made available. Maintenance Tracker is an optional security device designed to prevent unauthorized tampering and clearing of Veeder-Root tank monitoring and ISD alarms. Maintenance Tracker resides within the TLS console and when enabled, a message will appear on the two line display of the TLS console. For additional instructions on how to access the desired parameters to complete this test procedure, see Exhibit 18; "Accessing PMC and ISD Parameters at Gasoline Dispensing Facilities (GDFs) with Veeder-Root's "Maintenance Tracker" Security Feature Installed & Enabled".

4. EQUIPMENT

4.1 A flow meter, with flow control valve, with 18.3 scfh full scale range and ± 2% of full scale accuracy. The meter must be accurate within 0.4 scfh for any flow setting made during the prescribed tests.

4.2 Gasoline resistant hoses, fittings, connectors.

4.3 Portable NDIR hydrocarbon analyzer, 0 to 18,000 ppm range (1.8 % by volume for iso-butane), with a minimum accuracy of ±0.1% by volume, such as RKI Instruments "Eagle" model (with NDIR HC sensor) or equivalent. Only an NDIR analyzer calibrated to iso-butane may be used for this test. The manufacturer's operating instructions for the HC analyzer and proof or evidence that the sensor is NDIR shall be kept with the equipment at all times so that proper procedure can be verified.

4.4 Ladder or other access means to manually sample vapor outflow from the top of the Vapor Polisher assembly.

4.5 A calibration check gas of iso-butane in nitrogen or air at a concentration of 9,000 ppm (0.9% by volume. The calibration check gas must be certified to an analytical accuracy of ±2% traceable to a reference material approved by the National Institute of Standards and Technology (NIST) and recertified at least every two years.

4.6 An inlet test gas of iso-butane **in nitrogen** (air balance gas not allowed) at a nominal concentration of 10% by volume (100,000 ppm). The actual value of the gas concentration shall be between 9.7 and 10.3% by volume (97,000 to 103,000 ppm). The calibration check gas must be certified to an analytical accuracy of ±2% traceable to a reference material approved by the National Institute of Standards and Technology (NIST) and recertified at least every two years.

4.7 Pressure regulators for the calibration check gas cylinder and the inlet test gas cylinder.

4.8 Stopwatch with an accuracy of ± 0.2 seconds.

5. CALIBRATION REQUIREMENTS

5.1 All flow measuring devices shall be bench tested for accuracy using a reference gauge or NIST traceable standard at least once every 180 consecutive days. Accuracy checks shall be performed, with nitrogen, at a minimum of three (3) points (e.g., 20, 50 and 80 percent of full scale) and shall meet the requirements of Section 4.

5.2 Information on the calibration check gas and inlet test gas shall be entered into a log identifying each cylinder by serial number. Documentation of certification shall be maintained with the gas cylinders at all times and shall also be attached to Form 1. The calibration check gas log shall be maintained with the gas cylinders at all times and made readily available to the district upon request. Sufficient information shall be maintained to allow a determination of the certification status of each calibration gas and shall include: (1) the date put in service, (2) assay result, (3) the dates the assay was performed, and (4) the organization and specific personnel who performed the assay.

6. PRE-TEST REQUIREMENTS

6.1 Follow the HC analyzer manufacturer's procedure for instrument start-up and warm-up.

6.2 Check the zero reading of the HC analyzer using ambient air. If the result is greater than 1,000 ppm (0.1% by volume) then re-zero the analyzer per the manufacturer's recommended procedures. Record results on Form 1.

6.3 Check the calibration of the HC analyzer by running the 9,000 ppm (0.9% by volume) calibration check gas following the manufacturer's procedures. The reading must be between 8,000 and 10,000 ppm (0.8% and 1.0% by volume). Record results on Form 1. If the result is outside of the required range then the analyzer shall be recalibrated per manufacturer's specifications prior to conducting this test.

6.4 Assemble the inlet test gas cylinder, regulator, flow meter and flow control valve, and transfer line as shown in Figure 1. Attach the HC analyzer sampling line to the outlet test port ¼ inch NPT fitting on the top of the polisher as shown in Figure 1.

6.5 Visually check to ensure the inlet 3-way valve (see **Figure 1**) to the Vapor Polisher is in the closed test position so the flow is coming from the inlet test gas to the inlet of the Vapor Polisher.

6.6 At the TLS console, set the Vapor Polisher to the manual open position (reference VR-203 IOM Section 15, PMC Diagnostic Menus, or VR-204 IOM Section 12, PMC Diagnostic Menus).

7. TEST PROCEDURE

7.1 Set the inlet test gas flow rate to 15 scfh. Adjust the flow rate as necessary during the test to maintain the flow rate of 14 to 16 scfh. Start the stopwatch. Record the start and end flow rates on Form 1.

7.2 Record the first HC reading three (3) minutes after starting the stopwatch. Take three (3) more readings one (1) minute apart for a total test time of 6 minutes.

7.3 Record the HC concentration for each minute from minute 3 to 6 on Form 1, with other required information. All results less than 9,000 ppm shall be recorded as "< 9000 ppm". All results greater than or equal to 9,000 ppm shall be recorded as "> 9000 ppm".

7.4 Alternative to Form 1: Districts may require the use of an alternate Form, provided it includes the same minimum parameters identified in Form 1.

7.5 Remove test equipment. Re-install the outlet test port cap by applying Teflon™ tape to the threads and tighten the cap ¼ inch turn past snug. Ensure that the 3-way inlet valve is in the normal operating ("open") position. At the TLS console re-set the Vapor Valve to the automatic mode.

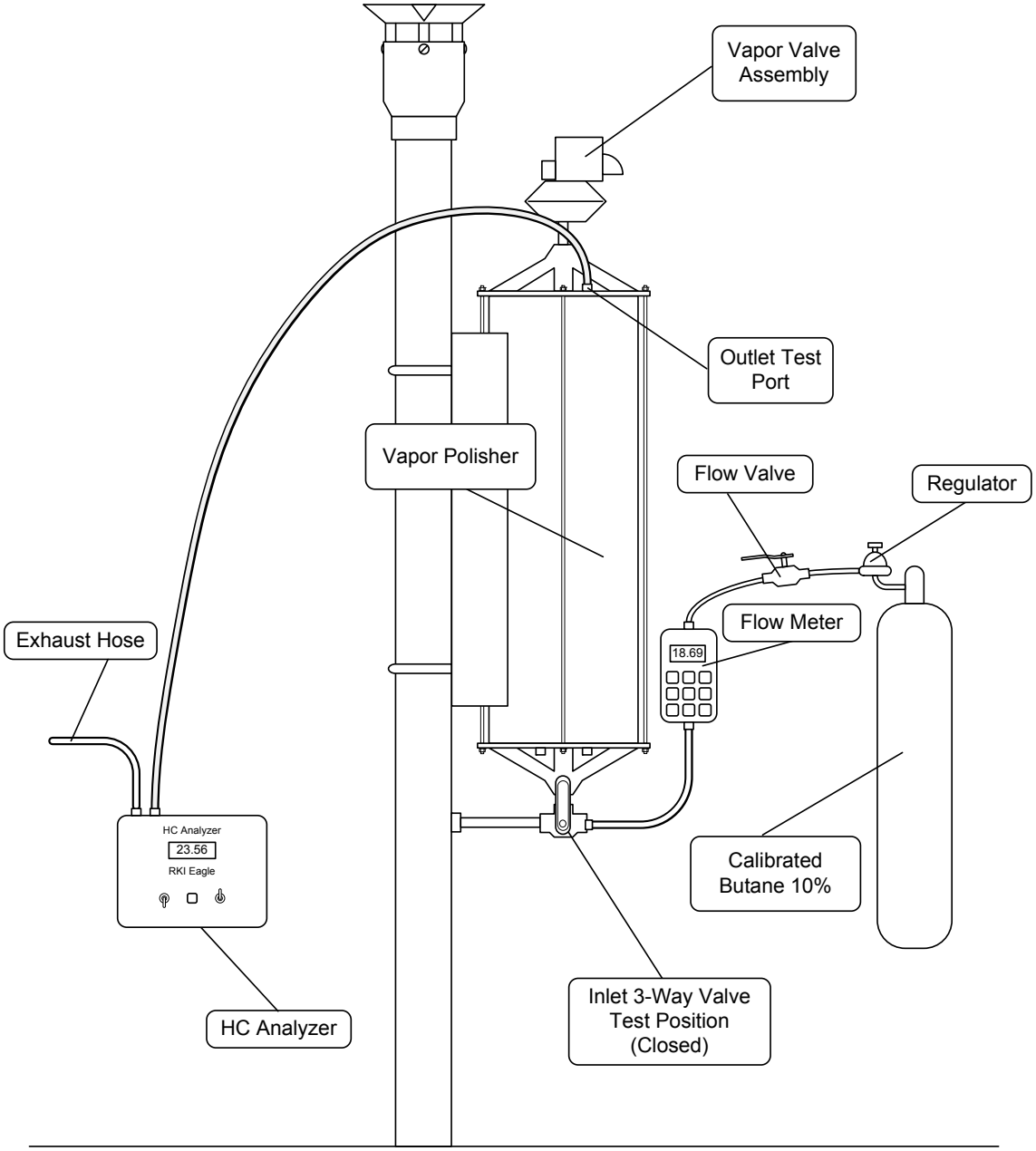
8. RESULTS

If the emission concentration is ≥ 9000 ppm (0.9% by volume during any part of the test, then the Vapor Polisher is not in compliance with the Exhibit 2 HC emission requirements.

9. ALTERNATIVE TEST PROCEDURES

This procedure shall be conducted as specified. Modifications to this test procedure shall not be used to determine compliance unless prior written approval has been obtained from the ARB Executive Officer, pursuant to Section 14 of Certification Procedure CP-201.

Figure 1


Vapor Valve Assembly
Outlet Test Port
Vapor Polisher
Flow Valve
Regulator
Flow Meter
18.69
Exhaust Hose
HC Analyzer
23.56
RKI Eagle
Calibrated Butane 10%
Inlet 3-Way Valve Test Position (Closed)
HC Analyzer

FORM 1
VEEDER ROOT VAPOR POLISHER HC EMISSIONS TEST

DATE OF TEST:

SERVICE COMPANY NAME	**SERVICE COMPANY'S TELEPHONE**
SERVICE TECHNICIAN	**VEEDER-ROOT TECH CERTIFICATION #(as applicable)** **ICC or DISTRICT TRAINING CERTIFICATION (as applicable)**
STATION NAME	**DISTRICT PERMIT #**
STATION ADDRESS	**CITY** **STATE** **ZIP**

STEP 6.2 **6.3**	**CAL GAS DOCUMENTATION ATTACHED?** ☐ **HC ANALYZER ZERO CHECK READING:** _____ **HC ANALYZER CAL CHECK READING:** _____ **IS THE ZERO READING < 1,000 ppm? Yes No** **IS THE CAL CHECK READING BETWEEN 8,000 and 10,000 ppm? Yes No** (IF NO: THE HC ANALYZER MUST BE RE-CALIBRATED.)
STEP 6.5 **6.6**	**3-WAY VALVE IN CORRECT POSITION (PER FIG. 1)?** ☐ **PMC VALVE MODE SET TO MANUAL OPEN?** ☐
STEP 7.1	**START FLOW RATE:** _____ **END FLOW RATE:** _____
STEP 7.3	**HC READING AT 3 MIN:** _____ **HC READING AT 4 MIN:** _____ **HC READING AT 5 MIN:** _____ **HC READING AT 6 MIN:** _____ **IS THE HC CONC. < 9,000 ppm FOR ALL READINGS? Yes No** (IF NO: THE VR POLISHER IS NOT IN COMPLIANCE WITH THE HC EMISSION REQUIREMENTS OF EXHIBIT 2.)
STEP 7.5	**3-WAY VALVE SET TO NORMAL OPEN POSITION?** ☐ **(UST Ullage to Vapor Polisher)** **RE-SET VAPOR VALVE TO AUTOMATIC MODE?** ☐

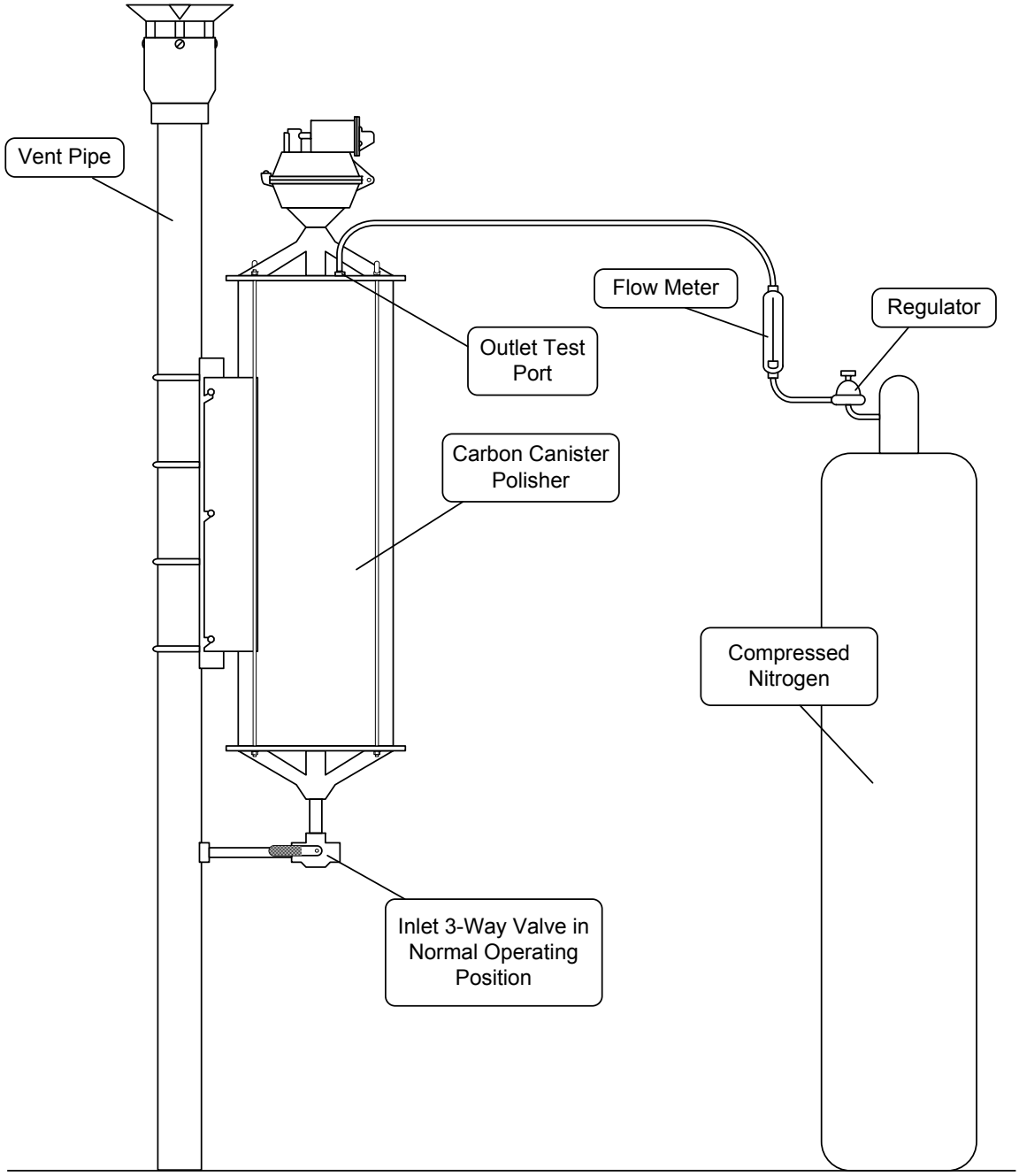
Appendix A: Partial Manual Purge Procedure

The purpose of this procedure is to purge a fully or mostly loaded canister to ensure that the HC load is less than 80% so that a Hydrocarbon Emissions Verification Test (Exhibit 12) can be performed.

1. Use the TLS Console PMC Diagnostic menus to manually close the canister vapor valve to be sure nitrogen supply gas will flow through the carbon and not out the exhaust vent.
2. Refer to Figure 2. Temporarily move the manual inlet test port three way valve to the test port position to disconnect the canister from the UST vent stack.
3. Connect a nitrogen gas supply with regulator and flow meter to the outlet test port.
4. Return the manual test port three way valve back to the normal operating position to reconnect the canister to the UST vent stack.
5. Open the nitrogen gas supply valve and set a flow rate of 18 CFH. This starts the purging process.
6. After 35 minutes of flow, which provides approximately 10 cubic feet of purge volume, close the nitrogen gas supply valve. The load on the carbon will now be less than 80% so that a normal Vapor Emission Operability Test can be performed after finishing this procedure. Note that the PMC Diagnostic Load % does not change as a result of this procedure because the canister vapor valve was manually closed in Step1.
7. Temporarily move the manual inlet test port three way valve to the test port position to disconnect the canister from the UST vent stack.
8. Disconnect the nitrogen gas supply from the canister outlet test port and replace the test port plug using fuel resistant sealing compound to seal off the port.
9. Return the manual test port three way valve back to the normal operating position to reconnect the canister to the UST vent stack.
10. Using the TLS Console PMC Diagnostic menus, return control of the canister vapor valve to automatic mode.

A Hydrocarbon Emissions Verification Test can now be performed.

Figure2



Purging Test Equipment Setup

EXHIBIT 13

Hirt VCS 100 Processor with Indicator Panel
Operability Test Procedure

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board, and the term "ARB Executive Officer" refers to the Executive Officer of the ARB or his or her authorized representative or designate.

1. PURPOSE AND APPLICABILITY

This test procedure verifies the operational status of the Hirt VCS 100 Processor and Indicator Panel.

The station may remain open (normal fuel dispensing) while conducting this procedure.

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

The Hirt VCS 100 Processor is designed to activate (e.g. thermally oxidize vapors) when the underground storage tank (UST) ullage pressure exceeds a nominal -0.40 inches water column ("w.c.). Processor activation will be verified by exposing the processor's internal vacuum sensor/switch to an atmospheric pressure input. The processor should activate and the Indicator Panel Processing lamp should light.

3. BIASES AND INTERFERENCES

3.1 This test is only valid when total ullage is 70% or less than capacity of GDF storage tanks.

3.2 At least 24 hours must have elapsed after any tests that introduce air and/or nitrogen into the vapor spaces, such as, but not limited to TP-201.3 (including Exhibit 4), TP-201.4 (including Exhibit 6) and Exhibit 5.

3.3 There shall be no Phase I bulk product deliveries into or out of the storage tank(s) within the three (3) hours prior to the test or during performance of this test procedure.

3.4 Processor should be inactive (i.e. powered but not processing gasoline vapor).

4. EQUIPMENT

4.1 Hand tools: 5/16" nut driver or equivalent, 3/8" open end wrench.

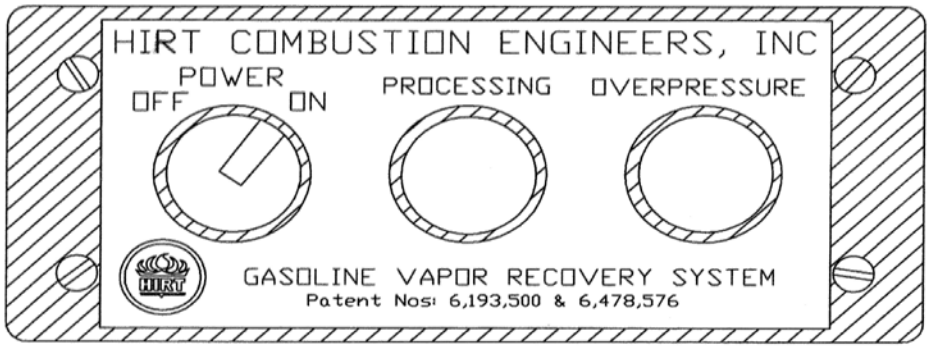
4.2 Stopwatch: Use a stopwatch with an accuracy of ±0.2 seconds.

4.3 Teflon pipe tape.

5. TEST PROCEDURE

5.1 System Status Check: Locate Hirt Indicator Panel and verify that the green lamp on the POWER switch is lit, to be sure power is ON. Record on Form 1. If the Power switch is not lit, the processor does not meet the Exhibit 2 Hirt VCS 100 Thermal Oxidizer specifications and no testing shall be conducted.

Indicator Panel Face

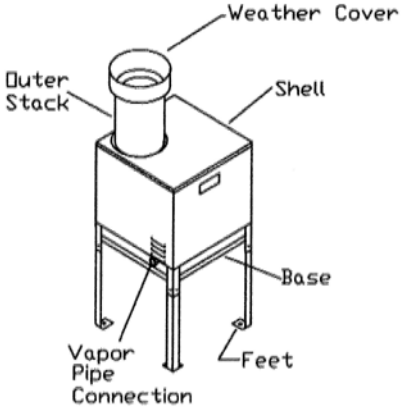


5.2 Check green PROCESSING lamp on Indicator Panel. Is the green PROCESSING lamp on? Record on Form 1. If so, then wait until PROCESSING lamp is extinguished before proceeding to step 5.3, to meet BIAS condition 3.4.

5.3 Forced Processor Operation: Turn POWER to processor OFF at Indicator Panel.

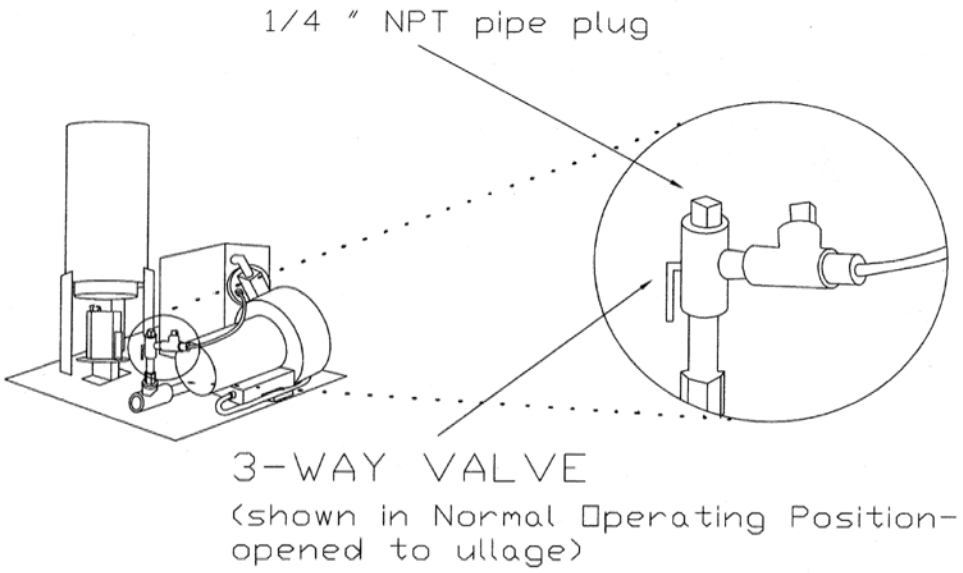
CAUTION: Processor components, such as Shell, Stack, Burner, and Weather Cover can be Hot! Use care when handling processor or removing its parts.

5.4. Remove screw from Weather Cover with 5/16" nut driver and remove Weather Cover from Outer Stack.

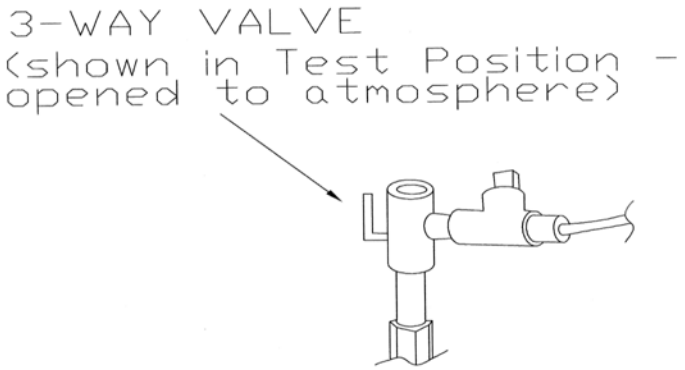


5.5 Remove (4) screws holding Shell to Base with 5/16" nut driver and then remove Shell.

5.6 Locate 3-Way Valve on tubing leading to Vacuum Sensor/Switch. The 3-Way Valve handle should be pointing down, in the Normal Operating Position – Opened to UST Ullage. Remove the 1/4" NPT pipe plug from 3-Way Valve with 3/8" wrench.



5.7 Turn 3-Way Valve handle to the up position.



5.8 Turn POWER to processor ON at Indicator Panel, and verify that green lamp on POWER switch is lit. Start the stopwatch.

5.9 Verify green PROCESSING lamp on the Indicator Panel lights within 3 minutes. Record on Form 1. If the Processing lamp is on, processor meets the Exhibit 2 Processor specifications. If the Processing lamp is not on within 3 minutes, the processor does not meet the Exhibit 2 Processor specifications and needs technical service.

5.10 Verify the OVERPRESSURE lamp on the Indicator Panel lights within sixty two (62) minutes. Record on Form 1. If the OVERPRESSURE lamp is on, processor meets the Exhibit 2 Processor specifications. If the OVERPRESSURE lamp is not on within sixty two (62) minutes, the processor does not meet the Exhibit 2 Processor specifications and needs technical service.

5.11 Turn POWER to processor OFF at Indicator Panel.

5.12 Turn 3-Way Valve handle back down to Normal Operating Position. Reinstall 1/4" NPT plug (with Teflon pipe tape) and tighten ¼ turn past snug. Reinstall Shell and Weather Cover.

5.13 Turn POWER to processor ON at Indicator Panel. Testing is completed.

6. REPORTING

Record all results on Form 1. Districts may require the use of an alternate Form, provided it includes the same minimum parameters as identified in Form 1.

FORM 1:
HIRT VCS 100 PROCESSOR OPERABILITY TEST

DATE OF TEST:

SERVICE COMPANY NAME	SERVICE COMPANY'S TELEPHONE
SERVICE TECHNICIAN	HIRT TECHNICIAN CERTIFICATION #(as applicable) CC or DISTRICT TRAINING CERTIFICATION (as applicable)
STATION NAME	DISTRICT PERMIT #

STATION ADDRESS	CITY	STATE ZIP

Was TP-201.3 (Including Exhibit 4) conducted in the last 24 hours?	Yes ____ No ____
Was TP-201.4 (Including Exhibit 6) conducted in the last 24 hours?	Yes ____ No ____
Was Exhibit 5 conducted in the last 24 hours?	Yes ____ No ____
Was there a fuel delivery within the last 3 hours?	Yes ____ No ____
The % ullage of GDF storage tank(s) is _____ gallons.	

STEP 5.1	**Is POWER switch lit?**	YES ☐ NO ☐
STEP 5.2	**Is PROCESSING lamp ON?** If "YES", test cannot be performed until lamp goes off.	YES ☐ NO ☐
STEP 5.9	**Time for PROCESSING Lamp to Light? _____ minutes** **Did PROCESSING Lamp light within three (3) minutes?**	YES ☐ NO ☐
STEP 5.10	**Time for OVERPRESSURE Lamp to Light? _____ minutes** **Did OVERPRESSURE Lamp light within sixty two (62) minutes?**	YES ☐ NO ☐

EXHIBIT 14

Franklin Fueling Systems Healy Clean Air Separator
Static Pressure Performance Test Procedure

1 APPLICABILITY

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term “ARB” refers to the California Air Resources Board, and the term “ARB Executive Officer” refers to the Executive Officer of the ARB or his or her authorized representative or designate.

1.1 This test procedure is used to quantify the vapor tightness of the Healy Clean Air Separator (CAS) pressure management system installed as part of a gasoline dispensing facility (GDF) under Executive Order VR-203 and VR-204.

2 PRINCIPLE AND SUMMARY OF TEST PROCEDURE

2.1 The Clean Air Separator, while isolated from the vapor recovery system, is evaluated for vapor integrity using a vacuum decay procedure. The vacuum decay after 5 minutes is compared with an allowable value. The allowable value is based upon the initial vacuum level when conducting the test using the table provided in this test procedure.

2.2 A positive pressure decay procedure is included that conducts the same evaluation as the vacuum decay but with positive pressure. This test is conducted if there is insufficient vacuum (not greater than – 2.00” wc) to conduct the vacuum decay. Districts have the authority to specify in the permit conditions that this positive pressure test is to be conducted even if the vacuum test has been conducted.

3 RANGE

3.1 The full-scale range of the electronic measuring device shall not exceed 0-20.00” wc with a minimum accuracy of not less than 0.25 percent of full-scale.

4 INTERFERENCES

4.1 Leaks in the piping for the Clean Air Separator could bias the test results toward non-compliance.

4.2 Introduction of gaseous nitrogen into the system at flow rates exceeding 4 CFM (240 CFH) may bias the results of the test toward non-compliance. Only gaseous nitrogen shall be used to conduct this test.

4.3 Pressurizing the Clean Air Separator bladder greater than 14.00” wc could damage the bladder, biasing the test toward non-compliance.

4.4 Thermal Bias for Electronic Manometers

Electronic manometers shall have a warm-up period of at least 15 minutes followed by a drift check of 5 minutes. If the drift exceeds 0.01” wc, the instrument should not be used.

5 APPARATUS

5.1 Nitrogen

Use commercial grade gaseous nitrogen in a high pressure cylinder, equipped with a two-stage pressure regulator.

5.2 Pressure Measurement Device

A digital (electronic) manometer with 0.01 inches WC, or better resolution. The sensor must have a minimum measuring range of +/- 10 inches WC. The sensor must also be accurate to 0.05 inches WC for any pressure measurement made during the prescribed tests. For a manometer with a +/- 10 inches WC measurement range, this requires a 0.25% basic accuracy.

5.3 Test Port Assembly

Use a test port assembly constructed similar to the one in Figure A. The assembly should have an 8 oz. Pressure Relief valve, to ensure that the Clean Air Separator is not over pressurized. The Model 9968 Clean Air Separator Test Port Assembly can be purchased from Healy Systems, Inc.

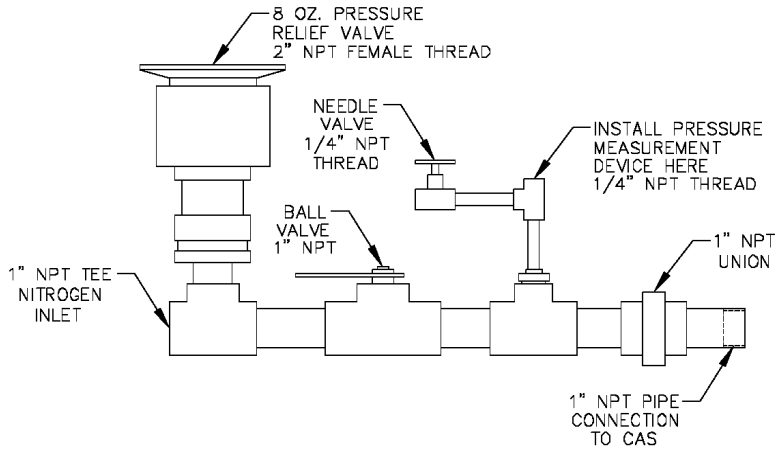


Figure A - Clean Air Separator Test Port Assembly

5.4 Stopwatch

Use a stopwatch accurate to within 0.2 seconds.

