California Environmental Protection Agency

Air Resources Board

ARB Approved

Installation, Operation and Maintenance Manual

for

Executive Order

VR-208-A
EMCO Wheaton Retail Balance Phase II EVR System
Including INCON In-Station Diagnostics (ISD)

NOTICE:

The **ARB Approved Installation, Operation and Maintenance Manual (IOM) for the VR-207** describes the tools, methods and skill levels required to install the **EMCO Wheaton Retail Balance Phase II EVR System Including the INCON ISD.**

Unless specified otherwise, only skilled technicians that are trained, certified and licensed by EMCO Wheaton Retail (i.e. EMCO Certified Technicians) are able to perform installation, maintenance or repairs of components manufactured by EMCO Wheaton Retail or warranty will be void.

It is the responsibility of each EMCO Certified Technician to be familiar with the current requirements of state, federal, local codes and air district rules and regulations of installation and repair of gasoline dispensing equipment.

It is also the responsibility of each EMCO Certified Technician to be aware of all the manuals, necessary safety precautions, and site requirements to assure a safe and trouble-free installation.

To schedule a training class or to confirm the status of an EMCO Certified Technician, please visit the EMCO Wheaton Retail's website at www.emcoretail.com or contact:

Jose E. Rodriguez
Manager of Technical Services & Support
EMCO Wheaton Retail
Phone: 619-421-1743
Email: JERodriguezSD@aol.com

EMCO Wheaton Retail
2300 Industrial Park Drive
Wilson, North Carolina 27893
Phone: 252-243-4394
Fax: 252-243-4759
Email: ewrc@emcoretail.com

Unless specified otherwise, only skilled technicians that are trained, certified and licensed by Hirt Combustion Engineers, Inc (i.e. HCE Certified Technicians) are able to perform installation, maintenance or repairs of components manufactured by Hirt Combustion Engineers, Inc or warranty will be void.

It is the responsibility of each HCE Certified Technician to be familiar with the current requirements of state, federal, local codes and air district rules and regulations of installation and repair of gasoline dispensing equipment.

It is also the responsibility of each HCE Certified Technician to be aware of all the manuals, necessary safety precautions, and site requirements to assure a safe and trouble-free installation.

To schedule a training class or to confirm the status of a HCE Certified Technician, please contact:

Customer Service Department
Hirt Combustion Engineers, Inc.
3659 San Gabriel River Parkway
Pico Rivera, CA 90660
Phone: 562-692-6970
Fax: 562-692-7413
Email: HirtVCS@aol.com

Unless specified otherwise, only skilled technicians that are trained, certified and licensed by Franklin Fueling Systems (i.e. INCON Certified Technicians) are able to perform installation, maintenance or repairs of components manufactured by Franklin Fueling Systems or warranty will be void.

It is the responsibility of each INCON Certified Technician to be familiar with the current requirements of state, federal, local codes and air district rules and regulations of installation and repair of gasoline dispensing equipment.

It is also the responsibility of each INCON Certified Technician to be aware of all the manuals, necessary safety precautions, and site requirements to assure a safe and trouble-free installation.

A copy of the INCON VRM Troubleshooting and Diagnostics Guide can be found at http://www.franklinfueling.com

To confirm an INCON Certified Technician training status, a regulator can access a searchable database at the following web site:
http://www.franklinfueling.com/CertifiedInstallers/CertifiedInstallers.asp

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About EMCO Wheaton Retail

WHEATON RETAIL *Focusing on the Future, Serving Today's Needs*

EMCO Wheaton Retail Corporation located in Wilson, North Carolina is the premier manufacturer and supplier of a wide range of products to ensure the environmental safe handling of liquid petroleum. Under new ownership since May 1996, the company continuous to be at the forefront in the development of innovative products and services for the domestic and international petroleum equipment industry.

EMCO Wheaton Retail products are grouped into four major categories:

- Vapor recovery and automatic nozzles
- Dispenser accessories including safe breaks valves and swivels
- Overfill prevention and spill containment devices
- Valves and fittings

Products are brought to market primarily through a global distributor network. In addition, the company has twenty-one domestic and international field sales offices. Our mission is to provide the highest quality, lowest total cost and quickest order response.

EMCO Contractor Requirements

Level	Component	Authorized Tasks	Training Pre-Requisites
A Must be re-certified every two-years	Hanging Hardware	• Installation • Functional Testing • Preventive Maintenance • Repair	No pre-requisite
Note: Depending on local codes, in addition to EMCO training, contractors may be required to take air district training or ICC certification as an approved vapor recovery installer.			

- EMCO Certified Technicians must be able to show proof of certification if asked. Carry the wallet card or have a copy of your certification on file with the gasoline dispensing facility.
- EMCO Certified Technicians must record his or her certification number on the applicable paperwork for all warranties to be deemed valid.
- EMCO Certified Technician should ALWAYS verify training and certifications requirements with the air district staff BEFORE beginning installation of EVR systems or components.

Hirt Contractor Requirements

Technician Certification	Contractors holding valid Installer Certification are approved to perform VCS 100 processor and indicator panel installation; wiring and conduit routing; start-up; maintenance; troubleshooting; and parts replacement.
NOTE: **Depending on local codes, in addition to the Hirt training, contractors may be required to take air-district training or ICC certification as an approved vapor-recovery installer.**	

INCON ISD Contractor Requirements

Level	Description of Certification
I	Automatic Tank Gauge Installer Certification Training
II	Automatic Tank Monitor Start-Up and Service/Warranty Certification Training
III	Line Leak Detector Installer/Service/Warranty Certification Training
IV	TS-STS Operation/Repair Test
V	Vapor Recovery Monitoring Installation/Operation

NOTE:

Depending on local codes, in addition to the INCON training, contractors may be required to take air-district training or ICC certification as an approved vapor-recovery installer.

- An INCON Vapor Recovery Monitoring (VRM) Certified Technician needs to have completed training Levels I, II, V.
- Only an INCON certified Vapor Recovery Monitoring (VRM) Technician or service person is allowed to make setup changes, clear alarms, and access areas internal to the Console.
- INCON VRM Certified Technician must be re-certified every two years for any level.
- INCON VRM Certified Technicians must be able to show proof of certification if asked. Carry the certification card or have a copy of your certification on file with the gasoline dispensing facility.
- INCON VRM Certified Technicians must record his or her certification number on the applicable paperwork for all warranties to be deemed valid.

Executive Order VR-208
Exhibit 1
System Components

Component	Manufacturer / Model
Nozzle	EMCO Wheaton Retail Model A4005EVR, RA4005EVR (Rebuilt)
Coaxial Curb Hose	Goodyear Model Maxxim Premier Plus
Coaxial Whip Hose	Goodyear Model Maxxim Premier Plus
Hose Swivel	EMCO Wheaton Retail Model A4110EVR
Breakaway Coupling	EMCO Wheaton Retail Model A4119EVR
Vapor Processor with Indicator Panel	Hirt Combustion Engineers Model VCS-100
ISD Console	INCON/ TS-EMS INCON/ TS-550 INCON/ TS-5000
Vapor Recovery Monitoring (VRM) Software	INCON/ TS-VRM Version 1.1.0
Vapor Flow Meter (1 per Dispenser)	INCON/ TS-VFM
Vapor Pressure Sensor (1 per GDF)	INCON/ TS-VPS
Dispenser Retrofit Kit (Optional) (1 per Dispenser)	INCON/ TS-DRK

Overview – EMCO Balance EVR System

EMCO Model A4005EVR Dripless Nozzle - During vehicle refueling, the *nozzle* is securely latched to the vehicle fill pipe by means of a permanent band located on the spout. The position of the band permits the *nozzle* to remain in place on either a vertical or horizontal plane. The flexible bellows and soft boot face together provide the proper vapor seal connection between the spout and vehicle fill pipe as fuel passes into the vehicle tank.

The *No Seal, No Flow insertion interlock mechanism* assures adequate compression of the bellows and boot face against the vehicle fill pipe, creating a tight vapor seal for proper balance phase II vapor recovery. The *No seal, No Flow insertion interlock mechanism* prevents fuel flow through the fuel delivery system (fuel storage tank, turbine, fuel piping, dispenser and hanging hardware) unless the nozzle is properly inserted and securely latched to the vehicle fill pipe.

The integral *vapor control valve* is located within the nozzle body. The *vapor control valve* opens to allow the return of vapor through the balance phase II vapor recovery system (vapor path of the hanging hardware, dispenser, vapor piping and fuel storage tank) when the nozzle is securely latched to the vehicle fill pipe, with the bellows compressed and the nozzle lever engaged.

The *automatic shut-off* is a required safety device of the nozzle that stops and prevents the overflow and spillage of fuel once the vehicle tank is full. Note: "topping off" the vehicle tank in not recommended.

EMCO Model A4110EVR Coaxial Hose Swivel – The *coaxial hose swivel* installs between the dripless nozzle and the coaxial curb hose providing a full range of movement, minimizing kinking and twisting of the coaxial curb hose during vehicle refueling.

EMCO Model A4119EVR Coaxial Safe Break Valve – The *coaxial safe break valve* is a shear pin non-reconnectable component. The *coaxial safe break valve* is equipped with a dual poppet design that seals off both the fuel and vapor paths upon separation or customer drive-off, eliminating fuel spillage, vapor emissions and minimizing damage to the dispenser unit.

Goodyear Model Maxxim Premier Plus Whip & Curb Hoses – The *coaxial curb hose* is a two hose design which passes fuel through the center hose and returns vapors through the outer hose. A liquid removal device (venturi) is incorporated and protected within the confines of the inner hose. As fuel gathers at the bottom of the loop typically from customer "top-offs", the liquid removal device extracts and returns the fuel to the inner fuel hose eliminating hose blockage.

Overview – EMCO Balance EVR System

INCON ISD System – The *ISD system consists* of a *vapor recovery monitor VRM*, a *vapor flow meter VFM* and a *vapor pressure sensor VPS*. The *VRM* uses data from both the *VFM* (located inside each dispenser unit) and the *VPS* (one per station) to perform assessments on the station's balance phase II vapor recovery system. The *VRM* provides warning and failure indicators along with a user panel interface to access all daily, weekly and monthly ISD reports.

The *ISD system* offers another option that eliminates additional conduit runs. The *data transfer unit DTU* uses technology that transmits data from the *VFM* and *VPS* back to the *VRM* across existing dispenser power wires.

Hirt VCS-100 Vapor Processor with Indicator Panel – Under conditions where the Gasoline Dispensing Facility GDF is operational and the balance system hardware is functioning normally, the inherent On Board Vapor Recovery ORVR compatibility of the balance phase II vapor recovery system will create a predominately negative pressure in the ullage space of the gasoline storage tanks. Under these conditions the *vapor processor* will typically not need to operate.

During periods of less activity, the GDF being shut down overnight, winter fuels being present or other conditions that will create the pressurization of the ullage space, the *vapor processor* will operate intermittently as required above the particular set-point to manage the positive pressure in the ullage space to an accepted level. A vacuum sensor located within the *vapor processor* determines the set-point and is factory calibrated at a nominal -0.40 inches of water.

The *vapor processor* employs a specialized turbine which collects only the excess vapor from the ullage space. A unique combustor converts the excess vapor into harmless carbon dioxide CO2 and water vapor H2O.

The *vapor processor* is equipped with an *indicator panel* that provides power, processing and overpressure indictors that help the station operator, district inspectors and service technicians determine the operating status of the *vapor processor* and the GDF.

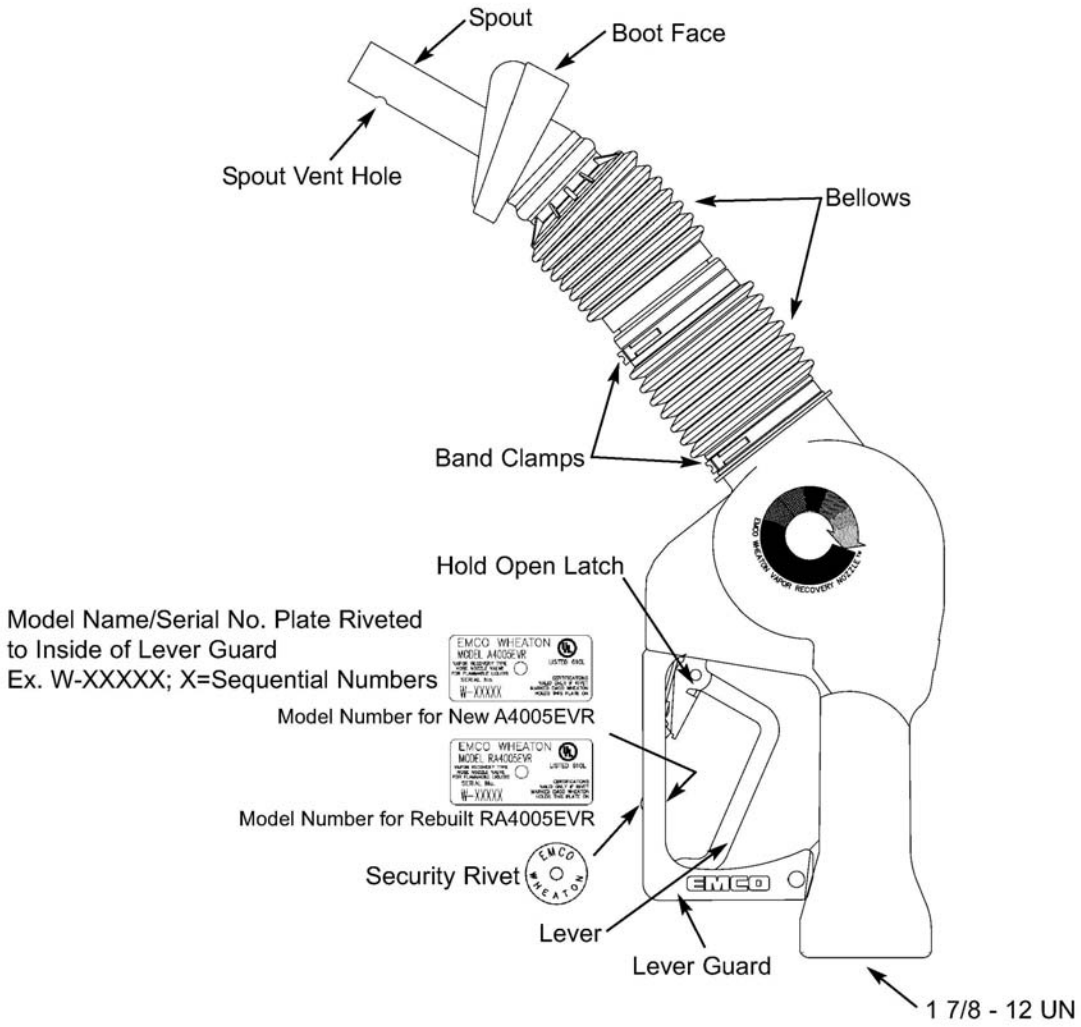


Figure 1: Model EMCO Wheaton Retail A4005EVR

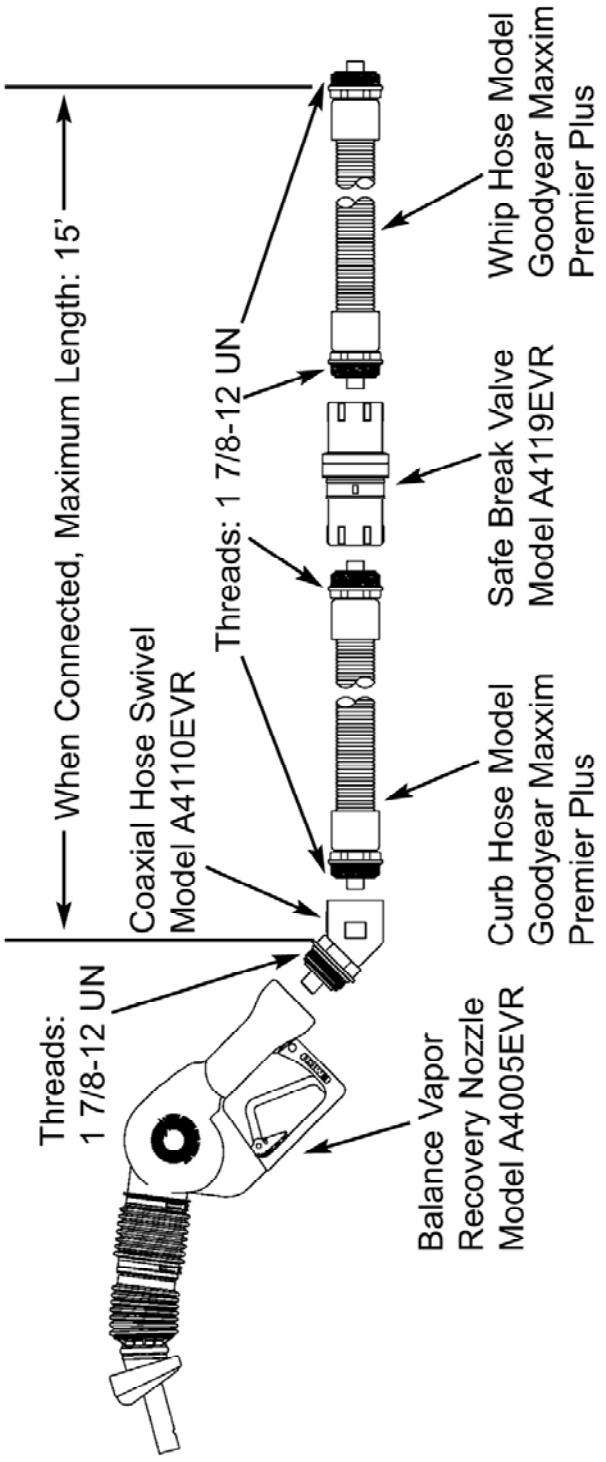
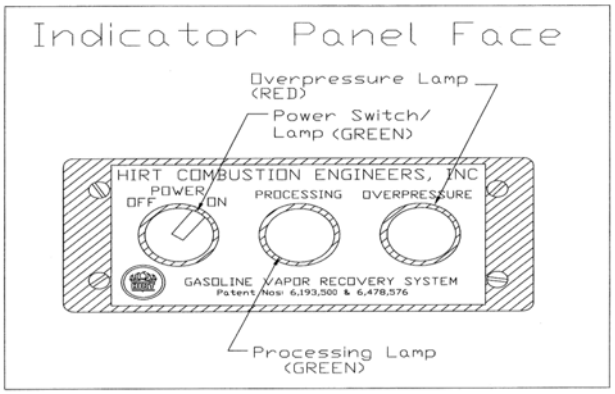
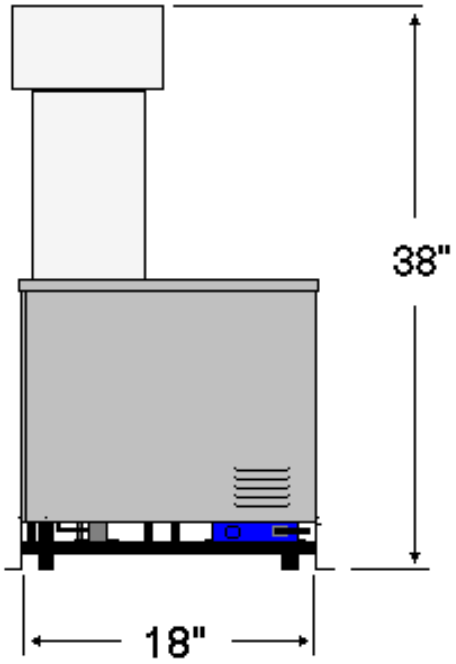


Figure 2 Model EMCO Wheaton Retail & Goodyear Hanging Hardware
(Nozzle, Coaxial Hose Swivel, Coaxial Fuel Hose, Coaxial Safe Break Valve)





Weight: 80lbs.
Electrical: 120VAC, 3Ampere Intermittent
Vapor Inlet Connection: ¾ NPT

Figure 3: Model Hirt Combustion Engineers, Inc. VCS-100 Vapor Processor with Indicator Panel

Weekly Inspections

HANGING HARDWARE SYSTEM					
Component	Procedure	Fail Criteria	Corrective Action	Reference Manuals	Authorized Personnel
Nozzle	Inspect each whip and curb hose, safe break valve, hose swivel and nozzle for loose connections or leaks	Presence of a leak Presence of residue from a leak Visible o-ring between any component connection	Tighten connections or replace with new EMCO or Goodyear product	IOM – Section 9	Nozzle, Swivel Hose, Hose and Safe Break Valve Replacement: Station Operator or EMCO Certified Technician Level A Component Repair: EMCO Certified Technician Level A
Hose Swivel				IOM – Section 11	
Safe Break Valve				IOM – Section 12	
Hoses				IOM – Section 13	

COAXIAL WHIP & CURB HOSES					
Component	Procedure	Fail Criteria	Corrective Action	Reference Manuals	Authorized Personnel
Hoses	Inspect whip and curb hoses for wear, severe kinks, cracks, splitting and functional swivels	Kinks, cracks, splitting, non-functional swivels or any visible openings	Replace with new Goodyear hose	IOM – Section 13	Hose Replacement: Station Operator or EMCO Certified Technician Level A

COAXIAL SAFE BREAK VALVE					
Component	Procedure	Fail Criteria	Corrective Action	Reference Manuals	Authorized Personnel
Safe Break Valve	Inspect safe break valve for leaks around the scuff	Presence of a leak around the scuff or any visible openings	Replace with new EMCO safe break valve	IOM – Section 12	Safe Break Valve Replacement: Station Operator or EMCO Certified Technician Level A
COAXIAL HOSE SWIVEL					
Component	Procedure	Fail Criteria	Corrective Action	Reference Manuals	Authorized Personnel
Hose Swivel	Inspect hose swivel for leaks and functional swivel	Presence of a leak, non-functional swivel or any visible openings	Replace with new EMCO hose swivel	IOM – Section 11	Hose Swivel Replacement: Station Operator or EMCO Certified Technician Level A