5.5 Flow Meter

Use a flow meter to determine the required pressure setting of the delivery pressure gauge on the nitrogen supply pressure regulator. This pressure shall be set such that the nitrogen flow rate is between 2.0 CFM (120 CFH) and 4.0 CFM (240 CFH).

5.6 Leak Detection Solution

Any liquid solution designed to detect vapor leaks may be used to verify the pressure integrity of the test equipment prior to conducting the test.

5.7 Condensate Collection Vessel

A container approved for use with gasoline that can hold at least a half gallon of material.

5.8 Graduated Cylinder

A graduated cylinder that is suitable for use with gasoline and capable of measuring to the nearest ounce or ml.

6 PRE-TEST PROCEDURES

6.1 The following safety precautions shall be followed:

6.1.1 Only gaseous nitrogen shall be used to pressurize the system.

6.1.2 An 8 oz. pressure relieve valve shall be installed on the Test Port Assembly to prevent the possible over-pressurizing of the Clean Air Separator.

6.1.3 A ground strap should be employed during the introduction of nitrogen into the system.

6.2 There shall be no Phase I bulk product deliveries into or out of the gasoline storage tank(s) within the three (3) hours prior to the test or during the performance of this test procedure.

6.3 A copy of the most current calibration shall be kept with all equipment. All electronic pressure measuring devices shall be bench tested for accuracy using a reference gauge, incline manometer or National Institute of Standards and Technology (NIST) traceable standard at least once every 180 consecutive days. Accuracy checks shall be performed at a minimum of three (3) points (e.g., 20, 50 and 80 percent of full scale) each for both positive and negative pressure readings. Accuracy shall meet the requirements of Section 4.

6.4 Use the flow meter to determine the nitrogen regulator delivery pressures that correspond to nitrogen flow rates of 2.0 CFM (120 CFH) and 4.0 CFM (240 CFH). These pressures define the allowable range of delivery pressures acceptable for this test procedure. The flow meter shall be connected in-line between the nitrogen supply regulator and the Test Port Assembly during pressurization. The flow meter may be connected in-line between the nitrogen supply regulator and the Test Port Assembly during the test.

6.5 The electronic pressure measurement device shall be subject to warm-up and drift check before use; see Section 4.5.

6.6 The four ball valves used in the installation of the Clean Air Separator are lockable and shall be locked in the position shown in Figure 1 or Figure 1H of this Exhibit during normal operation. Figure 1 applies to vertical CAS installations and Figure 1H applies to horizontal CAS installations. The four padlocks provided by Healy Systems, Inc. in their installation kit are keyed the same. However, it is possible that one or more of the padlocks on the Clean Air Separator could have been replaced (seizing, damage, broken key, etc.). Conducting this test will require a set of keys necessary to unlock all padlocks.

6.7 Verify that the Clean Air Separator is in its normal operating configuration by confirming that all components are as indicated (See Figure 1 or Figure 1H):

Valve “A” - Open
Valve “B, C and D” - Closed
Pipe End “E” - Plugged
Tee Branch “F” – Plugged

Figure 1
Normal Clean Air Separator Operating Configuration

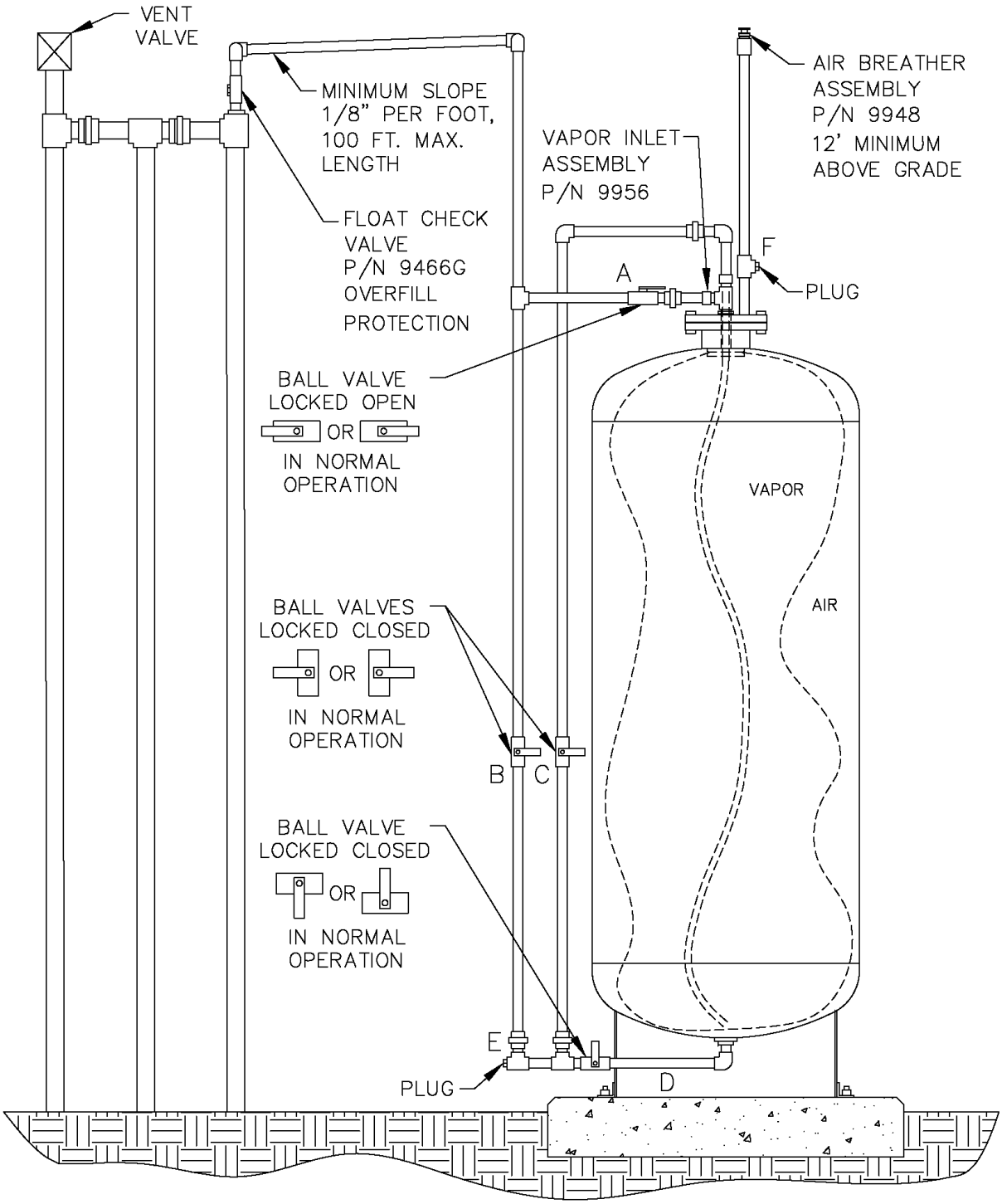
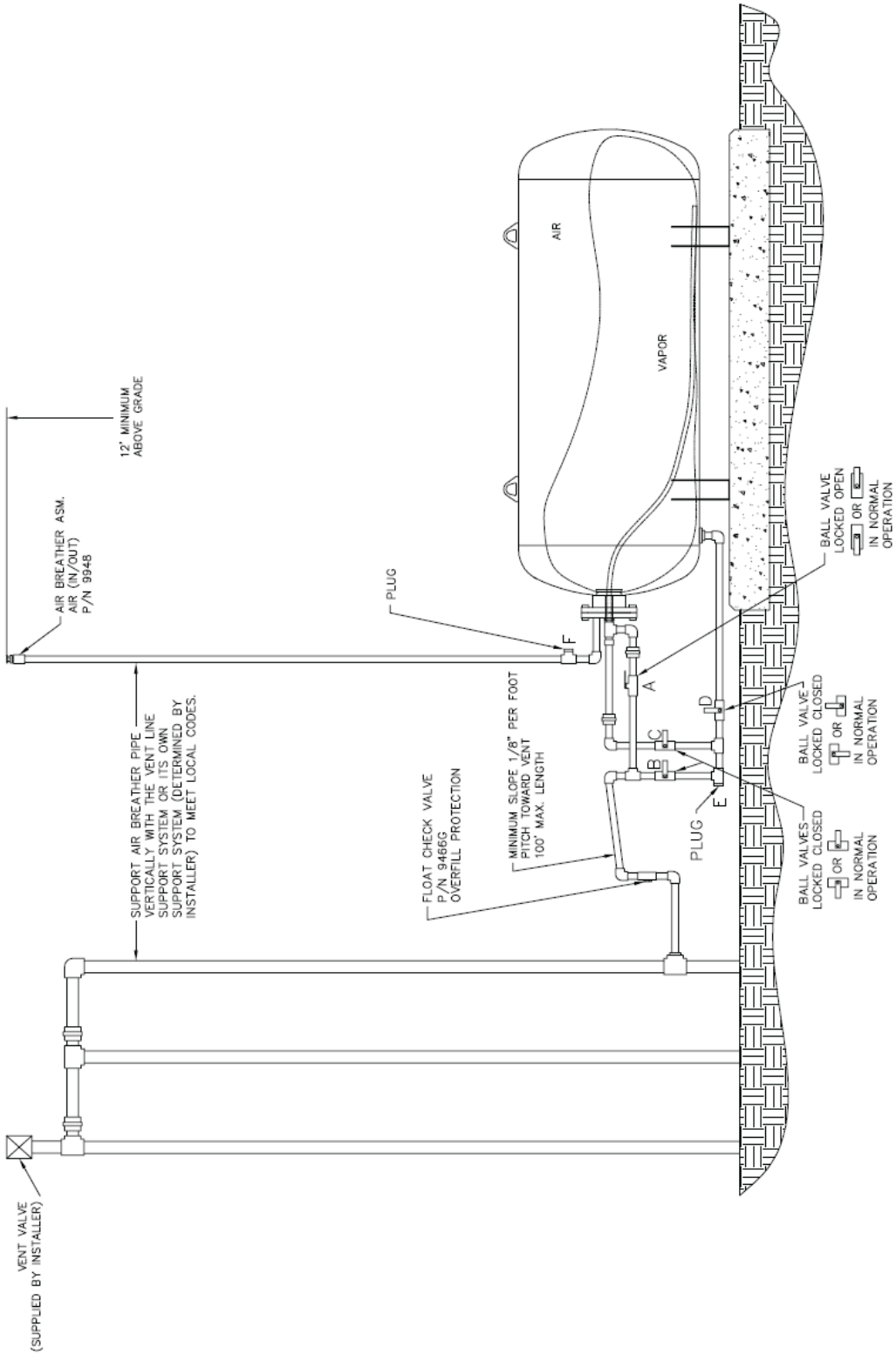


Figure 1H
Normal Clean Air Separator Operating Configuration



6.8 Installing the Test Port Assembly

6.8.1 Open the ball valve marked “B”, shown in Figure 1 or Figure 1H. This ensures that if there is any condensate in the primary connection line to the Clean Air Separator it will drop down into the lower section of the piping configuration, so that it can be measured. Close the valve after approximately 30 seconds.

6.8.2 Position the condensate collection vessel below plug “E” prior to removing it. Remove the 1” plugs from locations “E” and “F” from Figure 1 or Figure 1H. Transfer the collected condensate into the graduated cylinder. If there is more than 16 oz. (473 mL) of liquid condensate, the bladder and vapor processor vessel must be drained. Conduct the bladder and vessel draining procedures from the Clean Air Separator section of the ***ARB Approved Installation, Operation and Maintenance Manual***.

Note: Depending upon the size of the graduated cylinder and the amount of condensate, it may take multiple transfers from the condensate collection vessel to get the total condensate measurement.

6.8.3 Install the Test Port Assembly to the Clean Air Separator at location “E”. See Figure 2 or Figure 2H. Figure 2 applies to vertical CAS installations and Figure 2H applies to horizontal CAS installations.

6.8.4 Connect the gaseous nitrogen supply to the Test Port Assembly. See Figure 2 or Figure 2H.

6.8.5 Check the test equipment and piping isolated from normal Clean Air Separator operation by the ball valves “B, C and D” by pressurizing with nitrogen to a pressure of 4” wc ± 1” wc and closing the ball valve on the Test Port Assembly. Use leak detection solution. Tighten as necessary. The test equipment shall have no leaks.

6.8.6 Open the needle valve on the Test Port Assembly to bleed the pressure off the equipment. Keep ball valve on Test Port Assembly closed.

Figure 2
Clean Air Separator in Configuration to Conduct Test

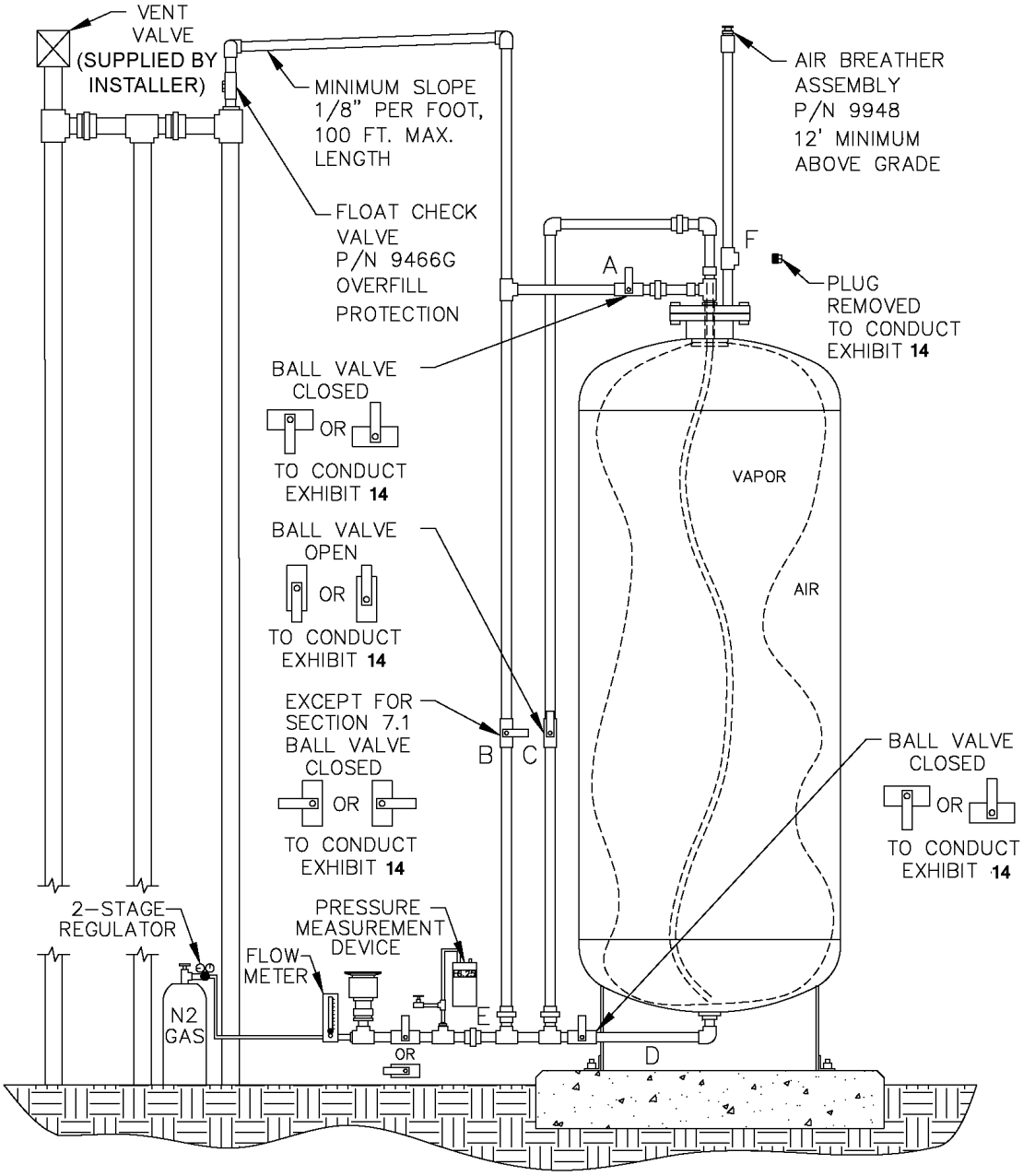
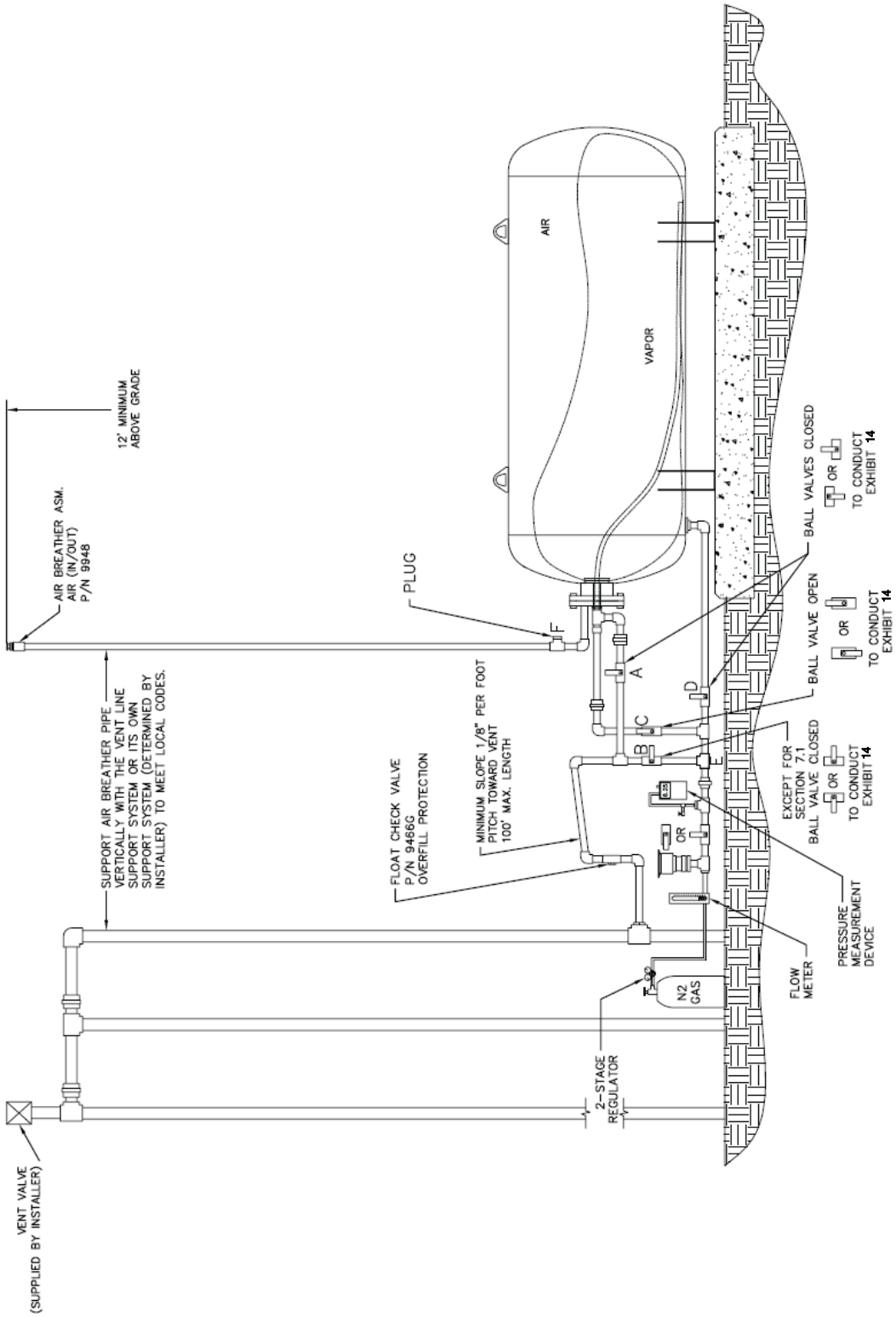


Figure 2H
Clean Air Separator in Configuration to Conduct Test



7 TESTING

7.1 Open the ball valve marked “B” from Figure 2 or Figure 2H. The pressure measurement device installed on the Test Port Assembly should now be reading UST and Clean Air Separator ullage pressure (or vacuum).

7.2 If the station vacuum is greater than (more negative) than -2.00” wc, then proceed to Section 7.2.1. If less than –2.00” wc, then proceed to Section 7.3:

7.2.1 Close the ball valves marked “A” and “B” from Figure 2.

7.2.2 Open the ball valve marked “C” from Figure 2 and wait one minute.

7.2.3 If necessary, use the needle valve on the Test Port Assembly to bleed air into the bladder until the vacuum level reaches as close to a whole number on the pressure measurement device as the accuracy of the device will provide (ie. -2.00, -3.00, -4.00, -5.00, -6.00, -7.00, -8.00). Make sure the needle valve is closed. Record this vacuum and start the stop watch to begin a 5 minute decay.

7.2.4 Record the vacuum at one-minute increments up to 5 minutes.

7.2.5 Using the information from Table 1, verify that the vacuum after 5 minutes is equal to or greater than the allowable minimum for the initial vacuum recorded from Section 7.2.3.

7.2.6 If the vacuum is greater than the allowable minimum, the Clean Air Separator passed the test.

7.2.7 If the vacuum is less than the allowable minimum, the Clean Air Separator failed the test.

TABLE 1
Allowable 5 Minute Vacuum Decay for Clean Air Separator

Vacuum at Start of Test (inches wc)	Allowable Minimum Vacuum after 5 min. (inches wc)
8.0	5.5
7.0	4.7
6.0	3.8
5.0	3.0
4.0	2.2
3.0	1.5
2.0	0.8

7.3 If the station vacuum is less than –2.00” wc (from Section 7.2), or at the direction of district (refer to Section 2.2), conduct the following:

7.3.1 Close the ball valves marked “A” and “B” from Figure 2.

7.3.2 Open the ball valve marked “C” from Figure 2.

7.3.3 Open the ball valve of the Test Port Assembly and flow nitrogen into the Clean Air Separator bladder at a flow rate between 2 and 4 CFM until the pressure in the bladder reaches 2.20” wc.

7.3.3.1 Depending upon the nitrogen flow rate used, the bladder could take up to 30 minutes to fill completely.

7.3.3.2 Because of the close proximity of the pressure measurement device to the nitrogen inlet of the Test Port Assembly, the pressure measurement device may read a higher pressure when nitrogen is flowing. The pressure measurement device is usually steady, but will start to increase rapidly when the bladder is getting full. Periodically stopping nitrogen flow will provide an accurate reading of the pressure in the bladder.

7.3.4 Once the pressure reaches 2.20” wc, shut off the flow of nitrogen to the Clean Air Separator bladder and close the ball valve of the Test Port Assembly.

7.3.5 Wait 5 minutes or until pressure stabilizes above 2.00” wc. If the pressure does not stabilize, repeat steps 7.3.3 and 7.3.4.

7.3.6 Use the needle valve on the Test Port Assembly to bleed off the nitrogen until the pressure reaches 2.00” wc. Make sure the needle valve is closed. Record the pressure.

7.3.7 Start the stop watch to begin a 5 minute decay.

7.3.8 Record the pressure in one-minute increments up to 5 minutes.

7.3.9 If the pressure in the bladder is greater than 1.77” wc at the end of 5 minutes, then the Clean Air Separator passed the test.

7.3.10 If the pressure in the bladder is less than 1.77” wc at the end of 5 minutes, then the Clean Air Separator failed the test.

7.4 If the bladder was evaluated using the vacuum procedure (Section 7.2), close the ball valve “C” to keep it in a vacuum condition. If the bladder was evaluated using the pressure procedure (Section 7.3), open the needle valve on the Test Port Assembly to bleed off all pressure from the bladder.

7.5 Close the ball valve marked “C”, if not already done.

7.6 Remove the Test Port Assembly from location “E” and install the 1” pipe plug. Use a pipe sealant approved for use with gasoline on the threads and tighten to 60 ft-lbs.

7.7 Install the 1” pipe plug to location “F”. Use a pipe sealant approved for use with gasoline on the threads and tighten to 60 ft-lbs.

7.8 Open the ball valve marked “A”. Lock all ball valves using the padlocks.

7.9 The Clean Air Separator should now be in normal operation configuration. Verify this by using the outline from Section 6.7 and Figure 1 or Figure 1H.

8 REPORTING

8.1 Record test data on the form shown in Figure 3. Districts may require the use of an alternate form, provided that the alternate form includes the same minimum parameters as in Form 1.

Form 1

Data Form for Determination of Static Pressure Performance of the
Healy Clean Air Separator for Executive Order VR-203 and VR-204

SOURCE INFORMATION	
GDF Name and Address _____ _____ _____	GDF Representative and Title _____ _____ GDF Phone No. _____
Date and Time of Last Fuel Drop to GDF: _____ Date of Last Calibration of Pressure Measurement Device: _____	P/O #: _____ A/C#: _____ District Test Witness: _____

VACUUM TEST (Section 7.1 through 7.2.7)

Vacuum at start of test, inches water column (7.2.3)	_____
Vacuum at one minute, inches water column	_____
Vacuum at two minutes, inches water column	_____
Vacuum at three minutes, inches water column	_____
Vacuum at four minutes, inches water column	_____
Final vacuum at five minutes, inches water column	_____
Allowable minimum vacuum, inches water column (from Table 1)	_____

POSITIVE PRESSURE TEST (Section 7.3 through 7.3.9)

Pressure at start of test, inches water column (7.3.6)	_____
Pressure at one minute, inches water column	_____
Pressure at two minutes, inches water column	_____
Pressure at three minutes, inches water column	_____
Pressure at four minutes, inches water column	_____
Final pressure at five minutes, inches water column	_____
Allowable final pressure, inches water column (7.3.9)	**1.77**

Healy Certified Technician Name, Certification Number and Expiration Date	Test Company	Date Test Conducted

EXHIBIT 15
VST Green Machine Compliance Test Procedure

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "ARB" refers to the State of California Air Resources Board, and the term "ARB Executive Officer" refers to the Executive Officer of the ARB or his or her authorized representative or designate.

1) PURPOSE AND APPLICABILITY

1.1 This procedure will assess the performance of the VST *Green Machine* by determining the concentration of hydrocarbons (HCs) being emitted from the processor and the *Green Machine*'s capability to control Underground Storage Tank (UST) pressure. This test will be referred to as the "GM Bag Test".

1.2 This test will also assure that the *Green Machine's* continuous monitoring function is working properly. This test is known as the "Continuous Monitoring Test".

1.3 This procedure is applicable for compliance testing but should not commence within 3 hours after a fuel delivery or within an hour after the Green Machine has been operating.

1.4 This procedure may be conducted while the station is operating.

2) PRINCIPLE AND SUMMARY OF TEST PROCEDURE

For the "GM Bag Test", the NOVA portable HC Analyzer "zero" and "span" will need to be set. Once the analyzer is set, the Tedlar bags will be purged with Nitrogen prior to use in the compliance test. Finally, the GM Bag Test will be run and the results compared to the required maximum level of HCs as measured by the NOVA.

The Continuous Monitoring Test uses the VST *Green Machine* Controller to test the amperage for the Vacuum/Motor Pump. This test will simulate a motor fault. If there is no current sensed, a "Fuel Alarm LX" will show on the Veeder Root TLS-350 display.

3) EQUIPMENT AND SUPPLIES

3.1 VST *Green Machine* Compliance Test kit
- 3.1.1 Tedlar sample bag
- 3.1.2 Flare Cap
- 3.1.3 Propane regulator

3.2 NOVA portable H/C analyzer and sample lines
3.3 Vacuum Pump and Lines
3.4 Bottle of consumer grade Propane
3.5 Supply of standard compressed Nitrogen
3.6 Pressure regulator (Nitrogen Regulator)

4) PRE-TEST REQUIREMENTS

Tedlar Bag Preparation:

4.1 Place the Tedlar bag on a flat surface.
4.2 Using the Nitrogen gas cylinder, connect the cylinder to the bag via the line provided. Use 5 psi or less to fill the bag.

Figure 1: Tedlar Bag with Connections

Figure 2: Tedlar Bag Connected to Nitrogen

4.3 Fill the bag approximately two-thirds full of Nitrogen.
4.4 Cap the large hose fitting on the bag with the flare cap that is provided.

Figure 3: Large Cap with Flare Fitting

4.5 Allow the Nitrogen to remain in the bag for 5 minutes.
4.6 Connect the vacuum pump to the sample port via the provided line.

Figure 4: Attach Tedlar Bag to Vacuum Pump to Evacuate the Nitrogen

4.7 Purge the bag using a vacuum pump, until the bag is completely evacuated.

4.8 The bag is now purged and ready for use. Conduct this procedure before and after every test.

NOVA Calibration:

4.9 Follow the manufacturer's instructions for calibrating the NOVA.

Test Set-Up:

4.10 Remove the 1" plug from the test port on the *Green Machine* and close the ball valve on the air outlet.

Normal Operating Configuration

Test Configuration

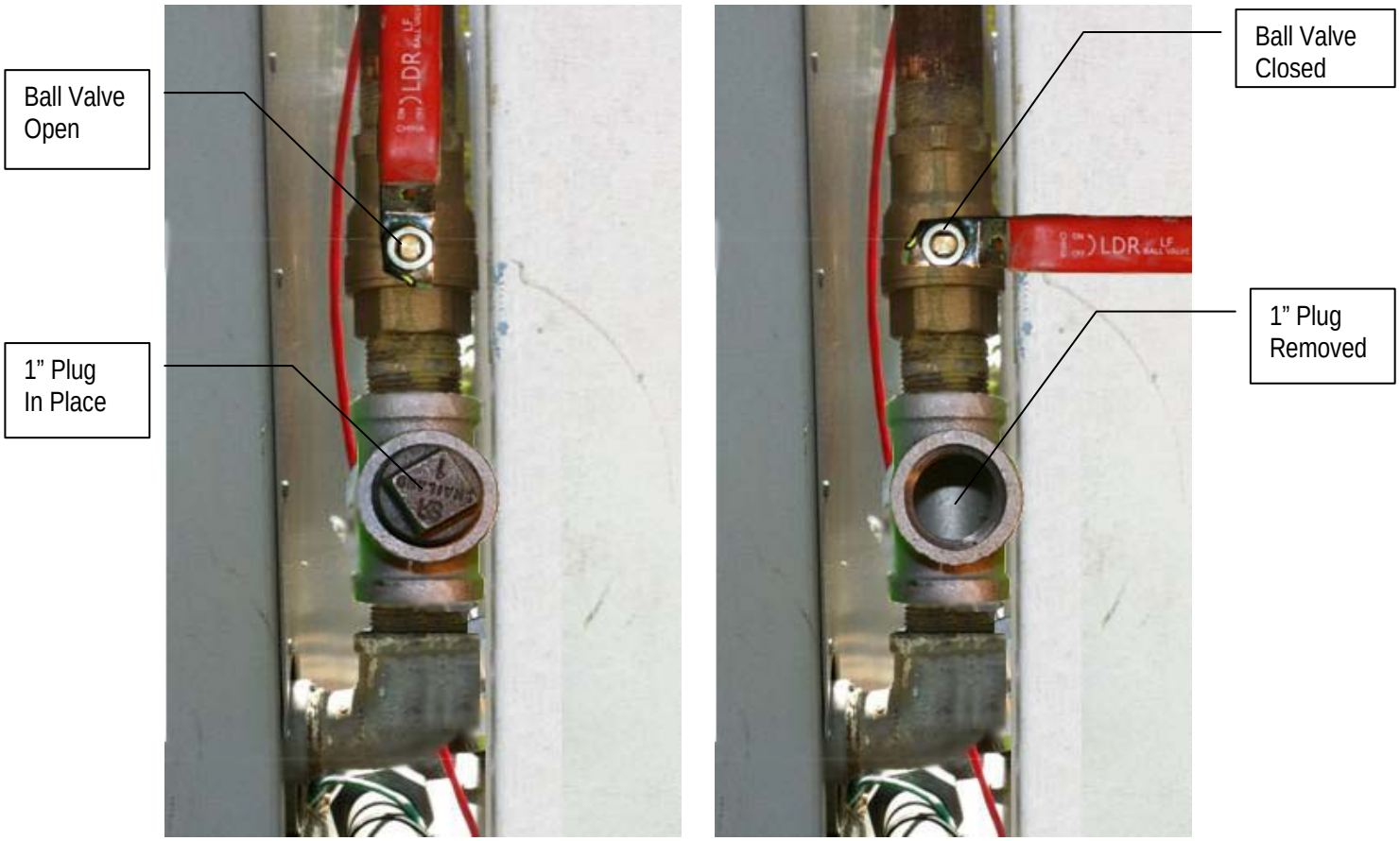


Figure 5: Ball Valve and 1" Plug on Test Port

4.11 Connect the provided test hose to the pipe tee on the air outlet.

Figure 6: Test Hose on 1" Test Port

5) TEST PROCEDURE

Continuous Monitoring:

5.1 Press the F3 button on the VST *Green Machine* Controller. The panel will display "CONTINUOUS MONITOR TEST". The *Green Machine* will not go into the RUN mode. After 30 seconds, the VST *Green Machine* Controller will display "TEST COMPLETE/CHECK FOR ALARM".

Figure 7: F3 Displays "Cont. Monitor Test"

Figure 8: End of Test Message

5.2 Check the Veeder Root TLS-350 for an alarm. A red light will flash and the alarm will read “FUEL ALARM LX”, with “X” being the liquid sensor channel that the *Green Machine* is using as the input for the *Green Machine* motor fault. Record on the test data sheet provided at the end of this procedure if the alarm occurred or not, and attach the alarm printout if available.

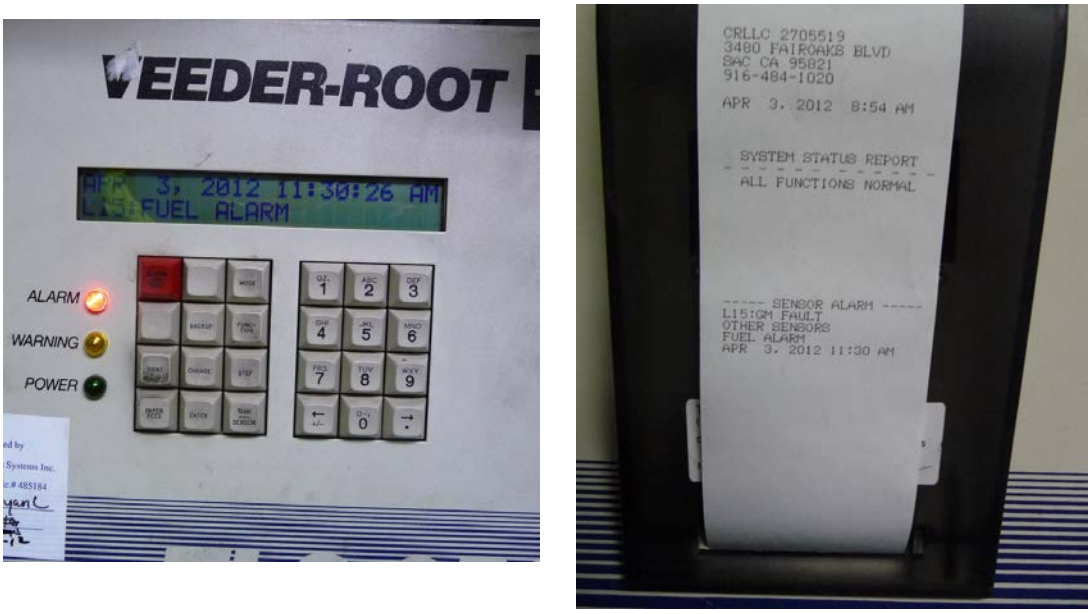


Figure 9: Green Machine Motor Fault TLS-350 Alarm

5.3 Confirm the alarm clears on the TLS-350. The TLS alarm may take a few minutes to clear. Clear the alarm by pressing the red alarm/test button on the TLS-350. Wait until the alarm clears, typically 10 – 60 seconds, and the TLS returns to normal operation.

5.4 Press F5 on the VST *Green Machine* Controller at any time to return to normal operation or the *Green Machine* will return to normal operation 30 seconds after the completion of the test.

GM Bag Test:

5.5 Prior to running the Bag Test, place the *Green Machine* in the Manual OFF Mode at the TLS-350.

5.6 Connect the Tedlar bag to the VST *Green Machine* outlet tee via the hose provided with the Compliance Test Kit.

Figure 10: Tedlar Bag attached to Green Machine

5.7 Press F4 on the VST *Green Machine* Controller. **DO NOT PRESS THE F4 BUTTON UNTIL THE BAG IS ATTACHED TO THE GREEN MACHINE AND READY TO COLLECT THE SAMPLE.** During the RUN cycle, the Tedlar bag should inflate while the sample is gathered. After the RUN cycle, record the time at the end of the collection in the appropriate place on the form at the end of this procedure. The VST *Green Machine* will begin the PURGE cycle next. Once in the PURGE cycle, attach the NOVA portable H/C analyzer to the Tedlar bag.

Figure 11: F4 – GM Bag Test

6) COMPLIANCE DETERMINATION

6.1 The GM Bag Tests should not be run within an hour of the VST *Green Machine* operating or within 3 hours of a fuel delivery. The Tedlar bag will have the full contents of one complete RUN of the VST *Green Machine*.

6.2 Once the VST *Green Machine* has cycled into the PURGE mode, connect the NOVA portable H/C analyzer to the sample port on the Tedlar bag via the provided tubing.

1. After allowing the sample in the bag to mix and stabilize for 3 minutes, open the valve on the Tedlar bag, turn on the NOVA sample pump and begin pulling the sample through the analyzer.
2. Allow the readings to stabilize, approximately another three minutes. Note and record the percentage of HCs seen by the NOVA on the form provided at the end of this document.
3. This reading must be equal to or less than 17%.
4. The bag must be sampled by the NOVA within an hour of taking the sample from the *Green Machine* in order to prevent degradation of the sample. Record the time of sampling on the test data sheet

Figure 12: Tedlar Bag attached to the Green Machine and NOVA

6.3 Once the reading has been recorded on the provided form, remove the bag and equipment from the VST *Green Machine*. Replace the 1” plug and return the ball valve to the “open” position. Purge the Tedlar Bag once again as shown in the Tedlar Bag Preparation section.

6.4 The VST *Green Machine* will return to normal operation 30 seconds after the completion of the test. Place the *Green Machine* back into Automatic Mode at the TLS-350.

6.5 If any of the above tests show the *Green Machine* out of compliance, perform diagnostic procedures found in the *Green Machine* Troubleshooting Manual.

Test Data Sheet for VST *Green Machine* Compliance Test	
Date:	
Facility:	**Test Company:**
Address:	**Test Personnel:**
City:	**VST/Veeder-Root Tech Cert # (as applicable)**
State:	**ICC or District Training Certificate (as applicable)**
Zip Code:	

Compliance Results			
Did the "Fuel Alarm LX" appear on the Veeder Root TLS-350? ***Attach alarm printout if available*** **(Step 5.2)**			
YES NO			
HC Value (Step 6.2.2)	**HC value equal to or below 17% (Step 6.2.3)**	**Collection End Time (Step 5.7)**	**Sampling End Time (Step 6.2)**
	Pass / Fail		

EXHIBIT 16

Liquid Condensate Trap Compliance Test Procedure

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure the term "ARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the ARB Executive Officer or his or her authorized representative or designate.

1. PURPOSE AND APPLICABILITY

This procedure is used to verify the automatic evacuation of the Liquid Condensate Trap (LCT), the Liquid Sensor Alarm, as well as Visual and Audible Alarm. This procedure provides a method to determine compliance with the LCT requirements specified in ARB Executive Orders VR-203 and VR-204 and any subsequent amendments or revisions.

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

This test procedure provides a method to determine the compliance of LCTs. Gasoline is added to the LCT until the Liquid Sensor activates an alarm. The gasoline in the LCT is then allowed to be evacuated until the Liquid Sensor Alarm has cleared.

3. BIASES AND INTERFERENCES

3.1. There can be no Phase I deliveries to the gasoline underground storage tank (UST) while performing this test.

3.2. To ensure that the gasoline level is below the vapor tube on the side of the Turbine Pump the gasoline level in the UST (connected to the LCT) must be below its 90 percent capacity level.

4. EQUIPMENT

4.1. Five (5) gallon gasoline container and funnel or other method of pouring gasoline into the LCT.

5. PRETEST PROCEDURE

5.1. Notify the Certified Unified Program Agency (CUPA) prior to conducting this test procedure. A list of CUPAs can be found at www.calepa.ca.gov/CUPA/Directory/default.aspx.

5.2. No dispensing is allowed to any vehicle for the duration of the test.

5.3. Prior to testing, turn off the 87 grade turbine pump that is connected to the LCT suction line. (This is to keep from evacuating the LCT when adding gasoline for testing.)

5.4. Record LCT capacity in Form 1. A metal tag specifying LCT capacity is installed above the Fuel Entry Point (See Figures 1 and 2). If LCT capacity tag is not installed, the LCT is not in compliance with Exhibit 2 specifications.

6. TEST PROCEDURE:

6.1. Remove plug or cap on Fuel Entry Point installed at the suction riser of the LCT. Add gasoline through the open Fuel Entry Point (see Figures 1, 2 and 3). Note: Gasoline may be added at one of the dispenser risers in lieu of the LCT Fuel Entry Port.

For a typically sized LCT (9.9 gallons) this will be approximately 2 to 3 gallons of gasoline because the Liquid Sensor is installed at 2 inches from the bottom of the LCT (See Figure 4). For larger LCTs do not introduce more gasoline than 10 percent capacity of the LCT.

6.2. Verify the Liquid Sensor activates an Audible and Visual Alarm at the tank monitoring system control panel (control panel) and obtain a printout of the alarm/sensor status (see attached Appendix A for instructions on printing out the sensor alarm report for the Veeder-Root and INCON tank monitoring systems). Record results on Form 1 and attach printout of sensor status. After verification you may silence the Alarm.

If there is **No** Audible and Visual Alarm at the control panel within five (5) minutes, the LCT is not in compliance with Exhibit 2 specifications.

6.3. Verify Liquid Evacuation: Turn on the turbine pump that is connected to the LCT. Maintain this turbine pump operation (running) until the Liquid Sensor Alarm has cleared (*i.e.* turned off). Record results on Form 1 and attach printout of sensor status (see attached Appendix A for instructions on printing out the sensor alarm report for the Veeder-Root and INCON tank monitoring systems).

Note: To keep this turbine pump running you may need to authorize more than one fueling point during the testing period. For a typical LCT capacity of 10 gallons, it will take approximately 10 to 15 minutes to evacuate 3 gallons of gasoline.

If the Liquid Sensor Alarm **does not clear**, (gasoline is not being evacuated), the LCT is not in compliance with Exhibit 2 specifications.

7. POST TEST PROCEDURE:

If plug or cap on the LCT Fuel Entry Point was removed, reinstall using pipe thread sealant (*e.g.* pipe dope) **and** gasoline compatible PTFE tape (*e.g.* Teflon® tape, plumber's tape, or tape dope). If gasoline was introduced at one of the dispenser risers, reconnect the dispenser vapor piping to the riser.

8. REPORTING RESULTS

Record all alarms and evacuation test results, as well as any failures on Form 1. Ensure all printouts from control panel are attached to Form 1. Districts may require the use of alternate forms provided that the alternate forms include the same parameters as identified in Form 1.

Figure 1
Typical Configuration

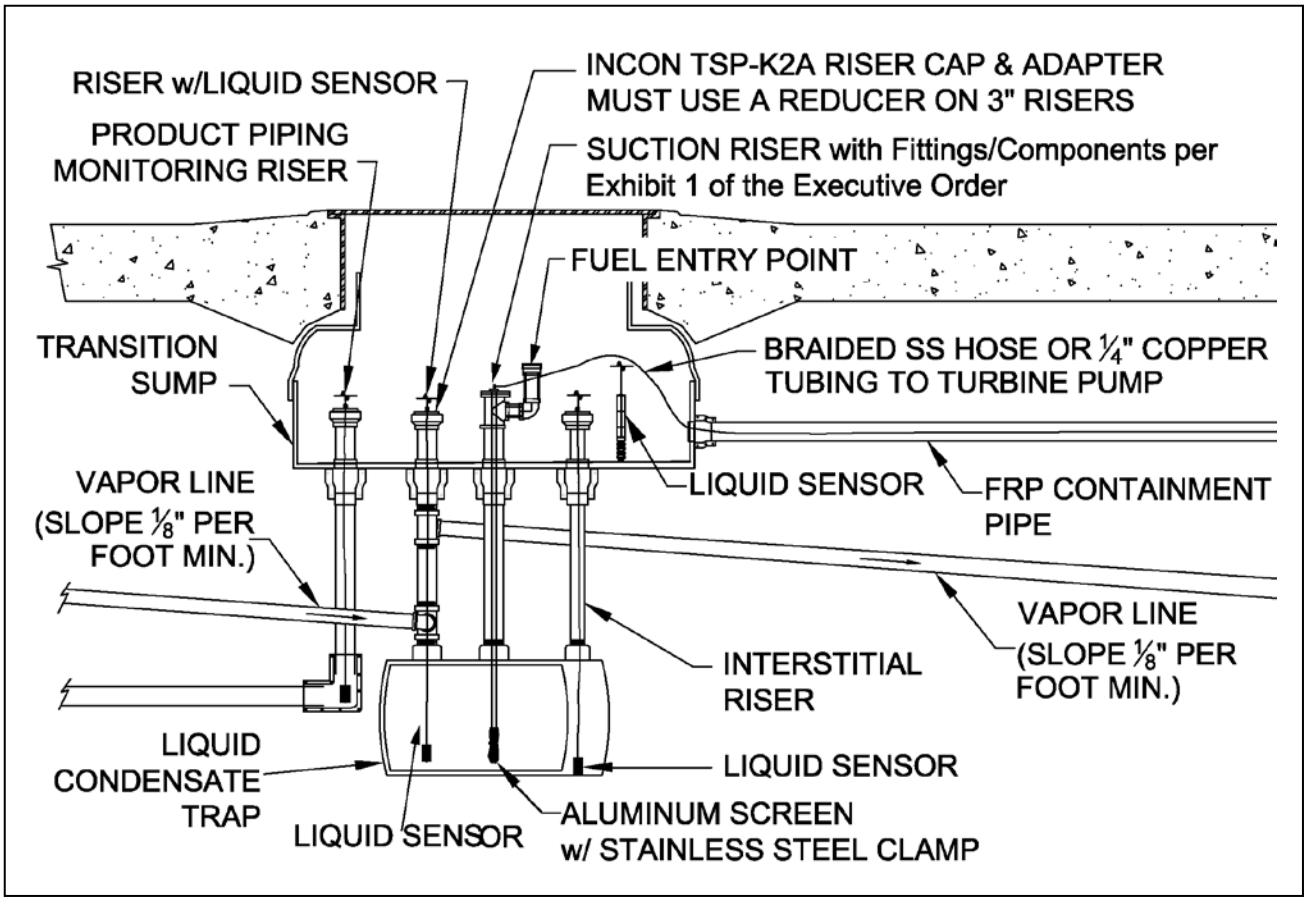


Figure 2
Open Fuel Entry Point

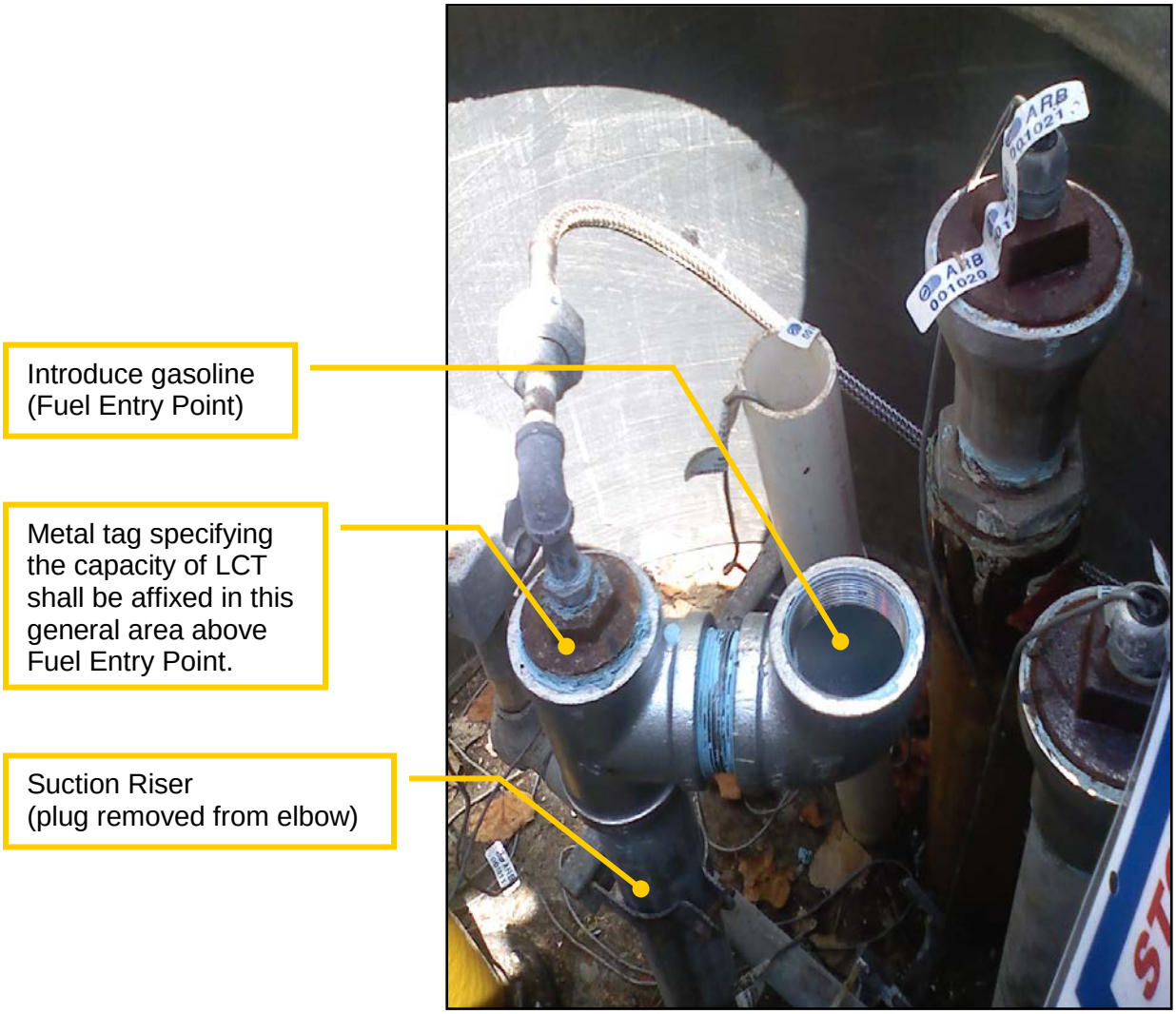
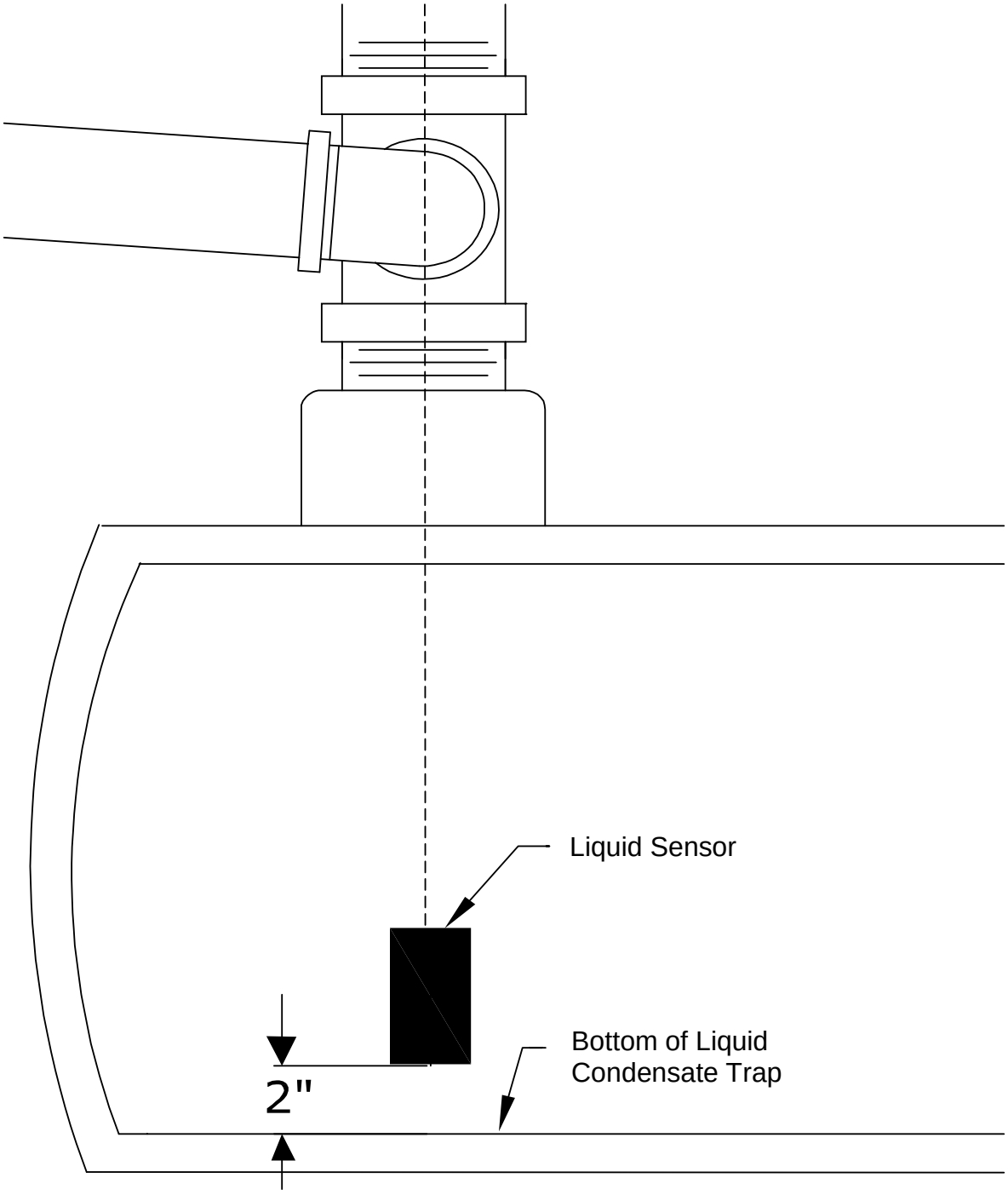


Figure 3
Adding Gasoline through Open Fuel Point

Figure 4
Liquid Sensor Height Setting



Form 1
Required Data When Conducting the
Liquid Condensate Trap Compliance Test Procedure

Liquid Condensate Trap Compliance Test Form	
Service Company Name	Service Company's Telephone
Date of Test Station Name and Address	Certification #'s (as applicable) Healy Tech. Cert. # District Training Cert. # ICC Cert. #
Service Technician (print name and sign)	District Permit #
	Capacity of LCT in gallons

Applicable Step Number	Requirement	Verification (please circle)
Step 3.2	Gasoline below 90 percent capacity level of UST?	Yes No
Step 5.3	Was tag with LCT capacity present above Fuel Entry Point?	Yes No
Step 6.2	Did Liquid Sensor activate an Audible Alarm as well as a Visual Alarm at control panel within five minutes after adding gasoline? (Attach alarm/sensor status printout to this Form.)	Yes No
Step 6.3	Did LCT evacuate and Sensor Alarms clear? (Attach alarm/sensor status printout to this Form.)	Yes No

APPENDIX A

Veeder Root LCT Liquid Sensor Alarm Report

There are many manufacturers of UST tank monitoring systems. The following are steps to print the Liquid Sensor Alarm History Report from the UST tank monitoring console for the Veeder-Root TLS-350 Tank Monitoring System.

> Note: When the LCT liquid sensors were originally programmed into the Tank Monitoring System the title given to those sensors included "LCT" in the name (*for example* if Liquid Sensor 10 is the High Level Liquid Sensor for the LCT it could have been named "L10 LCT High Liquid".)

Veeder-Root TLS Console

Liquid Sensor Alarm History Reports are a record of the last three alarms for the liquid sensor selected. To print a liquid Sensor Alarm History Report **and** if Maintenance Tracker is enabled go to Exhibit 18 for instructions (to temporarily disable Maintenance Tracker) and then return to instructions below.

How to Obtain Liquid Condensate Trap (LCT) Alarm Print-outs

Step	Button Pushed	Number of Times Pushed	Readout
1	MODE	Multiple, Push until readout on right is shown	SETUP MODE
2	FUNCTION	Multiple, Push until readout on right is shown	LIQUID SENSOR SETUP
3	PRINT *	Once	LIQUID SENSOR SETUP
4	MODE	Multiple, Push until readout on right is shown	DIAG MODE
5	FUNCTION	Multiple, Push until readout on right is shown	ALARM HISTORY REPORT
6	STEP	Multiple, Push until readout on right is shown	L#: ALARM HISTORY
7	TANK/SENSOR	Multiple, until you reach the liquid sensor number assigned to the High Liquid Level in the LCT.	**EXAMPLE**: L10:LCT HIGH LIQUID
8	PRINT**	Once	**EXAMPLE**: L10:LCT HIGH LIQUID
9	MODE	Multiple, Push until readout on right is shown	MM DD, YYYY HH:MM:SS: XM ALL FUNCTIONS NORMAL

*****A printout will be generated displaying a read-out of all liquid sensors. Find the liquid sensor number assigned to the LCT.

******A printout will be generated displaying the last three alarms for the Liquid sensor assigned to the LCT.

.

APPENDIX A CONTINUED
INCON LCT LIQUID SENSOR ALARM REPORT

Follow the figures below to print a Sensor Report for LCT Alarm (Do not select Alarm History):

Figure 1 – Press 'Home' button until you reach the screen shown below. Select Print Option

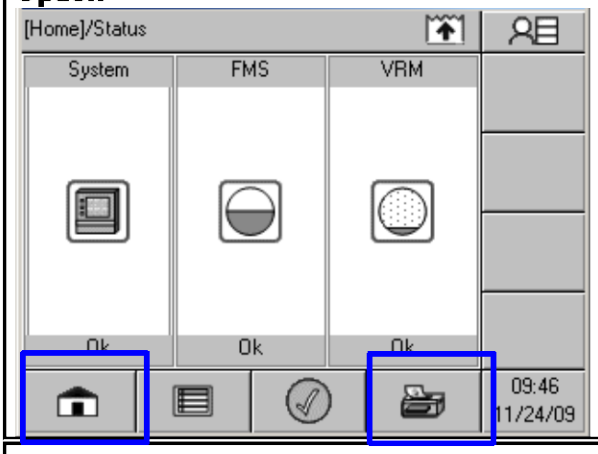


Figure 2 - Select the FMS Option

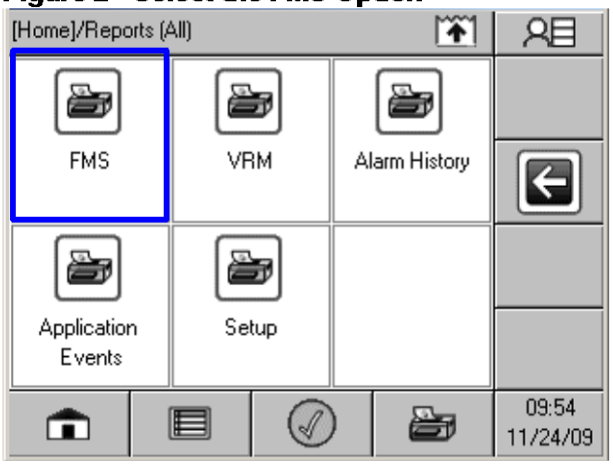


Figure 3 - Select 'Sensor' Option - You may need to press the 'scroll' button to see the 'Sensors' selection on screen.

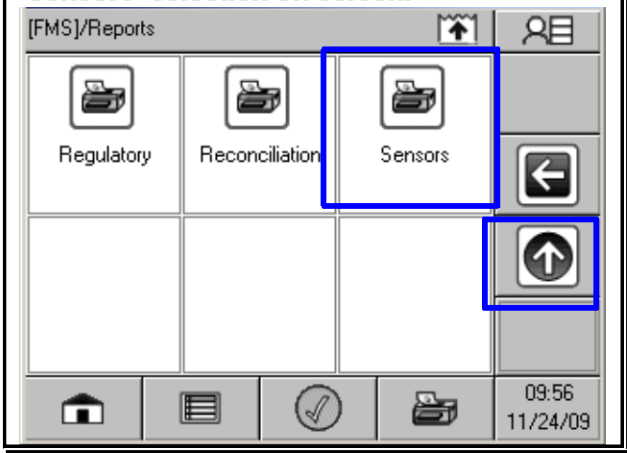


Figure 4 - Select 'Print' Option

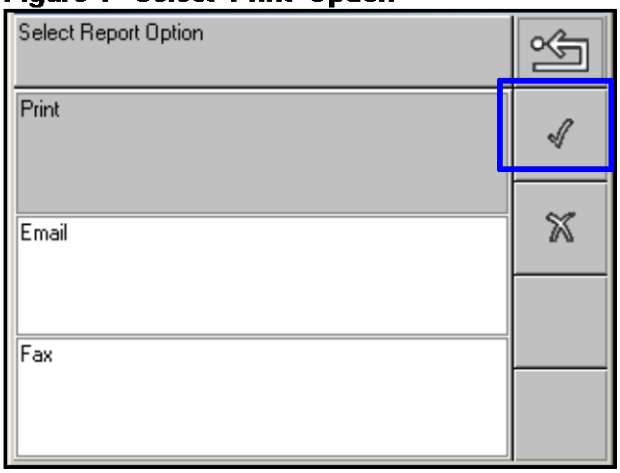


Figure 5 - Select 'Last Available' Option. If your alarm does not show, select 'Last 30 Days' or current month and year Option. Be patient, printer takes a few minutes to print.