NOZZLE					
Nozzle Components	Procedure	Fail Criteria	Corrective Action	Reference Manuals	Authorized Personnel
Lever, Hold Open Latch, Lever Guard	Inspect for defects, cuts or damage to the: Lever Hold Open Latch Lever Guard Spout	Damaged or missing	Replace with new EMCO latch kit or nozzle	IOM – Sections 9 & 10	Latch Kit Repair: EMCO Certified Technician Level A Nozzle Replacement: Station Operator or EMCO Certified Technician Level A
Spout		Sheared or bent	Replace with new EMCO Spout Kit or nozzle	IOM – Sections 9 & 10	Spout Kit Repair: EMCO Certified Technician Level A Nozzle Replacement: Station Operator or EMCO Certified Technician Level A

NOZZLE					
Nozzle Components	Procedure	Fail Criteria	Corrective Action	Reference Manuals	Authorized Personnel
Spout Vent Hole	Inspect for defects, cuts or damage to the: Spout Vent Hole Boot Face Bellows	Vent hole blocked	Clear blockage	IOM – Section 9	Blockage Repair: Station Operator or EMCO Certified Technician Level A
Boot Face		> than 0.38 sq. inches of 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])	Replace with new EMCO boot face kit or nozzle	IOM – Sections 9 & 10	Boot Face Kit Repair: EMCO Certified Technician Level A Nozzle Replacement: Station Operator or EMCO Certified Technician Level A
Bellows		A cut across 7 consecutive bellows convolutions	Replace with new EMCO bellows kit or nozzle	IOM – Sections 9 & 10	Bellows Kit Repair: EMCO Certified Technician Level A Nozzle Replacement: Station Operator or EMCO Certified Technician Level A

NOZZLE					
Nozzle Components	Procedure	Fail Criteria	Corrective Action	Reference Manuals	Authorized Personnel
Insertion Interlock Rod	Inspect for defects, cuts or damage to the: Insertion Interlock Rod Band Clamps Serial Plate Security Rivet	Insertion interlock rod sticks during engagement or disengagement	Replace with new EMCO Spout Kit or nozzle	IOM – Sections 9 & 10	Spout Kit Repair: EMCO Certified Technician Level A Nozzle Replacement: Station Operator or EMCO Certified Technician Level A
Band Clamps		Damaged or missing	Replace with new EMCO band clamp kit or nozzle	IOM – Sections 9 & 10	Band Clamp Kit Repair: EMCO Certified Technician Level A Nozzle Replacement: Station Operator or EMCO Certified Technician Level A
Serial Plate, Security Rivet		Damaged or missing	Replace with new EMCO nozzle	IOM – Section 9	Nozzle Replacement: Station Operator or EMCO Certified Technician Level A

Weekly Inspections and Testing Checklist

Checklist results may be used to assist with filling out GDF maintenance log	Date: _____________	Page _____ of _____

Dispenser Number	Unihose or Fuel Grade (circle one)					Nozzle Inspection (circle one)		Hose Swivel Inspection (circle one)		Hose Inspection (circle one)		Safe Break Valve Inspection (circle one)	
	Unihose	87	89	91	Other _____	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
	Unihose	87	89	91	Other _____	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
	Unihose	87	89	91	Other _____	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
	Unihose	87	89	91	Other _____	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
	Unihose	87	89	91	Other _____	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
	Unihose	87	89	91	Other _____	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
	Unihose	87	89	91	Other _____	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
	Unihose	87	89	91	Other _____	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
	Unihose	87	89	91	Other _____	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
	Unihose	87	89	91	Other _____	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail

Annual Inspections

HIRT VCS-100 VAPOR PROCESSOR ANNUAL INSPECTION CHECKLIST

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:

Instructions: Perform each step and check each box after step is completed. File completed checklist with station's Maintenance Records.

1.	Turn OFF electrical power to processor. CAUTION: The processor can be hot from operation. Use caution when removing Weather Cover, Shell, and raising Inner Stack; they are HOT!	☐
2.	Remove Weather Cover. Look inside stack and burner chamber to check for debris. Remove any debris.	☐
3.	Remove padlocks, if any, and remove Shell from processor.	☐
4.	Loosen stack bolt and raise Inner Stack. The pilot and igniter/sensor are now exposed. The internals should be checked for foreign material. Remove any foreign material.	☐

HIRT VCS-100 VAPOR PROCESSOR ANNUAL INSPECTION CHECKLIST		
5.	Check igniter/sensor for carbon buildup. Replace Pilot Tip assembly if Excessive buildup. See instructions that come with replacement Pilot Tip for Installation details.	☐
6.	Visually check all processor piping and tubing for leaks (this is checked when conducting TP-201.3 and Exhibit 4 of Executive Order VR-208). Check metal tubing and piping for kinks, worn areas, and cracks or deterioration. Check piping and metal tubing fittings to insure that they are strong and tight sealing. Replace any questionable components.	☐
7.	Conduct Exhibit 8 of Executive Order VR-208 "Hirt VCS 100 Processor With Indicator Panel Operability Test Procedure"	☐
8.	Check setting of Pilot Needle Valve adjustment (section 8.8 of Hirt VCS 100 IOM).	☐
9.	Lower Inner Stack and tighten bolt. Replace Shell, Weather Cover, and padlocks removed for visual inspection.	☐
10.	Verify handle on 3-way valve is in the down position – Processor to UST Ullage.	☐
11.	Turn ON electrical power to processor.	☐

Annual System Compliance Testing	
Test Procedure	Test Procedure Number or Exhibit
Static Pressure Decay Test	Exhibit 4 (TP-201.3)
Liquid Removal Test	Exhibit 5
Dynamic Back Pressure Test	Exhibit 6 (TP-201.4)
Nozzle Bag Test	Exhibit 7
Hirt VCS-100 Vapor Processor Operability Test	Exhibit 8
INCON ISD System Vapor Flow Meter Operability Test Procedure	Exhibit 10
INCON VRM Operability Test Procedure	Exhibit 11

Alarm Troubleshooting Summary For Hirt VCS 100 Processor

Hirt VCS 100 Troubleshooting Summary				
VCS 100 Indicator Panel	Category	Light	Cause	Recommended Troubleshooting
OVERPRESSURE LIGHT	VCS 100 Processor or System	Red	UST ullage pressure is positive for at least 1 continuous hour.	GDF Owner/Operator Responsibilities: • "Weekly Inspections" of Hanging Hardware as specified in section 5 of Installation, Operation, and Maintenance Manual. • "Drive-Offs and Other Customer Abuse" as specified in section 8 of Installation, Operation, and Maintenance Manual. • Exhibit 7 of Executive Order VR-208 • Record findings in GDF Owner/Operator Maintenance Log. Certified Contractor Responsibilities: • Follow VCS 100 Troubleshooting Guide (Contact Hirt by either Phone: (562) 692-6970 or by email: HirtVCS@aol.com to get Guide) • TP-201.3 and Exhibit 4 of Executive Order VR-208 • Exhibit 7 of Executive Order VR-208 • Exhibit 8 of Executive Order VR-208 • Record findings in GDF Owner/Operator Maintenance Log.

In-Station Diagnostic (ISD) Alarm Troubleshooting Summary

INCON ISD Troubleshooting Summary				
INCON Vapor Recovery Monitor (VRM)	Category	Type	Definition	Recommended Troubleshooting
Daily Vapor Collection, Fueling Point (n)*	VRM	Warning or Failure	This vapor recovery alarm occurs when the vapors being returned to the UST are blocked or a reduction in flow has been determined.	May be caused by leaking hanging hardware, blocked hoses or vapor recovery lines, jammed flow meter. Run Exhibit 10 of VR-208 to verify a blockage. Check for leaks by viewing the vanes through the sight glass on the VRM.
Weekly or Monthly Ullage Pressure*	VRM	Warning or Failure	This vapor recovery alarm occurs when the UST ullage pressure exceeds the alarm threshold for the time period specified in the alarm.	May be caused by a malfunction in the Hirt VCS 100. Perform a check on the processor and make sure it is turned on and processing vapors.
Weekly Ullage Pressure Leak Test*	VRM	Warning or Failure	This vapor recovery alarm occurs when the VRM determines a leak greater than the allowable	May occur when there is an excessive leak in the vapor recovery containment area. Perform a static pressure decay test per TP-201.3.
Vapor Processor Warning	VRM	Warning Only	Occurs when processor run time exceeds 62 continuous minutes, or processor is shutoff, or input to ISD console is disconnected	Hirt VCS 100 is not running or operating properly. Leak in the vapor recovery containment area. Perform Exhibit 8 of VR-208-A. Perform a static pressure decay test per TP-201.3 to verify system integrity and identify leak(s)
Vapor Processor Malfunction*	VRM	Warning or Failure	Occurs when the ullage pressure exceeds 2.00 inches water column gauge (WCG) for 144 minutes in one day (90^{th} percentile > 2.00" WCG)	Hirt VCS 100 is not running or operating properly. Leak in the vapor recovery containment area. Perform Exhibit 8 of VR-208-A. Perform a static pressure decay test per TP-201.3 to verify system integrity and identify leak(s)
Channel (n), missing	VRM	Alarm	A flow meter is not connected or there is an open in the wiring. This will only occur for a flow meter channel that is programmed to have a flow meter.	Check the connection. Measure the voltage of the terminals, which should be approximately 18VDC
Channel (n), error	VRM	Alarm	The VRM does not understand the data transmission.	This may happen when a channel is programmed for a magnostrictive probe but has a vapor flow meter connected instead.

INCON ISD Troubleshooting Summary				
INCON Vapor Recovery Monitor (VRM)	Category	Type	Definition	Recommended Troubleshooting
External TS-DIM Connection Down	VRM	Alarm	No communication between the TS-DIM and the Console.	Occurs with bad connection, TS-DIM does not have power, TS-DIM is not working. Check the wiring between the TS-DIM and the Console. Check the jumper settings in the TS-DIM, see Section 15 of this IOM
TS-DIM Read Data Error	VRM	Alarm	Bad communication to the Console.	Most likely a baud rate problem. Check the baud rate in the Console as well as the jumper settings in the TS-DIM.
External Automatic Tank Gauge (ATG) Connection Down	VRM	Alarm	No communication or bad communication between the ATG and the Console	Check the Communication Port settings in both the ATG and the Console. These settings should match. Make sure there is a straight serial cable between the ATG and the Console.
(i) Module is offline, *where i is the module number*	System	Alarm	Occurs when a module is not communicating with the controller.	If RED LED is on or Green LED is blinking, try cycling power.
(i) Module number mismatch, *where i is the module number*	System	Alarm	Occurs when the number of modules does not match the programmed number of modules	Check the setup at ***System Configuration >>Modules Expected*** to see if the correct numbers are programmed.

* If they progress to failure, these ISD alarms will result in shutdown.

Drive-Offs and Other Customer Abuse

If the hanging hardware components are involved in a drive off situation or if they incur some customer abuse, and they are not replaced as new, each individual component of the hanging hardware must be visually inspected and functional tested before the components can return to dispensing fuel.

- A visual assessment and functional tests are outlined in the following pages.

ANY COMPONENT THAT DOES NOT PASS A VISUAL INSPECTION OR FUNCTIONAL TEST MUST BE REPLACED.

IF THE SAFE BREAK VALVE IS INVOLVED IN A DRIVE-OFF SITUATION, IT MUST BE REPLACED.

THE SAFE BREAK VALVE IS NON-RECONNECTABLE.

Before beginning work, barricade the work area to block customer use

VISUAL ASSESSMENT OF THE HANGING HARDWARE

Visually Inspect the hanging hardware system as follows to determine the extent of the damage:

Action	Test Procedure	Corrective Action	Reference Manuals	Authorized Personnel
Perform a thorough visual examination of the exterior of the whip and curb hose for any obvious imperfections	Obvious imperfections include, but are not limited to: Damage to the swivels Damage to the couplings Kinks – flats spots Tears or slits to the outer hose	Replace with new Goodyear hose(s)	IOM – Section 13	Hose Replacement: Station Operator or EMCO Certified Technician Level A
	If there are no imperfections to the whip and curb hose, those hoses may be reused	Reassemble hose(s)	IOM – Section 13	
Perform a thorough visual inspection of the nozzle for any obvious imperfections	Obvious imperfections include, but are not limited to: Damage spout, broken or bent Damage to the insertion interlock rod Torn boot face or bellows Damage to the lever, hold open latch and lever guard Missing band clamp, serial plate and security rivet	Replace damaged components where applicable	IOM – Section 12	Component Repair: EMCO Certified Technician Level A
		Replace with new EMCO nozzle	IOM – Section 9	Nozzle Replacement:: Station Operator or EMCO Certified Technician Level A

FUNCTIONAL TESTING OF THE HANGING HARDWARE

Perform the following functional tests prior to re-using a nozzle, hose swivel, hose or safe break valve following a drive-off situation:

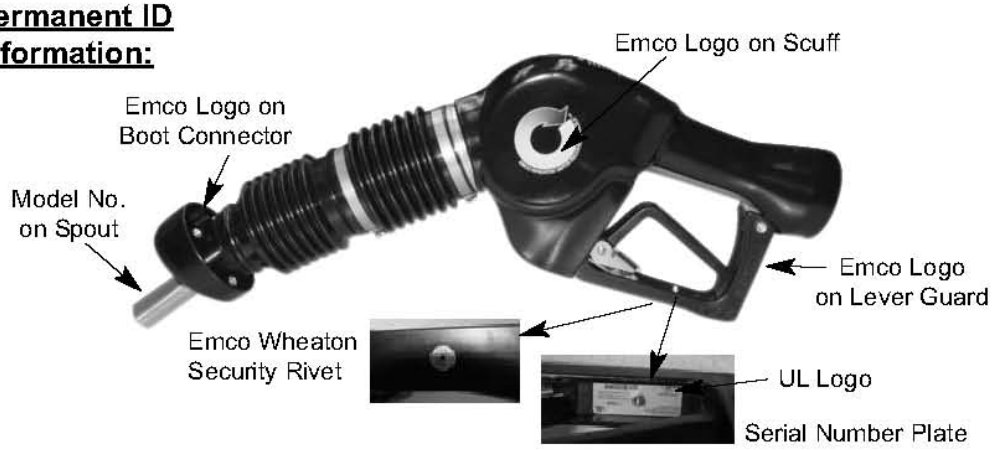
Test	Test Procedure	Corrective Action	Reference Manuals	Authorized Personnel
Leak Check	Verify that there are no liquid leaks in all components Dispense fuel and check each connection between the components A visual inspection of the nozzle can determine any obvious liquid leaks	Any component that does not pass the functional test must be replaced	IOM – Sections 9, 10, 11 & 13	Component Replacement: Station Operator or EMCO Certified Technician Level A
Meter Creep	Checking for meter creep will verify the integrity of the connections Dispense 1/10 to 2/10 of a gallon of fuel into an approved container then release lever, move components around and/ or gently shake the hose and verify if the displace amount on the dispenser changes	Any component that does not pass the functional test must be replaced	IOM – Sections 9, 10, 11 & 13	Component Replacement: Station Operator or EMCO Certified Technician Level A
Automatic Shut-Off & Insertion Interlock	The insertion interlock mechanism shall not allow dispensing when the bellows is uncompressed as determined by direct observation	Replace with new EMCO nozzle or repair	IOM – Sections 9, 10, 11, 12 & 13	Nozzle Replacement: Station Operator or EMCO Certified Technician Level A Repair: EMCO Certified Technician Level A

EMCO®
WHEATON RETAIL

A4005EVR

Balance Vapor Recovery Nozzle
RA4005EVR = Rebuilt
XXX = Scuff Guard Color

Permanent ID Information:



INSTALLATION INSTRUCTIONS

Service Tools Required:

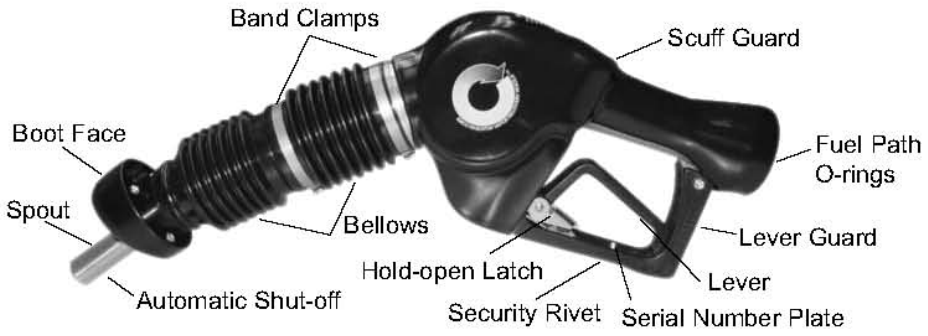
- 2" Crows Foot
- Pipe Wrench w/ Flat Jaws
- Petroleum Jelly or Other Suitable Lubricant
- Torque Wrench w/ 50 ft-lbs Setting
- Gasoline Approved Container

CAUTION:

1. Always barricade work area to keep pedestrians and vehicles from accessing the dispenser.
2. Always use a gasoline approved container or test can when performing any type of preventive maintenance.
3. Before attempting to install, remove or service the A4005EVR nozzle, turn off and tag out power to the corresponding dispenser.
4. Before attempting to install, remove or service the A4005EVR nozzle, close the emergency impact valves located inside the base of the dispenser. Relieve the line pressure and standing fuel through the nozzle spout into a gasoline approved container by compressing the bellows and squeezing the lever.

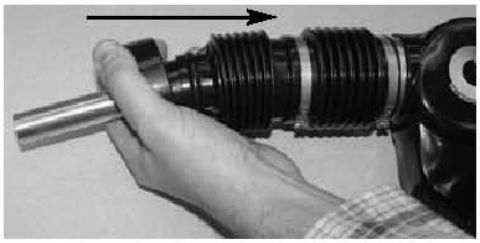
IMPORTANT: Failure to perform cautions 3 and 4 may result in a hazardous gasoline spill, damage to equipment, personal injury and/or death.

Pre-Inspection:



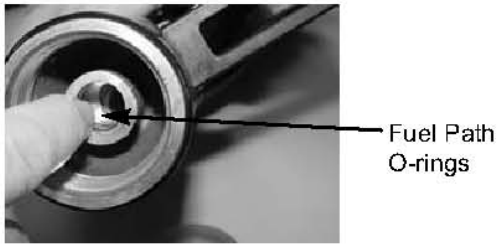
1. Carefully unpack and remove the A4005EVR nozzle from the shipping container. Evaluate the following components for damage: scuff guard, lever guard, lever, hold open latch, serial number plate, security rivet, bellows, band clamps, boot face and spout.
2. Verify the automatic shutoff located at the end of the spout. The vent hole must be free and clear of all debris.
3. Verify the fuel path o-rings located at the hose end of the A4005EVR nozzle. Both o-rings must be properly secured inside the factory machined grooves.

Pre-Functional Test:



4. Functional test the insertion interlock of the A4005EVR nozzle by compressing the bellows and then squeezing the lever. The A4005EVR nozzle will not function unless the insertion interlock is properly engaged.

Pre-Installation:



5. Lightly lubricate both fuel path o-rings using petroleum jelly or other suitable lubricant.

2

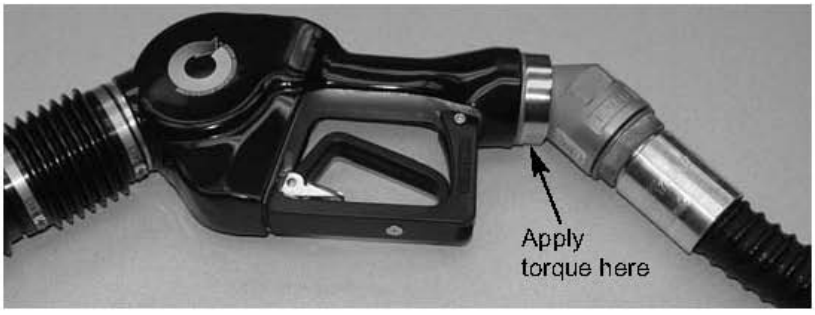
6. Before attempting to install the A4005EVR nozzle onto the A4110EVR hose swivel, verify the vapor path o-ring is properly secured onto the swivel nut, and in good working condition. Lightly lubricate the o-ring using petroleum jelly or other suitable lubricant.

IMPORTANT: Do not use pipe thread sealant compound or Teflon tape when installing the A4005EVR nozzle. Failure to comply will void warranty.

Installation:

IMPORTANT: If this is a new facility installation, the fueling point must be flushed into a gasoline approved container before installing the A4005EVR nozzle. Failure to perform this procedure could result in foreign material becoming lodged inside the nozzle's fuel path causing it not to shut off or a reduction in fuel flow.

7. Attach the A4005EVR nozzle onto the swivel nut, tighten by hand to avoid cross threading. Take caution to avoid pinching the vapor path o-ring.



8. Using a 2" crows foot and torque wrench tighten the swivel nut to 50 ft-lbs of torque.

Post Functional Tests:

9. Carefully purge the trapped air from the fueling point. Begin dispensing by compressing the bellows and then squeezing the lever. Dispense one gallon of fuel into a gasoline approved container.

10. Functional test the automatic shutoff of the A4005EVR nozzle. Begin dispensing by compressing the bellows and then squeezing the lever. Place the hold-open latch in "high" clip position to secure the lever. Dispense one gallon of fuel into a gasoline approved container. At the same time, lower the spout tip into the standing fuel until the vent hole is completely submersed. The main valve of the A4005EVR nozzle will automatically close causing fuel flow to stop.

IMPORTANT: Perform step 10 a minimum of three times to assure the insertion interlock, hold open latch and the automatic shutoff of the A4005EVR nozzle are operating properly.

According to UL requirement 842, the fuel flow rate must be greater than 3 gallons per minute for the automatic shutoff to operate properly. A common cause of low flow rates are dirty or clogged dispenser filters.

Post Inspection:

11. Before placing the A4005EVR nozzle onto the dispenser cradle, inspect all hanging hardware connections for potential fuel leaks. Make proper adjustments if necessary.

PREVENTIVE MAINTENANCE

1. Weekly inspect the A4005EVR nozzle, evaluate the following components for damage: scuff guard, lever guard, lever, hold open latch, serial number plate, security rivet, bellows, band clamps, boot face and spout. Damage components must be replaced with factory authorized service kits.

Part Number	Description
492775EVR	Bellows & Boot Face Kit
492776EVR	Boot Face Kit
492834EVR	Spout Kit
494150EVR	Latch Kit
494748EVR	Fuel Path O-ring Kit
494750EVR	Bellows Band Clamps Kit
A0557EVR-XXX	Scuff Guard Kit

IMPORTANT: Do not remove the serial number plate and security rivet from the A4005EVR nozzle. Failure to comply will void warranty.

2. Weekly inspect the automatic shutoff located at the end of the spout. The vent hole must be free and clear of all debris.
3. Weekly inspect all hanging hardware connections for potential fuel leaks.

IMPORTANT: Should a drive-off or incidence of customer abuse occur, follow the initial inspection and function instructions found in the installation section.

PERFORMANCE STANDARDS & SPECIFICATIONS

This component was factory tested to, and met the following specifications:

1. Meets ARB Material Compatibility with Fuel Blends as per Section 3.8 of CP-201.
2. Meets ARB Capable of Refueling Any Vehicle Standards as per Section 4.7.1 of CP-201.
3. Meets ARB Spout Dimension Standards as per Section 4.7.3 of CP-201.
4. Meets ARB Nozzle and Dispenser Compatibility Standards as per Section 4.9 of CP-201.
5. Meets ARB Balance Nozzle Criteria Standards as per Section 5.1 of CP-201.
6. TP-201.2B – Complies with the maximum allowable leak rate of 0.07 CFH @ 2.00 inches of water column pressure.
7. TP-201.2C – Complies with the maximum allowable spillage factor of 0.24 pounds/ 1,000 gallons.
8. TP-201.2D – Complies with the maximum allowable average of 3 post fuel drips.
9. TP-201.2E – Complies with the maximum allowable average of 100mL liquid retention and 1mL liquid spit-back.
10. TP-201.2J – Complies with the maximum allowable component pressure drop of 0.08 inches of water column @ 60 CFH.

IMPORTANT: Leave these installation instructions with the station owner and/or operator.

WARRANTY POLICY

Emco Wheaton Retail Corporation service station products are warranted to be free from defects in material and workmanship under normal use and service. Vapor recovery nozzles are warranted for a period of twelve (12) months from date of shipment from Emco Wheaton Retail Corporation or from installation date as specified by the returned warranty card, not to exceed fifteen (15) months from the date of shipment from Emco Wheaton Retail Corporation. This warranty excludes the spout and/or front end components of balance vapor recovery nozzles unless damage is obvious when the nozzle is removed from the shipping carton and the defective nozzle is returned to Emco Wheaton Retail Corporation prior to use and within two (2) months from the date of invoice. Other service station products are warranted for a period of twelve (12) months from the date of manufacture.

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 original 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.

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, materials, specifications and models and to discontinue models without notice or obligation.

Emco Wheaton Retail Corporation warrants the workmanship and materials to be free of defects and will comply with the performance standards of California ARB CP-201 for a period of one (1) year from the date of installation or fourteen months from the date of shipment from Emco Wheaton Retail Corporation.

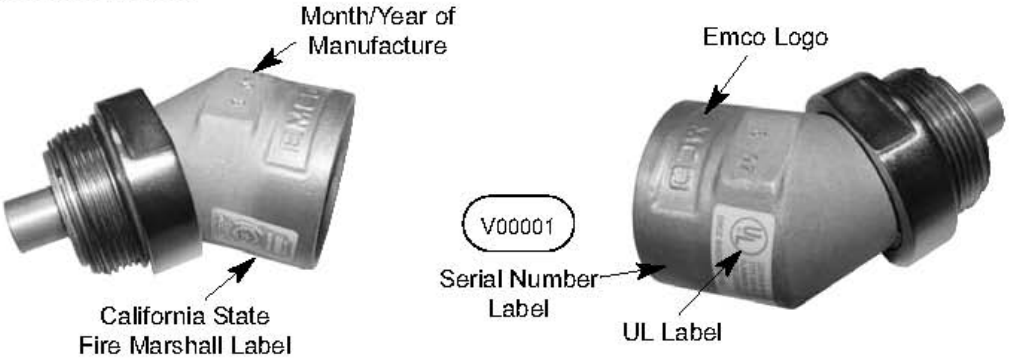
Emco Wheaton Retail Corp.
2300 Industrial Park Dr. • Wilson, NC 27893
252-243-0150 • 252-243-4759 (fax)
619-421-1743 (Technical Services, California)

p/n 569044
Rev. D, 06/09

EMCO® WHEATON RETAIL

A4110EVR
Coaxial Hose Swivel

Permanent ID Information:



INSTALLATION INSTRUCTIONS

Service Tools Required:

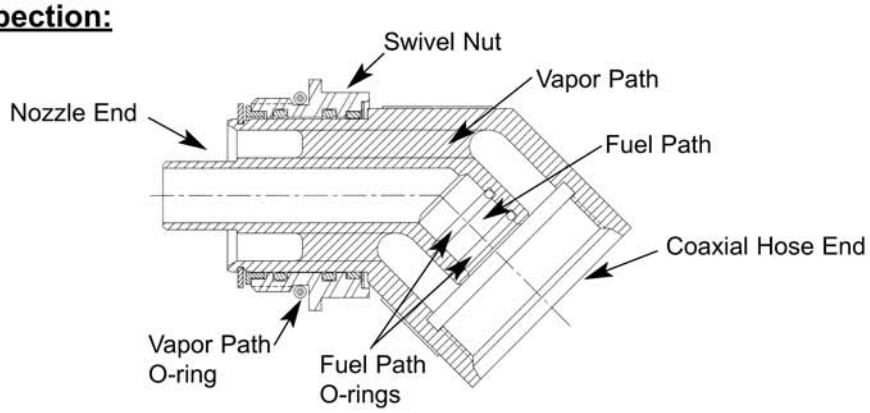
- 2" Crows Foot
- 1 7/8" Crows Foot
- Gasoline Approved Container
- Petroleum Jelly or Other Suitable Lubricant
- Torque Wrench w/ 50ft-lbs Setting
- Pipe Wrench w/ Flat Jaws

CAUTION:

1. Always barricade work area to keep pedestrians and vehicles from accessing the dispenser.
2. Always use a gasoline approved container or test can when performing any type of preventive maintenance.
3. Before attempting to install, remove or service the A4110EVR hose swivel, turn off and tag out power to the corresponding dispenser.
4. Before attempting to install, remove or service the A4110EVR hose swivel, close the emergency impact valves located inside the base of dispenser. Relieve the line pressure and standing fuel through the nozzle spout into a gasoline approved container by compressing the bellows and squeezing the lever.

IMPORTANT: Failure to perform cautions 3 and 4 may result in a hazardous gasoline spill, damage to equipment, personal injury and/ or death.

Pre-Inspection:



1. Carefully unpack and remove the A4110EVR hose swivel from the shipping container and evaluate for any kind of damage.
2. Verify the fuel path o-rings located at the coaxial hose end of the A4110EVR hose swivel. Both o-rings must be properly secured inside the factory machined grooves.
3. Verify the vapor path o-ring located at the nozzle end of the A4110EVR hose swivel. The o-ring must be properly secured onto the swivel nut.

Pre-Installation:

4. Lightly lubricate the fuel path o-rings using petroleum jelly or other suitable lubricant.

5. Lightly lubricate the vapor path o-ring using petroleum jelly or other suitable lubricant.

6. Before attempting to install the A4110EVR hose swivel onto the curb hose, verify that the word "NOZZLE" is stamped on the outside of the curb hose connector.

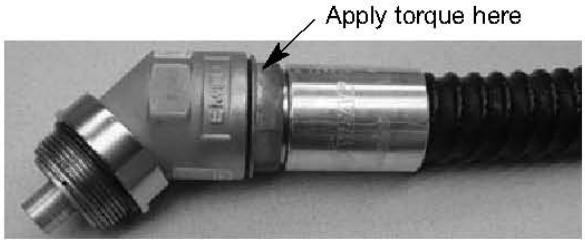
7. Verify the vapor path o-ring is properly secured onto the curb hose connector and in good working condition. Lightly lubricate the o-ring using petroleum jelly or other suitable lubricant.

IMPORTANT: Do not use pipe thread sealant compound or Teflon tape when installing the A4110EVR hose swivel. Failure to comply will void warranty.

Installation:

IMPORTANT: If this is a new facility installation, the fueling point must be flushed into a gasoline approved container before installing the A4110EVR hose swivel. Failure to perform this procedure could result in foreign material becoming lodged inside the hose swivel's fuel path causing a reduction in fuel flow.

8. Attach the A4110EVR hose swivel onto the curb hose connector. Tighten by hand to avoid cross threading.



9. Using a 1 7/8" crows foot and torque wrench tighten the curb hose connector to 50 ft-lbs of torque.

10. Attach the A4005EVR nozzle onto the A4110EVR hose swivel. Tighten by hand to avoid cross threading. Take caution to avoid pinching the vapor path o-ring.

11. Using a 2" crows foot and torque wrench tighten the swivel nut to 50 ft-lbs of torque.

Post Functional Tests:

12. Carefully purge the trapped air from the fueling point. Begin dispensing by compressing the bellows and then squeezing the lever. Dispense one gallon of fuel into a gasoline approved container.

13. Functional test the automatic shutoff of the A4005EVR nozzle. Begin dispensing by compressing the bellows and then squeezing the lever. Place the hold open latch in "high" clip position to secure the lever. Dispense one gallon of fuel into a gasoline approved container. At the same time, lower the spout tip into the standing fuel until the vent hole is completely submersed. The main valve of the A4005EVR nozzle will automatically close causing fuel flow to stop.

IMPORTANT: Perform step 13 a minimum of three times to assure the insertion interlock, hold open latch and the automatic shutoff of the A4005EVR nozzle are operating properly.

According to UL requirement 842, the fuel flow rate must be greater than 3 gallons per minute for the automatic shutoff to operate properly. A common cause of low flow rates are dirty or clogged dispenser filters.

Post Inspection:

14. Before placing the A4005EVR nozzle onto the dispenser cradle, inspect all hanging hardware connections for potential fuel leaks, make proper adjustments if necessary.

PREVENTIVE MAINTENANCE

1. Weekly inspect the A4110EVR hose swivel, evaluate for any kind of damage. Damage components must be replaced with factory authorized service kits.

Part Number	Description
494748EVR	Fuel Path O-ring Kit
494749EVR	Vapor Path O-ring Kit

2. Weekly inspect all hanging hardware connections for potential fuel leaks.

IMPORTANT: Should a drive-off or incidence of customer abuse occur, follow the initial inspection and function instructions found in the installation section.

PERFORMANCE STANDARDS & SPECIFICATIONS

This component was factory tested to, and met the following specifications:

1. Meets ARB Material Compatibility with Fuel Blends as per Section 3.8 of CP-201.

2. TP-201.2J – Complies with the maximum allowable component pressure drop of 0.01 inches of water column @ 60 CFH.

IMPORTANT: Leave these installation instructions with the station owner and/ or operator.

WARRANTY POLICY

Emco Wheaton Retail Corporation service station products are warranted to be free from defects in material and workmanship under normal use and service. Vapor recovery nozzles are warranted for a period of twelve (12) months from date of shipment from Emco Wheaton Retail Corporation or from installation date as specified by the returned warranty card, not to exceed fifteen (15) months from the date of shipment from Emco Wheaton Retail Corporation. This warranty excludes the spout and/or front end components of balance vapor recovery nozzles unless damage is obvious when the nozzle is removed from the shipping carton and the defective nozzle is returned to Emco Wheaton Retail Corporation prior to use and within two (2) months from the date of invoice. Other service station products are warranted for a period of twelve (12) months from the date of manufacture.

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 original 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.

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Emco Wheaton Retail Corporation warrants the workmanship and materials to be free of defects and will comply with the performance standards of California ARB CP-201 for a period of one (1) year from the date of installation or fourteen months from the date of shipment from Emco Wheaton Retail Corporation.

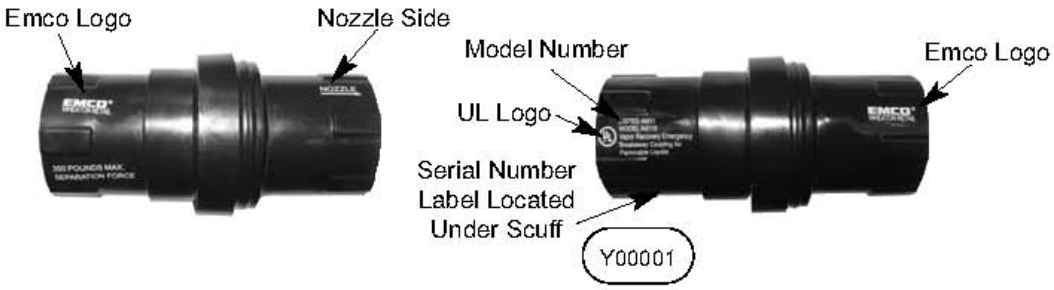
Emco Wheaton Retail Corp.
2300 Industrial Park Dr. • Wilson, NC 27893
252-243-0150 • 252-243-4759 (fax)
619-421-1743 (Technical Services, California)

p/n 569042
Rev. D, 06/09

EMCO ®
WHEATON RETAIL

A4119EVR
Coaxial Safe Break Valve

Permanent ID Information:



INSTALLATION INSTRUCTIONS

Service Tools Required:

- 1 7/8" Crows Foot
- Torque Wrench w/ 50ft-lbs Setting
- Gasoline Approved Container
- Pipe Wrench w/ Flat Jaws
- Petroleum Jelly or Other Suitable Lubricant

CAUTION:

1. Always barricade work area to keep pedestrians and vehicles from accessing the dispenser.
2. Always use a gasoline approved container or test can when performing any type of preventive maintenance.
3. Before attempting to install, remove or service the A4119EVR safe break valve, turn off and tag out power to the corresponding dispenser.
4. Before attempting to install, remove or service the A4119EVR safe break valve, close the emergency impact valves located inside the base of the dispenser. Relieve the line pressure and standing fuel through the nozzle spout into a gasoline approved container by compressing the bellows and squeezing the lever.
5. If a hose retractor is used, the A4119EVR safe break valve must be attached on the nozzle side of the retractor clamp.

IMPORTANT: Failure to perform cautions 3 and 4 may result in a hazardous gasoline spill, damage to equipment, personal injury and/ or death.

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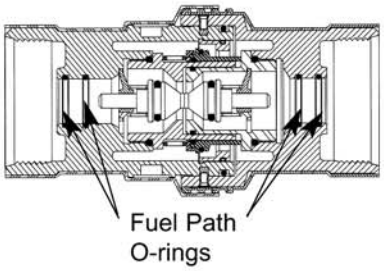
Pre-Inspection:



1. Carefully unpack and remove the A4119EVR safe break valve from the shipping container and evaluate for any kind of damage.
2. Verify the fuel path o-rings located on both ends of the A4119EVR safe break valve. All o-rings must be properly secured inside the factory machined grooves.

Pre-Installation:

3. Lightly lubricate the fuel path o-rings using petroleum jelly or other suitable lubricant.

4. Before attempting to install the A4119EVR safe break valve onto the whip hose, verify the word “NOZZLE”, which is printed on the scuff guard of the safe break valve, is on the opposite end. Verify the vapor path o-ring is properly secured onto the connector, and in good working condition. Lightly lubricate the o-ring using petroleum jelly or other suitable lubricant.

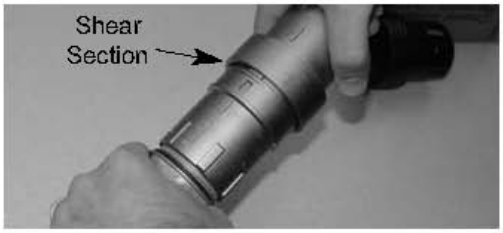
5. Before attempting to install the A4119EVR safe break valve onto the curb hose, verify the vapor path o-ring is properly secured onto the connector, and in good working condition. Lightly lubricate the o-ring using petroleum jelly or other suitable lubricant.

IMPORTANT: Do not use pipe thread sealant compound or Teflon tape when installing the A4119EVR safe break valve. Failure to comply will void warranty.

Installation:

IMPORTANT: If this is a new facility installation, the fueling point must be flushed into a gasoline approved container before installing the A4119EVR safe break valve. Failure to perform this procedure could result in foreign material becoming lodged inside the safe break valve's fuel path causing a reduction in fuel flow.

6. Remove the scuff guard by sliding on to the whip hose. Attach the A4119EVR safe break valve onto the whip hose connector. Tighten by hand to avoid cross threading. Take caution to avoid pinching the vapor path o-ring.



IMPORTANT: Never tighten across the shear section of the A4119EVR safe break valve. Failure to comply will result in damage to the safe break valve and void warranty.

7. Using a 1 7/8" crows foot and torque wrench, tighten the whip hose connector to 50 ft-lbs of torque.

8. Remove the scuff guard by sliding on to the curb hose. Attach the A4119EVR safe break valve onto the curb hose connector. Tighten by hand to avoid cross threading. Take caution to avoid pinching the vapor path o-ring.

9. Using a 1 7/8" crows foot and torque wrench, tighten the curb hose connector to 50 ft-lbs of torque.

Post Functional Tests:

10. Carefully purge the trapped air from the fueling point. Begin dispensing by compressing the bellows and then squeezing the lever. Dispense one gallon of fuel into a gasoline approved container.

11. Functional test the automatic shutoff of the A4005EVR nozzle. Begin dispensing by compressing the bellows and then squeezing the lever. Place the hold open latch in "high" clip position to secure the lever. Dispense one gallon of fuel into a gasoline approved container. At the same time, lower the spout tip into the standing fuel until the vent hole is completely submersed. The main valve of the A4005EVR nozzle will automatically close causing fuel flow to stop.

IMPORTANT: Perform step 11 a minimum of three times to assure the insertion interlock, hold open latch and the automatic shutoff of the A4005EVR nozzle are operating properly.

According to UL requirement 842, the fuel flow rate must be greater than 3 gallons per minute for the automatic shutoff to operate properly. A common problem cause of low flow rates are dirty or clogged dispenser filters.

Post Inspection:

12. Before placing the A4005EVR nozzle onto the dispenser cradle, inspect all hanging hardware connections for potential fuel leaks. Make proper adjustments if necessary.

PREVENTIVE MAINTENANCE

1. Weekly inspect the A4119EVR safe break valve, evaluate for any kind of damage. Damaged components must be replaced with factory authorized service kits.

Part Number	Description
494748EVR	Fuel Path O-ring Kit

2. Weekly inspect all hanging hardware connections for potential fuel leaks.

IMPORTANT: Should a drive-off or incidence of customer abuse occur, follow the initial inspection and function instructions found in the installation section.

PERFORMANCE STANDARDS & SPECIFICATIONS

This component was factory tested to, and met the following specifications:

1. Meets ARB Material Compatibility with Fuel Blends as per Section 3.8 of CP-201.
2. TP-201.2J – Complies with the maximum allowable component pressure drop of 0.04 inches of water column @ 60 CFH.

IMPORTANT: Leave these installation instructions with the station owner and/or operator.

WARRANTY POLICY

Emco Wheaton Retail Corporation service station products are warranted to be free from defects in material and workmanship under normal use and service. Vapor recovery nozzles are warranted for a period of twelve (12) months from date of shipment from Emco Wheaton Retail Corporation or from installation date as specified by the returned warranty card, not to exceed fifteen (15) months from the date of shipment from Emco Wheaton Retail Corporation. This warranty excludes the spout and/or front end components of balance vapor recovery nozzles unless damage is obvious when the nozzle is removed from the shipping carton and the defective nozzle is returned to Emco Wheaton Retail Corporation prior to use and within two (2) months from the date of invoice. Other service station products are warranted for a period of twelve (12) months from the date of manufacture.

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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.

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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.

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p/n 569043
Rev. D, 06/09

EMCO® WHEATON RETAIL

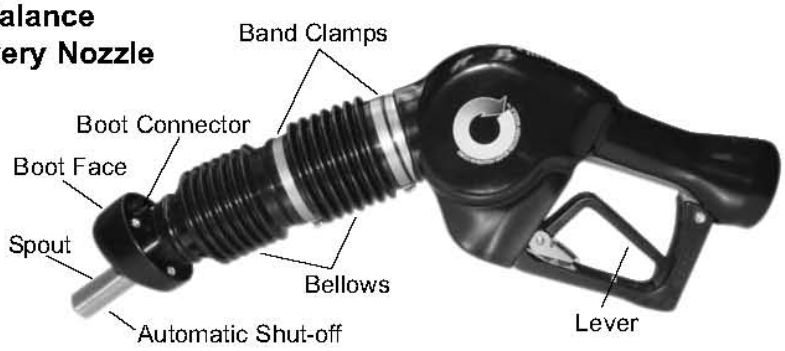
492775EVR

Bellows & Boot Face Kit

Packing List:

(1) Bellows & Boot Face
(1) Bellows O-ring
(2) Bellows Band Clamps

A4005EVR Balance Vapor Recovery Nozzle



INSTALLATION INSTRUCTIONS

Service Tools Required:

- Flat Head Screw Driver w/ Fine Tip
- Scribe Tool w/ 90 degree tip
- Bench Vise w/ 5" Jaw Width
- Gasoline Approved Container
- Bellows Retainer Plate Tool p/n 494712EVR
- Bellows Band Clamp Crimp Tool p/n 494652EVR

CAUTION:

1. Always barricade work area to keep pedestrians and vehicles from accessing the dispenser.
2. Always use a gasoline approved container or test can when performing any type of preventive maintenance.
3. Before attempting to install, remove or service the A4005EVR nozzle, turn off and tag out power to the corresponding dispenser.
4. Before attempting to install, remove or service the A4005EVR nozzle, close the emergency impact valves located inside the base of the dispenser. Relieve the line pressure and standing fuel through the nozzle spout into a gasoline approved container by compressing the bellows and squeezing the lever.