EXHIBIT 17
Veeder-Root ISD Vapor Flow Meter Operability Test Procedure

The following procedures shall be used at field sites to determine the operability of the Veeder-Root ISD system to satisfy the requirements documented in VAPOR RECOVERY CERTIFICATION PROCEDURE, CP-201, CERTIFICATION PROCEDURE FOR VAPOR RECOVERY SYSTEMS AT GASOLINE DISPENSING FACILITIES. Testing the ISD equipment in accordance with this procedure will verify the equipment's operability for Vapor Collection Monitoring.

Veeder-Root's TLS console ISD System Self-Test Monitoring algorithms are designed to verify proper selection, setup and operation of the TLS console modules and sensors and will not complete and report passing test results in the event of a failure of components used in the system. Completed ISD monitoring tests are evidence that:

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

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

A step-by-step worksheet for recording data from the following operability tests is provided at the end of this Exhibit.

The term "TLS Console" used throughout this Exhibit includes but is not limited to TLS-350, TLS-350 Plus, TLS-350R, Red Jacket ProMax, Gilbarco EMC consoles which are also referenced in Exhibit 1.

SECTION A. VEEDER-ROOT ISD VAPOR FLOW METER OPERABILITY TEST PROCEDURE

1. PURPOSE AND APPLICABILITY

1.1 This procedure is used to verify the setup and operation of the Vapor Flow Meter (VFM)

2. EQUIPMENT

2.1 **Nitrogen High Pressure Cylinder with Pressure Regulator**. Use a high pressure nitrogen cylinder capable of maintaining a pressure of at least 2000 pounds per square inch gauge (psig) and equipped with a compatible two-stage pressure regulator and a one psig relief valve. A ground strap is recommended during introduction of nitrogen into the system.

2.2 **Flow meter**. Use a flow meter (Rotometer) capable of accurately measuring nitrogen flow rate of 60 cubic feet per hour (cfh).

2.3 **Pressure Measuring Device**. An electronic pressure measuring device with a full range that shall not exceed 0-10 inches of water column (WC) with a minimum accuracy of 0.5 percent of full-scale. A 0-20 inches WC device may be used provided the minimum accuracy is 0.25 percent of full-scale.

2.4 **Squeeze Bulb.** A rubberized or equivalent device used to increase pressure to 5.00” WC.

2.5 **Balance Nozzle Adapter.**

2.5.1 For VST Model VST-EVR-NB nozzle, use Part No. VST-STA-100.
2.5.2 For Emco Wheaton Retail Model A4500EVR nozzle, use Part No. 494761EVR

2.6 **Surrogate Spout.** Use the correct Surrogate Spout Assembly listed below to conduct the pre-test leak check. Figure 1.A shows the VST Surrogate Spout Assembly and Figure 1.B shows the Emco Wheaton Retail Surrogate Spout Assembly.

2.6.1 For VST Model VST-EVR-NB nozzle, use Part No. VST-TSS-100.
2.6.2 For Emco Wheaton Retail Model A45005EVR nozzle, use Part No. 494771EVR

2.7 **Adapter Supply Hose.** The nominal inside diameter of the flexible hose shall be between 0.75 and 1.00 inches, and the length of the tubing shall be between 3 feet and 6 feet.

2.8 **Ball Valve.** The nominal inside diameter of the ball valve shall be 0.25”.

2.9 **Nitrogen Supply Line.** The nominal inside diameter of the flexible tubing shall be between 0.25” and 0.375”.

2.10 **Gas Volume Meter**. Use a Dresser Measurement Roots Meter®, or equivalent (preferably fitted with a digital readout), to measure the volumetric flow rate through the Balance Nozzle Adapter. The gas volume meter shall be calibrated within 180 days prior to conducting this procedure.

2.11 **Stopwatch.** Use a stopwatch accurate to within 0.2 seconds.

2.12 **Lubricant**. Petroleum Jelly.

2.13 **Leak Detection Solution**. Any liquid solution designed to detect gaseous leaks may be used to verify the pressure integrity of test equipment during this test.

2.14 **Notebook personal computer (PC) with ISD PC Setup Tool Version 1.09 or later**. Serial communication cables are required to connect to the ISD system.

Figure 1.A

VST Surrogate Spout Assembly

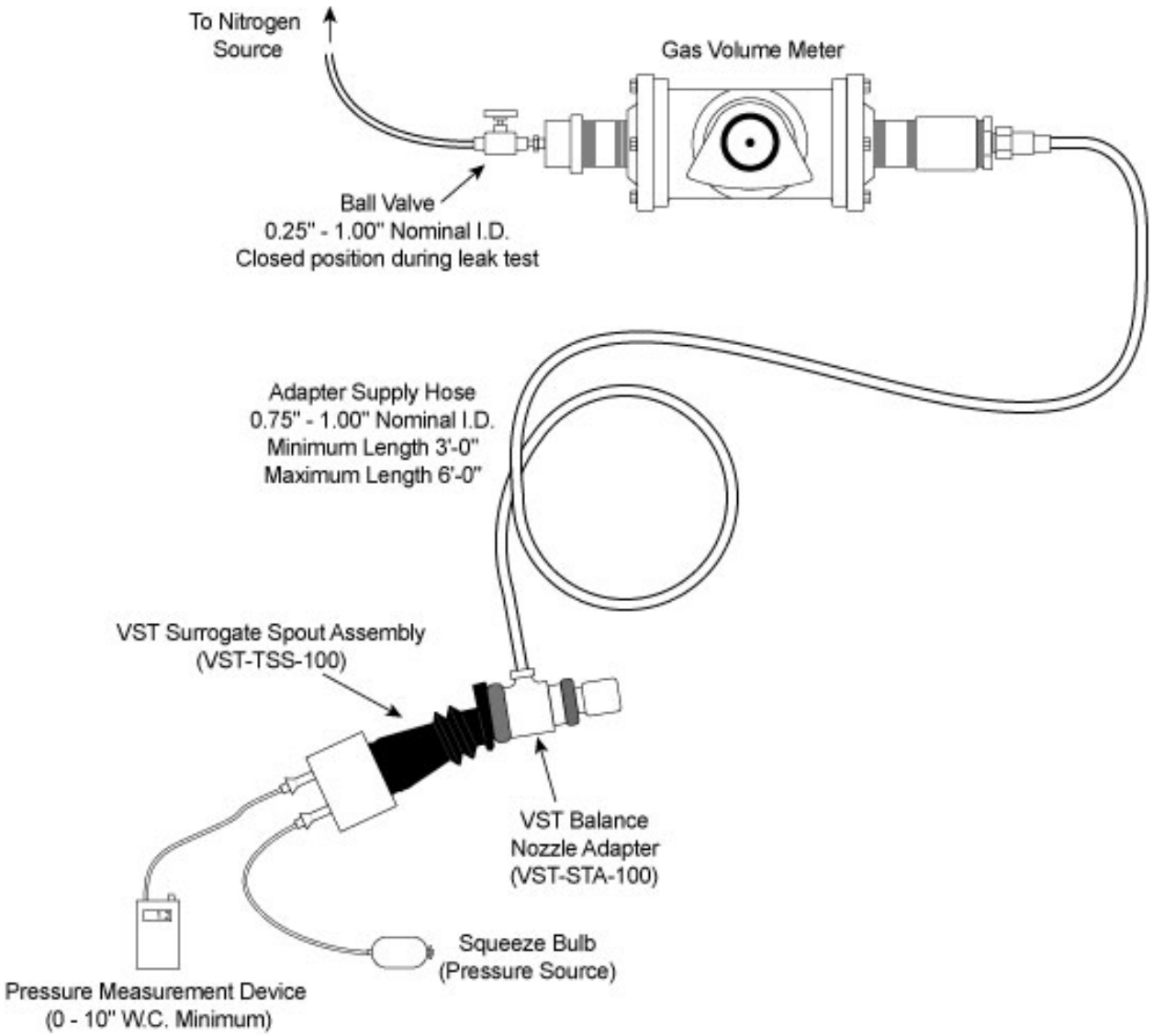


Figure 1.B

EMCO Wheaton Retail Surrogate Spout Assembly

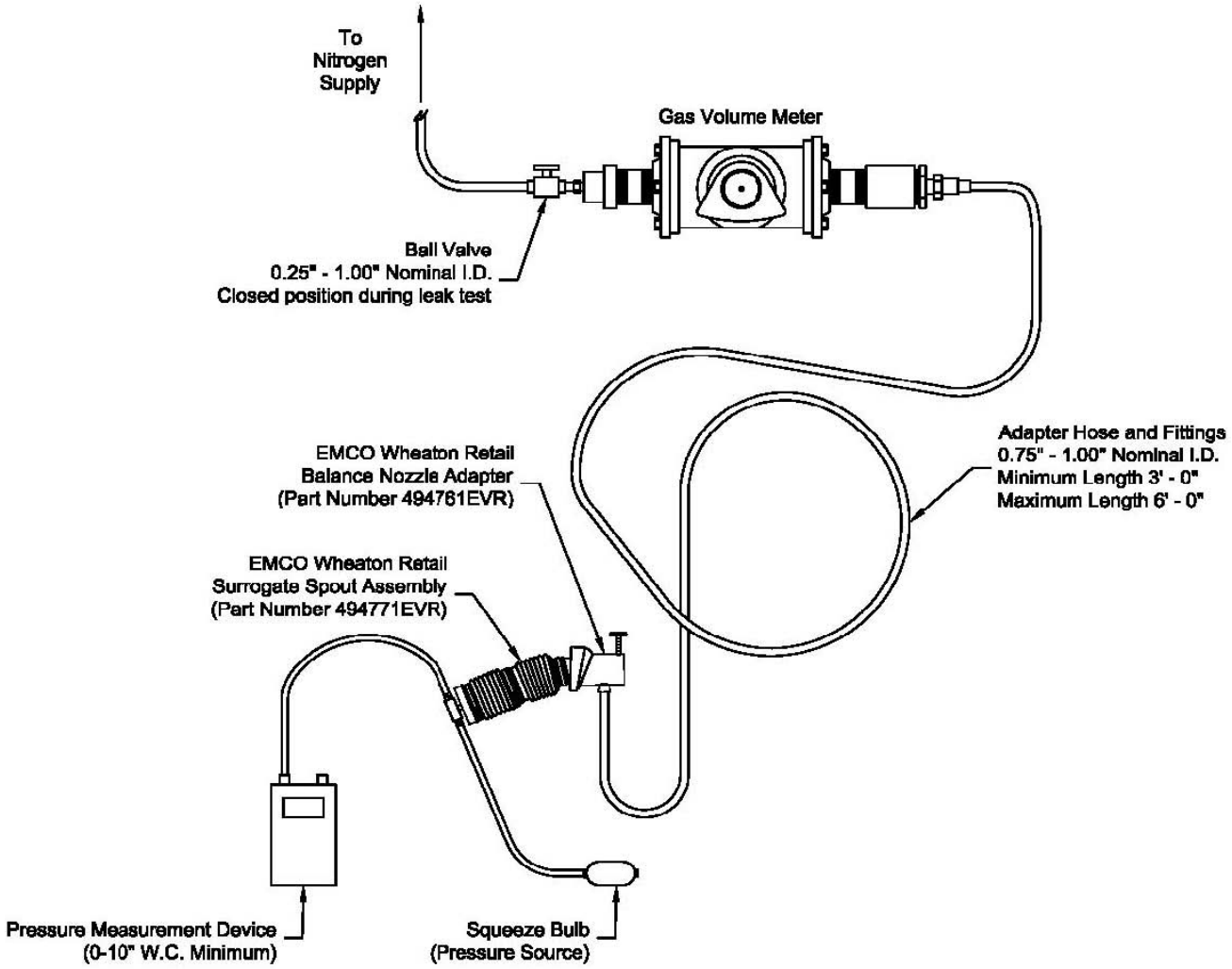


Figure 2.A
VST Vapor Flow Meter Test Assembly

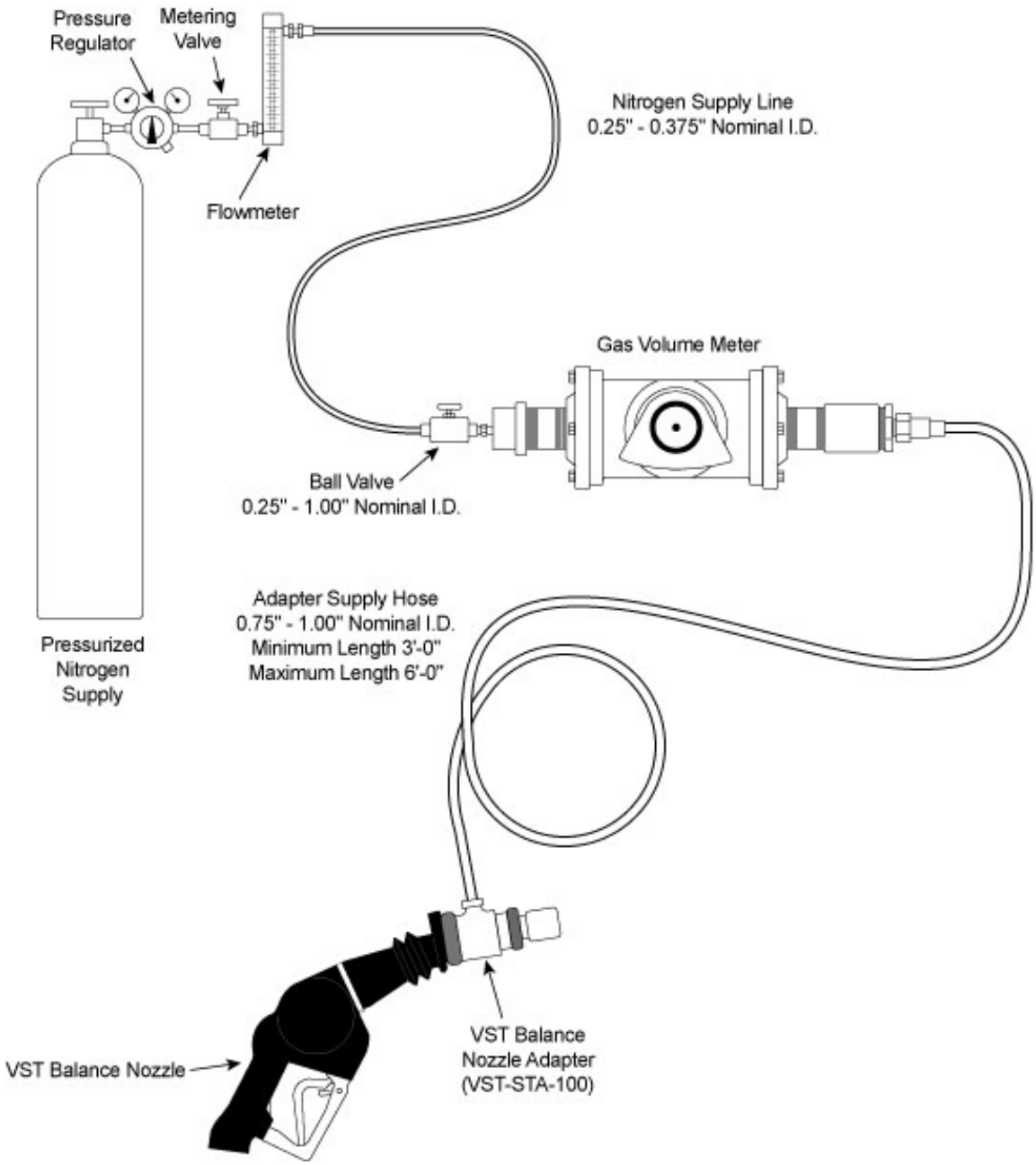
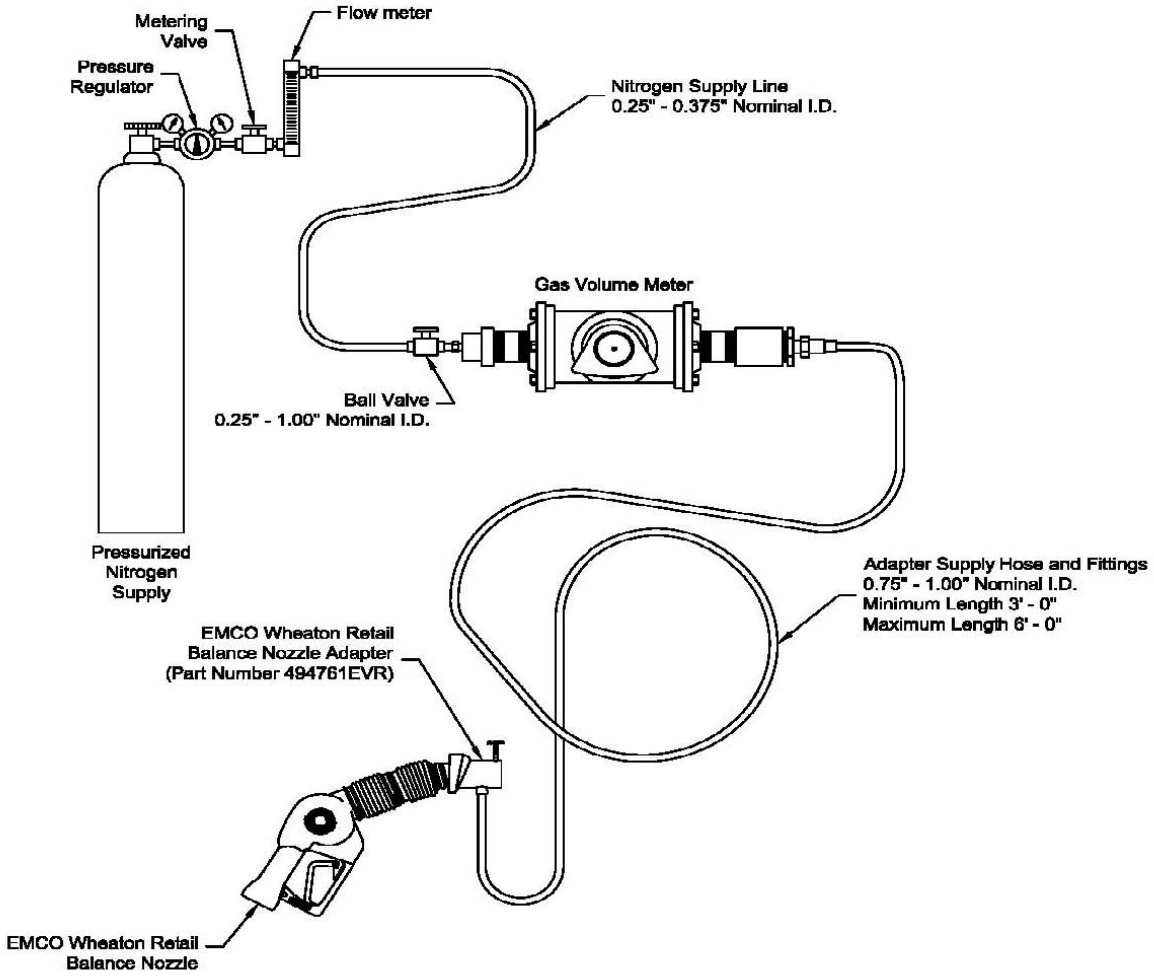


Figure 2.B
Emco Wheaton Retail Vapor Flow Meter Test Assembly



3. PRE-TEST PROCEDURES

3.1 From the TLS Console, ISD Setup Menu print the ISD Setup Report. The ISD Hose Table will identify which VFM (column AA) is being used on each Fueling Position (FL)

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

ISD AIRFLOW METER MAP
ID SERIAL NUM LABEL
------------------------
 1 00000111   AFM1 FP1 -
 2 00000112   AFM2 FP3 -
 3 00000113   AFM3 FP5 -
 4 00000114   AFM4 FP7 -
 5 00000115   AFM5 FP9 -
 6 00000116   AFM6 FP11
```

Note: If Veeder-Root's "Maintenance Tracker" is installed and enabled, access to the "diagnostic mode" and "set-up mode" of the TLS Console is prohibited unless a Maintenance Tracker Technician Key or personal computer equipped with Veeder-Root's ISD Setup Tool Software Version 1.09 or higher is made available. Maintenance Tracker is an optional security device designed to prevent unauthorized tampering and clearing of Veeder-Root tank monitoring and ISD alarms. Maintenance Tracker resides within the TLS console and when enabled, a message will appear on the two line display of the TLS console. For additional instructions on how to access the desired parameters to complete this test procedure, see Exhibit 18; "Accessing PMC and ISD Parameters at Gasoline Dispensing Facilities (GDFs) with Veeder-Root "Maintenance Tracker" Security Feature Installed & Enabled".

3.2 Connect the notebook PC running Veeder-Root's "ISD PC Setup Tool" terminal mode, v1.09 or higher, or use Microsoft HyperTerminal to the dedicated TLS Console serial port that is required for ISD reports access. Access the individual airflow meter totals for the airflow meter being tested using the following RS232 command: IV8700.

If this command does not provide results for all vapor flow meters installed at the GDF, the last two digits of the command can be altered to obtain individual flow meter readings. Therefore, it is acceptable to enter the following alternate

command: IV87XX; where XX=any value from 00 to 18 (18 is the maximum number of flow meters that a single TLS Console can accommodate).

Typical IV8700 Report