IMPORTANT: Failure to perform cautions 3 and 4 may result in a hazardous gasoline spill, damage to equipment, personal injury and/or death.

Pre-Inspection:

1. Carefully unpack and remove all kitted parts from the shipping container and evaluate for any kind of damage. Verify that no parts are missing from the packing list before proceeding with the installation.

Pre-Installation:

2. Empty all standing fuel within the spout and bellows into a gasoline approved container before attempting to service the bellows and boot face.

3. It is unnecessary to remove the A4005EVR nozzle from the fueling point during the removal and installation of the bellows and boot face. Use the bench vise to properly secure the A4005EVR nozzle during service.

Installation:

Removing the Existing Bellows & Boot Face

4. Locate the top bellows band clamp. Use the flat head screw driver to dislodge the locking mechanism and remove the band clamp from the bellows.

2

5. Locate the bottom bellows band clamp. Use the flat head screw driver to dislodge the locking mechanism and remove the band clamp from the bellows.

6. Remove the bellows and boot face from the A4005EVR nozzle. Grab the bellows and pull away from the nozzle body.

7. Use the scribe tool to remove the bellows o-ring.

IMPORTANT: Properly discard all removed components.

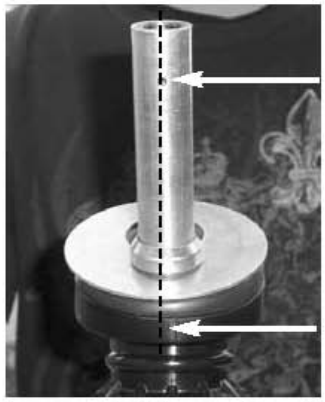
Installing the New Bellows & Boot Face

8. Before attempting to install the new bellows and boot face verify that the top of the interlock push rod is properly aligned with the bottom edge of the interlock guide.

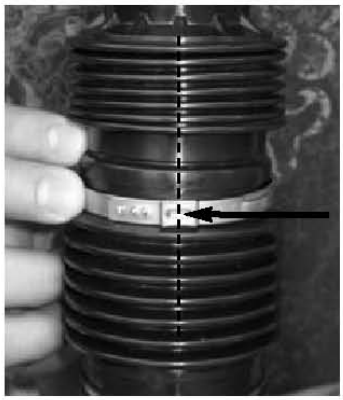
9. Install the new bellows o-ring. Verify that the o-ring seats properly into the machined groove.

10. Slide the new bellows over the spout until the end reaches the nozzle body. Push down over the bellows o-ring until properly seated.

11. Use the bellows retainer plate tool p/n 494712EVR to secure and lock the bellows and boot face in place.

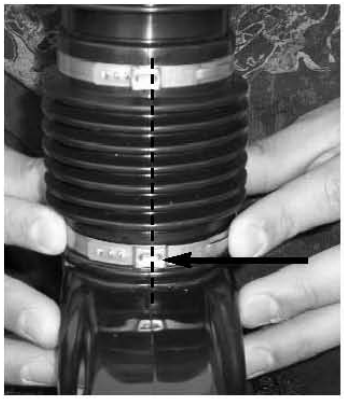


12. Slowly rotate the bellows until the parting line of the boot connector is aligned with the spout and automatic shut-off.



13. Install the new top bellows band clamp into the groove of the bellows. Lock and align the crimp portion with the parting line of the bellows.

14. Use the bellows band clamp crimp tool p/n 494652EVR to crimp and secure into place.



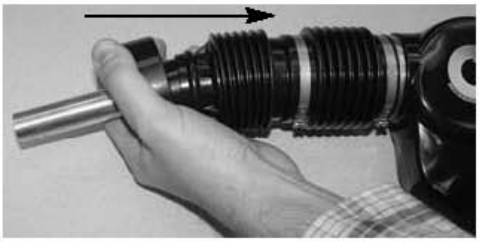
15. Install the new bottom bellows band clamp into the groove of the bellows. Lock and align the crimp portion with the parting line of the bellows.

16. Use the bellows band clamp crimp tool p/n 494652EVR to crimp and secure into place.

17. Remove the bellows retainer plate tool p/n 494712EVR from bellows and spout.

18. Remove the A4005EVR nozzle from the bench vise.

Post-Functional Test:



19. Functional test the insertion interlock of the A4005EVR nozzle by compressing the bellows and then squeezing the lever. The A4005EVR nozzle will not function unless the insertion interlock is properly engaged.

Post-Installation:

20. Place the A4005EVR nozzle back onto the dispenser cradle.

PREVENTIVE MAINTENANCE

1. Weekly inspect the bellows & boot face for tears, cuts and slits. Replace with factory authorized service kits.

Part Number	Description
492775EVR	Bellows & Boot Face Kit

PERFORMANCE STANDARDS & SPECIFICATIONS

This component was factory tested to, and met the following specifications:

1. Meets ARB Material Compatibility with Fuel Blends as per Section 3.8 of CP-201.
2. Meets ARB Capable of Refueling Any Vehicle Standards as per Section 4.7.1 of CP-201.

IMPORTANT: Leave these installation instructions with the station owner and/ or operator.

WARRANTY POLICY

Emco Wheaton Retail Corporation service station products are warranted to be free from defects in material and workmanship under normal use and service. Vapor recovery nozzles are warranted for a period of twelve (12) months from date of shipment from Emco Wheaton Retail Corporation or from installation date as specified by the returned warranty card, not to exceed fifteen (15) months from the date of shipment from Emco Wheaton Retail Corporation. This warranty excludes the spout and/or front end components of balance vapor recovery nozzles unless damage is obvious when the nozzle is removed from the shipping carton and the defective nozzle is returned to Emco Wheaton Retail Corporation prior to use and within two (2) months from the date of invoice. Other service station products are warranted for a period of twelve (12) months from the date of manufacture.

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 original 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.

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p/n 569046
Rev. A, 06/09

8

EMCO® WHEATON RETAIL

492776EVR
Boot Face Kit

Packing List:

(1) Boot Face
(4) Mounting Screws

A4005EVR
Balance Vapor Recovery Nozzle

INSTALLATION INSTRUCTIONS

Service Tools Required:

- Philips Head Screw Driver w/ Fine Tip
- Bench Vise w/ 5" Jaw Width
- Gasoline Approved Container

CAUTION:

1. Always barricade work area to keep pedestrians and vehicles from accessing the dispenser.
2. Always use a gasoline approved container or test can when performing any type of preventive maintenance.
3. Before attempting to install, remove or service the A4005EVR nozzle, turn off and tag out power to the corresponding dispenser.
4. Before attempting to install, remove or service the A4005EVR nozzle, close the emergency impact valves located inside the base of the dispenser. Relieve the line pressure and standing fuel through the nozzle spout into a gasoline approved container by compressing the bellows and squeezing the lever.

IMPORTANT: Failure to perform cautions 3 and 4 may result in a hazardous gasoline spill, damage to equipment, personal injury and/or death.

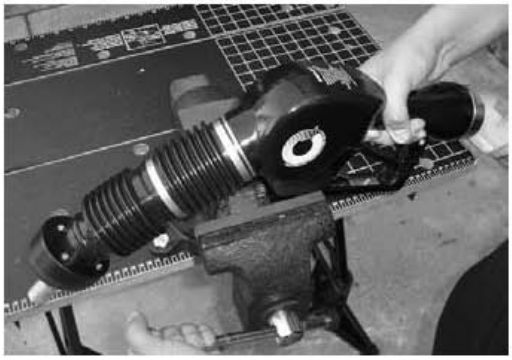
1

Pre-Inspection:

1. Carefully unpack and remove all kitted parts from the shipping container and evaluate for any kind of damage. Verify that no parts are missing from the packing list before proceeding with the installation.

Pre-Installation:

2. Empty all standing fuel within the spout and bellows into a gasoline approved container before attempting to service the boot face.



3. It is unnecessary to remove the A4005EVR nozzle from the fueling point during the removal and installation of the boot face. Use the bench vise to properly secure the A4005EVR nozzle during service.

Installation:

Removing the Existing Boot Face

4. Use the philips screw driver to remove the four mounting screws located on the back of the boot connector.

5. Remove the existing boot face by pulling out of the boot connector.

IMPORTANT: Properly discard all removed components.

2

Installing the New Boot Face

6. Install the new boot face into the boot connector by pressing evenly. Align the four mounting holes of the boot face with those of the boot connector.

7. Use the philips screw driver to install and tighten the four new mounting screws.
8. Remove the A4005EVR nozzle from the bench vise.

Post-Installation:

9. Place the A4005EVR nozzle back onto the dispenser cradle.

PREVENTIVE MAINTENANCE

1. Weekly inspect the boot face for tears, cuts and slits. Replace with factory authorized service kits.

Part Number	Description
492776EVR	Boot Face Kit

PERFORMANCE STANDARDS & SPECIFICATIONS

This component was factory tested to, and met the following specifications:

1. Meets ARB Material Compatibility with Fuel Blends as per Section 3.8 of CP-201.
2. Meets ARB Capable of Refueling Any Vehicle Standards as per Section 4.7.1 of CP-201.

IMPORTANT: Leave these installation instructions with the station owner and/ or operator.

WARRANTY POLICY

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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 original 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.

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p/n 570184
Rev. A, 06/09

EMCO® WHEATON RETAIL

492834EVR

Spout Kit

Packing List:

(1) Spout
(1) Bellows O-ring
(2) Bellows Band Clamps
(1) Interlock Guide
(1) Interlock Push Rod

A4005EVR Balance Vapor Recovery Nozzle

INSTALLATION INSTRUCTIONS

Service Tools Required:

- Flat Head Screw Driver w/ Fine Tip
- 15" Crescent Wrench
- Torque Wrench w/ 45-55 ft-lbs. Setting
- Bench Vise w/ 5" Jaw Width
- Scribe Tool w/ 90 Degree Tip
- Needle Nose Pliers
- 40mm Crows Foot
- Snap Ring Pliers w/ Fine Tip
- Bellows Retainer Plate Tool p/n 494712EVR
- Bellows Band Clamp Crimp Tool p/n 494652EVR
- Gasoline Approved Container

CAUTION:

1. Always barricade work area to keep pedestrians and vehicles from accessing the dispenser.
2. Always use a gasoline approved container or test can when performing any type of preventive maintenance.
3. Before attempting to install, remove or service the A4005EVR nozzle, turn off and tag out power to the corresponding dispenser.
4. Before attempting to install, remove or service the A4005EVR nozzle, close the emergency impact valves located inside the base of the dispenser. Relieve the line pressure and standing fuel through the nozzle spout into a gasoline approved container by compressing the bellows and squeezing the lever.

IMPORTANT: Failure to perform cautions 3 and 4 may result in a hazardous gasoline spill, damage to equipment, personal injury and/or death.

Pre-Inspection:

1. Carefully unpack and remove all kitted parts from the shipping container and evaluate for any kind of damage. Verify that no parts are missing from the packing list before proceeding with the installation.

Pre-Installation:

2. Empty all standing fuel within the spout and bellows into a gasoline approved container before attempting to service the spout.

3. It is unnecessary to remove the A4005EVR nozzle from the fueling point during the removal and installation of the spout. Use the bench vise to properly secure the A4005EVR nozzle during service.

Installation:

Removing the Existing Bellows & Boot Face

4. Locate the top bellows band clamp. Use the flat head screw driver to dislodge the locking mechanism and remove the band clamp from the bellows.

2

5. Locate the bottom bellows band clamp. Use the flat head screw driver to dislodge the locking mechanism and remove the band clamp from the bellows.

6. Remove the bellows and boot face from the A4005EVR nozzle. Grab the bellows and pull away from the nozzle body.

7. Use the scribe tool to remove the bellows o-ring.

IMPORTANT: Properly discard bellows band clamps and bellows o-ring.

Removing the Existing Spout

8. Locate the snap ring on the spout. Use the snap ring and needle nose pliers to remove the snap ring from the machined groove. Slide the snap ring upward.

3



9. Disassemble the interlock guide. Remove the top piece by pulling upward and sliding over the spout. Remove the bottom piece by sliding over the spout.


10. Use the 15" crescent wrench to loosen the spout nut. Unfasten the spout nut by hand to avoid cross threading.

11. Remove the spout by slowly pulling upward.

12. Use the needle nose pliers to remove the interlock push rod.

IMPORTANT: Properly discard all removed components.

4

Installing the New Spout

13. Use the needle nose pliers to install the new interlock push rod.

14. Install the new spout by inserting the vent tube connector into the nozzle vent port. Slowly push downward on the spout and align the dimple on the spout with the notch on the nozzle body.

15. Fasten the new spout nut by hand onto the nozzle threads to avoid cross threading. Use the 40mm crows foot and torque wrench to tighten the spout nut between 45 to 55 ft-lbs of torque.

16. Install the new interlock guide by sliding the top and bottom pieces over the spout. Press the top piece into the bottom piece.

17. Use the snap ring and needle nose pliers to install the new snap ring into the machined groove located on the spout. Slide the snap ring downward until seated properly.

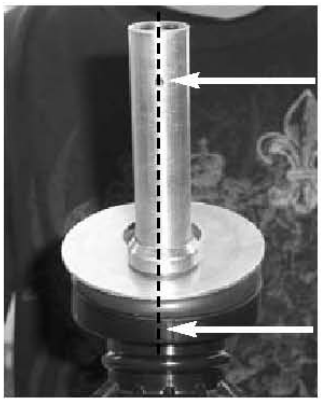
Installing the Existing Bellows & Boot Face

18. Before attempting to install the existing bellows & boot face verify that the top of the interlock push rod is properly aligned with the bottom edge of the interlock guide.

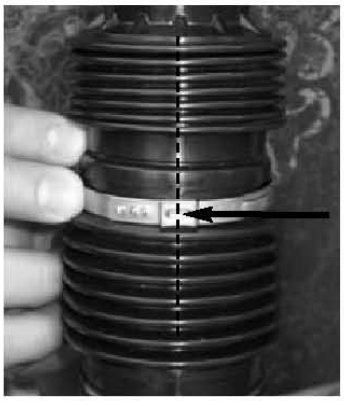
19. Install the new bellows o-ring. Verify that the o-ring seats properly into the machined groove.

20. Slide the bellows over the spout until the end reaches the nozzle body. Push down over the bellows o-ring until properly seated.

21. Use the bellows retainer plate tool p/n 494712EVR to secure and lock the bellows and boot face in place.



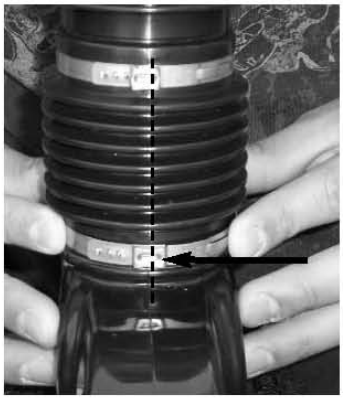
22. Slowly rotate the bellows until the parting line of the boot connector is aligned with the spout and automatic shut-off.



23. Install the new top bellows band clamp into the groove of the bellows. Lock and align the crimp portion with the parting line of the bellows.

24. Use the bellows band clamp crimp tool p/n 494652EVR to crimp and secure into place.

7



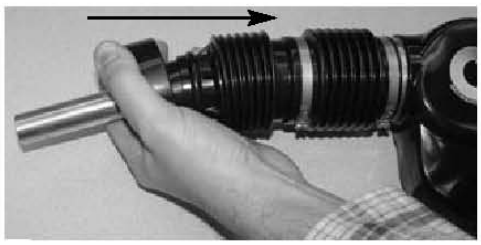
25. Install the new bottom bellows band clamp into the groove of the bellows. Lock and align the crimp portion with the parting line of the bellows.

26. Use the bellows band clamp crimp tool p/n 494652EVR to crimp and secure into place.

27. Remove the bellows retainer plate tool p/n 494712EVR from bellows and spout.

28. Remove the A4005EVR nozzle from the bench vise.

Post-Functional Test:



8

29. Functional test the insertion interlock of the A4005EVR nozzle by compressing the bellows and then squeezing the lever. The A4005EVR nozzle will not function unless the insertion interlock is properly engaged.

30. Functional test the automatic shutoff of the A4005EVR nozzle. Begin dispensing by compressing the bellows and then squeezing the lever. Place the hold-open latch in "high" clip position to secure the lever. Dispense one gallon of fuel into a gasoline approved container. At the same time, lower the spout tip into the standing fuel until the automatic shut is completely submersed. The main valve of the A4005EVR nozzle will automatically close causing fuel flow to stop.

IMPORTANT: Perform step 30 a minimum of three times to assure the insertion interlock , hold open latch and the automatic shutoff of the A4005EVR nozzle are operating properly.

According to UL requirement 842, the fuel flow rate must be greater than 3 gallons per minute for the automatic shutoff to operate properly. A common cause of low flow rates are dirty or clogged dispenser filters.

Post-Installation:

31. Place the A4005EVR nozzle back onto the dispenser cradle.

PREVENTIVE MAINTENANCE

1. Weekly inspect the spout for sheared, bent or blocked vent hole. Replace with factory authorized service kits.

Part Number	Description
492834EVR	Spout Kit

PERFORMANCE STANDARDS & SPECIFICATIONS

This component was factory tested to, and met the following specifications:

1. Meets ARB Material Compatibility with Fuel Blends as per Section 3.8 of CP-201.
2. Meets ARB Capable of Refueling Any Vehicle Standards as per Section 4.7.1 of CP-201.
3. Meets ARB Spout Dimension Standards as per Section 4.7.3 of CP-201.

IMPORTANT: Leave these installation instructions with the station owner and/ or operator.

WARRANTY POLICY

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Rev. A, 06/09

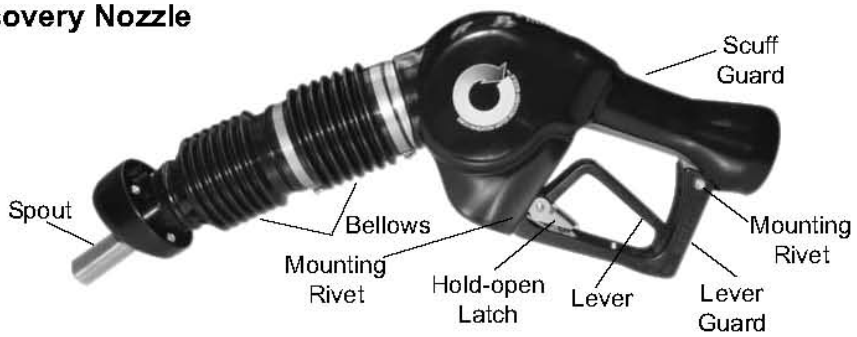
EMCO® WHEATON RETAIL

494150EVR
Latch Kit

Packing List:

(1) Latch Assembly
(2) Mounting Rivets
(1) Dust Plug

A4005EVR Balance Vapor Recovery Nozzle



INSTALLATION INSTRUCTIONS

Service Tools Required:

- Pipe Wrench w/ Flat Jaws
- Awl w/ ¼"Tip
- Flat Head Screw Driver w/ Wide Tip
- Hammer
- 1/8" Diameter Punch
- 5/8" Diameter Punch
- Bench Vise w/ 5" Jaw Width
- Gasoline Approved Container
- Lever Guard Rivet Installation Tool p/n 494653EVR
- Needle Nose Pliers

CAUTION:

1. Always barricade work area to keep pedestrians and vehicles from accessing the dispenser.
2. Always use a gasoline approved container or test can when performing any type of preventive maintenance.
3. Before attempting to install, remove or service the A4005EVR nozzle, turn off and tag out power to the corresponding dispenser.
4. Before attempting to install, remove or service the A4005EVR nozzle, close the emergency impact valves located inside the base of the dispenser. Relieve the line pressure and standing fuel through the nozzle spout into a gasoline approved container by compressing the bellows and squeezing the lever.

IMPORTANT: Failure to perform cautions 3 and 4 may result in a hazardous gasoline spill, damage to equipment, personal injury and/or death.

Pre-Inspection:

1. Carefully unpack and remove all kitted parts from the shipping container and evaluate for any kind of damage. Verify that no parts are missing from the packing list before proceeding with the installation.

Pre-Installation:

2. Empty all standing fuel within the spout and bellows into a gasoline approved container before attempting to service the latch.

3. It is necessary to remove the A4005EVR nozzle from the A4110EVR hose swivel during the removal and installation of the latch. Use the pipe wrench with flat jaws to loosen the swivel nut. Unfasten the swivel nut by hand from the A4005EVR nozzle to avoid cross threading.

IMPORTANT: Drain the fuel from the hanging hardware into a gasoline approved container when removing the A4005EVR nozzle from the A4110EVR hose swivel.

Installation:

Removing the Existing Latch

4. Pull the rear end of the scuff guard over the nozzle body unit the dust plug is visible. Use the bench vise to properly secure the A4005EVR nozzle during service.

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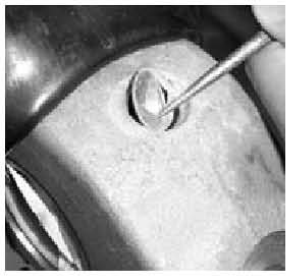

5. Use the awl and hammer to lightly tap and remove the dust plug.

6. Use the flat head screw driver to loosen the brass screw. Use the needle nose pliers to remove the brass screw and spring from the nozzle body.