```
DEC 14, 2007  5:47 AM
AIR FLOW METER TOTALS
DATE-TIME                VOLUME
                    AFM  1    AFM  2    AFM  3    AFM  4
07-12-14 05:46:00 76739.892 63139.977 42860.023 44139.693
```

3.3 Conduct a pre-test leak check of the Balance Nozzle Adapter, the gas volume meter and the adapter supply hose by connecting the Balance Nozzle Adapter to a surrogate spout as shown in Figure 1.A or Figure 1.B. Turn the ball valve in Figure 1.A or Figure 1.B to the closed position. Raise the test pressure to 5.00" ±0.50" WC using a squeeze bulb. There shall not be a pressure drop of more than 1.00" WC from the above starting pressure for 30 seconds from the start of the test. If the leak test passes, proceed with the testing. If the leak test fails, proceed to isolate the source of the leak by pressurizing the test equipment again. Squirt liquid leak detector solution on interfaces and other potential leak sources and watch for the formation of bubbles. Once leak(s) are repaired, repeat the leak test procedure.

Note: Leak checks shall be conducted in a shaded area or away from direct sunlight. Leak checks may be conducted during the testing to ensure leak integrity of test equipment. Apply petroleum jelly, if necessary to the surface area in the Balance Nozzle Adapter. Petroleum jelly can also be applied to the nozzle spout and the face seal (rubber boot) of the surrogate spout assembly and the back of the Balance Nozzle Adapter if necessary.

3.4 Assemble the equipment as shown in Figure 2.A for VST or Figure 2.B for Emco Wheaton Retail nozzle. Leave the Balanced Nozzle Adapter off of the nozzle at this time. Do not enable the dispenser to dispense product. Remove nozzle and utilize any method to keep the nozzle hook in the **off** position.

3.5 Ensure that the ground strap is properly connected to an acceptable ground.

Note: The test requires that the nozzle be squeezed and liquid product must not flow from the dispenser.

3.6 Open the Phase I vapor poppet to atmosphere. Locate the Phase I EVR vapor poppet on the 87 grade tank and remove the dust cap. Open the vapor poppet to atmosphere by using a modified dust cap or equivalent.

4. TEST PROCEDURES

4.1 If the system has a Hirt VCS 100 Processor installed, locate the Hirt Indicator Panel. Turn POWER to processor OFF at Indicator Panel.

Hirt VCS 100 Indicator Panel

4.2 Prevent dispensing from all other fueling positions that use the VFM being tested.

4.3 Record the VFM serial number and fueling position being tested on the worksheet.

4.4 Completely drain any gasoline that may be in the nozzle and hose vapor return path by any acceptable method.

4.5 Continuing from step 3.4, turn the ball valve to the open position and adjust the nitrogen flow using the Rotometer to 60 cfh +/- 5.0 cfh.

4.6 Once the nitrogen flow is set, turn the ball valve to the closed position to stop the flow of nitrogen through the gas volume meter. This will ensure the nitrogen flow rate is set and the nitrogen can instantaneously be activated when the ball valve is turned to the open position.

4.7 Install the Balance Nozzle Adapter on the appropriate nozzle as shown in Figure 2.A or Figure 2.B. Apply petroleum jelly, if necessary to the surface area in the Balance Nozzle Adapter. Petroleum jelly can also be applied to the nozzle spout and the face seal (rubber boot) of the nozzle and the back of the Balance Nozzle Adapter if necessary.

4.8 Wait for two minutes of no air or liquid flow activity on the dispenser with the airflow meter being tested.

4.9 With the notebook PC connected to the TLS Console ISD, and the IV8700 Report page open, record the initial meter total for the VFM being tested on the worksheet.

4.10 Record the initial gas volume meter reading on the worksheet.

4.11 **Ensure the dispenser is <u>not</u> enabled to dispense product.** Simultaneously squeeze the nozzle handle to the full dispensing position and turn the ball valve to the open position to allow nitrogen to flow.

Note: Only one fueling point and grade per dispenser needs to be tested. If the nozzle handle is not engaging the vapor/product valve within the

nozzle, turn off the nitrogen flow using the ball valve; remove the Balance Nozzle Adapter from the nozzle to release the nitrogen pressure build up and repeat steps 4.7- 4.10. Excess pressure build up in the nozzle will engage the automatic shut-off diaphragm and not allow the vapor/product valve within the nozzle to open.

4.12 Monitor the gas volume meter display. Simultaneously stop the flow once 1.0 cubic feet (cf) +/- 0.10 cf of nitrogen is reached by turning the ball valve to the closed position and also releasing the nozzle handle.

Note: Final volume values may be biased if the ball valve and the nozzle handle are not activated at the same time.

4.13 Record the end meter reading from the gas volume meter. Calculate the total cubic feet value by subtracting the initial meter reading obtained in step 4.11 from the final meter reading in this step.

4.14 Convert the total cubic feet value to gallons using the equation on worksheet. Record the final gallon value on the worksheet.

4.15 Wait two minutes after each test run before obtaining the VFM reading from the notebook PC that is connected to the TLS Console ISD. A period of two minutes is required by the ISD system to receive and document total flow from the VFM.

4.16 Calculate the total VFM volume by subtracting the initial reading on step 4.8 from the final reading on step 4.14 and record the value on the worksheet.

4.17 Calculate the percent difference between the final gallons reading from the gas volume meter and the final VFM reading using the equation shown on the worksheet.

Pass: If the volume percent difference between recorded ISD VFM and the gas volume meter is within 15%, check “Pass” on the worksheet, and repeat the Test Procedures for the next dispenser.

Fail: If the volume percent difference between recorded ISD VFM and the gas volume meter is not within 15%, then go to Step 4.18.

4.18 Repeat Test Procedures using the opposite side of the dispenser. If test passes, continue to the next dispenser. If test fails, go to Step 4.19.

4.19 Conduct the leak test in step 3.3 to evaluate the test equipment. If the equipment passes the leak test, the ISD flow meter is not in compliance with Exhibit 2. If equipment leak test fails, repair the leak and go to Step 4.1.

5. POST-TEST PROCEDURES

5.1 Remove the Balance Nozzle Adapter and all equipment from the nozzle assembly.

5.2 A post-leak test of the equipment is not required if all the VFMs are within range. For the VFMs that are not within range, the leak test in step 3.3 will be conducted to further evaluate the test equipment.

5.3 If the system has a Hirt VCS 100 Processor installed, locate the Hirt Indicator Panel. Turn POWER to processor ON at Indicator Panel.

5.4 Prior to transportation, the inlet and outlet of the gas volume meter shall be carefully sealed to prevent foreign matter from entering the meter.

SECTION B. SITE SHUTDOWN VERIFICATION TEST

1. TEST PROCEDURES

1.1 This test must be performed by a certified Veeder-Root contractor due to possible backup battery issues. Before testing see Veeder-Root "Technical Support Service Alert", dated August 11, 2011 or contact Technical Support at 1-800 323-1799 or technicalsupport@veeder.com

1.2 Remove power from TLS console.

1.3 Confirm power to submersible pumps is off by verifying that gasoline dispensing has been disabled.

1.4 Restore power to TLS console.

1.5 Complete Site Shutdown Worksheet

Operability Test Procedure Data Worksheet

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

		Date of Test
Service Company Name		Service Company's Telephone
Service Technician		Veeder-Root Tech Certification #
Station Name		District Permit #
Station Address	City	State Zip

		ISD Flow Meter Total			Gas Flow Meter Total						
4.3	4.3	4.9	4.14	4.15	4.9	4.12	4.12	4.13	4.15		
Meter SN	Fueling Pos	Start	Stop	Difference Gal (Stop – Start)	Start	Stop	Difference Cubic Feet (Stop – Start)	Cubic feet To gallons[1]	% Diff[2]	Pass	Fail

[1] $Gallons = CubicFeet \times 7.481$

[2] $\%Diff = \frac{ISDDiffGal - GasFlowMeterDiffGal}{GasFlowMeterDiffGal} \times 100$

Veeder-Root In-Station Diagnostics (ISD)
Site Shutdown Test Worksheet

DATE OF TEST _____

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

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

COMMENTS (INCLUDE DESCRIPTION OF REPAIRS MADE)

EXHIBIT 18

Accessing PMC and ISD Parameters at Gasoline Dispensing Facilities (GDFs) with Veeder-Root "Maintenance Tracker" Security Feature Installed & Enabled

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure the term "ARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the ARB Executive Officer or his or her authorized representative or designate.

1. PURPOSE AND APPLICABILITY

The Maintenance Tracker is an optional security device produced and marketed by Veeder Root (VR) as a means to control and record access to their tank monitoring and ISD systems. Unless a specialized "technician key" is made available, the Maintenance Tracker prevents unauthorized personnel from gaining access to tank monitoring system diagnostic and setup modes which are necessary to clear system alarms. The technician key is a physical chip device, similar to a flash memory stick, which plugs into a companion RS232 card installed on the TLS Console.

Because the Veeder-Root In-Station Diagnostics (ISD) system resides within the TLS Console, the Maintenance Tracker also restricts access to PMC and ISD related parameters such as vapor pressure sensor values and the ability to turn on or turn off the vapor processor. When Maintenance Tracker is installed and enabled, the parameters listed in Table 1 (see below) are not accessible through the TLS Console unless a technician key is made available. An alternative way to access these parameters without a technician key is available through the RS232 interface by using a software program developed by Veeder-Root called "ISD Setup Tool" Version 1.09 or higher.

The purpose of this procedure is to provide instructions on how to access PMC and ISD parameters specified in Table 1 when Maintenance Tracker is installed and enabled. This procedure only applies to GDFs equipped with Veeder-Root PMC and ISD systems. This procedure shall be used in conjunction with the appropriate or applicable procedure listed in Table 1.

The term "TLS Console" used throughout this Exhibit includes but is not limited to TLS-350, TLS-350 Plus, TLS-350-R, Red Jacket ProMax, and Gilbarco EMC consoles, which are also referenced in Exhibit 1.

Table 1: Description of PMC and ISD Parameters Restricted By Maintenance Tracker

Executive Order	Exhibit	Description of Parameter
VR-203, VR-204	Exhibit 4: Required Items in Conducting TP-201.3	Manually close/open vapor polisher processor vapor valve
VR-203, VR-204	Exhibit 8: VST ECS Hydrocarbon Sensor Verification Test Procedure	Manually turn off/on the VST ECS processor
VR-203, VR-204	Exhibit 10: VST ECS/ VST Green Machine, Veeder-Root Vapor Polisher Vapor Pressure Sensor Verification Test Procedure	1. Disable/Enable Processor 2. ISD Pressure Sensor Value
VR-203, VR-204	Exhibit 11: Veeder-Root Vapor Polisher Operability Test Procedure	1. Vapor Valve setting-Auto/Manual 2. Manually close/open processor vapor valve 3. Vapor Polisher ambient and outlet temperature values 4. Gasoline tank temperature values 5. Atmospheric pressure
VR-203, VR-204	Exhibit 12: Veeder-Root Vapor Polisher Hydrocarbon Emissions Verification	Manually close/open vapor valve
VR-203, VR-204	Exhibit 16. Liquid Condensate Trap Compliance Test Procedure	Liquid Sensor Alarm History Report
VR-204	Exhibit 17. Veeder-Root ISD Vapor Flow Meter Operability Test Procedure	ISD Setup Report
VR-204	IOM Section 12: Figure 48 & 50: Clear Test After Repair	Diagnostic Mode, ability to perform a CTAR

2. PRINCIPLE AND SUMMARY OF PROCEDURE

As indicated in section one, there are two ways to access PMC and ISD parameters when Maintenance Tracker is installed and enabled; directly from the TLS Console using a key or indirectly through the RS232 interface using a specialized software program developed by Veeder-Root. This procedure provides access instructions for both methods. Option 1 provides instructions on how access the ISD and PMC parameters directly from the TLS Console when a Maintenance Tracker key is available. Option 2 provides instructions on how to access the ISD and PMC parameters through the RS232 interface by using the software program called “ISD Setup Tool Version 1.09” (or higher).

3. BIASES AND INTERFERENCES