7. Remove the A4005EVR nozzle from the bench vise and place on a flat surface. Use the 1/8" diameter punch and hammer to lightly tap and remove both mounting rivets located on the lever guard.

8. Remove the lever guard from the nozzle body.

9. Remove the existing latch by slowly pulling upward until the square stem clears the nozzle body.

IMPORTANT: Properly discard the dust plug and mounting rivets and latch.

Installing the New Latch

10. Locate the notch on the square stem and align to the right of the nozzle body. Install the new latch by pressing downward on the square stem.

11. Remove the A4005EVR nozzle from the bench vise and turn top side up. Install the existing spring around the square stem. Fasten the existing brass screw by hand onto the top of the square stem to avoid cross threading. Use the flat head screw driver to tighten.

4

12. Install the new dust plug. Use the 5/8 punch and hammer to light tap into place.

13. Remove the A4005EVR nozzle from the bench vise and place on flat surface. Install the existing lever guard onto the nozzle body using the new mounting rivets. Use the lever guard rivet installation tool p/n 494653EVR and hammer to properly flare the ends of the mounting rivets.

14. Install the existing scuff guard by pulling over the nozzle body.

Post-Installation:

15. Before attempting to reinstall the A4005EVR nozzle, please refer to the A4005EVR Balance Vapor Recovery Nozzle Installation Instructions p/n 569044.

PREVENTIVE MAINTENANCE

1. Weekly inspect the latch for damage or if missing. Replace with factory authorized service kits.

Part Number	Description
494150EVR	Latch Kit

PERFORMANCE STANDARDS & SPECIFICATIONS

This component was factory tested to, and met the following specifications:

1. Meets ARB Material Compatibility with Fuel Blends as per Section 3.8 of CP-201.

IMPORTANT: Leave these installation instructions with the station owner and/ or operator.

WARRANTY POLICY

Emco Wheaton Retail Corporation service station products are warranted to be free from defects in material and workmanship under normal use and service. Vapor recovery nozzles are warranted for a period of twelve (12) months from date of shipment from Emco Wheaton Retail Corporation or from installation date as specified by the returned warranty card, not to exceed fifteen (15) months from the date of shipment from Emco Wheaton Retail Corporation. This warranty excludes the spout and/or front end components of balance vapor recovery nozzles unless damage is obvious when the nozzle is removed from the shipping carton and the defective nozzle is returned to Emco Wheaton Retail Corporation prior to use and within two (2) months from the date of invoice. Other service station products are warranted for a period of twelve (12) months from the date of manufacture.

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 original 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.

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, materials, specifications and models and to discontinue models without notice or obligation.

Emco Wheaton Retail Corporation warrants the workmanship and materials to be free of defects and will comply with the performance standards of California ARB CP-201 for a period of one (1) year from the date of installation or fourteen months from the date of shipment from Emco Wheaton Retail Corporation.

Emco Wheaton Retail Corp.
2300 Industrial Park Dr. • Wilson, NC 27893
252-243-0150 • 252-243-4759 (fax)
619-421-1743 (Technical Services, California)

p/n 570182
Rev. A, 06/09

EMCO® WHEATON RETAIL

494748EVR
Fuel Path O-ring Kit

Packing List:

(2) Fuel Path O-rings

A4110EVR Coaxial Hose Swivel

A4005EVR Balance Vapor Recovery Nozzle

A4119EVR Coaxial Safe Break Valve

INSTALLATION INSTRUCTIONS

Service Tools Required:

- Pipe Wrench w/ Flat Jaws
- Bench Vise w/ 5" Jaw Width
- Petroleum Jelly or Other Suitable Lubricant
- Scribe Tool w/ 90 Degree Tip
- Gasoline Approved Container

CAUTION:

1. Always barricade work area to keep pedestrians and vehicles from accessing the dispenser.
2. Always use a gasoline approved container or test can when performing any type of preventive maintenance.
3. Before attempting to install, remove or service the A4005EVR nozzle, A4110EVR hose swivel and A4119EVR safe break valve, turn off and tag out power to the corresponding dispenser.
4. Before attempting to install, remove or service the A4005EVR nozzle, A4110EVR hose swivel and A4119EVR safe break valve, close the emergency impact valves located inside the base of the dispenser. Relieve the line pressure and standing fuel through the nozzle spout into a gasoline approved container by compressing the bellows and squeezing the lever.

IMPORTANT: Failure to perform cautions 3 and 4 may result in a hazardous gasoline spill, damage to equipment, personal injury and/or death.

1

Pre-Inspection:

1. Carefully unpack and remove all kitted parts from the shipping container and evaluate for any kind of damage. Verify that no parts are missing from the packing list before proceeding with the installation.

Pre-Installation:

2. Empty all standing fuel within the spout and bellows into a gasoline approved container before attempting to service the fuel path o-rings.

3. It is necessary to remove the A4005EVR nozzle, A4110EVR hose swivel and A4119EVR safe break valve during the removal and installation of the fuel path o-rings. Use the pipe wrench with flat jaws to loosen the swivel nut. Unfasten the swivel nut by hand from the A4005EVR nozzle to avoid cross threading.

IMPORTANT: Drain the fuel from the hanging hardware into a gasoline approved container when removing the A4005EVR nozzle from the A4110EVR hose swivel.

A4005EVR Nozzle

A4110EVR Hose Swivel

A4119EVR Safe Break Valve

4. Use the bench vise to properly secure the A4005EVR nozzle, A4110EVR hose swivel or A4119EVR safe break valve during service.

2

Installation:

Removing the Existing Fuel Path O-rings

A4005EVR Nozzle

A4110EVR Hose Swivel

A4119EVR Safe Break Valve

5. Use the scribe tool to remove the existing fuel path o-rings.
6. Clean and remove all existing grease, fuel residue, debris, etc. from within the machined grooves.

IMPORTANT: Properly discard all removed components.

Installing the New Fuel Path O-rings

A4005EVR Nozzle

A4110EVR Hose Swivel

A4119EVR Safe Break Valve

7. Use the scribe tool to install the new fuel path o-rings. Verify that both o-rings seat properly into the machined grooves.

A4005EVR Nozzle

A4110EVR Hose Swivel

A4119EVR Safe Break Valve

8. Lightly lubricate the fuel path o-rings using petroleum jelly or other suitable lubricant.

Post-Installation:

9. Before attempting to reinstall the A4005EVR nozzle, A4110EVR hose swivel or A4119EVR safe break valve, please to refer to the following installation instructions below.

    - A4005EVR Balance Vapor Recovery Nozzle p/n 569044
    - A4110EVR Coaxial Hose Swivel p/n 569042
    - A4119EVR Coaxial Safe Break Valve p/n 569043

PREVENTIVE MAINTENANCE

1. Weekly inspect the A4005EVR nozzle, A4110EVR hose swivel and A4119EVR safe break valve connections for leaks or fuel residue. Replace with factory authorized service kits.

Part Number	Description
494748EVR	Fuel Path O-ring Kit

PERFORMANCE STANDARDS & SPECIFICATIONS

This component was factory tested to, and met the following specifications:

1. Meets ARB Material Compatibility with Fuel Blends as per Section 3.8 of CP-201.

IMPORTANT: Leave these installation instructions with the station owner and/ or operator.

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WARRANTY POLICY

Emco Wheaton Retail Corporation service station products are warranted to be free from defects in material and workmanship under normal use and service. Vapor recovery nozzles are warranted for a period of twelve (12) months from date of shipment from Emco Wheaton Retail Corporation or from installation date as specified by the returned warranty card, not to exceed fifteen (15) months from the date of shipment from Emco Wheaton Retail Corporation. This warranty excludes the spout and/or front end components of balance vapor recovery nozzles unless damage is obvious when the nozzle is removed from the shipping carton and the defective nozzle is returned to Emco Wheaton Retail Corporation prior to use and within two (2) months from the date of invoice. Other service station products are warranted for a period of twelve (12) months from the date of manufacture.

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 original 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.

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, materials, specifications and models and to discontinue models without notice or obligation.

Emco Wheaton Retail Corporation warrants the workmanship and materials to be free of defects and will comply with the performance standards of California ARB CP-201 for a period of one (1) year from the date of installation or fourteen months from the date of shipment from Emco Wheaton Retail Corporation.

Emco Wheaton Retail Corp.
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619-421-1743 (Technical Services, California)

p/n 570178
Rev. A, 05/09

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EMCO® WHEATON RETAIL

494749EVR
Vapor Path O-ring Kit

Packing List:

(1) Vapor Path O-ring

A4110EVR
Coaxial Hose Swivel

INSTALLATION INSTRUCTIONS

Service Tools Required:

- Pipe Wrench w/ Flat Jaws
- Bench Vise w/ 5" Jaw Width
- Petroleum Jelly or Other Suitable Lubricant
- Scribe Tool w/ 90 Degree Tip
- Gasoline Approved Container

CAUTION:

1. Always barricade work area to keep pedestrians and vehicles from accessing the dispenser.
2. Always use a gasoline approved container or test can when performing any type of preventive maintenance.
3. Before attempting to install, remove or service the A4005EVR nozzle and A4110EVR hose swivel, turn off and tag out power to the corresponding dispenser.
4. Before attempting to install, remove or service the A4005EVR nozzle and A4110EVR hose swivel, close the emergency impact valves located inside the base of the dispenser. Relieve the line pressure and standing fuel through the nozzle spout into a gasoline approved container by compressing the bellows and squeezing the lever.

IMPORTANT: Failure to perform cautions 3 and 4 may result in a hazardous gasoline spill, damage to equipment, personal injury and/or death.

1

Pre-Inspection:

1. Carefully unpack and remove all kitted parts from the shipping container and evaluate for any kind of damage. Verify that no parts are missing from the packing list before proceeding with the installation.

Pre-Installation:

2. Empty all standing fuel within the spout and bellows into a gasoline approved container before attempting to service the vapor path o-rings.

3. It is necessary to remove the A4005EVR nozzle from the A4110EVR hose swivel during the removal and installation of the vapor path o-ring. Use the pipe wrench with flat jaws to loosen the swivel nut. Unfasten the swivel nut by hand from the A4005EVR nozzle to avoid cross threading.

IMPORTANT: Drain the fuel from the hanging hardware into a gasoline approved container when removing the A4005EVR nozzle from the A4110EVR hose swivel.

4. Use the bench vise to properly secure the A4110EVR hose swivel during service.

2

Installation:

Removing the Existing Vapor Path O-ring

5. Use the scribe tool to remove the existing vapor path o-ring from the machined groove located on top of the swivel nut.
6. Clean and remove all existing grease, fuel residue, debris, etc. from within the machined groove.

IMPORTANT: Properly discard all removed components.

Installing the New Vapor Path O-ring

7. Install the new vapor path o-ring. Verify that the o-ring seats properly into the machined groove.

8. Lightly lubricate the vapor path o-ring using petroleum jelly or other suitable lubricant.

Post-Installation:

9. Before attempting to reinstall the A4005EVR nozzle, please to refer to A4005EVR Balance Vapor Recovery Installation Instructions p/n 569044.

PREVENTIVE MAINTENANCE

1. Weekly inspect the A4110EVR hose swivel connections for leaks or fuel residue. Replace with factory authorized service kits.

Part Number	Description
494749EVR	Vapor Path O-ring Kit

PERFORMANCE STANDARDS & SPECIFICATIONS

This component was factory tested to, and met the following specifications:

1. Meets ARB Material Compatibility with Fuel Blends as per Section 3.8 of CP-201.

IMPORTANT: Leave these installation instructions with the station owner and/ or operator.

4

WARRANTY POLICY

Emco Wheaton Retail Corporation service station products are warranted to be free from defects in material and workmanship under normal use and service. Vapor recovery nozzles are warranted for a period of twelve (12) months from date of shipment from Emco Wheaton Retail Corporation or from installation date as specified by the returned warranty card, not to exceed fifteen (15) months from the date of shipment from Emco Wheaton Retail Corporation. This warranty excludes the spout and/or front end components of balance vapor recovery nozzles unless damage is obvious when the nozzle is removed from the shipping carton and the defective nozzle is returned to Emco Wheaton Retail Corporation prior to use and within two (2) months from the date of invoice. Other service station products are warranted for a period of twelve (12) months from the date of manufacture.

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 original 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.

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Emco Wheaton Retail Corporation warrants the workmanship and materials to be free of defects and will comply with the performance standards of California ARB CP-201 for a period of one (1) year from the date of installation or fourteen months from the date of shipment from Emco Wheaton Retail Corporation.

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p/n 570179
Rev. A, 05/09

EMCO® WHEATON RETAIL

494750EVR

Bellows Band Clamp Kit

Packing List:

(6) Bellows Band Clamps

A4005EVR Balance Vapor Recovery Nozzle

INSTALLATION INSTRUCTIONS

Service Tools Required:

- Flat Head Screw Driver w/ Fine Tip
- Bench Vise w/ 5" Jaw Width
- Bellows Retainer Plate Tool p/n 494712EVR
- Bellows Band Clamp Crimp Tool p/n 494652EVR
- Gasoline Approved Container

CAUTION:

1. Always barricade work area to keep pedestrians and vehicles from accessing the dispenser.
2. Always use a gasoline approved container or test can when performing any type of preventive maintenance.
3. Before attempting to install, remove or service the A4005EVR nozzle, turn off and tag out power to the corresponding dispenser.
4. Before attempting to install, remove or service the A4005EVR nozzle, close the emergency impact valves located inside the base of the dispenser. Relieve the line pressure and standing fuel through the nozzle spout into a gasoline approved container by compressing the bellows and squeezing the lever.

IMPORTANT: Failure to perform cautions 3 and 4 may result in a hazardous gasoline spill, damage to equipment, personal injury and/or death.

Pre-Inspection:

1. Carefully unpack and remove all kitted parts from the shipping container and evaluate for any kind of damage. Verify that no parts are missing from the packing list before proceeding with the installation.

Pre-Installation:

2. Empty all standing fuel within the spout and bellows into a gasoline approved container before attempting to service the bellows band clamps.

3. It is unnecessary to remove the A4005EVR nozzle from the fueling point during the removal and installation of the bellows band clamps. Use the bench vise to properly secure the A4005EVR nozzle during service.

Installation:

Removing the Existing Bellows Band Clamps

4. Locate the top bellows band clamp. Use the flat head screw driver to dislodge the locking mechanism and remove the band clamp from the bellows.

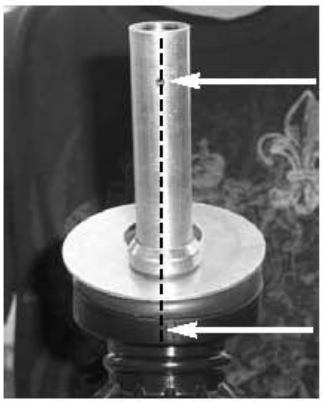
2

5. Locate the bottom bellows band clamp. Use the flat head screw driver to dislodge the locking mechanism and remove the band clamp from the bellows.

IMPORTANT: Properly discard all removed components.

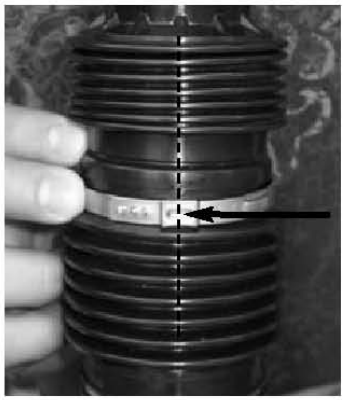
Installing the New Bellows Band Clamps

6. Use the bellows retainer plate tool p/n 494712EVR to secure and lock the bellows and boot face in place.



7. Slowly rotate the bellows until the parting line of the boot connector is aligned with the spout and automatic shut-off.

3



8. Install the new top bellows band clamp into the groove of the bellows. Lock and align the crimp portion with the parting line of the bellows.

9. Use the bellows band clamp crimp tool p/n 494652EVR to crimp and secure into place.

10. Install the new bottom bellows band clamp into the groove of the bellows. Lock and align the crimp portion with the parting line of the bellows.

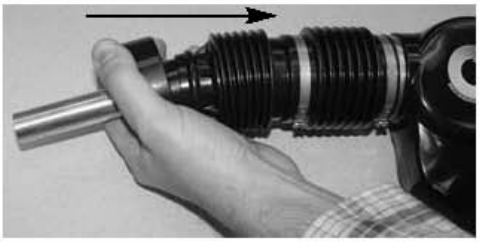
4

11. Use the bellows band clamp crimp tool p/n 494652EVR to crimp and secure into place.

12. Remove the bellows retainer plate tool p/n 494712EVR from bellows and spout.

13. Remove the A4005EVR nozzle from the bench vise.

Post-Functional Test:



14. Functional test the insertion interlock of the A4005EVR nozzle by compressing the bellows and then squeezing the lever. The A4005EVR nozzle will not function unless the insertion interlock is properly engaged.

Post-Installation:

15. Place the A4005EVR nozzle back onto the dispenser cradle.

5

PREVENTIVE MAINTENANCE

1. Weekly inspect the bellows band clamps for damage or if missing. Replace with factory authorized service kits.

Part Number	Description
494750EVR	Bellows Band Clamp Kit

PERFORMANCE STANDARDS & SPECIFICATIONS

This component was factory tested to, and met the following specifications:

1. Meets ARB Material Compatibility with Fuel Blends as per Section 3.8 of CP-201.
2. Meets ARB Capable of Refueling Any Vehicle Standards as per Section 4.7.1 of CP-201.

IMPORTANT: Leave these installation instructions with the station owner and/ or operator.

WARRANTY POLICY

Emco Wheaton Retail Corporation service station products are warranted to be free from defects in material and workmanship under normal use and service. Vapor recovery nozzles are warranted for a period of twelve (12) months from date of shipment from Emco Wheaton Retail Corporation or from installation date as specified by the returned warranty card, not to exceed fifteen (15) months from the date of shipment from Emco Wheaton Retail Corporation. This warranty excludes the spout and/or front end components of balance vapor recovery nozzles unless damage is obvious when the nozzle is removed from the shipping carton and the defective nozzle is returned to Emco Wheaton Retail Corporation prior to use and within two (2) months from the date of invoice. Other service station products are warranted for a period of twelve (12) months from the date of manufacture.

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 original 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.

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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.

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, materials, specifications and models and to discontinue models without notice or obligation.

Emco Wheaton Retail Corporation warrants the workmanship and materials to be free of defects and will comply with the performance standards of California ARB CP-201 for a period of one (1) year from the date of installation or fourteen months from the date of shipment from Emco Wheaton Retail Corporation.

Emco Wheaton Retail Corp.
2300 Industrial Park Dr. • Wilson, NC 27893
252-243-0150 • 252-243-4759 (fax)
619-421-1743 (Technical Services, California)

p/n 570180
Rev. A, 05/09

EMCO® WHEATON RETAIL

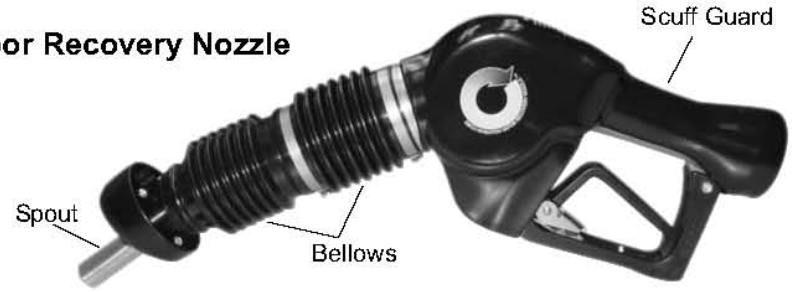
A0557EVR

Scuff Guard Kit

Packing List:

(1) Scuff Guard

A4005EVR
Balance Vapor Recovery Nozzle



INSTALLATION INSTRUCTIONS

Service Tools Required:

- Pipe Wrench w/ Flat Jaws
- Gasoline Approved Container
- Utility Knife

CAUTION:

1. Always barricade work area to keep pedestrians and vehicles from accessing the dispenser.
2. Always use a gasoline approved container or test can when performing any type of preventive maintenance.
3. Before attempting to install, remove or service the A4005EVR nozzle, turn off and tag out power to the corresponding dispenser.
4. Before attempting to install, remove or service the A4005EVR nozzle, close the emergency impact valves located inside the base of the dispenser. Relieve the line pressure and standing fuel through the nozzle spout into a gasoline approved container by compressing the bellows and squeezing the lever.

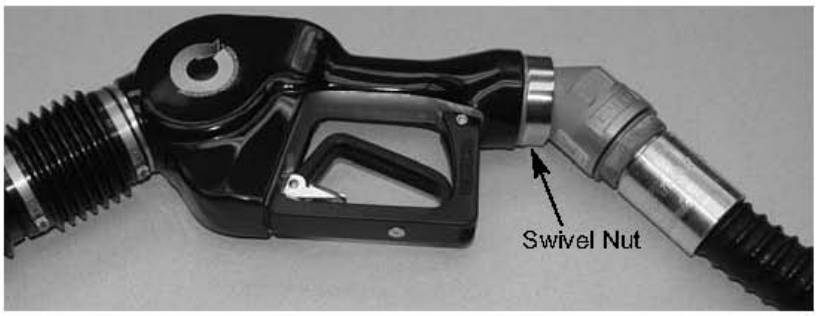
IMPORTANT: Failure to perform cautions 3 and 4 may result in a hazardous gasoline spill, damage to equipment, personal injury and/or death.

Pre-Inspection:

1. Carefully unpack and remove all kitted parts from the shipping container and evaluate for any kind of damage. Verify that no parts are missing from the packing list before proceeding with the installation.

Pre-Installation:

2. Empty all standing fuel within the spout and bellows into a gasoline approved container before attempting to service the scuff guard.