3.1 This procedure shall be used in conjunction with the applicable procedure listed in Table 1. All biases and interferences must be followed for each test procedure (or Exhibit) within ARB Executive Orders VR-203 and VR-204 and any subsequent amendments or revisions.

3.2 If the GDF is equipped with a wireless vapor pressure sensor (Veeder-Root part number 861190-201), the only way to access the parameters in Table 1 is to use Veeder-Root ISD Setup Tool version 1.10 or higher.

4. EQUIPMENT

4.1 Option 1: Maintenance Tracker Key, see Figure 3. To acquire a Maintenance Tracker key contact Veeder-Root Technical Support at 1-800-323-1799 M-F 8am-7pm ET or technicalsupport@veeder.com .

4.2 Option 2: RS232 interface (standard on all ISD systems), laptop computer, cables, and Veeder-Root ISD Setup Tool Version 1.09 (or higher) software. To acquire a copy of ISD Setup Tool Version 1.09 contact Veeder-Root Technical Support at 1-800-323-1799 M-F 8am-7pm ET or technicalsupport@veeder.com .

5. PRE ACCESS PROCEDURE

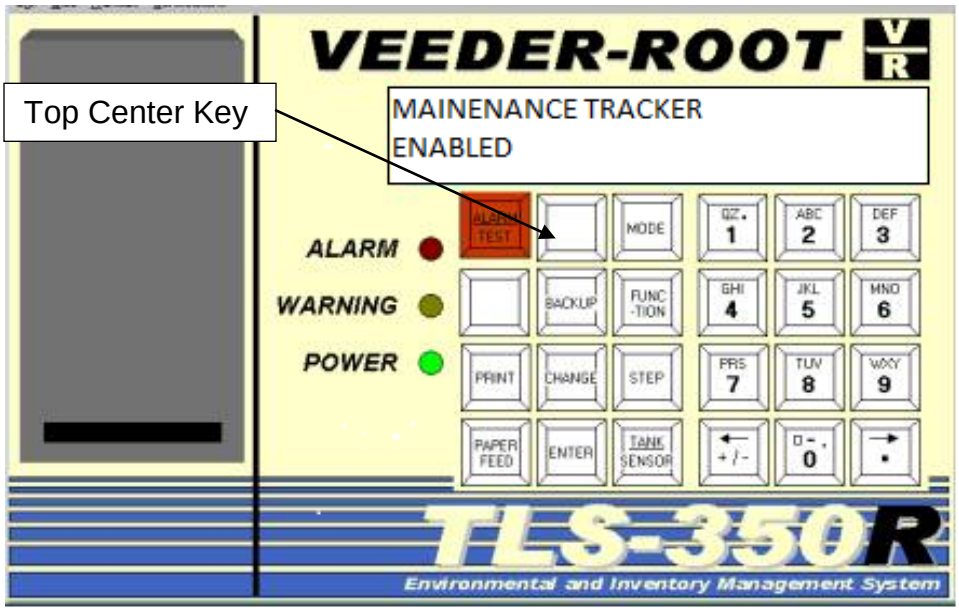
This procedure shall be used in conjunction with the applicable procedure listed in Table 1. All pretest procedures must be followed for each test procedure (Exhibit) within ARB Executive Orders VR-203 and VR-204 and any subsequent amendments or revisions.

6. ACCESS PROCEDURE

6.1. Option 1: Accessing PMC and ISD parameters through the TLS Console when Maintenance Tracker is enabled and key is available:

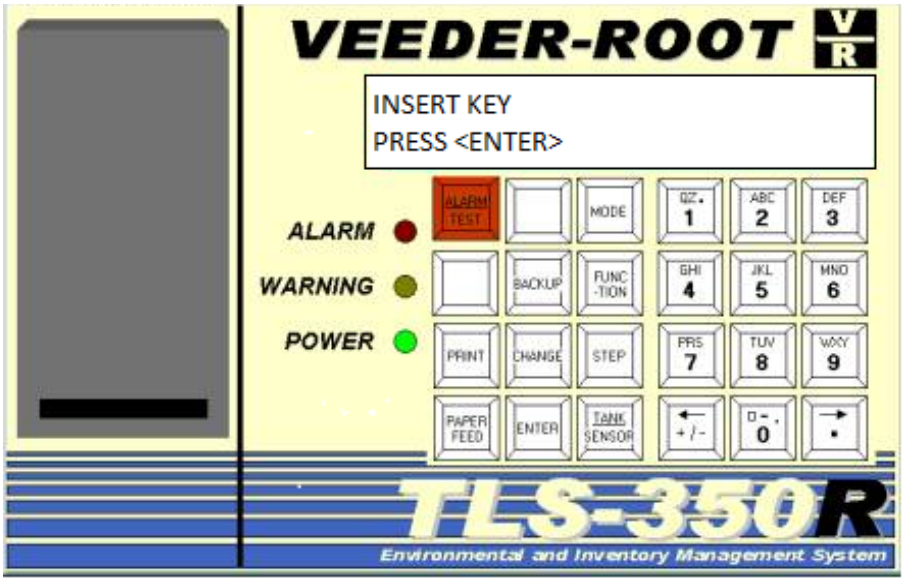
6.1.1. When the top center key on the Veeder-Root ISD TLS Console is pressed, “MAINTENANCE TRACKER ENABLED” is displayed. See Figure 1.

Figure 1: Maintenance Tracker Enabled on ISD TLS Console



6.1.2. In order to gain access to the diagnostic and setup menus, the user would then press the step key. The display will now read: “INSERT KEY PRESS <ENTER>”. See Figure 2.

Figure 2: Maintenance Tracker Enabled on ISD TLS Console



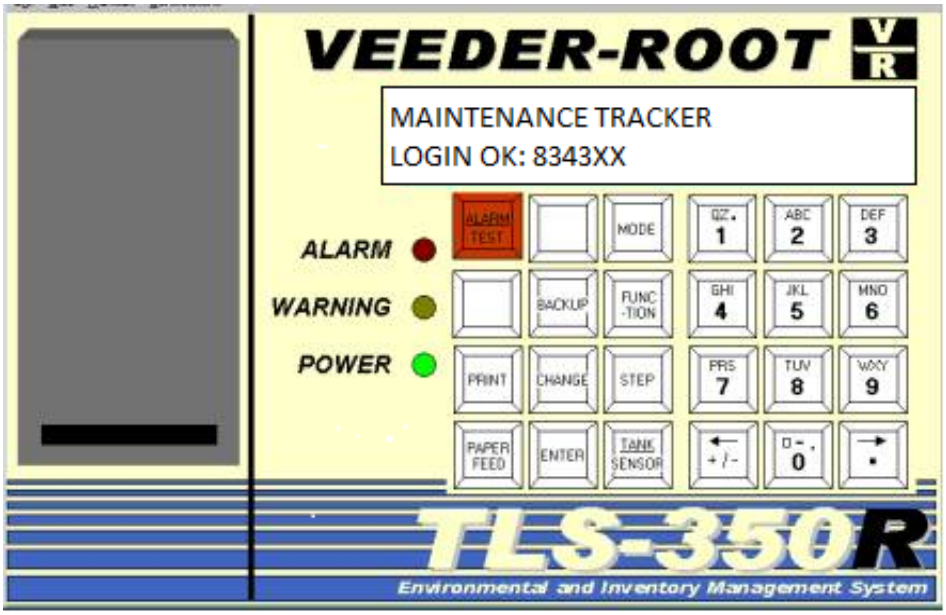
6.1.3. The Maintenance Tracker key (see Figure 3) must be plugged into a RS-232 port underneath the TLS Console within one minute or system will timeout. See Figure 4.

Figure 3: Maintenance Tracker Key

Figure 4: Maintenance Tracker Key Plugged Into TLS Console

6.1.4. Once the Key is inserted and recognized, the TLS Console display will now display “MAINTENANCE TRACKER LOGIN OK: XXXXXX”. The XXXXXX is the Technician Identification Number. See Figure 5. The feature has now been temporarily disabled. Any key pressed will now display “ALL FUNCTIONS NORMAL”.

Figure 5: Maintenance Tracker Temporarily Disabled



6.1.5. Return to the Exhibit listed in Table 1 to continue the test (Exhibit) in progress.

6.2. Option 2: Accessing PMC and ISD parameters through the RS232 interface when Maintenance Tracker is enabled yet key is not available:

6.2.1. Connect a PC or Laptop equipped with Veeder-Root “ISD Setup Tool Version 1.09” software per instructions in IOM 12 of VR-204.

6.2.2. Start the ISD Setup Tool Version 1.09 software on the laptop or PC.

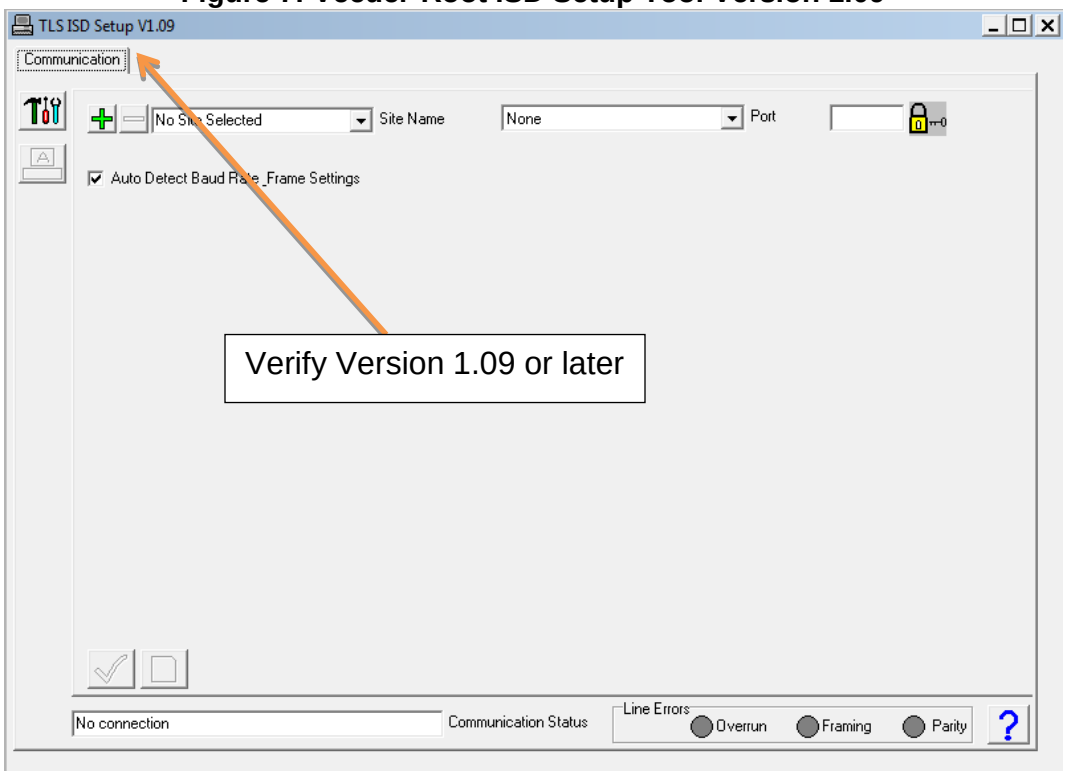
6.2.3. Click the check mark when prompted to “Enter Password”. See Figure 6.

Figure 6: Veeder-Root Setup Tool-Enter Password

6.2.4. Verify that Veeder-Root ISD Setup Tool Version 1.09 or later is being used. See Figure 7.

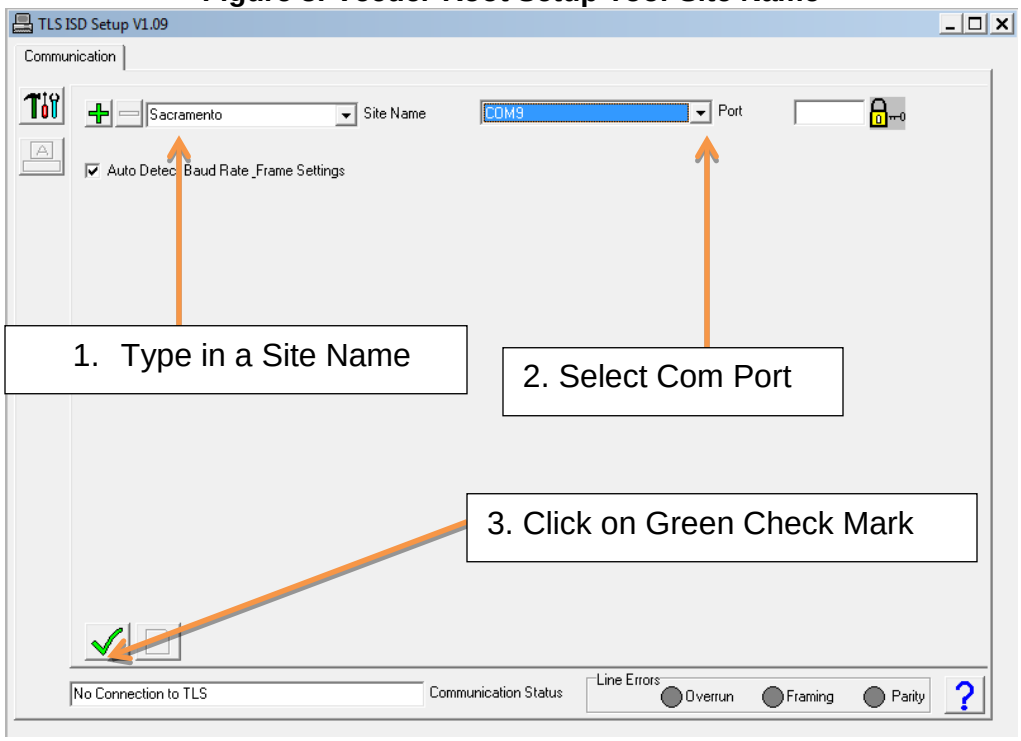
Note: Figures 7 through 24 are typical views of the laptop screen that may differ for different versions of ISD Setup Tool Version 1.09 and later.

Figure 7: Veeder-Root ISD Setup Tool Version 1.09



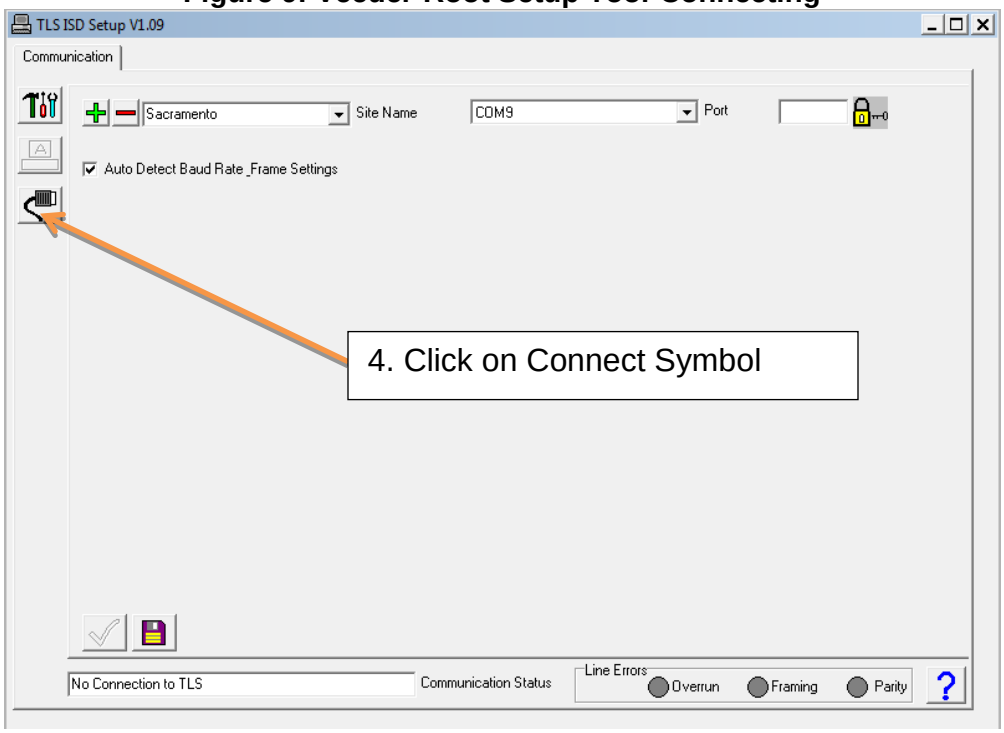
6.2.5. Type in the site name. Then select the communication port and click on the green check mark. See Figure 8.

Figure 8: Veeder-Root Setup Tool-Site Name



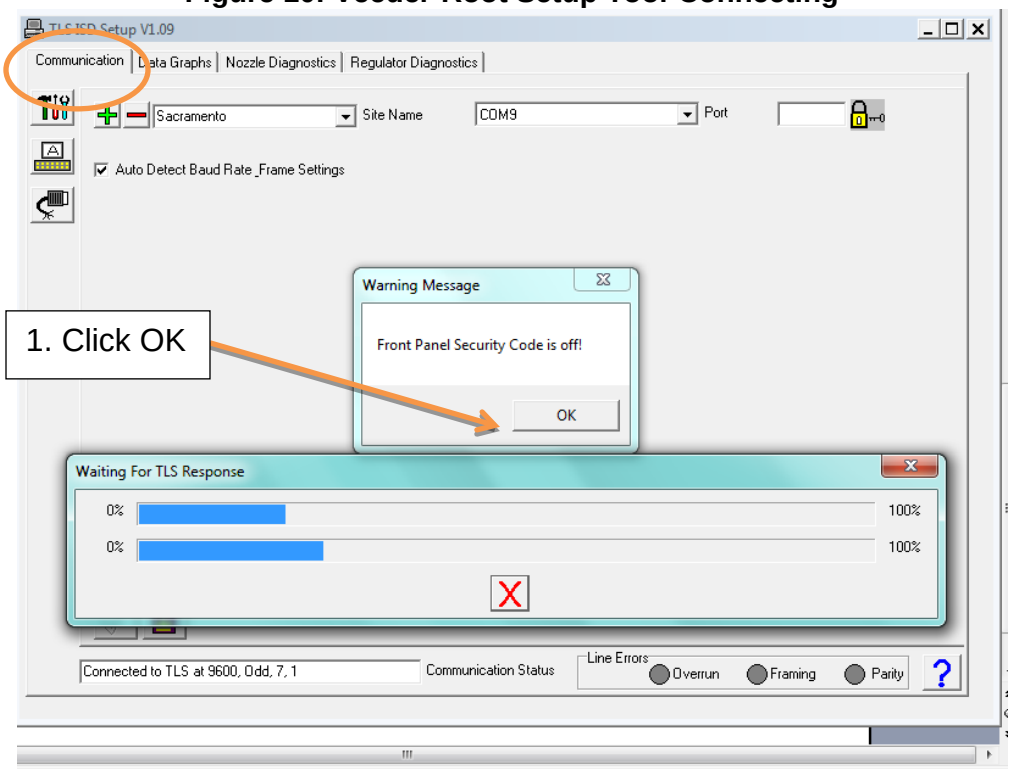
6.2.6. Click on the connect symbol. See Figure 9.

Figure 9: Veeder-Root Setup Tool-Connecting



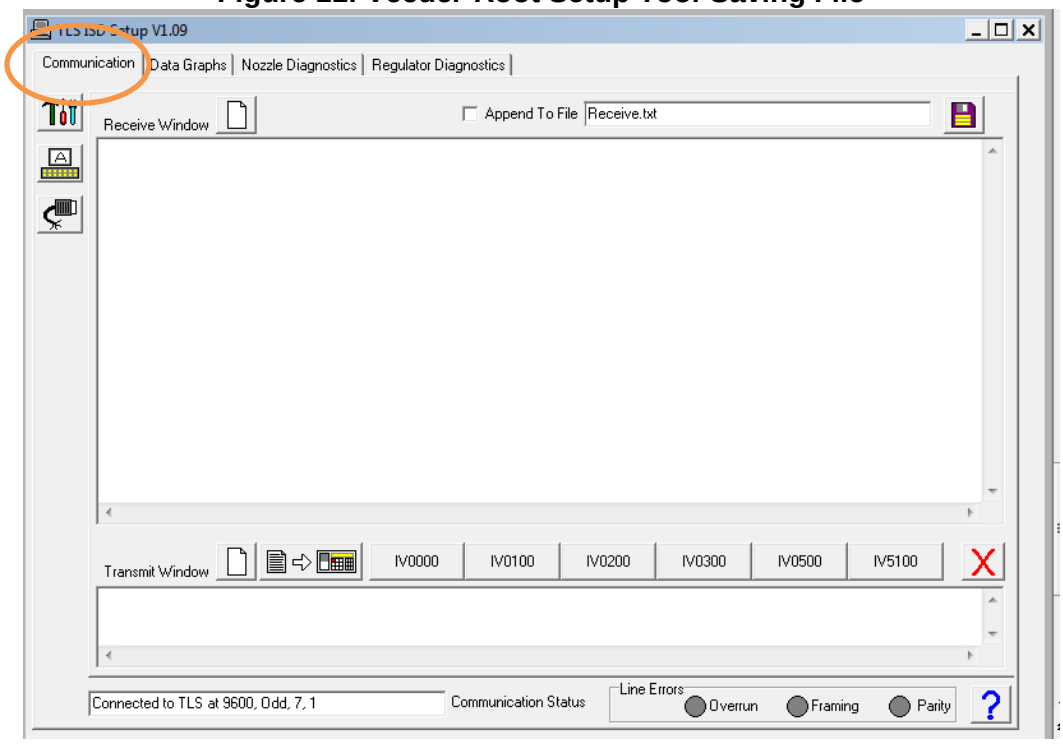
6.2.7. Click OK on the "Warning Message" and then click on the Computer Icon. Software will now connect to the TLS Console. See Figure 10.

Figure 10: Veeder-Root Setup Tool-Connecting



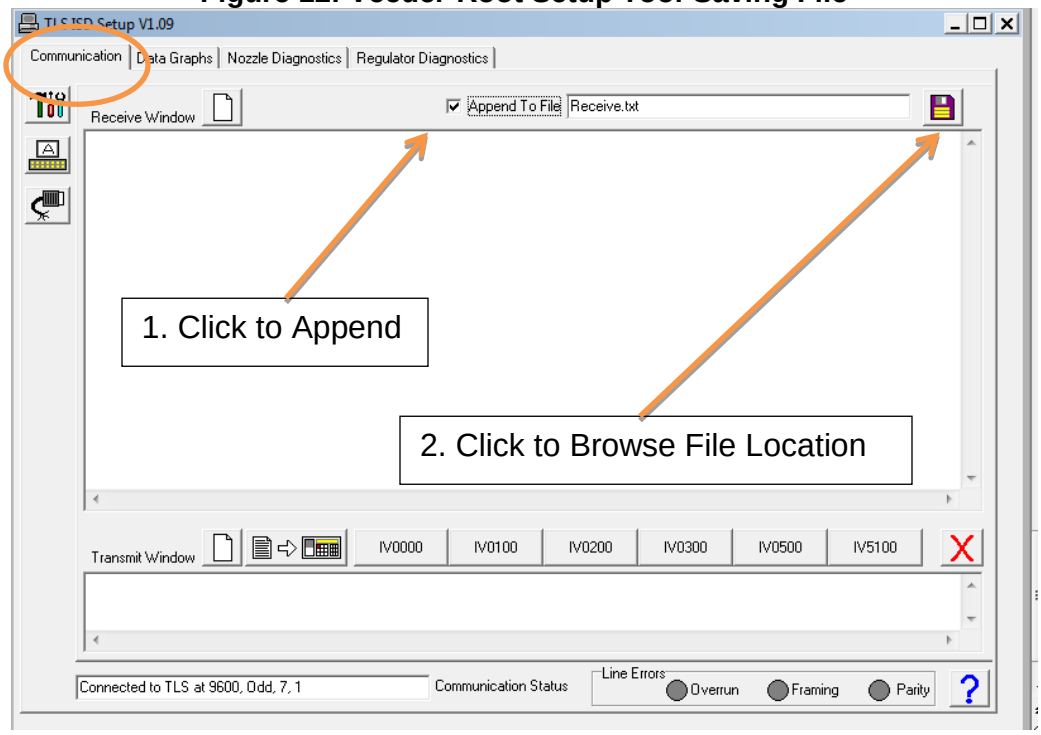
6.2.8. Once connected. Select the “Communication” Tab from the top of the screen. See Figure 11.

Figure 11: Veeder-Root Setup Tool-Saving File



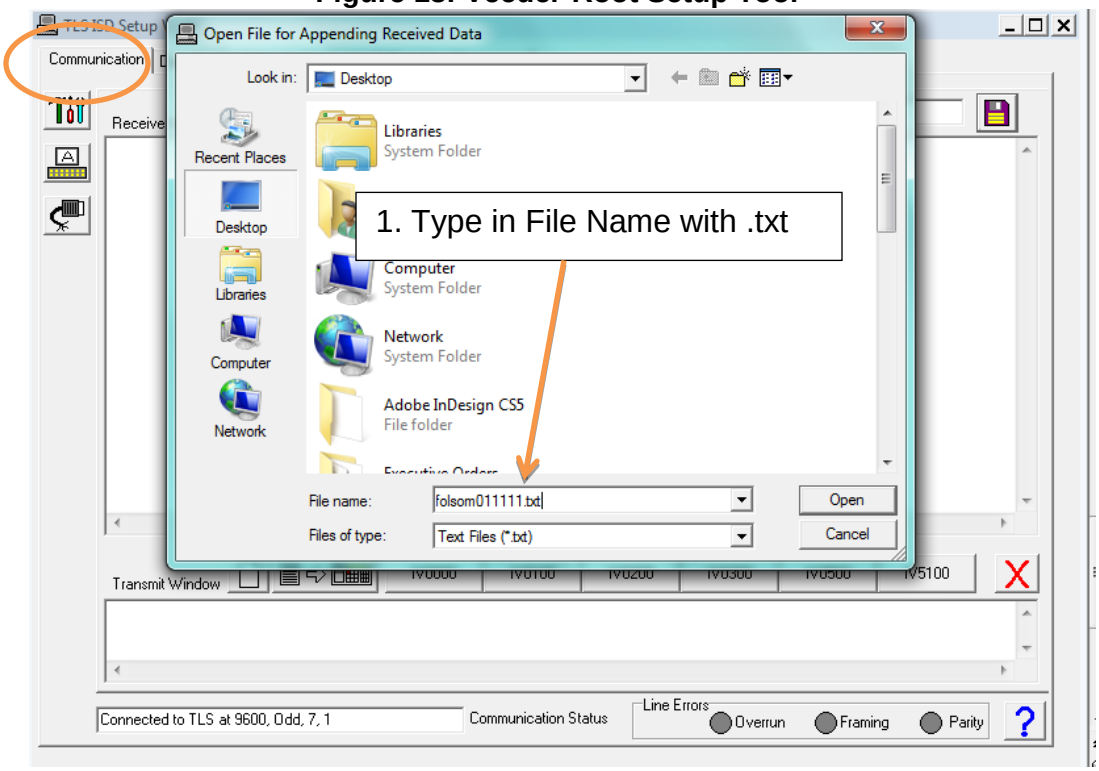
6.2.9. To save reports to a file, click on box to “Append to File”. Then click to browse file location. See Figure 12.

Figure 12: Veeder-Root Setup Tool-Saving File



6.2.10. To save reports type in a file name with a .txt extension. See Figure 13.

Figure 13: Veeder-Root Setup Tool-



6.2.11. Serial commands can now be entered and results will be saved in file selected above. See Figure 14. The Liquid Sensor Alarm History Report parameters for VR-203 (Exhibit 16) and VR-204 (Exhibit 16) can be accessed by using the following serial command: **I302SS**

The ISD Setup Report for VR-204 (Exhibit 17) can be accessed by using the following serial command for the Hose Table Data: IV4A00. The vapor flow meter serial numbers can be accessed with the following serial command: IV8300.

The PMC version can be accessed by using the following serial command: IV8200.

6.2.12. The parameters are listed in Table 2 (see below) can be accessed by selecting the “Regulator Diagnostics” tab from the top of the menu. See Figure 15.

Table 2: Parameters Accessible Via Regulator Diagnostics Tab

Parameter
Ullage Pressure
Assessment Time
Probe Temperature
Automatic Vapor Valve Control
Manual Vapor Valve Control-Open/Close
Vapor Valve Diagnostics
Atmospheric Pressure
Canister Load %

Figure 14: Veeder-Root Setup Tool-Serial Commands

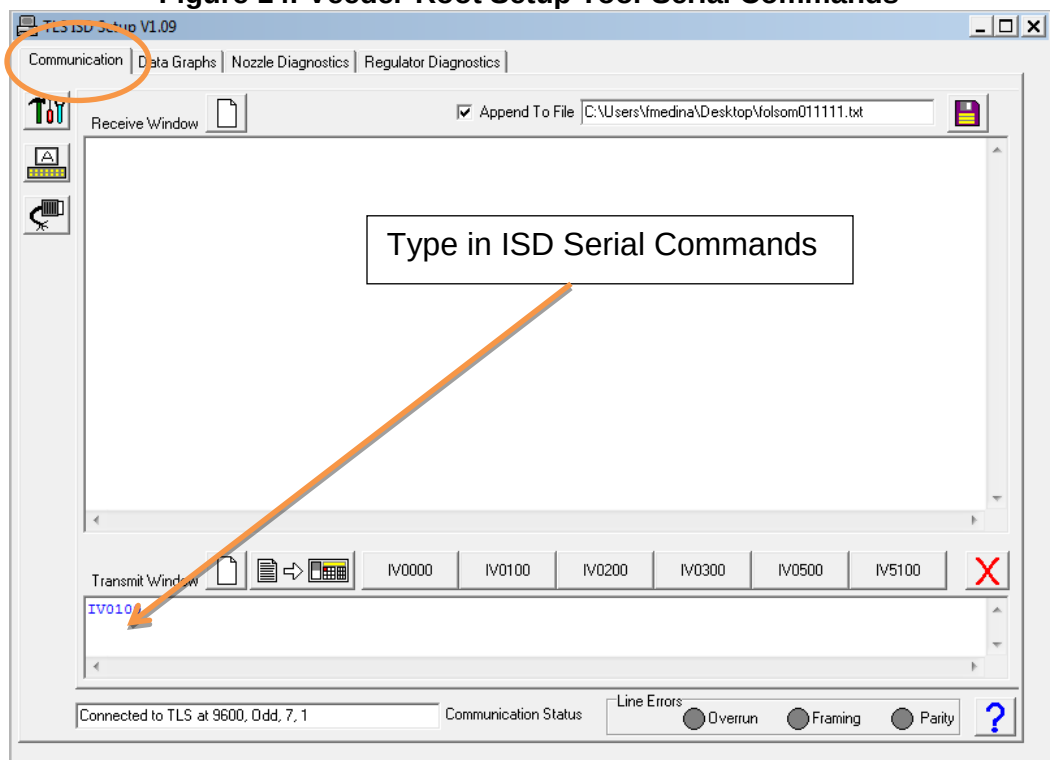
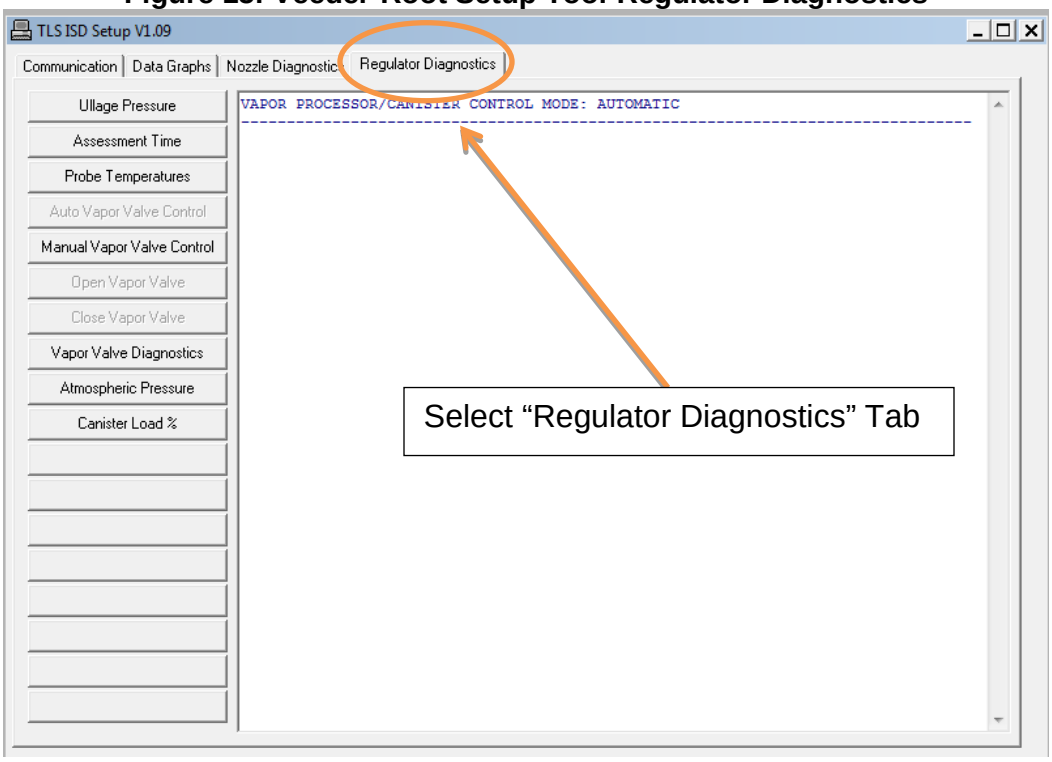
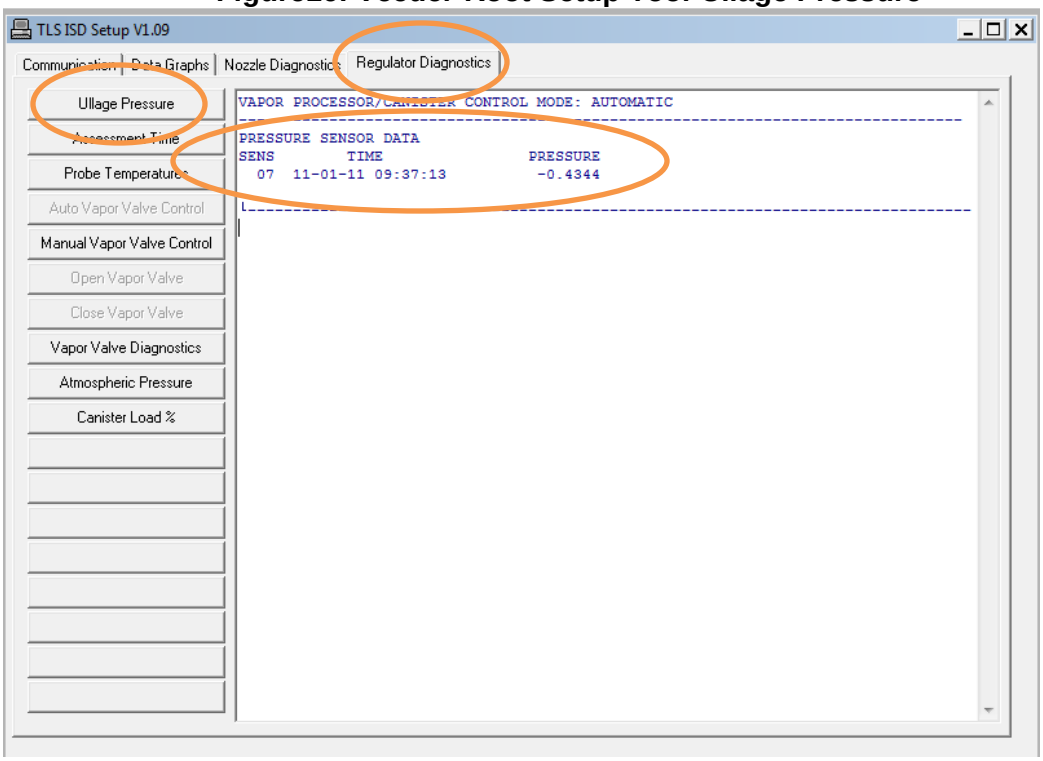


Figure 15: Veeder-Root Setup Tool-Regulator Diagnostics



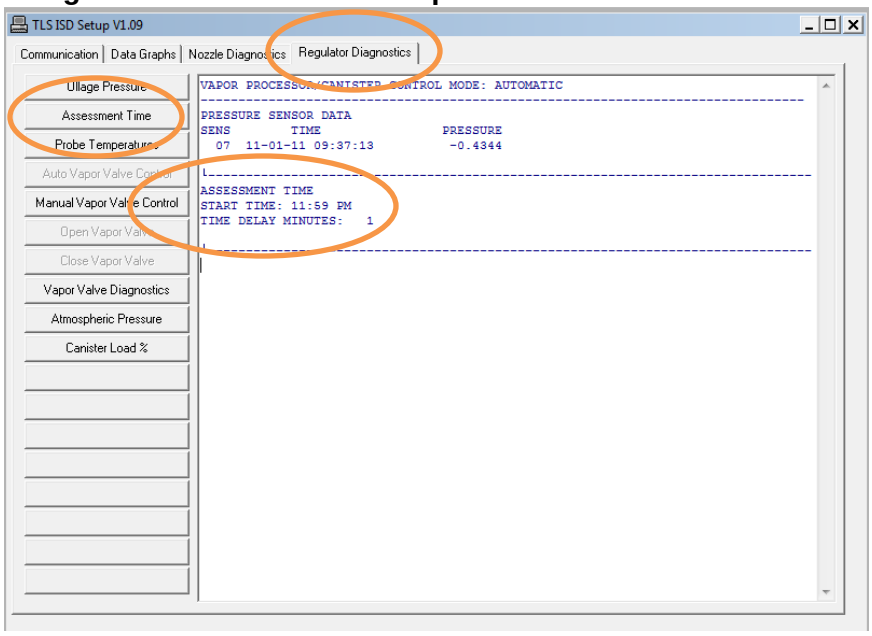
6.2.13. To access the current ullage pressure reading, select the "Regulator Diagnostics" tab at the top of the screen and select "Ullage Pressure" on the left side of the screen. See Figure 16.

Figure16: Veeder-Root Setup Tool-Ullage Pressure



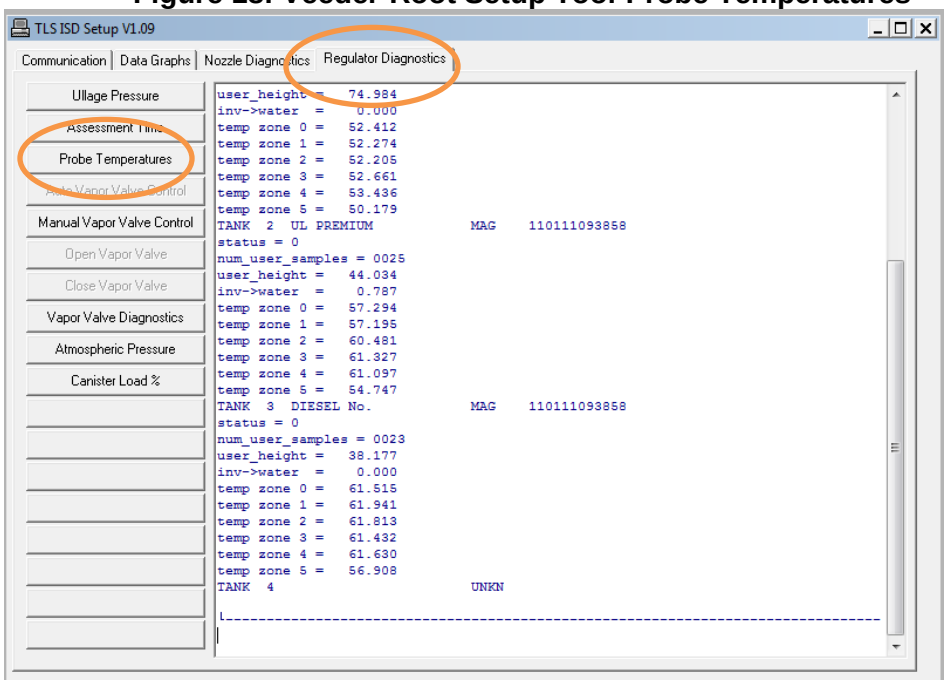
6.2.14. To access current ISD assessment time, select the “Regulator Diagnostics” tab at the top of the screen and select “Assessment Time” on the left side of the screen. See Figure 17.

Figure 17: Veeder-Root Setup Tool-ISD Assessment Time



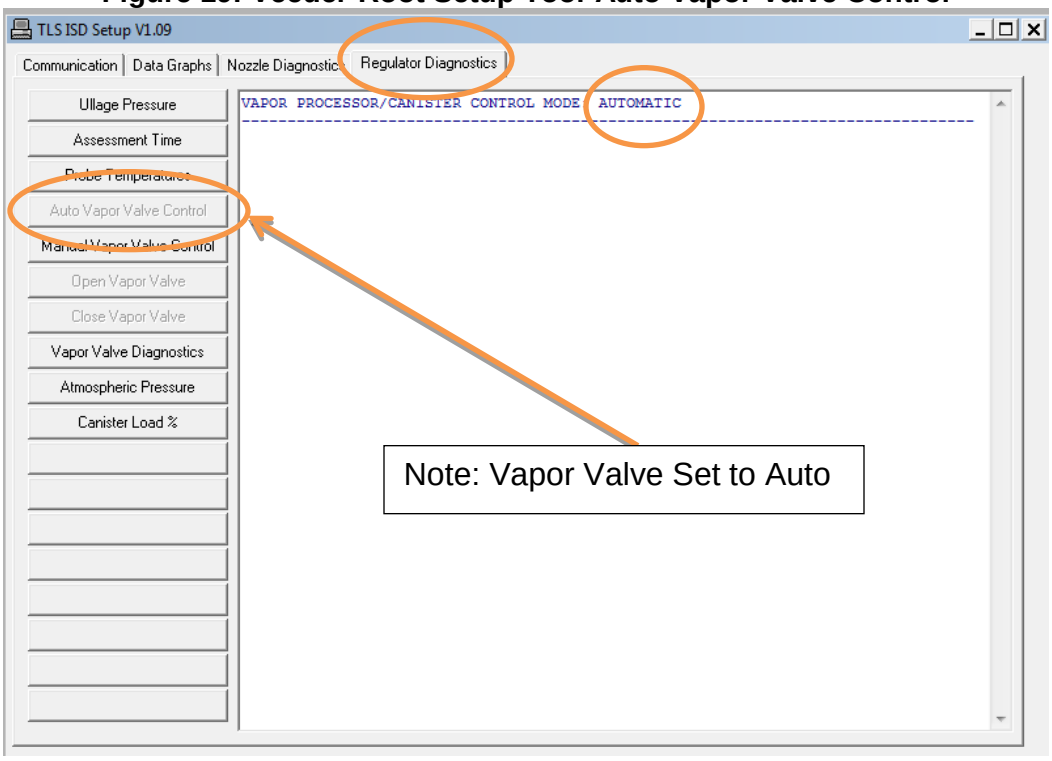
6.2.15. To access the probe temperatures, select the “Regulator Diagnostics” tab at the top of the screen and select “Probe Temperature” on the left side of the screen. See Figure 18.

Figure 18: Veeder-Root Setup Tool-Probe Temperatures



6.2.16. To switch the vapor valve from automatic to manual control or visa versa, select the “Regulator Diagnostics” tab at the top of the screen and select “Auto Vapor Valve Control” or “Manual Vapor Valve Control” to toggle between these two options. See Figure 19 and Figure 20. If “Manual Vapor Valve Control” is selected then “Open Vapor Valve” or “Close Vapor Valve” can be selected. See Figure 21 and Figure 22.

Figure 19: Veeder-Root Setup Tool-Auto Vapor Valve Control



6.2.17. To access the vapor valve diagnostics data, select the “Regulator Diagnostics” tab at the top of the screen and select “Vapor Valve Diagnostics” on the left side of the screen. See Figure 23.

6.2.18. To access the current atmospheric pressure reading, select the “Regulator Diagnostics” tab at the top of the screen and select “Atmospheric Pressure” on the left side of the screen. See Figure 24.

6.2.19. To access the load on the canister as a percentage, select the “Regulator Diagnostics” tab at the top of the screen and select “Canister Load %” on the left side of the screen. See Figure 25.

Figure 20: Veeder-Root Setup Tool-Manual Vapor Valve Control

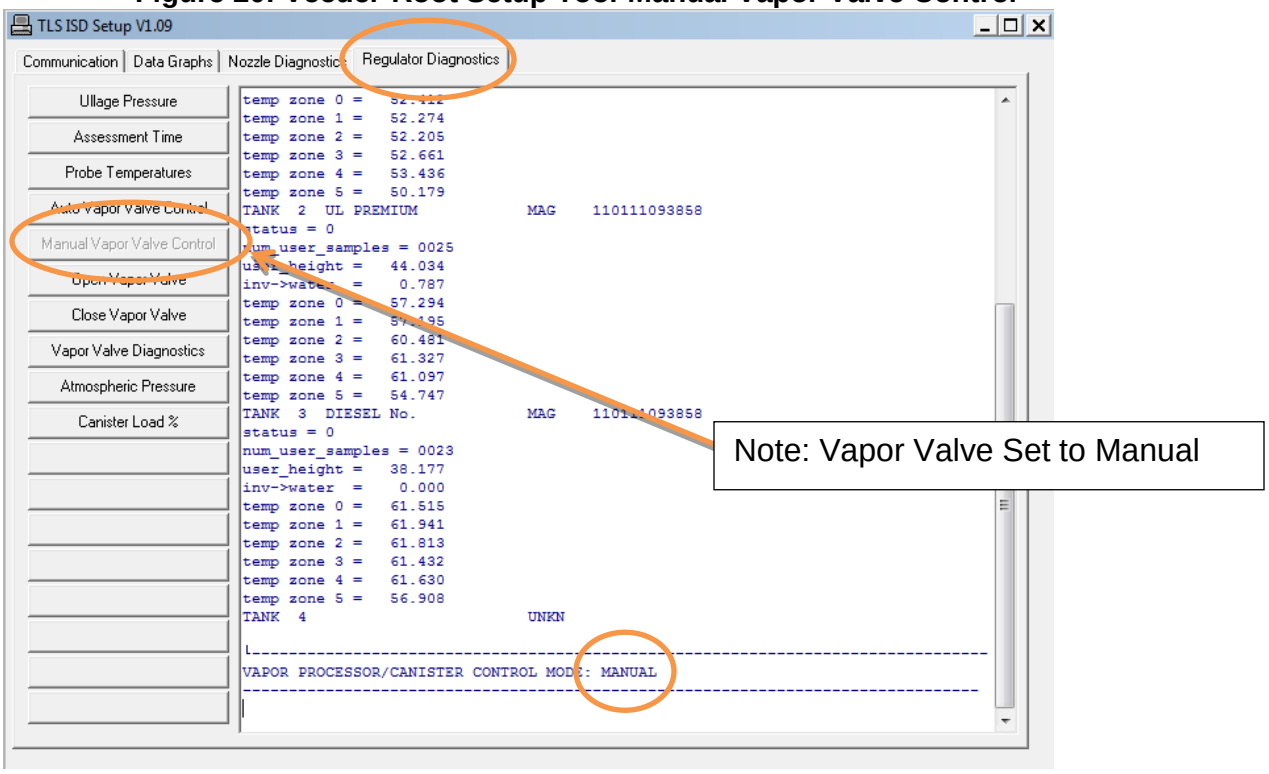


Figure 21: Veeder-Root Setup Tool-Open Vapor Valve

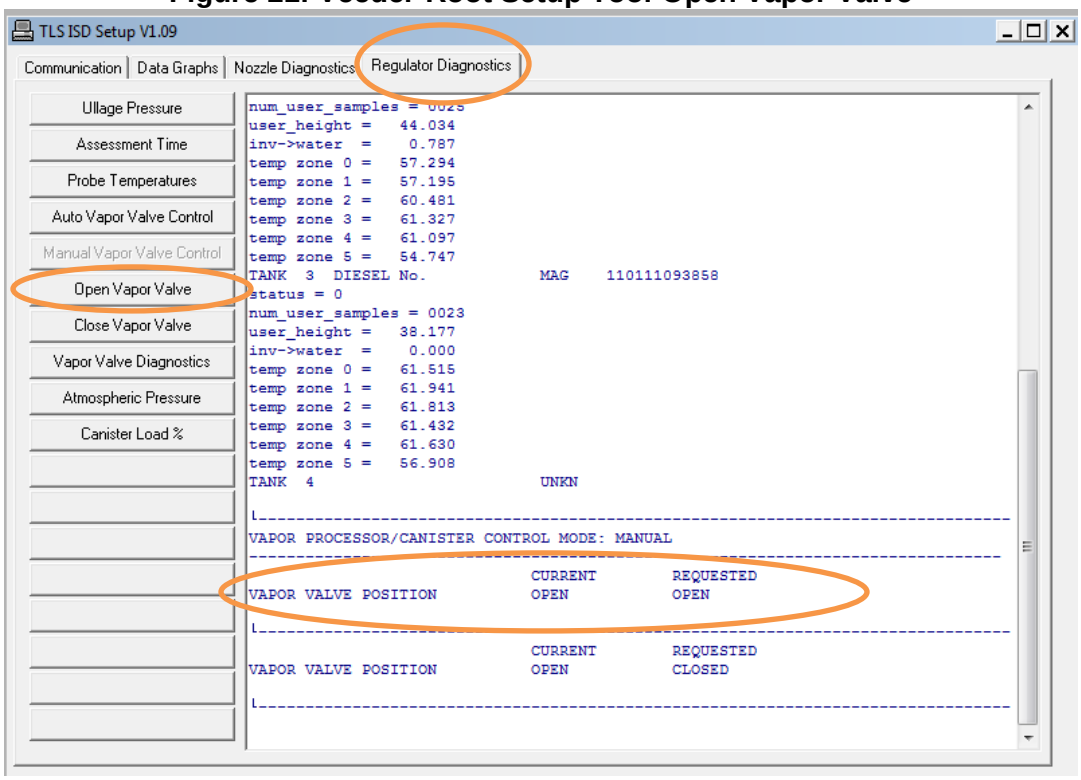


Figure 22: Veeder-Root Setup Tool-Close vapor Valve

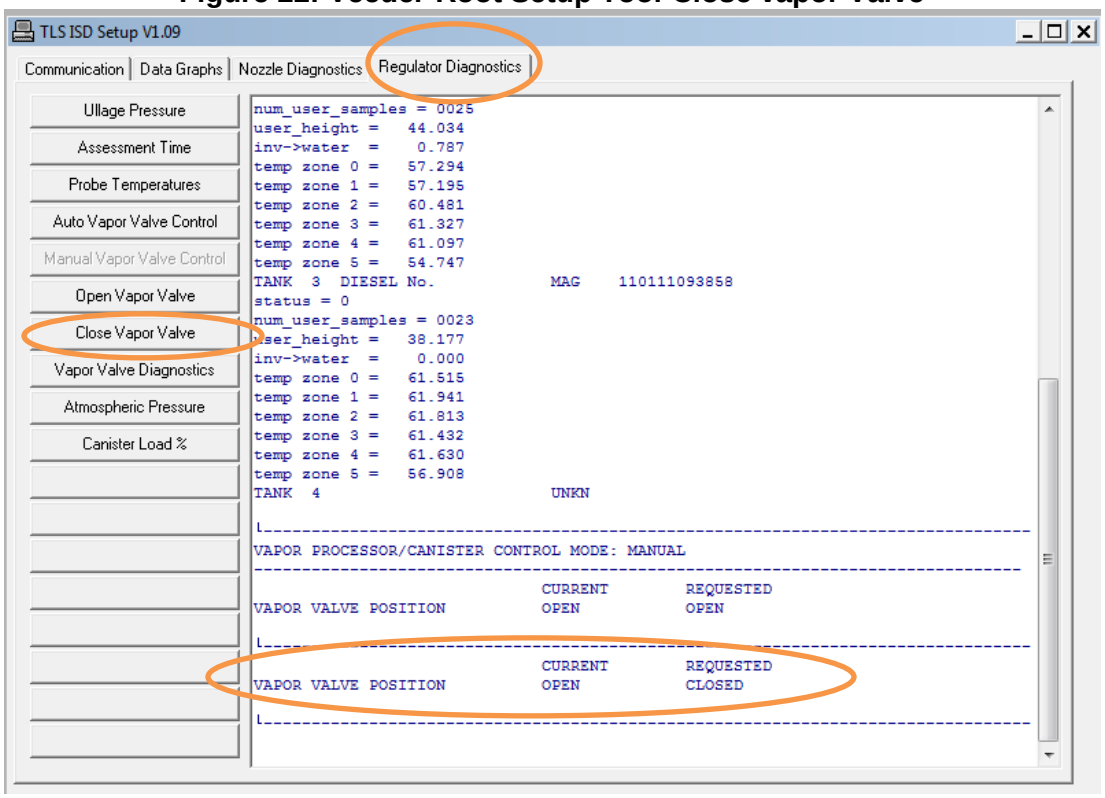


Figure 23: Veeder-Root Setup Tool-Vapor Valve Diagnostics

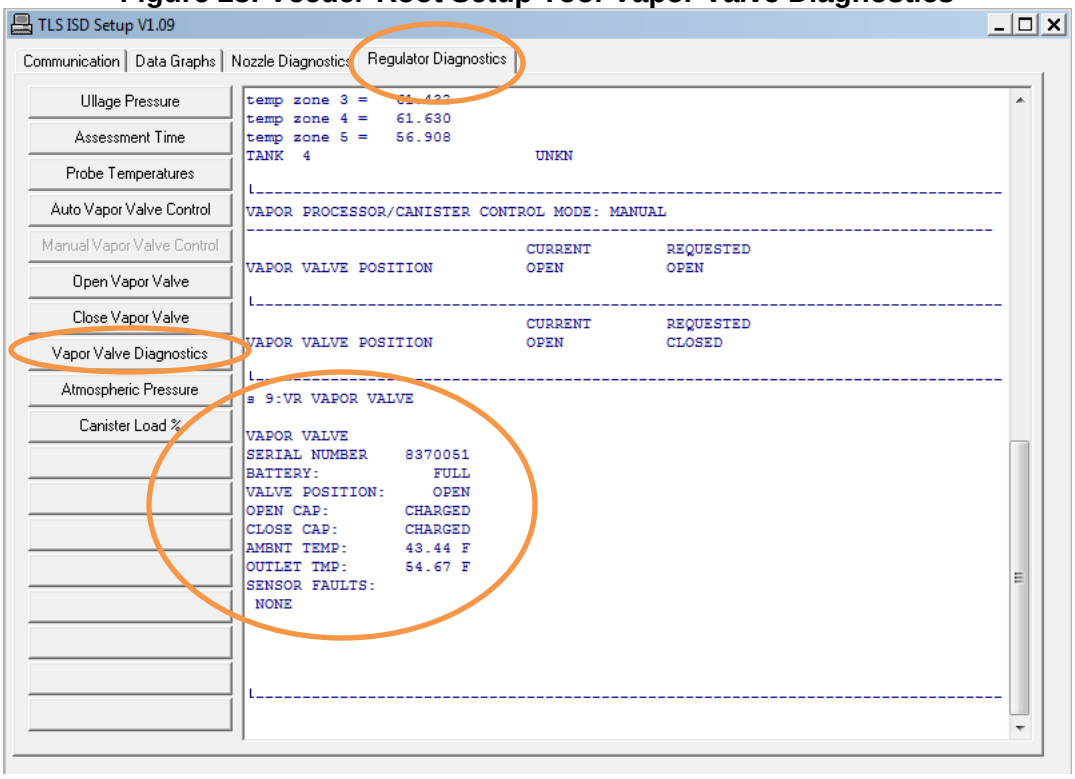


Figure 24: Veeder-Root Setup Tool-Atmospheric Pressure

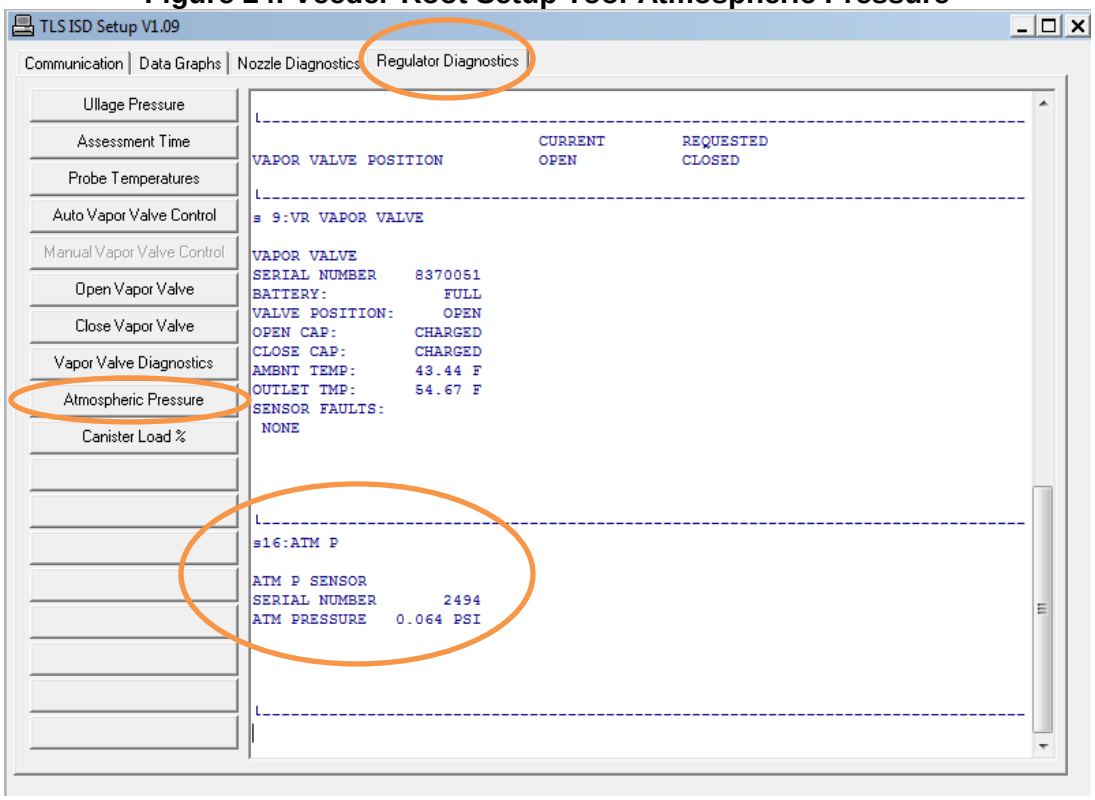


Figure 25: Veeder-Root Setup Tool-Canister Load

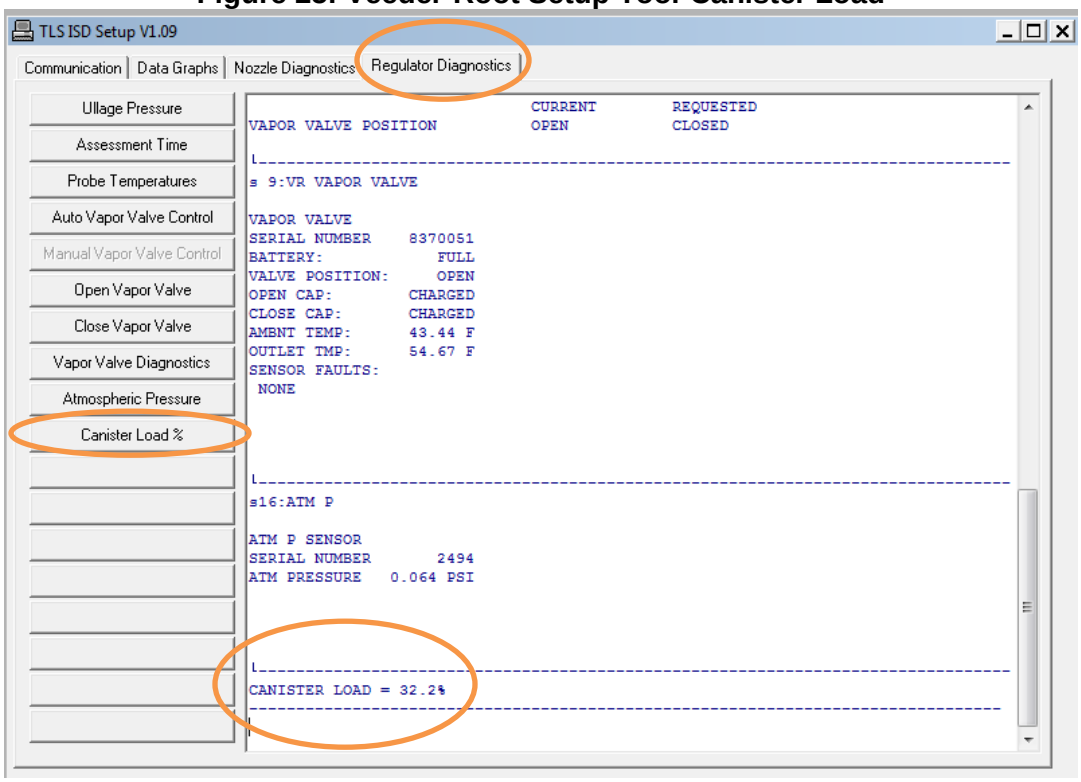


EXHIBIT 19
INCON ISD System Vapor Flow Meter Operability Test Procedure

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board and the term "Executive Officer" refers to the ARB Executive Officer or his or her authorized representative or designate.

1. PURPOSE AND APPLICABILITY

1.1 This procedure is used to verify the setup and operation of the INCON ISD System Vapor Flow Meter and Dispenser Shutdown Mapping certified for use with the VST Balance Phase II EVR System installed at gasoline dispensing facilities (GDF). This procedure is applicable to ARB Executive Order (EO) VR-204-N.

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

2.1 A tight fitting VST Balance Nozzle Adapter is placed on the spout of the dispensing nozzle. The VST adapter, which allows the introduction of nitrogen into the nozzle vapor collection path, is connected to the outlet side of a reference volume gas meter. The inlet side of the reference volume gas meter is connected to a flow meter (rotometer) that is attached to a high pressure nitrogen cylinder and a pressure regulator. See Figure 2. Nitrogen is introduced through both the reference volume gas meter and the INCON ISD System Vapor Flow Meter. Nitrogen flow volumes from both meters are then compared with each other to determine the accuracy of the INCON ISD System Vapor Flow Meter. This process is repeated for the remaining INCON ISD System Vapor Flow Meter equipped dispensers at the GDF.

2.2 The test is conducted with the pressure/vacuum (P/V) vent valve(s) installed on the storage tank vent pipes and the Phase I vapor poppet opened to atmosphere.

2.3 The test procedure requires no modifications to the GDF being evaluated.

2.4 The fueling point on the opposite side of the fueling point being tested must be blocked off so that dispensing is not allowed.

3. BIASES AND INTERFERENCES

3.1 Nozzle spouts that are damaged such that the VST Balance Nozzle Adapter cannot fit over the nozzle spout preclude the use of this test.

3.2 Phase I vapor poppet must be opened to allow the ullage pressure to equalize with atmosphere pressure. Failure to do so may bias the results toward noncompliance.

3.3 Drain or remove any liquid gasoline that may be in the nozzle and the vapor return path of the hose. Failure to drain this gasoline liquid will bias the test toward noncompliance.

3.4 The nominal inside diameter of the flexible hose and fittings not between 0.75 and 1.00 inches will bias the test toward noncompliance.

4. SENSITIVITY, RANGE, AND ACCURACY

4.1 The maximum rated capacity of the reference gas volume meter shall be at least 800 CFH and not greater than 3000 CFH.

4.2 The minimum rated capacity of the reference gas volume meter shall be 25 CFH.

4.3 The minimum readability of the reference gas volume meter shall be 0.01 cubic feet.

4.4 Accuracy of the reference gas volume meter, determined during calibration, will be ± 5 percent of the meter reading.

5. EQUIPMENT

5.1 **Nitrogen High Pressure Cylinder with Pressure Regulator**. Use a high pressure nitrogen cylinder capable of maintaining a pressure of at least 2000 pounds per square inch gauge (psig) and equipped with a compatible two- stage pressure regulator and a one psig relief valve. A ground strap is recommended during introduction of nitrogen into the system.

5.2 **Flow meter.** Use a flow meter (rotameter) capable of accurately measuring nitrogen flow rate of 60 cubic feet per hour (cfh).

5.3 **Pressure Measuring Device**. An electronic pressure measuring device with a full range that shall not exceed 0-10 inches of water column (WC) with a minimum accuracy of 0.5 percent of full-scale. A 0-20 inches WC device may be used provided the minimum accuracy is 0.25 percent of full-scale.

5.4 Squeeze Bulb. A rubberized or equivalent device used to increase pressure to 5.00” WC.

5.5 Balance Nozzle Adapter. Only the VST Balance Nozzle Adapter Part Number VST-STA-100 can be used to conduct to conduct this operability test. Figure 1 shows the VST Balance Nozzle Adapter.

5.6 Surrogate Spout. Only the VST Surrogate Spout Assembly Part Number VST-TSS-100 can be used to conduct the pre-test leak check. Figure 1 shows the VST Surrogate Spout Assembly.

5.7 Adapter Supply Hose. The nominal inside diameter of the flexible hose and fittings shall be between 0.75 and 1.00 inches, and the maximum length of the tubing shall be 6 feet.

5.8 Ball Valve. The nominal inside diameter of the ball valve shall be between 0.25 inch and 1.00 inch.

5.9 Nitrogen Supply Line. The nominal inside diameter of the flexible tubing and fittings shall be between 0.25” and 0.375” and the maximum length of the tubing shall be 20 feet.

5.10 Reference Gas Volume Meter. Use a Dresser Measurement Roots Meter®, or equivalent (preferably fitted with a digital readout), to measure the volumetric flow rate through the VST Balance Nozzle Adapter. The reference gas volume meter shall be calibrated within 180 days prior to conducting this procedure. The maximum allowable pressure drop(s) determined by the manufacture across the meter shall be:

For a meter with a maximum rated capacity of 1000 CFH through 3,000 CFH:
1.10 inches H2O at a flowrate of 3,000 CFH
0.05 inches H2O at a flowrate of 30 CFH

For a meter with a maximum rated capacity of 800 to 1,000 CFH:
0.70 inches H2O at a flowrate of 800 CFH
0.04 inches H2O at a flowrate of 16 CFH

5.11 Stopwatch. Use a stopwatch accurate to within 0.2 seconds.

5.12 Lubricant. Appropriate lubricant, either grease or spray lubricant, shall be used to ensure a tight seal on the interface of the nozzle and the VST Balance Nozzle Adapter.

5.13 Leak Detection Solution. Any liquid solution designed to detect gaseous leaks may be used to verify the pressure integrity of test equipment during this test.

Figure 1
VST Surrogate Spout Assembly

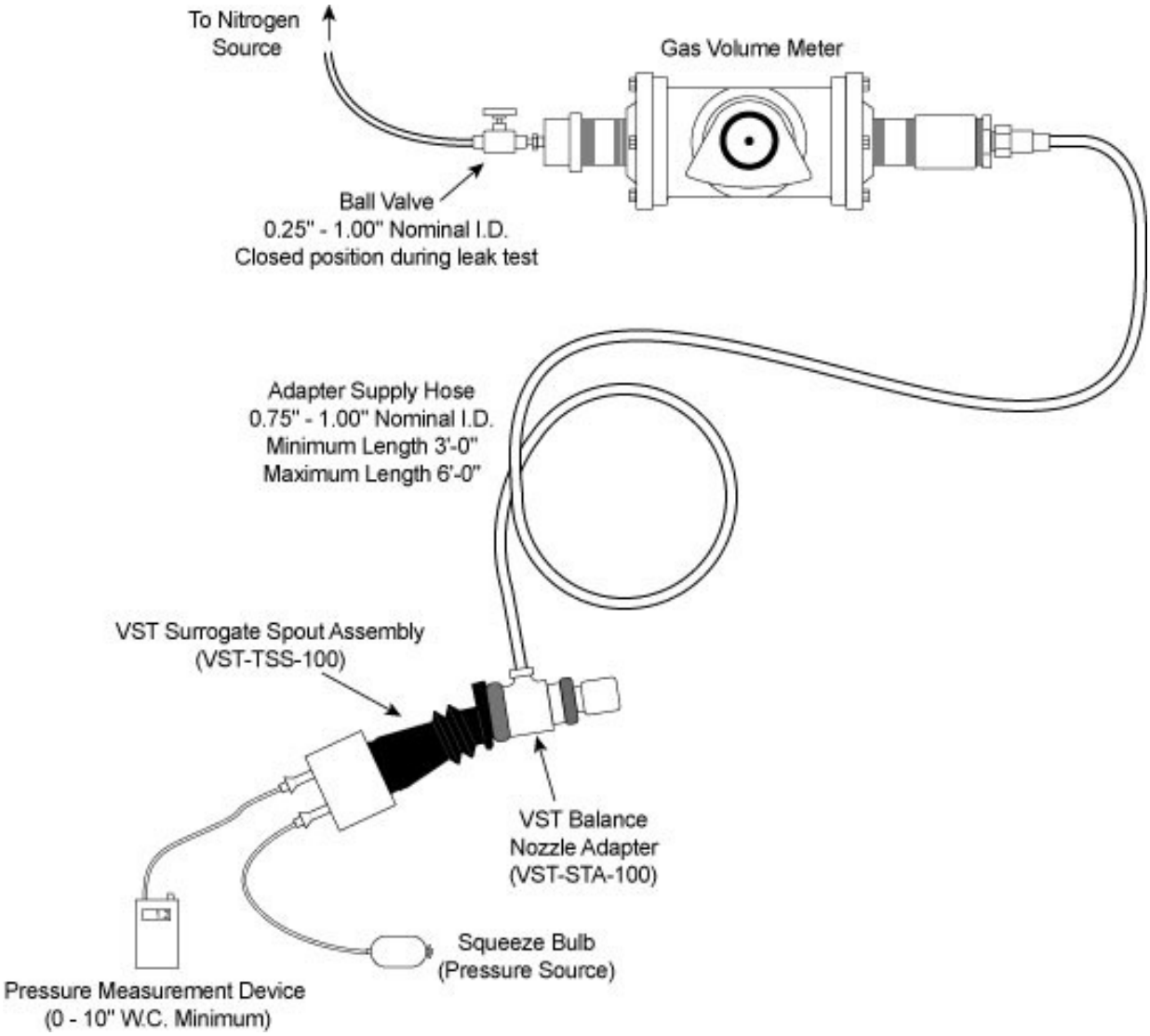
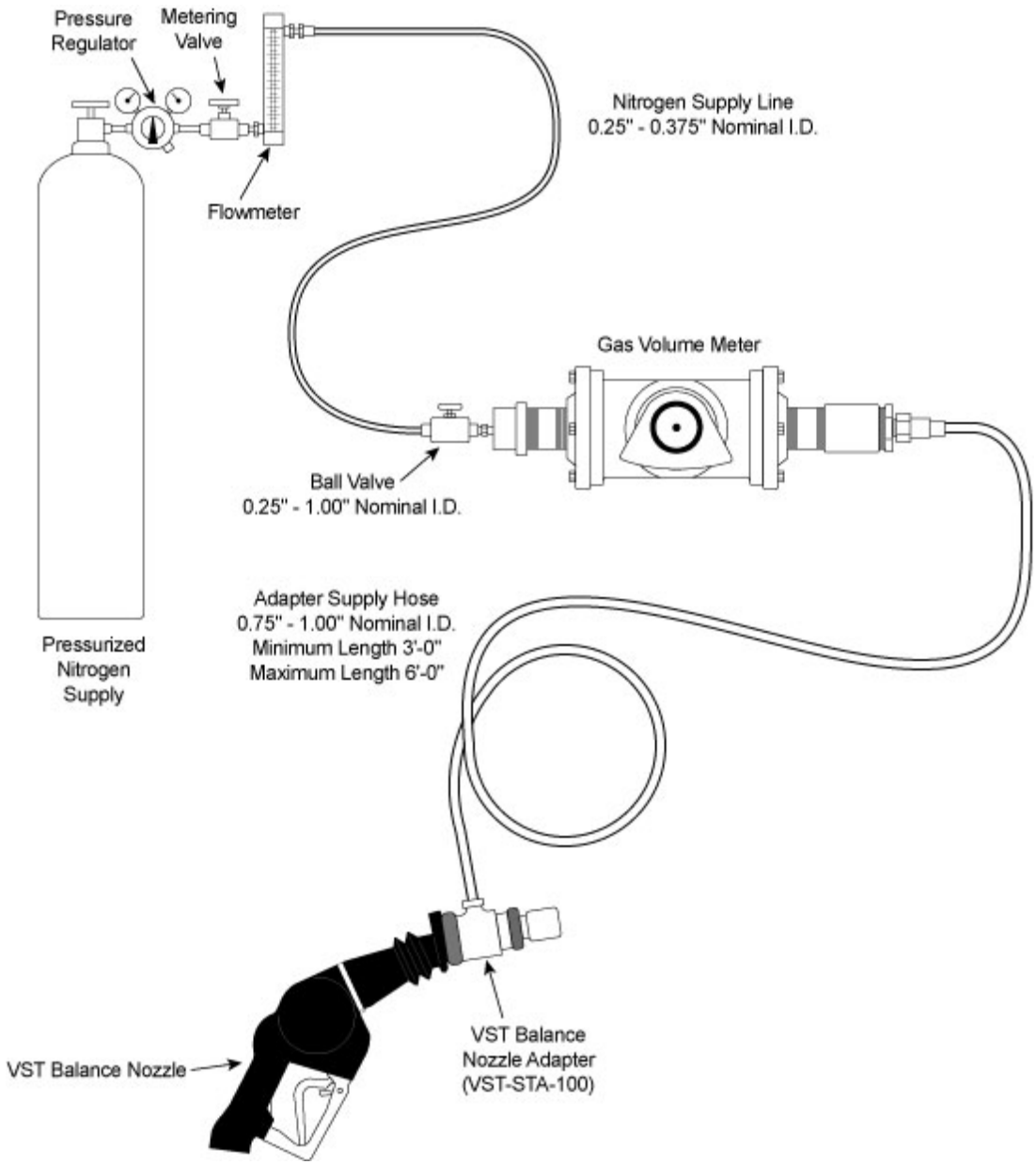


Figure 2
INCON ISD System Vapor Flow Meter Test Assembly



6. PRE-TEST PROCEDURES

6.1 Open the Phase I vapor poppet to atmosphere. Locate the Phase I EVR vapor poppet on the 87 grade tank and remove the dust cap. **Open** the vapor poppet to atmosphere by using a modified dust cap.

6.2 Verify leak integrity of test assembly. Conduct a pre-test leak check of the VST Balance Nozzle Adapter, the reference gas volume meter, and the adapter supply hose by connecting the VST Balance Nozzle Adapter to a surrogate spout as shown in Figure 1. Turn the ball valve in Figure 1 to the closed position. Raise the test assembly pressure to 5.00” ±0.50” WC using a squeeze bulb. There shall not be a pressure drop of more than 1.00” WC from the above starting pressure for 30 seconds from the start of the test. If the leak test passes, proceed with the testing. If the leak test fails, proceed to isolate the source of the leak by pressurizing the test equipment again. Apply liquid leak detector solution on interfaces and other potential leak sources and watch for the formation of bubbles. Once leak(s) are repaired, repeat the leak test procedure.

Note: Leak checks shall be conducted in a shaded area or away from direct sunlight. Leak checks may be conducted during the testing to ensure leak integrity of test equipment

6.3 Assemble the equipment as shown in Figure 2: INCON ISD System Vapor Flow Meter Test Assembly. Leave the VST Balanced Nozzle Adapter off of the nozzle at this time. Do not enable the dispenser to dispense product. Remove nozzle and utilize any method to keep the nozzle hook in the off position.

6.4 Ensure that the ground strap is properly connected to an acceptable ground.

7. TEST PROCEDURES

7.1 Prevent dispensing from all other fueling positions that share the same INCON ISD System Vapor Flow Meter being tested.

7.2 Record the INCON ISD System Vapor Flow Meter serial number and fueling position being tested on a field data sheet. An example of a typical field data sheet is provided at the end of this exhibit.

7.3 Completely drain any gasoline that may be in the nozzle and hose vapor return path by any acceptable method.

7.4 Turn the ball valve to the open position and adjust the nitrogen flow using the rotometer to 60 cfh +/- 5.0 cfh.

7.5 Once the nitrogen flow is set, turn the ball valve to the closed position to stop the flow of nitrogen through the gas volume meter. This will ensure the nitrogen flow rate is set and the nitrogen can instantaneously be activated when the ball valve is turned to the open position.

7.6 Install the VST Balance Nozzle Adapter on the appropriate nozzle as shown in Figure 2. Lubricant can be applied to the nozzle spout and the face seal or boot face (rubber boot) of the nozzle and the back of the VST Balance Nozzle Adapter if necessary.

7.7 Select Vapor Flow Accumulation on the INCON console for the appropriate fueling position. See Figures 3-8. The Accumulated Flow counter should read zero. To reset the counter, hang the nozzle up and remove.

Note: Only one fueling point and grade per dispenser needs to be tested.

7.8 Record starting value on reference meter. If using a tri-tester in Digital Roots mode, press the button to zero the meter. Simultaneously squeeze the nozzle handle to the full dispensing position and turn the ball valve to the open position to allow nitrogen to flow.

Note: If the nozzle handle is not engaging the vapor/product valves will not open within the nozzle, turn off the nitrogen flow using the ball valve; remove the Balance Nozzle Adapter from the nozzle to release the nitrogen pressure build up and repeat sections 7.8 and 7.9. Excess pressure build up in the nozzle will engage the secondary shut-off diaphragm and not allow the vapor/product valves within the nozzle to open.

7.9 Monitor the gas volume meter display. If using a tri-tester, use a stopwatch to time one minute of flow. Simultaneously stop the flow once 1.0 cubic feet (cf) +/- 0.50 cf of nitrogen is reached, or after one minute with Tri-Tester, by turning the ball valve to the closed position and also releasing the nozzle handle.

DO NOT HANG THE NOZZLE UP UNTIL YOU COLLECT THE VAPOR FLOW ACCUMULATION FROM THE INCON CONSOLE

Note: Final volume values may be biased if the ball valve and the nozzle handle are not activated at the same time. If the ball valve is open before the nozzle vapor valve leakage will occur around the nozzle boot. If this happens you must re-run the test.

7.10 Record the end meter reading from the reference gas volume meter. Calculate the total cubic feet value by subtracting the initial meter reading obtained in section 7.7 from the final meter reading in this section.

7.11 Convert the total cubic feet value to gallons using the equation on the field data sheet or section 9.1 of this procedure. Record the final vapor gallon value on the field data sheet.

7.12 Record Vapor Flow Accumulation result from INCON screen on test data sheet and print out results for test records.

Note: You must print out Vapor Flow Accumulation result from the INCON ISD console after each flow meter test for test confirmation as the INCON ISD will not save test results for later. You may print out test result after each test and at the end and after completing all flow meters verifications, strip off the print out for all flow meters and attach to data sheet.

7.14 Record the Fueling Point you are testing and write the corresponding air volume in gallons on the field data sheet. Note: The air volume is displayed in gallons.

7.15 Calculate the percent difference between the final vapor gallons reading from the reference gas volume meter and the INCON Vapor Flow Accumulation reading shown on the field data sheet using the calculations shown in Section 9 below.

Pass: If the volume percent difference between the recorded INCON ISD System Vapor Flow Meter and the reference gas volume meter is within 15%, check “Pass” on the field data sheet, and repeat the Test Procedures for the remaining INCON ISD System Vapor Flow Meter equipped dispensers at the GDF.

Fail: If the volume percent difference between recorded INCON ISD System Vapor Flow Meter and the reference gas volume meter is not within15%, then proceed to section 7.16.

7.16 Conduct the leak test in section 6.4 to evaluate the test equipment. If the equipment leak test passes proceed to section 7.17. If the test fails, repair the leak and go back to section 7.7.

7.17 Perform this test two more times and average the three readings together. If the vapor volume percent difference between the three recorded INCON ISD System Vapor Flow Meter and the three reference gas volume meter is within 15%, check “Pass” on the field data sheet.

7.18 If the operability test fails, check the fueling point and make sure the reading from the dispenser is correct. Be sure that the fueling point opposite the nozzle is hung up (i.e. hook lever closed during the test).

Figure 3

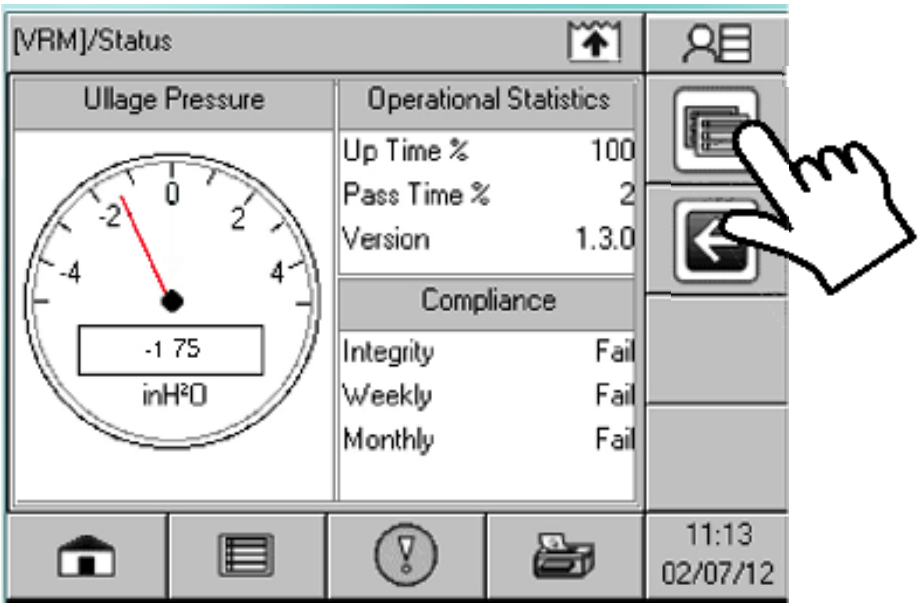


Figure 4

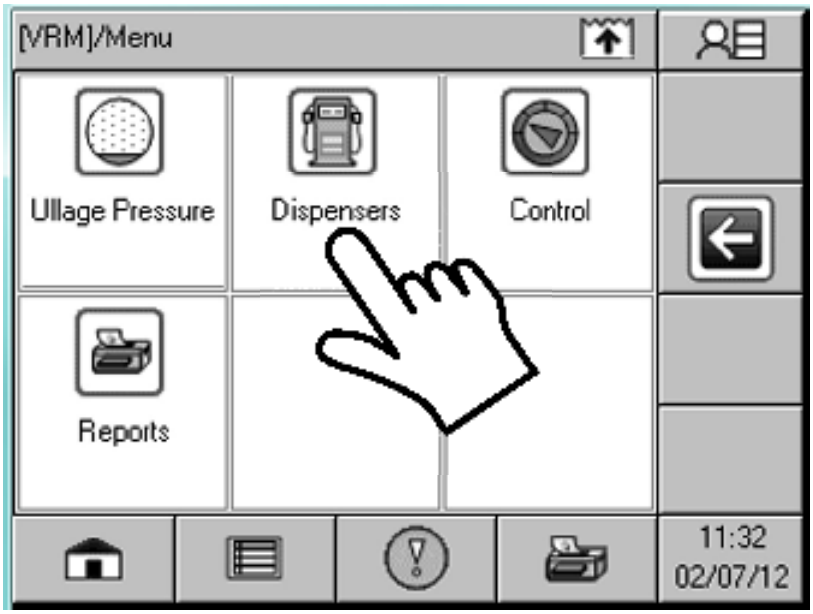


Figure 5

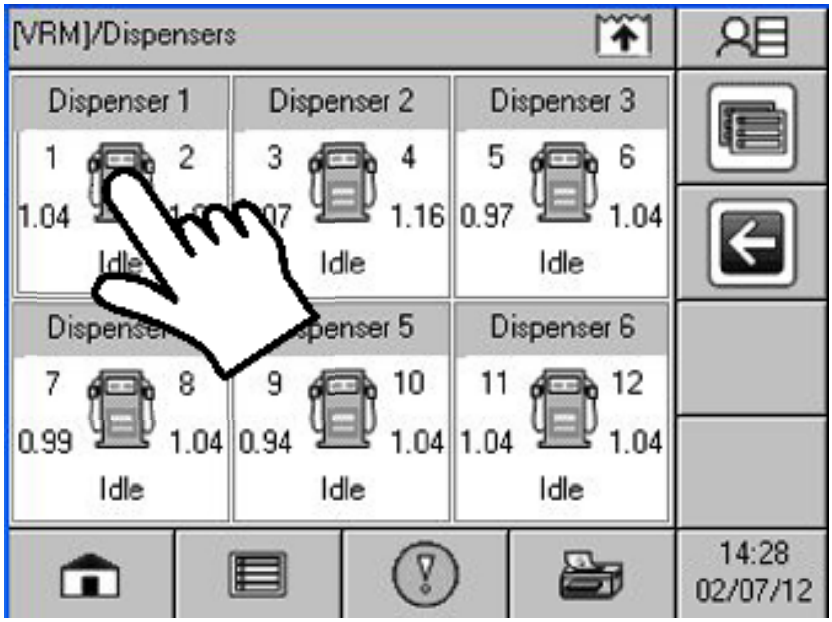


Figure 6

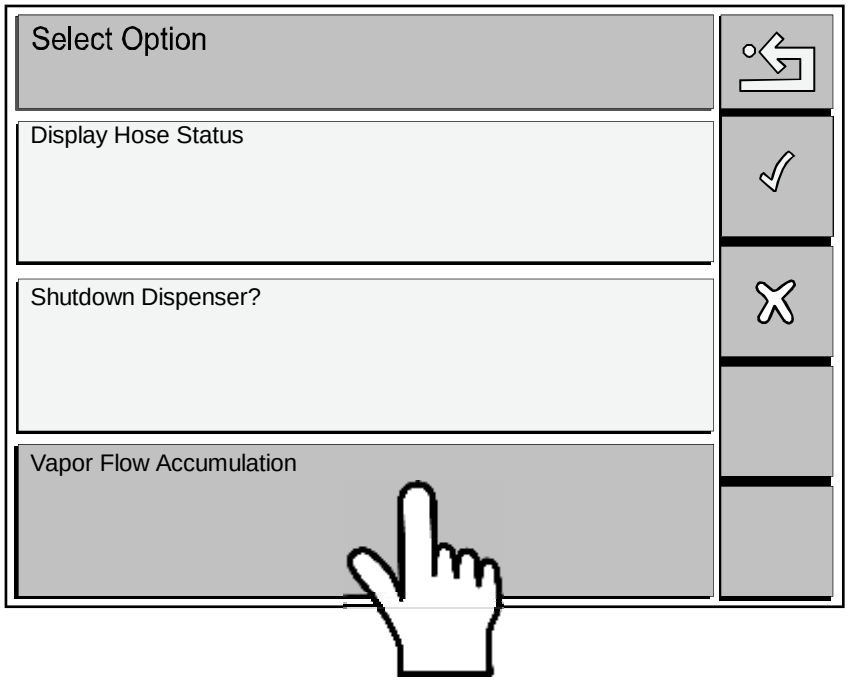


Figure 7

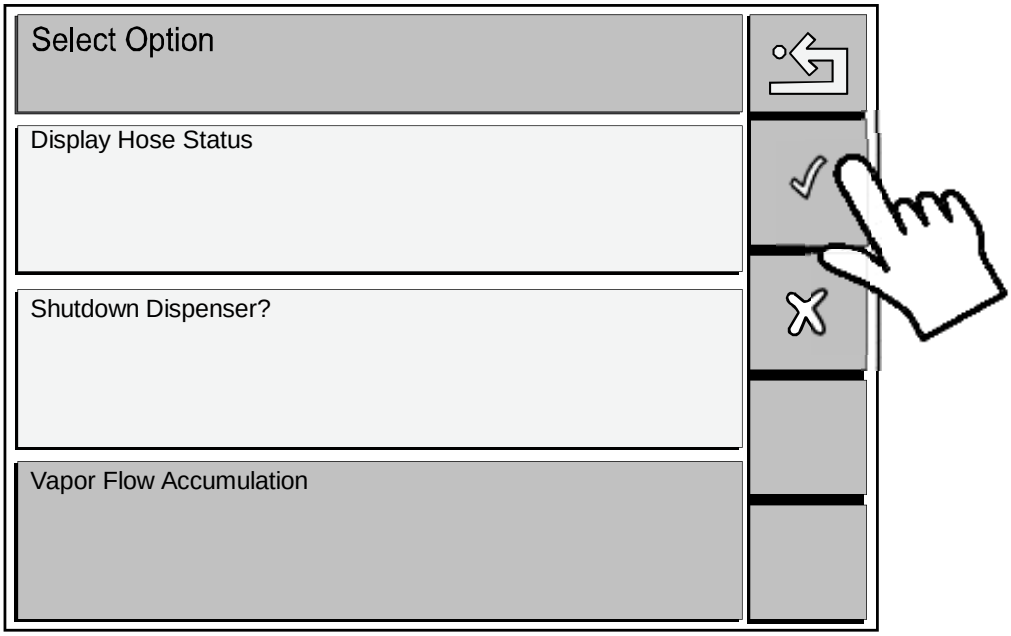
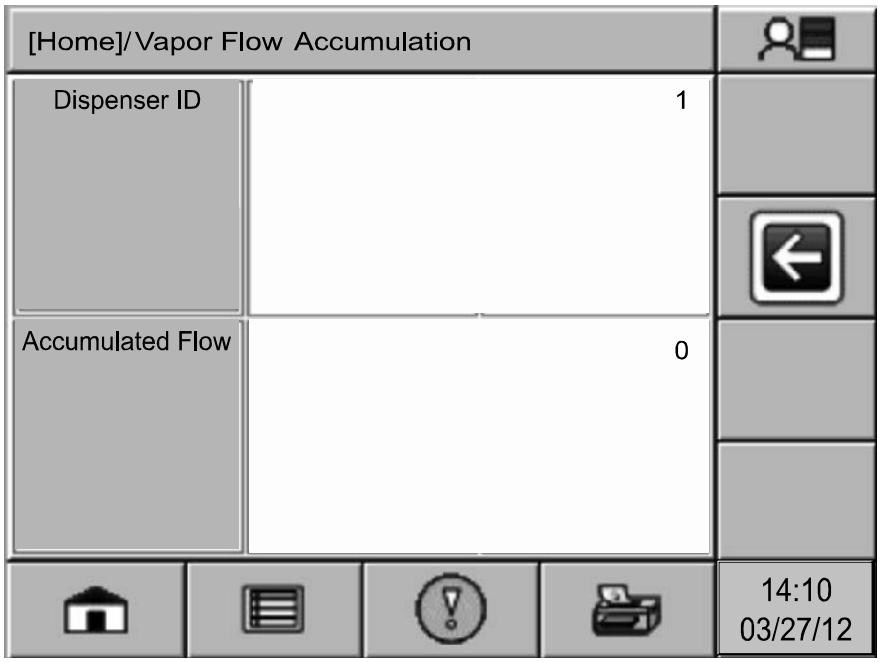

Select Option
Display Hose Status
Shutdown Dispenser?
Vapor Flow Accumulation

Figure 8


[Home]/Vapor Flow Accumulation
Dispenser ID
1
Accumulated Flow
0
14:10
03/27/12

8. POST-TEST PROCEDURES

8.1 Remove the VST Balance Nozzle Adapter and all equipment from the nozzle assembly.

8.2 A post-leak test of the equipment is not required if all the Vapor Flow Meters are within range. For the Vapor Flow Meters that are not within range, sections 7.16 – 7.17 must be conducted. The leak test in section 6 will be conducted to further evaluate the test equipment.

8.3 Close the Phase I EVR vapor poppet. Locate the Phase I vapor poppet on the 87 grade tank. Close the vapor poppet by removing the modified dust cap. Reinstall the original dust cap.

9. CALCULATING RESULTS

9.1 The conversion of the cubic feet reading from the reference volume gas meter to gallons shall be calculated as shown in Equation 9-1.

$$Gallons = Cubic\ Feet \times 7.481 \quad \textbf{[Equation 9-1]}$$

Where:

Gallons	=	Nitrogen volume from the reference meter in gallons
Cubic Feet	=	Cubic feet nitrogen volume reading from reference gas volume meter
7.481	=	Conversion factor from gallons to cubic feet, or gallons per cubic foot

9.2 The percent difference between the reference gas volume meter and the INCON Vapor Flow Meter shall be calculated as shown in Equation 9-2.

$$\%Diff = \frac{ISDtotalGal - GasFlowMeterDiffGal}{GasFlowMeterDiffGal} \times 100 \quad \textbf{[Equation 9.2]}$$

Where:

%Diff	=	Percent difference between reference gas volume meter and INCON ISD System Vapor Flow Meter
ISDtotalGal	=	Total gallons of flow from the INCON ISD System Vapor Flow Meter reported as “Air” from the Vapor Flow Accumulation menu on the INCON
GasFlowMeterDiffGal	=	The difference between the initial meter reading and the final meter reading from the reference gas volume meter.*
100	=	Conversion factor, percentage

* Note: Most readings from reference gas volume meters are in cubic feet and must be converted to gallons as shown in Equation 9.1

10. DISPENSER SHUTDOWN MAPPING VERIFICATION

This is a procedure to test the shutdown feature of the INCON VRM System. The purpose is to verify the dispenser mapping for proper shutdown.

This procedure can be done from either the touch-screen or the web page.

10.1 Dispenser Shutdown Test via Touch Screen Display:

1. Navigate to the dispenser status page by the following steps:

   a. Selecting the VRM Application icon
   b. Selecting the Sub-menu icon
   c. Selecting the Dispensers icon

2. Once at the Dispenser Status page, if you touch one of the dispenser icons, a message will ask you if you want to disable that dispenser. If you press the OK button then the dispenser will shutdown.

3. Verify the Dispenser under test is disabled and fuel cannot be pumped. From the Dispenser Status page, the dispenser under test should show “Shutdown”.

4. Once verified, if you press the same Dispenser again, a message will ask if you want enable Dispenser 1. Select “Yes” and the dispenser should come back to normal *operation*.

5. If the Dispenser under test did not shutdown or the wrong dispenser shutdown, then the wiring and setup should be checked and Steps 1 - 4 run again.

6. Repeat Steps 1 - 5 for all dispensers and record the results in the Test Form.

10.2 Dispenser Shutdown Test via Web Pages

The dispenser shutdown test can alternatively be run through the web pages. The following procedure can be done from either the LCD or the web page.
From the Web Page:

1. This procedure requires administrator privileges.

2. Navigate to the dispenser status page. http://Ip_address/vrm_status.html

3. In the **Dispenser Status** column, select the Dispenser under test. A message will appear asking if you want to disable the dispenser, click “OK”.

4. Verify the Dispenser under test is disabled and fuel cannot be pumped. From the Dispenser Status page, the dispenser under test should show “Shutdown”.

5. Once verified, if you press the same Dispenser again, a message will ask if you want enable Dispenser 1. Select “Yes” and the dispenser should come back to normal operation.