3. It is necessary to remove the A4005EVR nozzle from the A4110EVR hose swivel during the removal and installation of the scuff guard. Use the pipe wrench with flat jaws to loosen the swivel nut. Unfasten the swivel nut by hand from the A4005EVR nozzle to avoid cross threading.

IMPORTANT: Drain the fuel from the hanging hardware into a gasoline approved container when removing the A4005EVR nozzle from the A4110EVR hose swivel.

Installation:

Removing the Existing Scuff Guard

4. Place the A4005EVR nozzle on a flat surface. Use the utility knife to make the first cut along the front side of the scuff guard.

2

5. Use the utility knife to make the second cut along the rear side of the scuff guard.

6. Remove the scuff guard from the nozzle body.

IMPORTANT: Properly discard all removed components.

Installing the New Scuff Guard

7. Before attempting to install the new scuff guard. Soften the scuff guard by soaking in hot water and soap.

8. Install the new scuff guard by sliding over the spout and bellows. Pull the scuff guard completely over the nozzle body.

Post-Installation:

9. Before attempting to reinstall the A4005EVR nozzle, please refer to the A4005EVR Balance Vapor Recovery Nozzle Installation Instructions p/n 569044.

PREVENTIVE MAINTENANCE

1. Weekly inspect the scuff guard for the Emco Wheaton Retail manufacturer's logo. Replace with factory authorized service kits.

Part Number	Description
A0557EVR	Scuff Guard Kit

PERFORMANCE STANDARDS & SPECIFICATIONS

This component was factory tested to, and met the following specifications:

1. Meets ARB Material Compatibility with Fuel Blends as per Section 3.8 of CP-201.

IMPORTANT: Leave these installation instructions with the station owner and/ or operator.

WARRANTY POLICY

Emco Wheaton Retail Corporation service station products are warranted to be free from defects in material and workmanship under normal use and service. Vapor recovery nozzles are warranted for a period of twelve (12) months from date of shipment from Emco Wheaton Retail Corporation or from installation date as specified by the returned warranty card, not to exceed fifteen (15) months from the date of shipment from Emco Wheaton Retail Corporation. This warranty excludes the spout and/or front end components of balance vapor recovery nozzles unless damage is obvious when the nozzle is removed from the shipping carton and the defective nozzle is returned to Emco Wheaton Retail Corporation prior to use and within two (2) months from the date of invoice. Other service station products are warranted for a period of twelve (12) months from the date of manufacture.

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 original 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.

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Emco Wheaton Retail Corporation warrants the workmanship and materials to be free of defects and will comply with the performance standards of California ARB CP-201 for a period of one (1) year from the date of installation or fourteen months from the date of shipment from Emco Wheaton Retail Corporation.

Emco Wheaton Retail Corp.
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619-421-1743 (Technical Services, California)

p/n 570183
Rev. A, 06/09

Veyance Technologies, Inc.
703 S. Cleveland Massillon Rd
Fairlawn, OH 44333
Ph (330) 664-7000

Maxxim Premier Installation Instructions

1 Install the correct hose length and other hanging hardware on the dispenser. This will include whip hose, breakaway, long hose, and nozzle.

a) When installing Maxxim Premier Plus, the end of the hose stamped "NOZZLE END" must be attached to the nozzle.

b) If a hose retractor is required, use the Goodyear Maxguard retractor clamp; part # 532-365-105-000-00.

c) Do not use high retractor tension. High tension is difficult for customers to handle and it reduces the life of the hose. Retractor tension above 12 pounds will void the warranty.

d) Do not mix Maxxim Premier outer or inner hose with components from other manufacturer's stage II hoses. The mixed assembly may not be grounded and could cause a serious fire hazard.

e) Make sure that the long hose does not touch the pavement or the top of the island when the nozzle hangs on the dispenser hook.

2 Tighten the swivel nut to 50 ft. lbs. torque using an open end torque wrench. Do not use a pipe wrench because the teeth on the wrench will damage the fitting. This connection is sealed by an o-ring. Do not apply thread sealant.

- Alternate method: If a torque wrench is not available, turn the swivel nut by hand until snug and the o-ring is seated. Then use a wrench to tighten the swivel nut ¼ turn past snug. This connection has straight threads and must be cinched tight to prevent the threads from unscrewing in service.

One source for an open end torque wrench is Belknap Tools, both part #'s are needed:

- VB-0608005 open end wrench head
- VB-100ST-I wrench handle preset at the factory to 50 ft lbs

After extended service, the swivel nut o-ring can be lubricated with front end bearing grease or Parker O-Lube.

Maxxim Premier Plus Venturi Pick-up Length Instructions

It is the responsibility of the installer to determine the optimum venturi pick-up length and verify that hoses installed on a dispenser have the optimum pick-up location. Failure to properly size the pick-up location will reduce the effectiveness of the venturi in removing liquid blockage from the outer vapor hose and may result in failure of the liquid removal test.

When the Maxxim Premier Plus hose is assembled in the factory, a mark is placed on the outer hose to locate the venturi pick-up location. This mark will help the installer determine whether the hose has the optimum pick-up location for the installation.

Veyance Technologies, Inc.
703 S. Cleveland Massillon Rd
Fairlawn, OH 44333
Ph (330) 664-7000

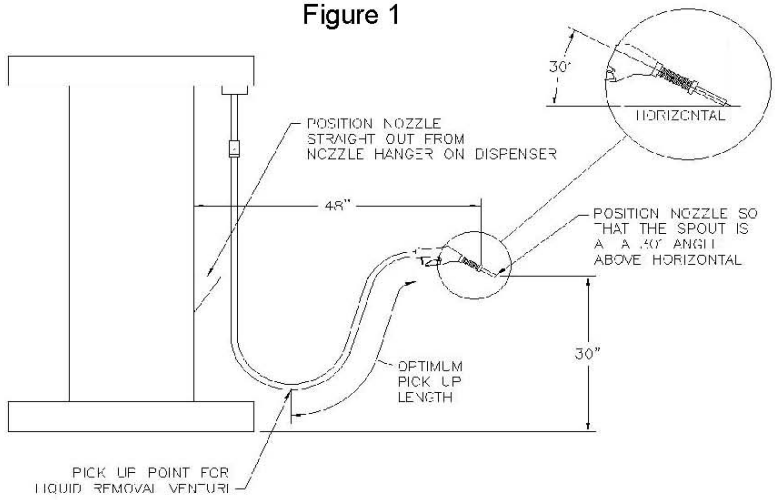
3 Hold the nozzle straight out from the dispenser so that the end of the compressed bellows (simulate when the bellows is compressed in the filler neck of a car) is 48 inches away from the front face of the dispenser (see Figure 1). Hold the nozzle so that the tip of the spout is 30 inches above the pavement and the spout is at a 30° angle above the horizontal plane (see Figure 1). When the nozzle and hose are held in the position shown in Figure 1, the mark on the outer vapor hose should be at the bottom of the loop.

4 If the mark on the hose is not at the bottom of the hose loop as shown in Figure 1, the installer may:

- Adjust the hose retractor (if installed);
- Install a different length whip hose; or
- Install a different long hose with the optimum venturi pick-up location. To determine the optimum venturi pick-up location (e.g., venturi pick-up tube length), conduct the following:

a) Hold the nozzle and hose in the position shown in Figure 1;
b) Measure the length from the back end of the nozzle (where the hose screws into the nozzle) to the bottom of the loop in the hose. This length is the optimum "pick-up" length for Goodyear's Maxxim Premier Plus balance venturi hose.
c) Contact your local Goodyear distributor to obtain a Maxxim Premier Plus hose with the optimum venturi pick-up tube length.

Figure 1



Questions on installation should be directed to your local Goodyear distributor or Goodyear Customer Service, 1-800-235-4632.

INSTALLATION MANUAL

HIRT VCS 100
VAPOR PROCESSOR AND INDICATOR PANEL

FOR EXECUTIVE ORDER VR-208

HIRT COMBUSTION ENGINEERS, INC.
3659 San Gabriel River Parkway · Pico Rivera, Ca 90660
P.O. Box 6816 · Pico Rivera, CA 90661
Tel: (562)692-1490 · Fax: (562)692-7413 · E-mail: HirtVCS@AOL.com

REV. 5:10/2008

Table of Contents

1. INTRODUCTION

This Manual contains the operation, installation, interconnection, start-up, and maintenance instructions for the VCS 100 processor and Indicator Panel. Note, these instructions are written to give the best installation in a sequence easiest for the installer. If there are any instructions in this manual which seem impossible, impractical, or questionable for your installation, call the Hirt Customer Service Department at (562) 692-6970 and ask for information regarding your local Hirt representative. Note, this manual should be retained for future reference.

2. SAFETY/WARNINGS

WARNING: Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury, or death. Read instructions thoroughly before installing or servicing this equipment.

WARNING: When gasoline vapor abatement system (i.e. processor) is in operation, temperature inside can exceed 2,000◦F. To prevent burn hazard, do not contact any part of the gasoline vapor abatement system except controls. Do not remove protective covers while gasoline vapor abatement system is in operation.

3. CONTRACTOR REQUIREMENTS

To prevent from voiding the product warranty, all contractors who install, startup, and/or repair the VCS 100 system must be a Hirt VCS 100 certified technician. To attend a VCS 100 training session, call Hirt Customer Service at (562) 692-6970 or send an email request to HirtVCS@aol.com. Once Hirt training is successfully completed, the technician will receive a wallet size proof of certification card. Technicians should carry the card while on the jobsite. Hirt maintains a list of active certified installers and companies. Technician certification can be verified by calling or emailing Hirt Combustion Engineers, Inc.

Note to Contractors/Technicians: Contractors should always verify the training and certification requirements with the local Air Quality Management District (District) before beginning installation of CARB EVR systems. The District inspector may request to see your certification card(s) on-site for confirmation.

4. HIRT VCS 100 PROCESSOR OVERVIEW

4.1 THEORY OF OPERATION

The processor continuously measures the pressure of the vapor in the storage tanks. When that pressure is negative, the processor remains de-energized and completely inactive. At any time when the pressure in the storage tank vapor becomes positive, the processor energizes its turbine, which extracts vapor from the storage tanks and sends that vapor into its thermal oxidizer where that vapor is destroyed. The processor continues to extract vapor until the pressure of the vapor is returned to negative, whereupon the processor turns itself off. It remains off unless or until the pressure again becomes positive.

4.2 PROCESSOR MECHANIZATION

The processor is connected to the storage tanks via the tank vapor vents, or another vapor pipe. The processor contains a vacuum sensor/switch, turbine, spark igniter, pilot, flame safeguard, vapor valve, and a thermal oxidizer.

When the vacuum sensor/switch measures that the pressure in the storage tank is negative, it remains open, thus not energizing the processor. In this condition the processor is inert and has zero effect on the remainder of the dispensing facility or its Stage I/II vapor recovery systems.

When the vacuum sensor/switch measures that the pressure of the vapor in the storage tanks is positive, the switch closes thereby energizing the turbine and activating the flame safeguard. The flame safeguard generates a spark at the pilot tip (i.e. spark igniter). The vapor is forced by the turbine from the storage tanks into the pilot and hence into the spark igniter. Only ignition of the pilot can cause the flame safeguard's relay to close*. Only when pilot ignition is present and the flame safeguard relay is closed does the vapor valve open admitting vapor to the thermal oxidizer. Note that if the pilot does not ignite, the main vapor valve does not open, thus unprocessed vapor from the thermal oxidizer cannot be vented to the atmosphere. In the thermal oxidizer, the vapor is converted into CO_2 and H_2O and then vented to the atmosphere.

*This electrical interlock, built into the flame safeguard, is required by the California State Fire Marshal, ETL, American Gas Association specification 1-97, and ANSI Z21.20

4.3 INDICATOR PANEL FUNCTION

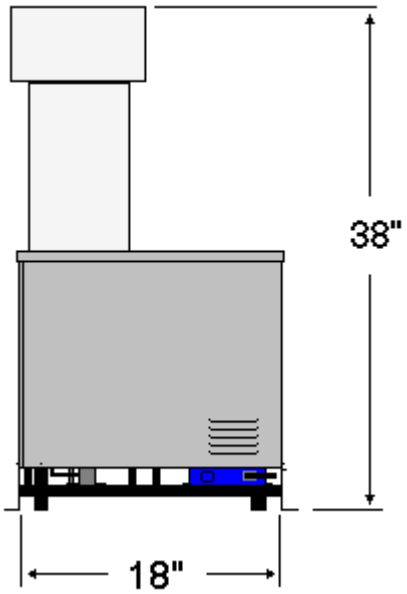
The processors' electrical power source comes thru an Indicator Panel. The panel allows the station operator to determine the current state of the

processor and whether or not the processor is operating properly. The panel includes a POWER switch with an integral POWER (green) lamp, a PROCESSING (green) lamp, and an OVERPRESSURE (red) lamp.

During normal operation, the POWER switch is on, the POWER lamp is on, the PROCESSING lamp is lit intermittently, and the OVERPRESSURE lamp is extinguished. The PROCESSING lamp is wired so it will light when the main valve is open and thermal oxidation is occurring.

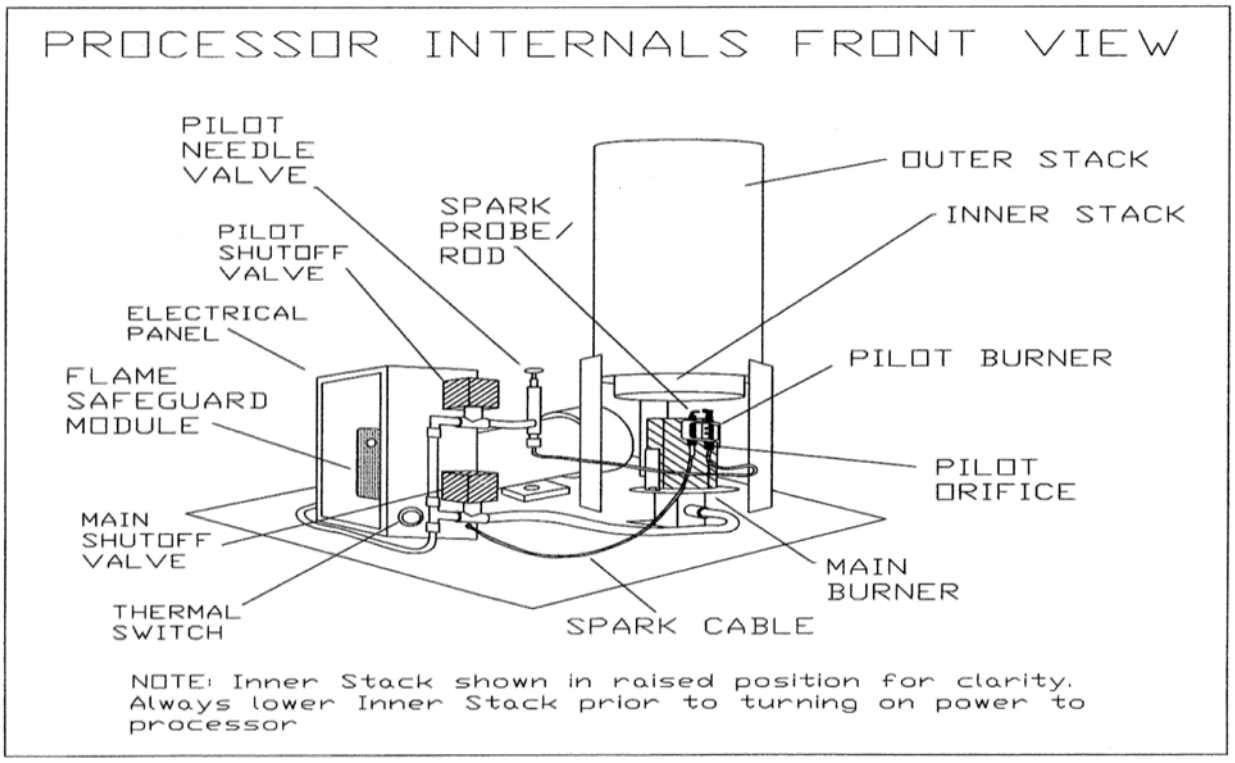
The OVERPRESSURE lamp is wired to the vacuum sensor/switch and a timing module. If the UST pressure is positive for at least 1 hour, then the vacuum sensor/switch will be closed and the timing module will light the OVERPRESSURE lamp. The OVERPRESSURE lamp indicates a leak in the vapor recovery system or possibly a malfunction of the Hirt VCS 100 processor. The OVERPRESSURE lamp will extinguish after the leaks or processor malfunction is corrected and the processor has restored the UST ullage to a nominal –0.40" w.c.

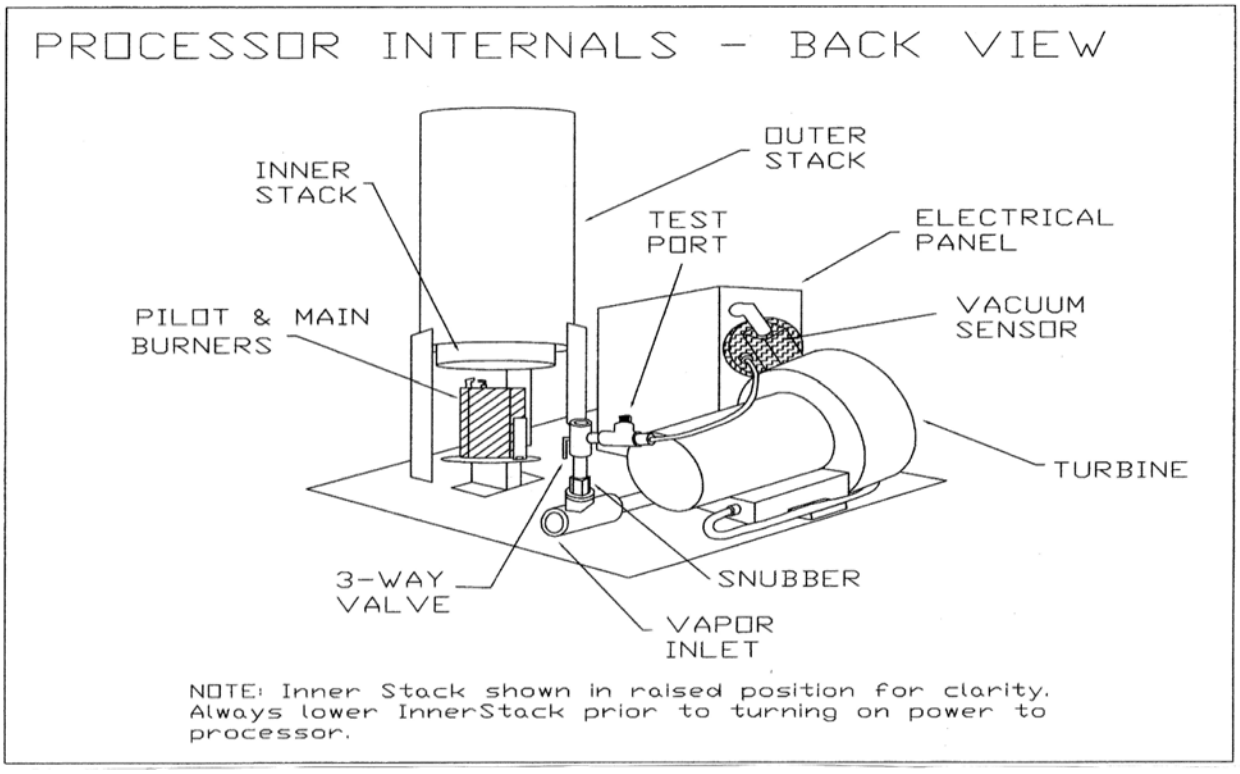
4.4 Processor Dimensions, Weight, and Specifications



MODEL: VCS 100
SERVICE: Outdoor, non hazardous area
ELECTRICAL: 120 VAC, 3 Ampere, intermittent
VAPOR PIPE CONNECTION: 3/4@ NPT
WEIGHT: 80 lbs.
OVERALL DIMENSIONS**:** 18" wide X 18" deep x 38" high (without legs)

4.5. Processor Internal Components





5. INSTALLATION OF PROCESSOR

5.1 PRE-INSTALLATION SITE REQUIREMENTS

Selection of processor location should be based on the following requirements and considerations:

5.1.1 Non-Hazardous area.

5.1.2 A minimum horizontal distance of 20 ft. from any fuel transfer point (i.e. nozzles or storage tank drop tubes).

5.1.3 A minimum horizontal distance of 20 ft. from pressure/vacuum valve.

5.1.4 Processor must be located so there is a 2 ft. clearance on all sides for maintenance.

5.1.5 Remote from wheel traffic, foot traffic, and valuable ground level space.

5.1.6 Ease of pipe run to processor from underground storage tanks(s). Typically the processor connects to the storage tank vent pipes. However, the processor can be connected to any tank fitting except for the dispenser's vapor return pipe. Note, the vapor piping must slope 1/8" per foot to prevent condensate from blocking vapor path. A slope of 1/4" per foot is recommended. (See section 7.2.2 and FIGURE 8)

Any installations resulting in a low point liquid trap shall use a Hirt P65 ¼" check valve to drain any liquid back to the UST (see figures 1 and 4 for typical check valve configurations).

5.1.7 Ease of conduit run to Indicator Panel.

5.1.8 Do not locate processor on property easement. Consult local authority, such as City Hall, to determine width of set back from properly line.

The preferred location for the processor is on the roof of the building to which the vent pipes attach. Many other locations are also practical such as ground mount, canopy mount, roof mount on a remote building, and satellite mount as noted in Figures 1 through 4.

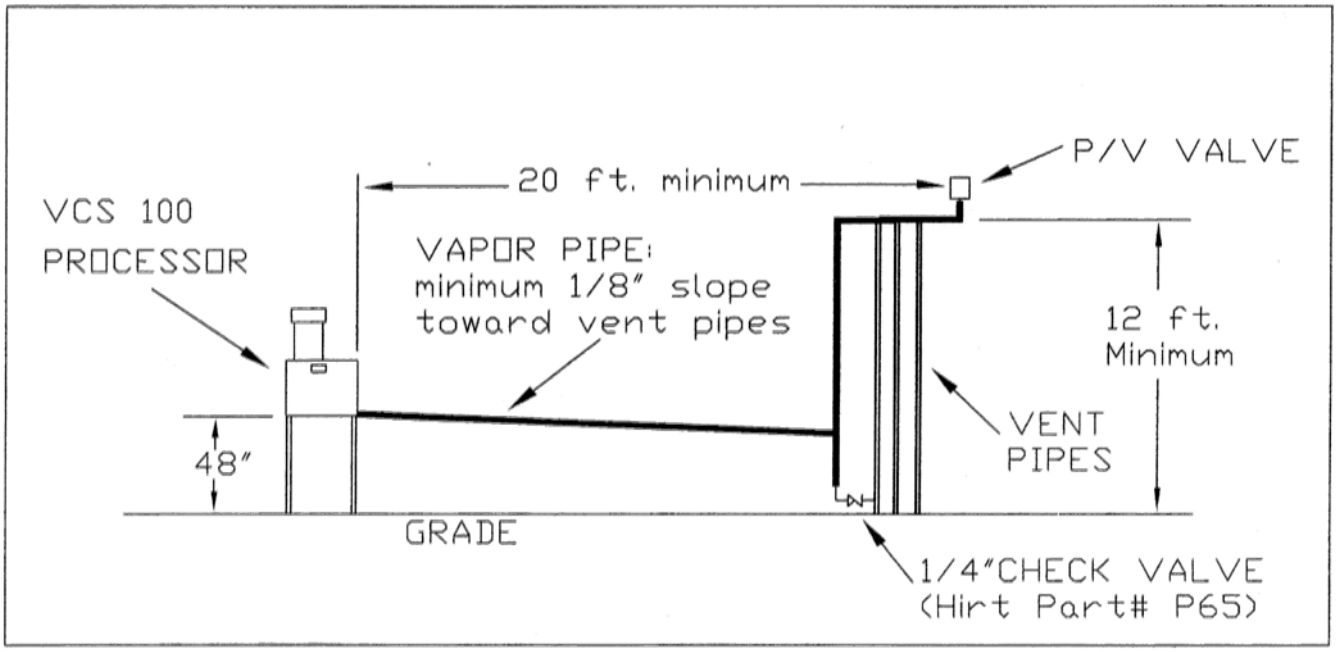


FIGURE 2: Canopy Mount

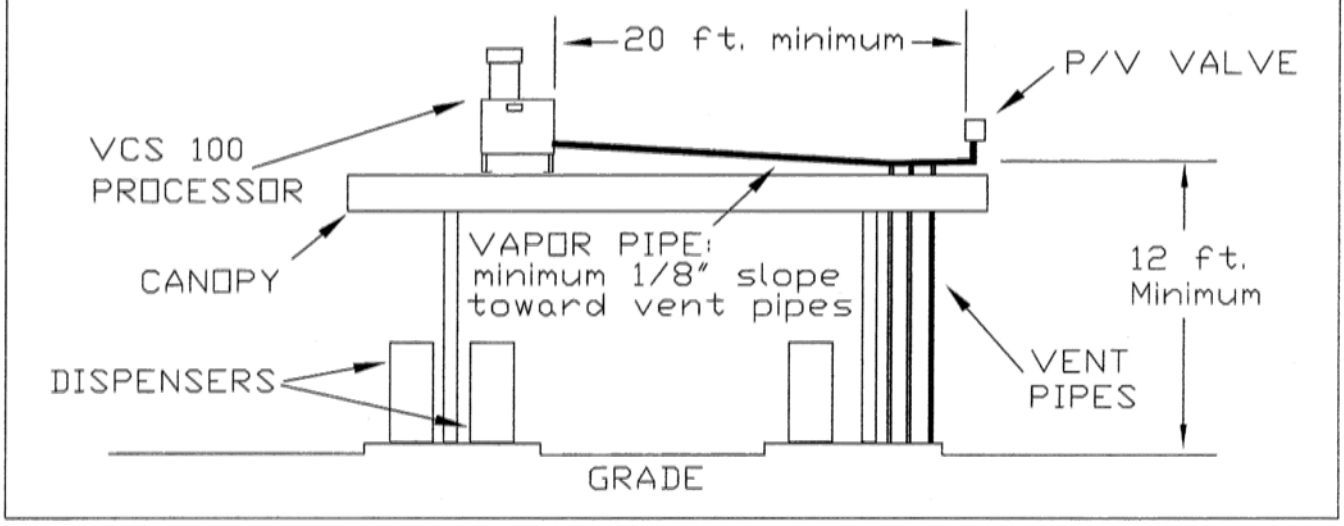


FIGURE 3: Roof Mount

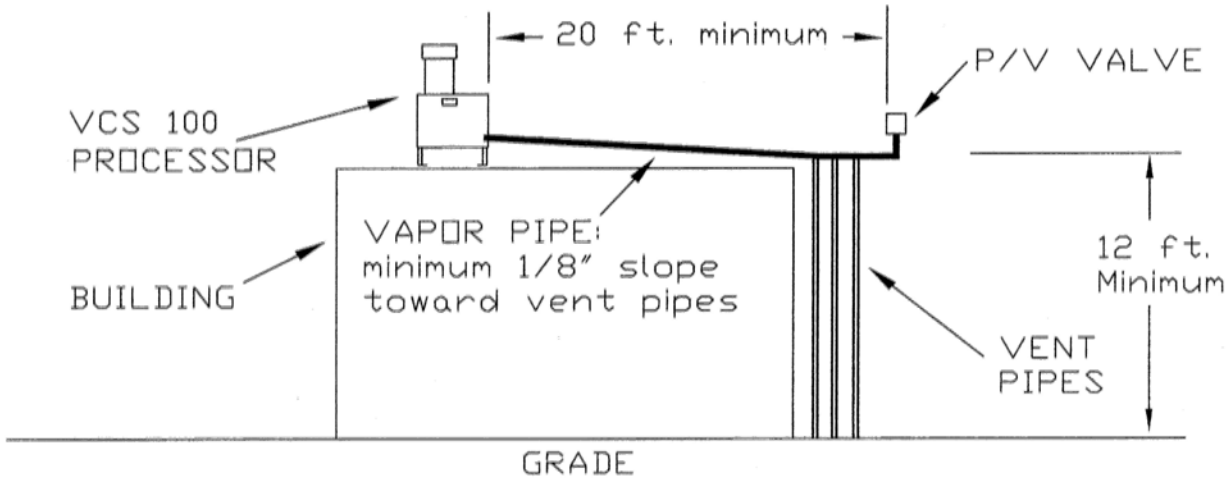
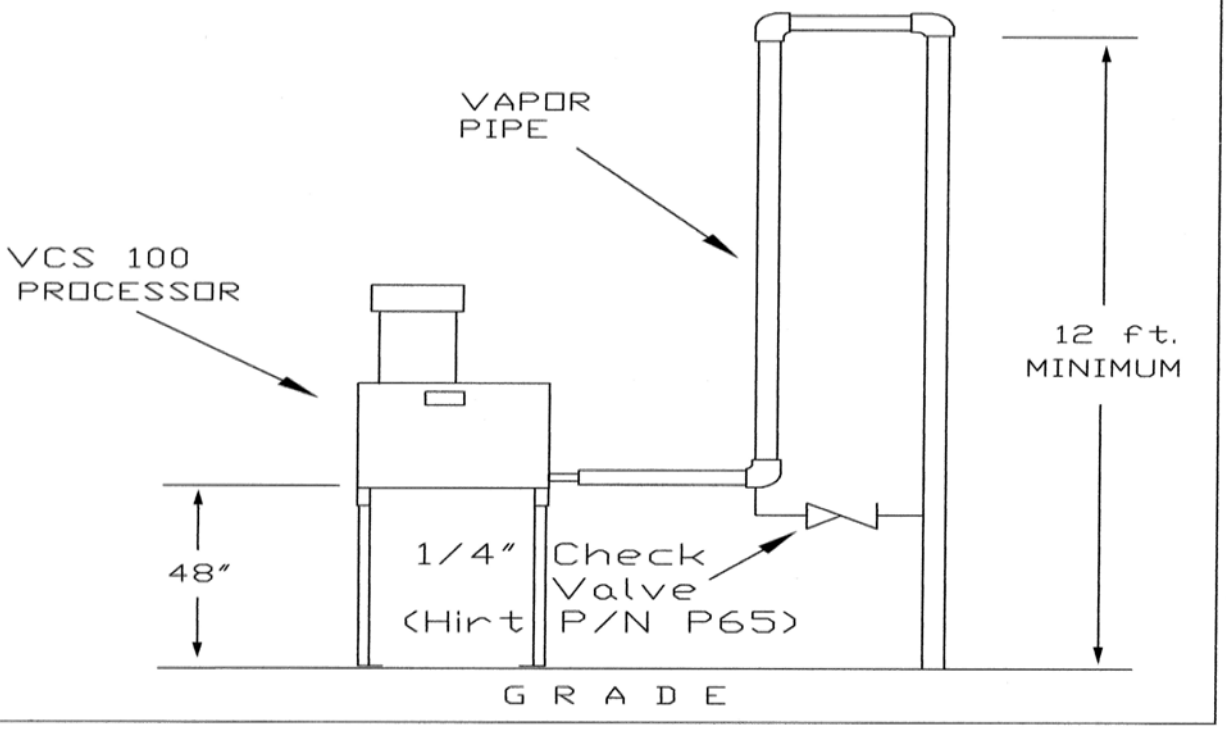


FIGURE 4: Satellite Vapor Pipe



5.2 ASSEMBLY OF LEGS TO PROCESSOR

Please refer to FIGURE 5, the processor general arrangement drawing, for the following instructions.

FIGURE 5: Processor (general arrangement)

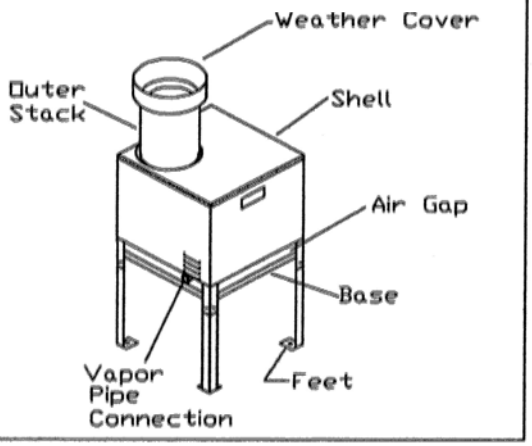
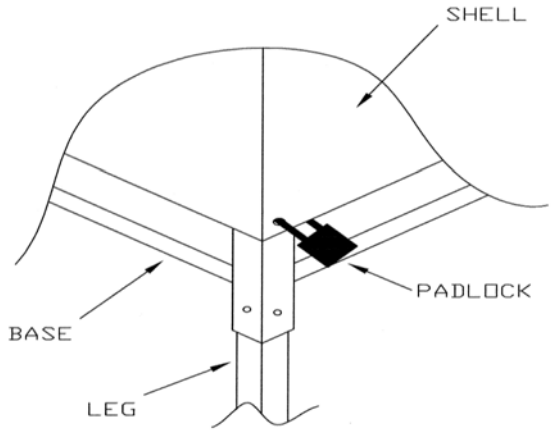


FIGURE 6



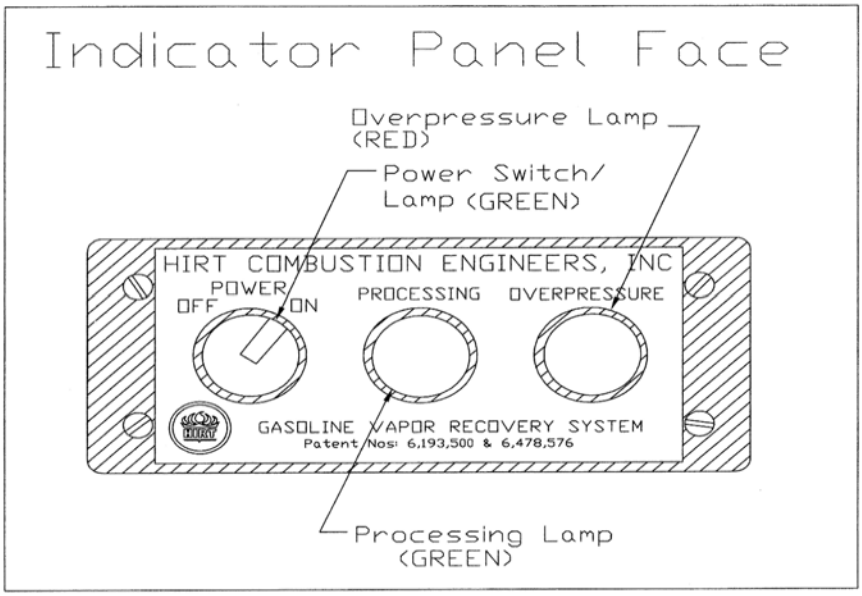
Ground level mount requires the use of the 48” Legs, and canopy or roof mount will require the 5” or longer Legs.

5.2.1 Bolt appropriate Legs to Base of processor. Be sure to use the bolts, lock washers, and nuts provided with the Legs. Note that Legs attach behind corner angle brackets of Base, See FIGURE 6 for details.

5.2.2 Bolt feet to concrete, deck plate, and/or solid non-flammable structure. Note, concrete mount will require the use of (4) 1/4” DIA. X 3” RED HEAD wedge anchors (i.e. 2.5” embedment).

WARNING: Do not block 1.5” air gap between processor Shell and Base. This gap allows combustion air to reach thermal oxidizer. Also, keep the processor area free and clear from combustibles, keep a minimum clearance of 2 ft. all the way around processor.

6. INSTALLATION OF INDICATOR PANEL



Install the Indicator Panel at a location chosen for the following considerations:

6.1 Indoors

6.2 Access by attendant.

6.3 In view of attendant.

6.4 Ease of conduit run to station's main electrical panel.

6.5 Ease of conduit run to processor location.

7. CONNECTION OF ELECTRICAL AND VAPOR PIPE

Remove Processor's Weather Cover, Shell, and electrical panel lid prior to performing the following steps.

7.1 ELECTRICAL POWER SUPPLY

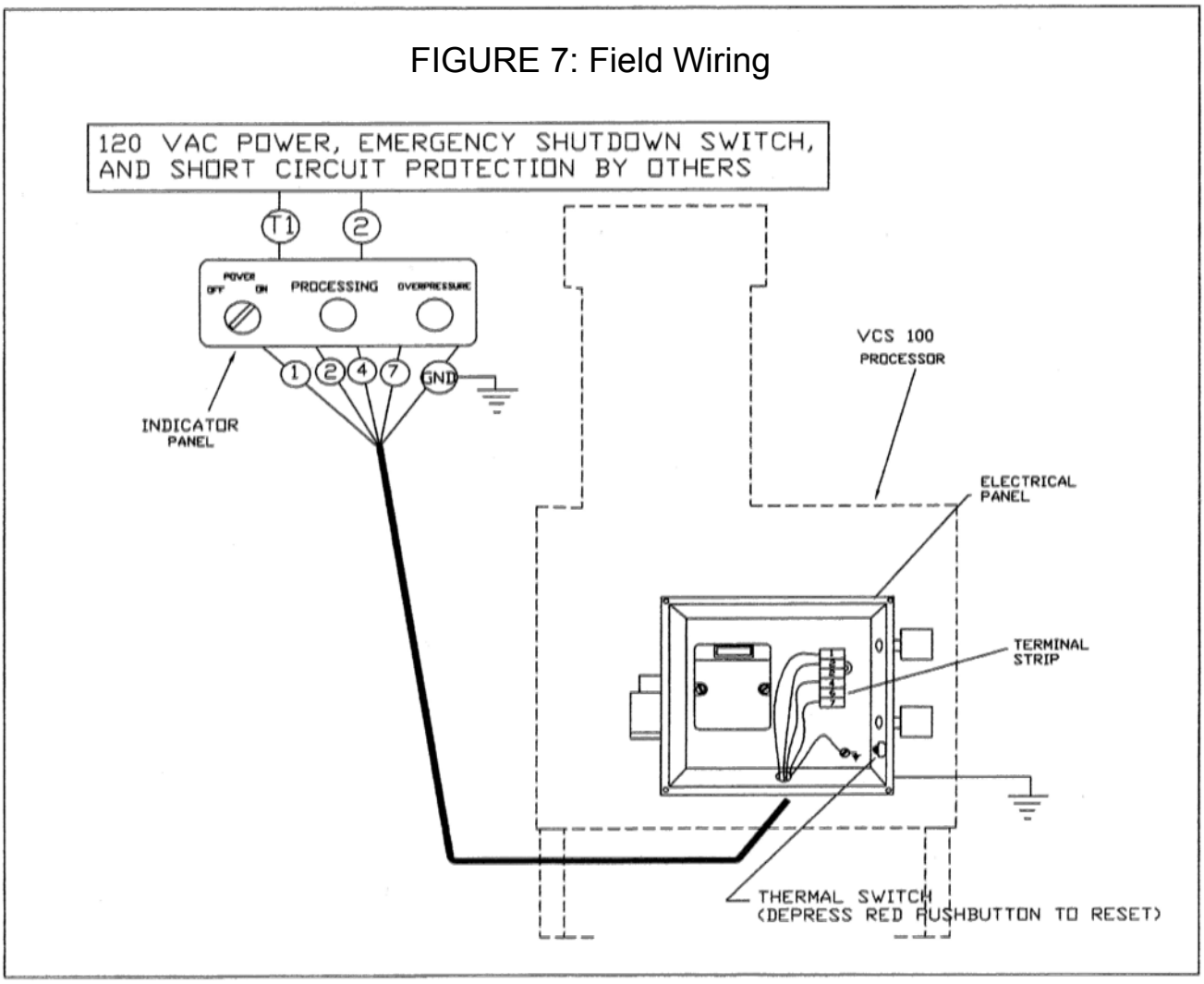
7.1.1 Note that the power to the Indicator Panel and processor comes through the station master switch and the emergency pump shutdown switch. See FIGURE 7.

7.1.2 Wire size should be per local electrical code for an eight (8) ampere, 120 VAC load. Be sure to include circuit protection per local code. Also, system must be electrically grounded in accordance with local

codes, or in the absence of local codes, with the current edition of the National Electrical Code, ANSI/NFPA70.

7.1.3 Conduit access to the processor is through the bottom of the processor's electrical panel. Be sure to use a sealed cable fitting approved for use in Class I, Groups C and D, Division 2 areas where the conduit enters the panel.

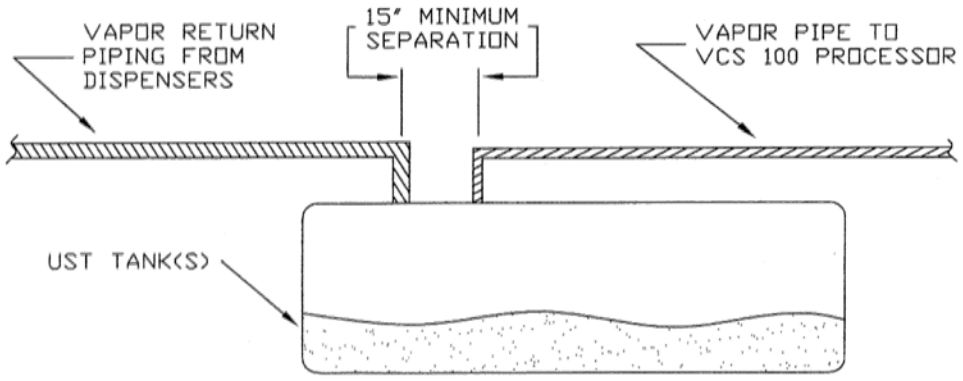
FIGURE 7: Field Wiring



7.2 GASOLINE VAPOR SUPPLY

7.2.1 A vapor pipe is needed to connect the processor to the ullage of <u>all</u> the gasoline storage tanks. Use 2" NPT galvanized pipe for runs up to 300 ft. Usually the vapor pipe connects to the vent pipes, however, any connection to the ullage of the storage tanks, <u>other than direct connection to the dispenser's vapor return pipe</u>, is acceptable. See FIGURE 8.