6. If the Dispenser under test did not shutdown or the wrong dispenser was shutdown, then the wiring and setup should be checked and Steps 1 - 5 run again.

7. Repeat Steps 1 - 6 for all dispensers and record the results in the Test Form.

11. REPORTING RESULTS

11.1 Document test data and other information as required in the INCON ISD Operability Test Forms at the end of this document. Districts may require the use of alternate forms, provided they include the same minimum parameters as identified in the INCON ISD Operability Test Form.

12. ALTERNATE PROCEDURES

12.1 This procedure shall be conducted as specified. Modifications to this test procedure shall not be used to determine compliance unless prior written approval has been obtained from the ARB Executive Officer, pursuant to Section 14 of the Certification Procedure CP-201.

VR-204-O: Exhibit 19
INCON ISD System Vapor Flow Meter Operability Test
Field Data Sheet

		Date of Test
Service Company Name		Service Company's Telephone
Service Technician		INCON Tech Certification #
Station Name		District Permit #
Station Address	City	State & Zip

INCON ISD System Vapor Flow			**Reference Volume Gas Meter**						
Vapor Flow Meter S/N	Fueling POS	Vapor Volume (gallons)	Start (cubic feet)	Stop (cubic feet)	Difference Cubic feet (Stop – Start)	Convert Cubic Feet To Gallons[1]	% Diff [2]	Pass	Fail

[1] *Gallons = Cubic Feet x 7.481*

[2] $\%Diff = \frac{ISDTotalGal - GasFlowMeterDiffGal}{GasFlowMeterDiffGal} \times 100$

VR-204-O: Exhibit 19 (Continued)
INCON ISD System Dispenser Shutdown Mapping Verification
Field Data Sheet

Dispenser Mapping Test	Check	Initials
Refer to the Dispenser Shutdown Mapping Verification section of the ISD Operability Test Procedure, section 10 of this document.		
Dispenser was shutdown properly?		
Fuel was unable to be dispensed from nozzles?		
Dispenser was re-enabled from console?		
Fuel is able to be dispensed from nozzles?		

EXHIBIT 20

INCON ISD System Vapor Pressure Sensor Verification Test procedure

Definitions common to all certification and test procedures are in:

D-200 Definition for Vapor Recovery Procedures

For the purpose of this procedure, the term “ARB” refers to the California Air Resources Board, and the term, “ARB Executive Officer” refers to the Executive Officer of the ARB or his or her authorized representative or designee.

1. Purpose and Applicability

1.1 The purpose of this test procedure is to determine if the INCON ISD System Vapor Pressure Sensor (listed in Exhibit 1) is operating in accordance with the vapor pressure sensor requirements of Exhibit 2. This procedure is used:

1.1.1 To determine whether the Vapor Pressure Sensor complies with the performance specification when the sensor is exposed to ambient pressure.

1.1.2 To determine the measured ullage pressure in underground gasoline storage tanks (USTs) installed at gasoline dispensing facilities (GDFs) equipped with VST Phase II Enhanced Vapor Recovery System with Clean Air Separator Including INCON ISD and compare to the pressure reading of the INCON ISD System at the Vapor Recovery Monitoring (VRM) console.

1.2 This procedure is applicable for compliance testing.

2. Principle and Summary of Test Procedure

Determining Ambient Pressure - The Vapor Pressure Sensor (VPS) is subjected to ambient pressure by turning the Vapor Pressure Sensor valve, which is located in the dispenser closest to the tanks, to the Atmospheric Valve Position as shown in Figure 2. This test can be performed while product is being dispensed into motor vehicles.

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

3. Biases and Interferences

3.1 This test shall not be conducted within 30 minutes following gasoline transfer from a cargo tank.

3.2 This test shall not be conducted if the system ullage pressure is less than negative eight (-8.0) inches WC or greater than positive eight (+8.0) inches WC.

4. Range and Accuracy

Digital Manometer (Electronic Pressure Measuring Device)

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

5. Equipment

5.1 The dust cap test assembly shall be modified in the following manner:

5.1.1 Install a probe in the center of the dust cap as shown in Figure 1a (one method is to tap and thread probe). The probe shall be of sufficient length to open approximately ½ inch of the dry break while allowing the cap to maintain a leak tight seal on the adaptor.

5.1.2 Install female quick connect fitting on the top of the dust cap, offset from the center probe as shown in Figure 1a. A Swagelok, part number SS-QC4-B-4-PM, quick connect fitting or equivalent can be used.

5.1.3 Use “Tygon tubing” or equivalent to connect the manometer to the dust cap (Figure 1b). Install a male quick connect fitting (Swagelok

part number SS-QC4-5-400 or equivalent can be used) on one end of a ferrule stainless steel tube (or equivalent material). Connect one end of the “Tygon tubing” to the stainless steel tube and connect the other end to the digital manometer (Figure 1b).

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

5.3 Digital Manometer (Electronic Pressure Measuring Device)

Use a minimum range ±10.00 inches WC digital manometer to monitor the UST pressure with a minimum readability of 0.01 inches of WC. Dwyer Series 475 Mark III Digital manometer or other digital manometer can be used. A digital manometer must have a minimum accuracy of plus or minus 0.05 inches WC of full scale within the compensated temperature ranges/limits (for Dwyer 475 Mark III full scale temperature must be between 60 – 78 degrees F). A copy of the manufacturer’s operating instructions shall be kept with the equipment.

6. Digital Manometer Calibration Requirements

6.1 A copy of the most current calibration of the digital manometer shall be kept with the equipment.

6.2 All digital manometers shall be bench tested for accuracy using a reference gauge, incline manometer or National Institute of Standards and Technology (NIST) traceable standard at least once every twelve (12) consecutive months. Accuracy checks shall be performed at a minimum of five (5) points (e.g., 10, 25, 50, 75 and 90 percent of full scale) each for both positive and negative pressure readings. Accuracy shall meet the requirements of Section 3.2 of TP-201.3.

7. Pre-Test Procedure

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

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

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

7.4 Attach digital manometer to open end of Tygon tubing.

Determining Ambient Pressure

8. Test Procedure for Testing the INCON ISD System Vapor Pressure Sensor at Ambient Pressure

]8.1 Access the INCON ISD System Vapor Pressure Sensor, which is located in the dispenser closest to the USTs. Record the Vapor Pressure Sensor location and serial number on the data forms 1 and 2.

8.2 Turn the Vapor Pressure Sensor ball valve to the closed position. This isolates the Vapor Pressure Sensor from the UST ullage space (see Figure 2).

8.3 Remove the plug from the Vapor Pressure Sensor ball valve (see Figure 2).

8.4 Verify on the VRM Status on the LCD of the console that the pressure value is zero inches WC, ±0.20 inches WC.

If the vapor pressure sensor is within ±0.2 inches WC of zero, proceed to Section 8.5 of this exhibit.

If the pressure value is not within ±0.2 inches WC of zero, the vapor pressure sensor will need to be calibrated. Proceed to section 8.4.1-8.4.3.

8.4.1 On the LCD of the console, go to the VRM Control page, refer to Figure 3, and perform the following steps

a. Press the CONTROL icon. This allows access to the control menu screen.
b. Press the CALIBRATE ZERO OFFSET icon.
c. Press anywhere in the upper calibration box. Select “Yes” to calibrate the sensor. This will zero the pressure reading for atmospheric pressure.

8.4.2 Verify on the VRM Status page that the pressure value is now reading zero (0.0) inches WC, ±0.20 inches WC.

8.4.3 If the pressure reading from the INCON VRM Console is NOT within ±0.2 inches WC from zero, **the Vapor Pressure Sensor is not in compliance with the pressure sensor requirements of Exhibit 2.** Proceed to the INCON ISD System trouble shooting manual available on the Franklin Fueling Systems website.

8.5 Record the above information on Form 1 “Data Form for Vapor Pressure Sensor Ambient Reference Test.” Districts may require the use of an alternate form, provided it includes the same minimum parameters as identified in the Data Form.

8.6 Reinstall the plug on the Vapor Pressure Sensor ball valve. Turn the ball valve handle to the “normal position” (See Figure 2).

Determining UST Pressure

9. Test Procedure for Testing the INCON ISD System Vapor Pressure Sensor at UST Pressure

9.1 Attach the dust cap or vapor coupler test assembly to the vapor adaptor (Figure 1b).

9.2 On the touch-screen display at the INCON VRM console, go to the *VRM»Status* page.

9.3 Simultaneously record the ullage pressure from the digital manometer (connected to the vapor coupler test assembly) and the INCON VRM Console. Record the above information on Form 2 "Data Form for Vapor Pressure Sensor UST Pressure Test." Districts may require the use of an alternate form, provided it includes the same minimum parameters as identified in the Data Form.

9.4 Verify the vapor pressure sensor reading from the INCON VRM Console is within ±0.2 inches WC from the digital manometer reading. If difference is not within ±0.2 inches WC, **the Vapor Pressure Sensor is not in compliance with the pressure sensor requirements of Exhibit 2.** Proceed to the INCON ISD System trouble shooting manual available on the Franklin Fueling Systems website.

10. Alternate Procedures

This procedure shall be conducted as specified. Any modifications to this test procedure shall not be used unless prior written approval has been obtained from the ARB Executive Officer, pursuant to Section 14 of CP-201.

Figure 1a - Typical Modified Vapor Adaptor Dust Cap (Bottom View)

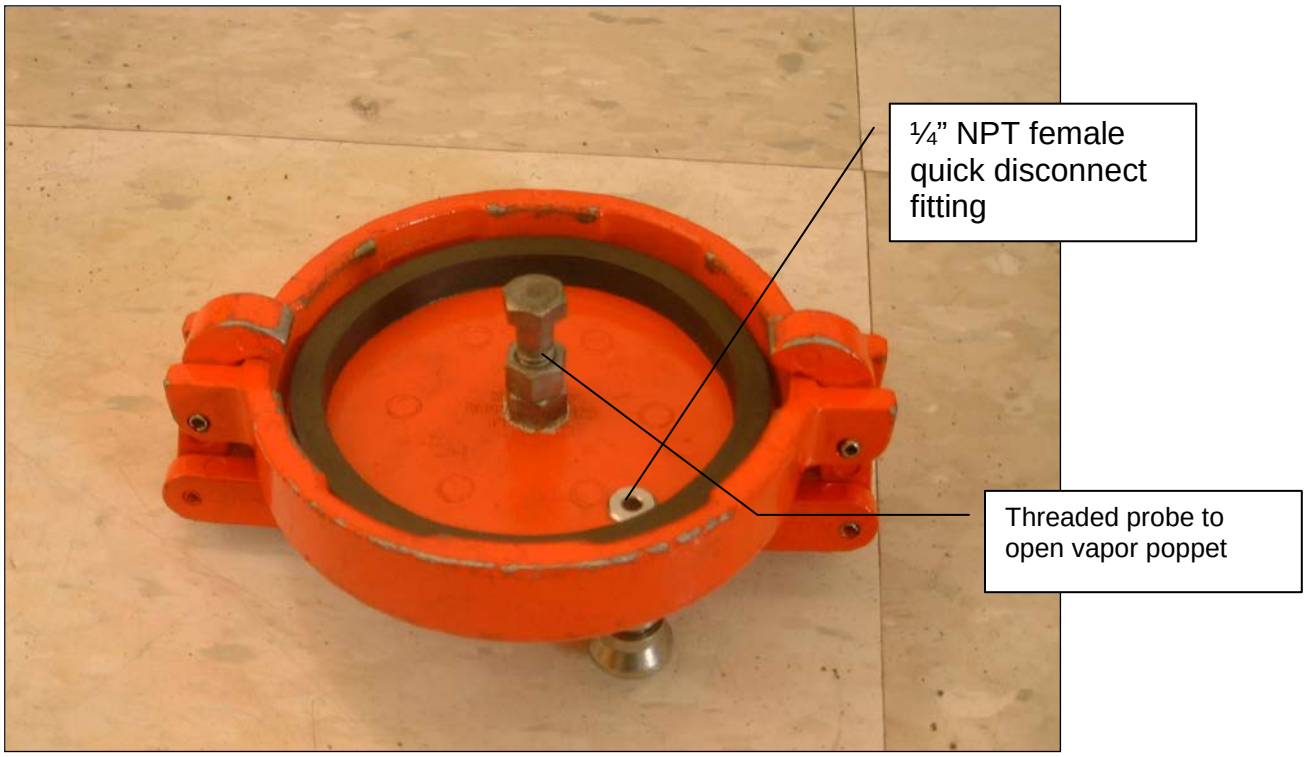
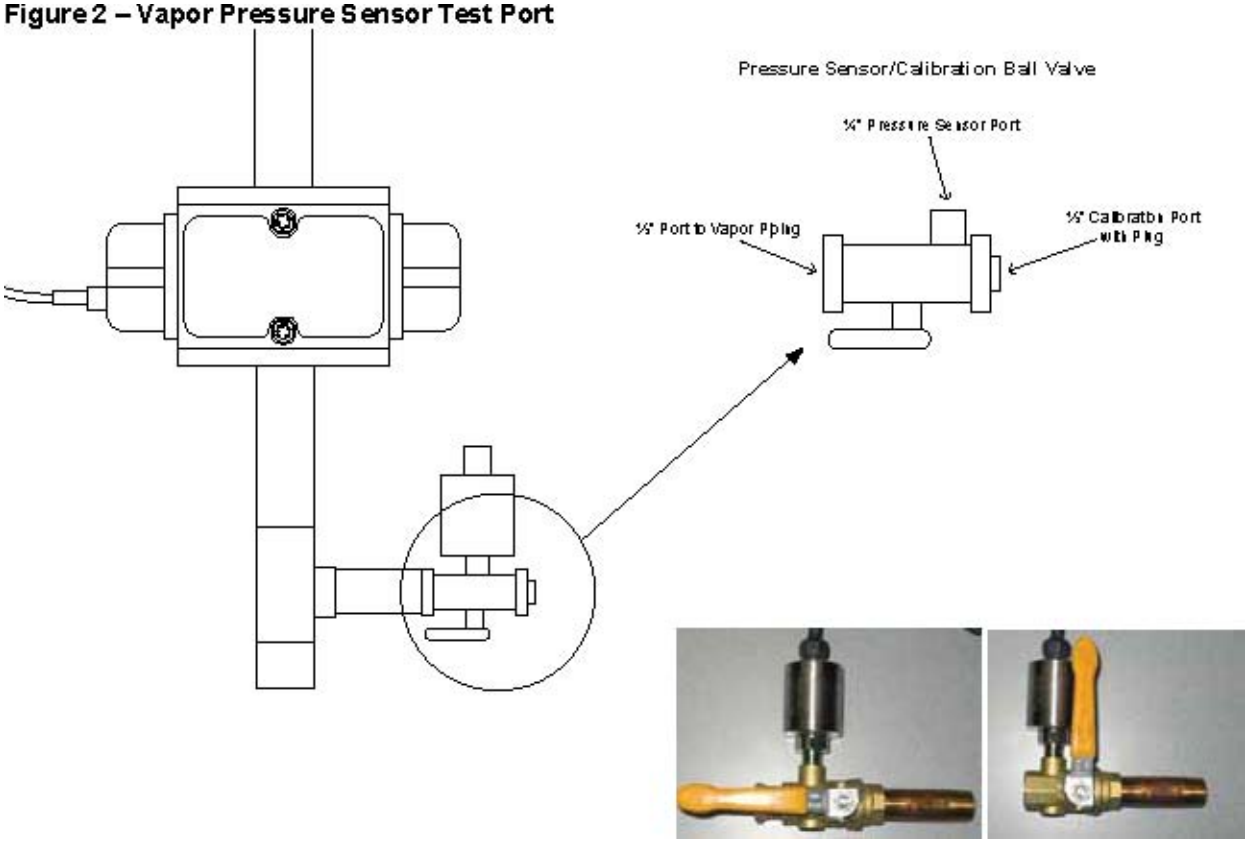


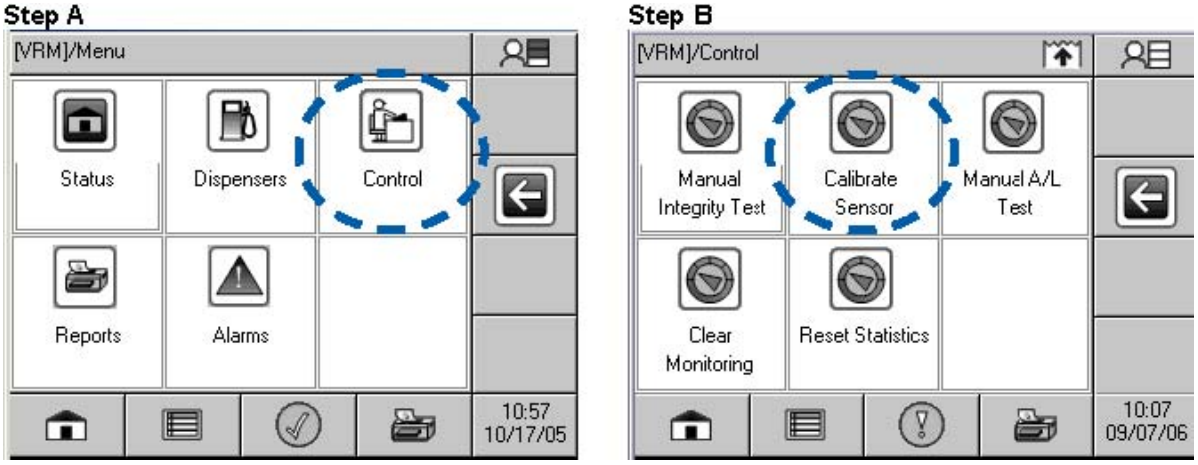
Figure 1b - Typical Field Installation of UST Pressure Measurement Assembly

Figure 2 – Vapor Pressure Sensor Test Port

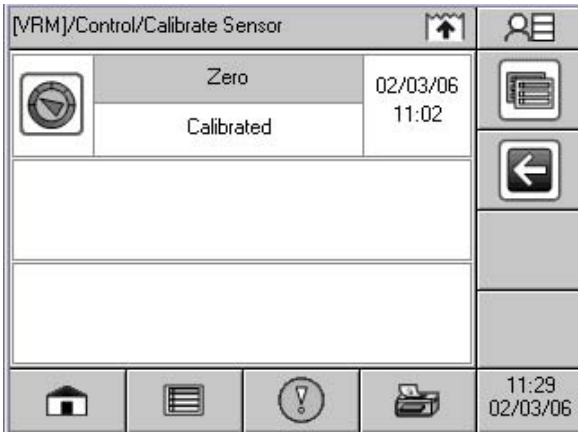


Valve in Normal Position Valve in Test Setup with Plug Removed

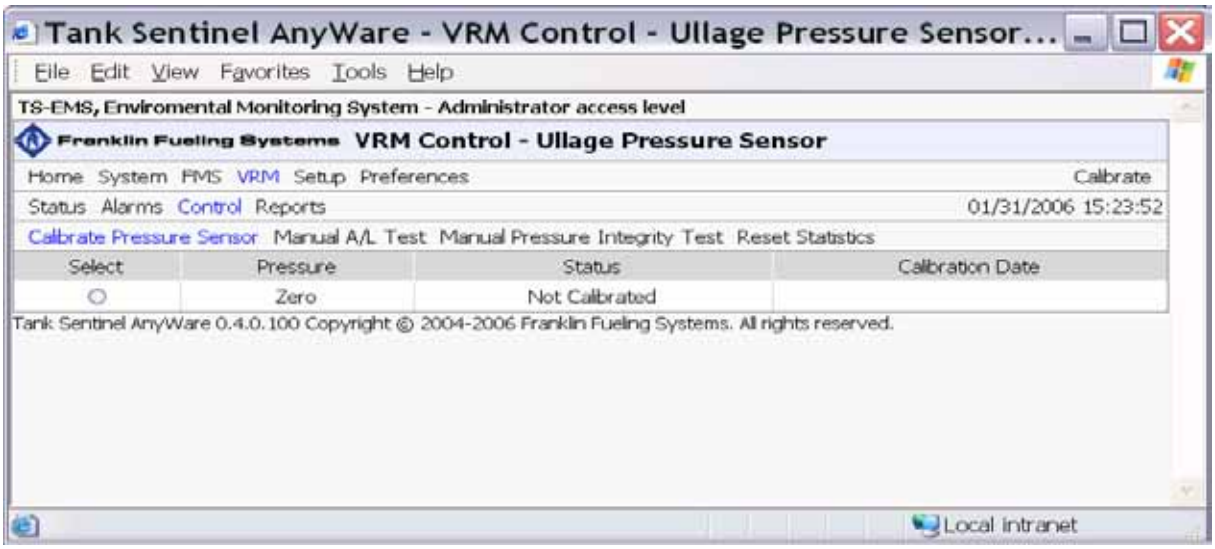
Figure 3 – Steps to Calibrate the Vapor Pressure Sensor



Step C



Calibrate Pressure Sensor Web Page View



Form 1

Data Form for Vapor Pressure Sensor Ambient Reference Test

DATE OF TEST _____

SERVICE COMPANY NAME	SERVICE COMPANY'S TELEPHONE
SERVICE TECHNICIAN	FFS INCON ISD TECH CERTIFICATION # (as applicable) ICC or DISTRICT TRAINING CERTIFICATION (as applicable)
STATION NAME	DISTRICT PERMIT #

STATION ADDRESS	CITY	STATE	ZIP

STEP 8.1	PRESSURE SENSOR LOCATION: _____ DISPENSER NUMBER	PRESSURE SENSOR SERIAL NUMBER:_____
STEP 8.3	VAPOR PRESSURE SENSOR BALL VALVE PLUG REMOVED? ☐ VALVE SET TO AMBIENT REFERENCE POSITION (PER FIG. 2)? ☐	
STEP 8.4	AMBIENT PRESSURE SENSOR VALUE _____Inches WC (OBTAIN PRESSURE VALUE FROM THE VRM STATUS ON THE LCD OF THE CONSOLE).	
STEP 8.4	IS THE PRESSURE BETWEEN +0.20 & -0.20? ☐ Yes ☐ No IF NO, THE VAPOR PRESSURE SENSOR MAY NEED TO BE CALIBRATED. TO CALIBRATE PRESSURE SENSOR, REFER TO SECTION 8.4.1 OF THE VAPOR PRESSURE SENSOR TEST PROCEDURE. AFTER SUCCESSFULLY COPLETING VAPOR PRESSURE SENSOR CALIBRATION IS THE PRESSURE BETWEEN +0.20 & -0.20? ☐ Yes ☐ No IF NO: THE PRESSURE SENSOR IS NOT IN COMPLIANCE WITH THE PRESSURE SENSOR REQUIREMENTS OF EXHIBIT 2. PROCEED TO THE INCON ISD SYSTEM TROUBLESHOOTING MANUAL AVAILABLE ON THE FRANKLIN FUELING SYSTEMS WEBSITE.	
STEP 8.5	VAPOR PRESSURE SENSOR BALL VALVE PLUG REINSTALLED? ☐ BALL VALVE SET TO NORMAL POSITION (See FIG. 2)? ☐	

Form 2

Data Form for Vapor Pressure Sensor UST Pressure Test

DATE OF TEST _____

SERVICE COMPANY NAME	**SERVICE COMPANY'S TELEPHONE**
SERVICE TECHNICIAN	**FFS INCON ISD TECH CERTIFICATION # (as applicable)** **ICC or DISTRICT TRAINING CERTIFICATION (as applicable)**
STATION NAME	**DISTRICT PERMIT #**
STATION ADDRESS **CITY**	**STATE** **ZIP**

PRESSURE SENSOR LOCATION: **DISPENSER NUMBER**	_____	**PRESSURE SENSOR SERIAL NUMBER:** _____

STEP 9.3	**UST PRESSURE DIGITAL MANOMETER VALUE** _____ **INCHES WC**
STEP 9.3	**UST PRESSURE FROM INCON ISD SYSTEM VRM CONSOLE** _____**Inches WC** **(OBTAIN PRESSURE VALUE FROM THE VRM STATUS ON THE LCD OF THE CONSOLE**).
STEP 9.4	**VRM CONSOLE SENSOR VALUE WITHIN ±0.2 INCHES WC OF DIGITAL MANOMETER VALUE? YES** ☐ **NO** ☐ **IF NO: THE PRESSURE SENSOR IS NOT IN COMPLIANCE WITH THE PRESSURE SENSOR REQUIREMENTS OF EXHIBIT 2. PROCEED TO THE INCON ISD SYSTEM TROUBLE SHOOTING MANUAL AVAILABLE ON THE FRANKLIN FUELING SYSTEMS WEBSITE.**