FIGURE 8: Pipe Separation for Processor

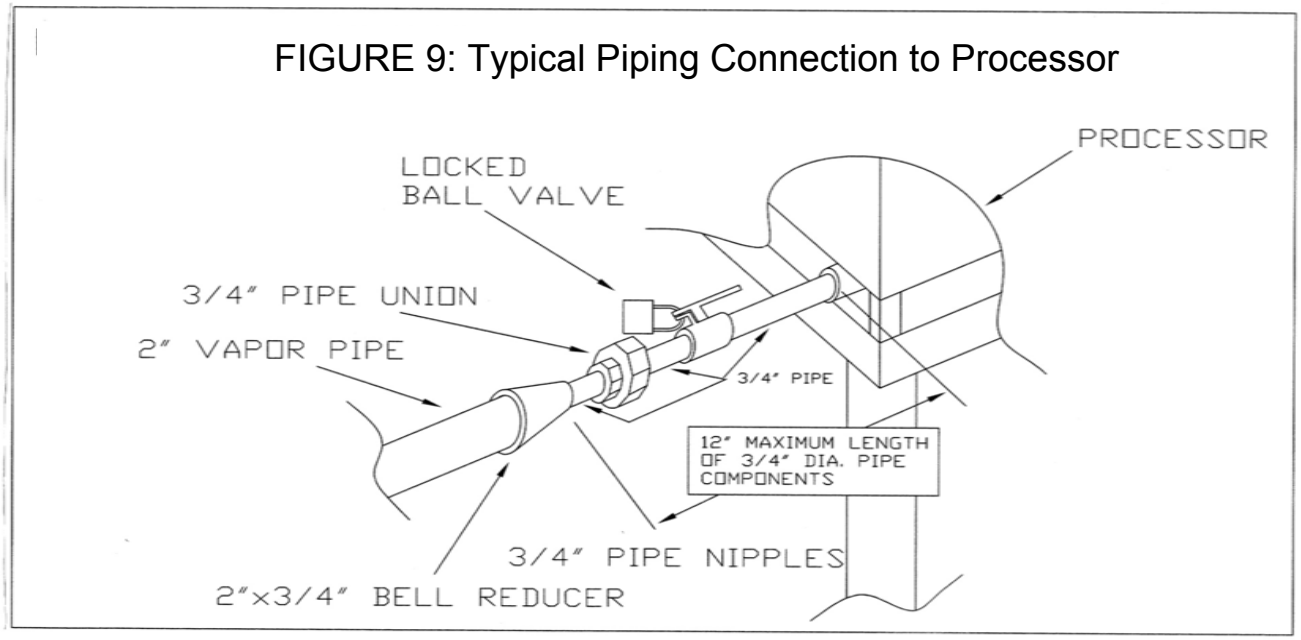


7.2.2 Vapor pipe must rise continuously from storage tank ullage connection to processor connection, and it needs to be supported to prevent trapping liquid in droops or sags in the pipe. Pipe slope must be at least 1/8" per foot, but a slope of 1/4" per foot is recommended. Also be sure to put a pipe support close to the processor to prevent placing undue stress on the Turbine.

7.2.3 Vapor pipe configuration must prevent liquid gasoline from reaching processor. Acceptable solutions include locating the processor 12 ft. above grade, connecting the vapor pipe to the top of the vent pipes, and installing a 12 ft. high loop. See FIGURES 1, 2, 3, and 4. Any installations resulting in a low point liquid trap shall use a Hirt P65 ¼" check valve to drain any liquid back to the UST (see figures 1 and 4 for typical check valve configurations).

7.2.4 Vapor pipe connection at the processor is with (3) 3/4" NPT nipples, (1) 3/4" NPT lockable ball valve, (1) 3/4" NPT union, and (1) 3/4" NPT to 2" NPT bell reducer. Note: The ball valve is installed in the vapor pipe at the processor for maintenance and repair. The ball valve is to be left in the locked open position (Opened to UST Ullage) during normal operation. Failure to leave ball valve in an open position may result in a processor malfunction. Note, use no more than a 12" length of 3/4" piping components. See FIGURE 9 for details.

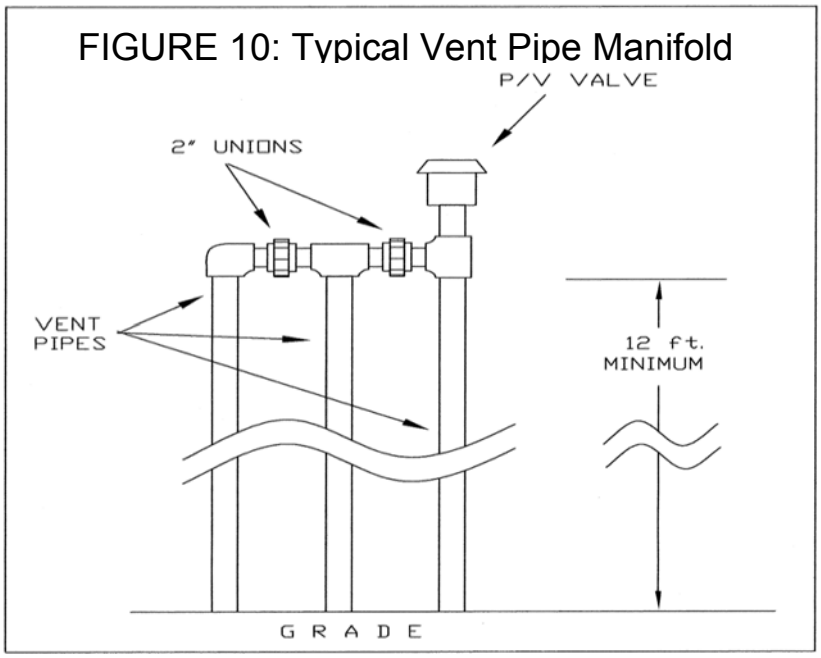
FIGURE 9: Typical Piping Connection to Processor



CAUTION: Hold processor internal pipe train with backing wrench to <u>prevent</u> twisting pipe train while connecting vapor piping.

7.2.5 If the ullage of the tanks is not already interconnected underground, then manifold the vent pipes together with 2" galvanized pipe at a minimum of 12 ft. above grade. See FIGURE 10 below. Note that at least (1) P/V Valve must remain connected to the manifold.

FIGURE 10: Typical Vent Pipe Manifold



8. START-UP

If all instructions thus far have been followed, the system should start itself and run automatically. Proceed with the following steps:

8.1 Check to see that nozzles are on their hangers and vapor hoses are connected. Check also to see that gasoline storage tank fittings (fill caps, dry breaks, drop tubes, drain valves, etc.) are seated and sealing.

8.2 At the Indicator Panel, turn the POWER switch ON. The green lamp on the switch should light, and the processor should have electrical power now. The green PROCESSING lamp will be lit intermittently (only when the processor is energized), and the red OVERPRESSURE lamp should remain extinguished.

WARNING: The processor (pilot and main burner) is automatic. It will cycle its thermal oxidizer ON if vacuum diminishes in the vapor spaces and OFF if there is sufficient vacuum. Therefore use caution when working close to the thermal oxidizer. It may come ON without notice. A mirror is recommended for looking down the stack.

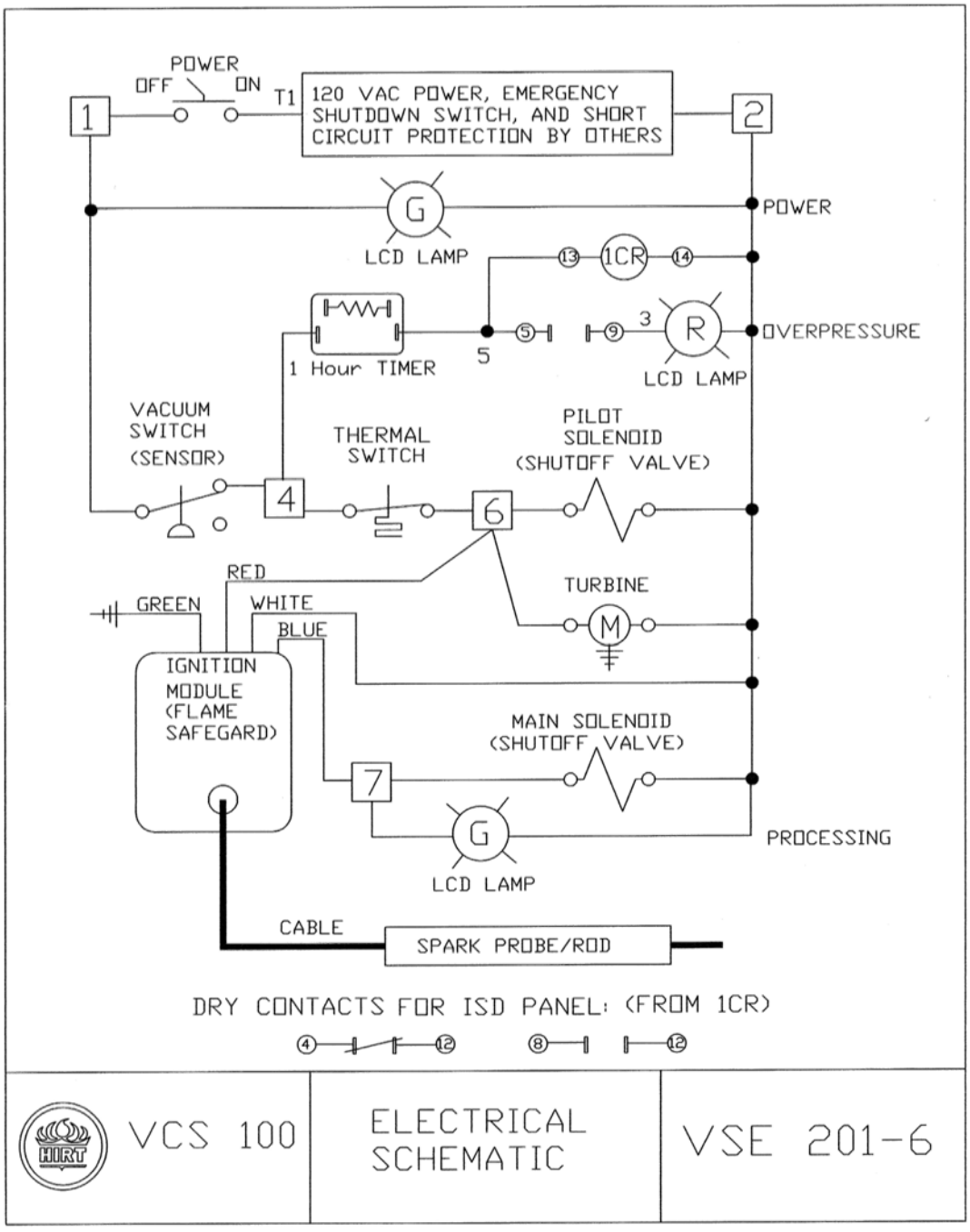
8.3 Check the pressure in storage tanks.

8.3.1 If UST ullage pressure is negative (vacuum), then proceed with step 8.6.

8.3.2 If the storage tank pressure is positive, check to see that turbine is running and either there is a flame at pilot burner tip or a spark. If not, reset thermal switch inside processor's electrical panel, by depressing (red) pushbutton, see FIGURE 7, Field Wiring Drawing. Turbine and spark should come on. If so, proceed with step 8.4. If turbine is not running or sparking is not present, refer to Hirt VCS 100 Troubleshooting Manual.

8.4 Within 1 hour, the processor pilot and main burner stages should ignite. Once a vacuum of approximately -0.40" w.c. is generated, the processor should shutoff. This indicates that the processor is completely functional and controlling itself automatically. If so, go to step 8.8. If the stages don't ignite within 1 hour or if your work schedule is such that waiting 1 hour is inconvenient then continue with the following step 8.5.

8.5 The turbine in the processor should be running and the igniter/sensor probe sparking but the pilot will not be ignited. Failure of the pilot to ignite is probably because the station's vapor piping is full of air. To purge this air and replace it with vapor, use 2 short pieces of wire and jump the circuit from terminal [1] to [6] and [6] to [7] at the terminal strip inside the electrical panel inside the processor.



Note on the ELECTRICAL SCHEMATIC that a [1] to [6] jumper energizes the turbine, ignition module, and pilot solenoid. A [6] to [7] jumper energizes the main solenoid.

As soon as the air is purged from the vapor piping, approximately 15 minutes, the pilot and main stages will both ignite. As soon as pilot and main ignite, the 2 jumpers must be removed. If so, go to step 8.8.

If the stages do not ignite after 15 minutes, go to step 8.7.

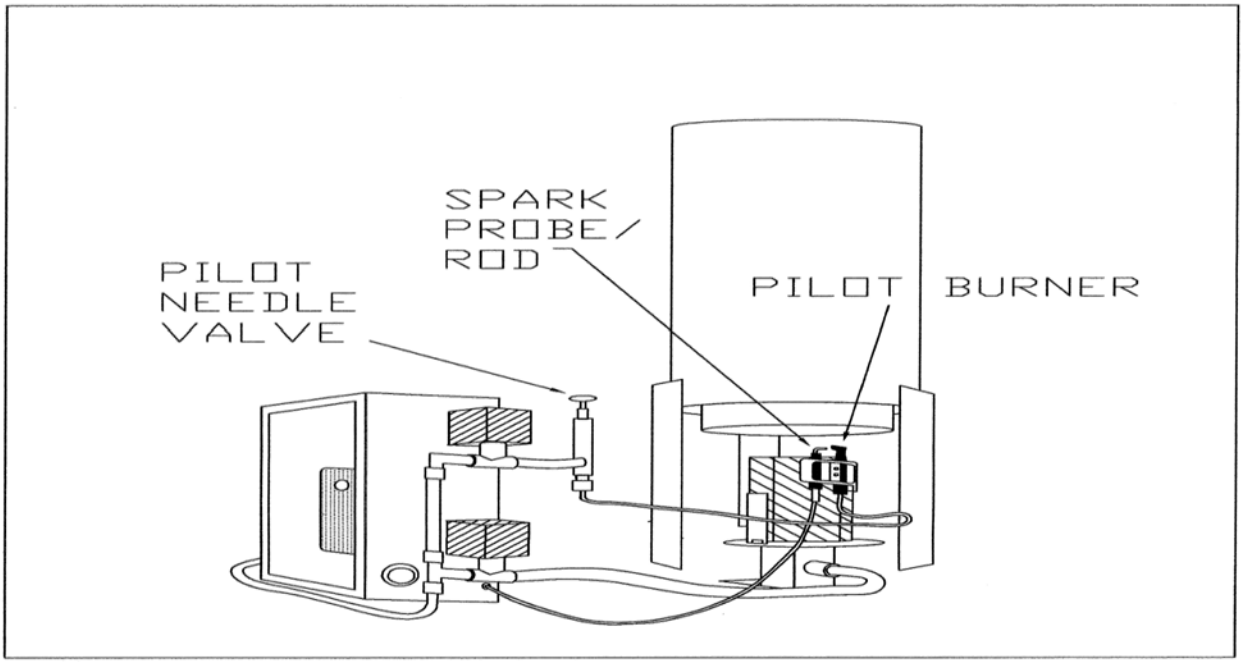
8.6 The processor will not turn on if the vacuum sensor/switch is satisfied. Therefore, any air in the vapor piping will need to be purged so the processor stages can ignite when storage tank vacuum decays. To purge this air and replace it with vapor, use 2 short pieces of wire and jump the circuit from Terminal [1] to [6] and [6] to [7] at the terminal strip inside the electrical panel inside the processor. Note on the ELECTRICAL SCHEMATIC that a [1] to [6] jumper energizes the turbine, igniter, and pilot solenoid. A [6] to [7] jumper energizes the main solenoid. As soon as the air is purged from the vapor piping, approximately 15 minutes, the pilot and main stages will both ignite. As soon as pilot and main ignite, the 2 jumpers must be removed. If so, go to step 8.8. If the stages do not ignite after 15 minutes, go to step 8.7.

8.7 If the pilot and main do not ignite after the jumpers have been connected for 15 minutes, it is probably because there is an air leak in the vapor piping and air is entering as fast as it is being purged.

First remove the jumper wires. To find leak(s), conduct ARB test procedure TP-201.3 and Exhibit 4 (Items to consider when conducting TP-201.3). Check the pipe fittings, vent riser manifold, PV valve, storage tank fill tube caps, dry break gaskets and cover cap gaskets, hoses, nozzles, and vapor valves – any place where air could be entering the UST ullage space. Correct leaks and then go back to step 8.3.

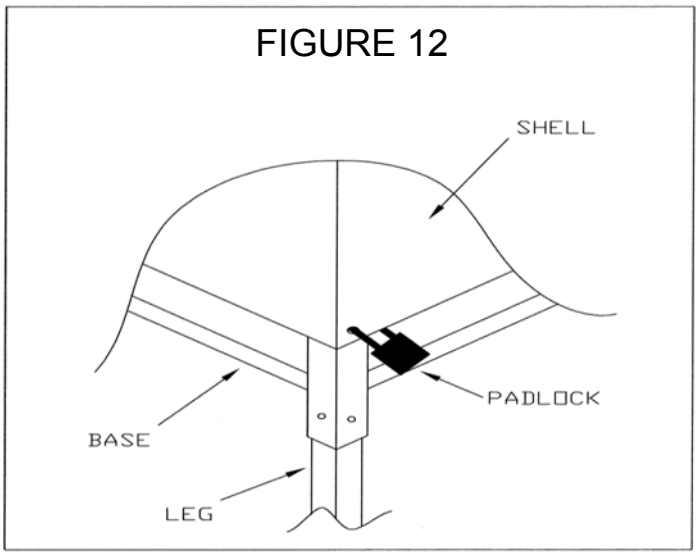
8.8 Check setting of Pilot Needle Valve adjustment. The valve is used to adjust the length of the (2) tongues of flame at the pilot burner. The ideal pilot flames are approximately 1” long, blue in color, with yellow tips. One flame tongue licks the Spark Probe/Rod. The factory setting for the Pilot Needle Valve is 2 1/4 turns open. A small adjustment may be necessary to achieve the ideal flame length. If required, adjust the black knob on the Needle

Valve more open or closed until ideal flame setting is achieved. See FIGURE 11.



8.9 Installation and start-up are now complete. Turn off power to processor. Replace lid on electrical panel, Shell, and Weather Cover. If desired, the station owner can add padlocks to prevent tampering, see FIGURE 12 below. Ensure the 3/4" ball valve at the processor inlet is in the locked open position (Opened to UST Ullage). Turn on power to processor. The processor is now in normal, automatic mode.

FIGURE 12



9. MAINTENANCE INSTRUCTIONS

The Hirt VCS 100 vapor processor must be inspected and tested annually. The technician must complete the Hirt VCS 100 Annual Inspection Checklist (reference section 6 of VR-208 IOM) and leave with the site's maintenance records.

10. REPAIR AND REPLACEMENT OF COMPONENTS

Any Hirt VCS 100 system components which have failed cannot be repaired. Failed components must be replaced. In order to maintain the product warranty, use only genuine Hirt replacement parts. Each component comes with its own written instructions covering replacement and testing to insure proper installation and operation.

11. PRODUCT WARRANTY

- This product has a 12 month warranty, which becomes effective at time of installation or from date of shipment from HCE, if registration card is not returned.
- 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 by HCE voids the above described warranty.

INCON®

Franklin Fueling Systems

Vapor Recovery Monitoring

Installation, Operation, and Maintenance Manual

For use with Hirt VCS100

VRM Software Version 1.1.0

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Inspection of Materials

Visually inspect all components for defects or damage prior to installation. If any defects or damage is found, do not use the product and contact FFS for further assistance.

Return Shipping Charges

FFS will not accept shipments of returned products without a Return Goods Authorization (RGA) number. RGAs are obtained by contacting FFS's Technical Service Division — NO RGAs will be given without the unit's serial number(s). Returned goods remain the property of the buyer until replaced or repaired.

Contacting Franklin Fueling Systems (FFS)

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Madison, WI 53718 USA

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Please visit our Web site at www.franklinfueling.com

Contents

Important Safety Messages

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

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

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

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

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

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

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

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

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

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

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

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

Introduction

The purpose of this manual is to guide installers, operators, and store owners with setting up their INCON Vapor Recovery Monitoring (VRM) system. The VRM system has been tested and approved by the California Air Resource Board as an In-Station Diagnostics (ISD) system per CP-201. This manual introduces the user interface then proceeds to setup and lastly, maintaining your VRM system.

For installation of the TS-550, TS-5000, TS-EMS and its components please refer to the *TS-5xxx Series Installation Guide* (p/n 000-2150).

Certified Contractor Requirements

Please read this entire manual carefully. Failure to follow the instructions in this manual may result in faulty operation, equipment damage, injury or death.

Contractor Certification Levels

- LEVEL I - Automatic Tank Gauge Installer Certification Training
- LEVEL II - Automatic Tank Monitor Start-Up and Service/Warranty Certification Training
- LEVEL III - LLD Installer/Service/Warranty Certification Training
- LEVEL IV - TS-STS Operation/Repair Test
- LEVEL V - Vapor Recovery Monitoring Installation/Operation

Certified Programmer/Service Person: Only an INCON certified VRM Technician or service person is allowed to make setup changes, clear alarms, and access areas internal to the Console. A certified contractor needs to have completed training levels I, II, and V.

Station Owner/Operator: The station owner or operator of the console is only allowed to print reports and re-enable dispensers. Making setup changes, clearing alarms, and accessing areas internal to the console is strictly prohibited.

Definitions and Acronyms

A/L – Air over Liquid ratio, this ratio is calculated at the end of the day for each fueling point.

ATG – Automatic Tank Gauge

CARB – California Air Resources Board

EVR – Enhanced Vapor Recovery

GDF – Gasoline Dispensing Facility

ISD – In-Station Diagnostics. This refers to the whole system as defined in CP-201.

ISP – Internet Service Provider

LLD – Line Leak Detector

Modules – These are the different plug-in cards within the TS-5xxx series console enclosure. They are the inputs and outputs for all the field wiring.

Console – The console is the physical box installed on the wall. The system console holds the entire electronic slide in modules and runs the general operating system. The VRM application is available in the TS-550/EMS/5000 models of the console.

PLC – Power Line Communication. This refers to the technology of transferring digital data over AC power lines

TS-VFM – Vapor Flow Meter

TS-VPS – Vapor Pressure Sensor

TSA – Tank Sentinel Anyware is the web-based interface to the console.

VRM – Vapor Recovery Monitoring is the application that runs on the console and performs In-Station Diagnostics.

Related Documents

000-2144, *TS-VFM Installation Guide*

000-2143, *TS-VPS Installation Guide*

000-2150, *TS-5xxx Installation Guide for TS-5, TS-550, TS-5000, and TS-EMS*

000-2142*, TS-5xxx Programmer's Guide for TS-5, TS-550, TS-500, and TS-EMS*

000-2151*, TS-5xxx Operator's Guide*

CP-201, *Certification Procedure for Vapor Recovery Systems at Gasoline Dispensing Facilities*

TP-201.3, *Determination of a 2" Static Pressure Performance of Vapor Recovery Systems of Dispensing Facilities*

TP-201.5, *Air to Liquid Volume Ratio*

Product Description

Vapor Recovery Monitoring

The Vapor Recovery Monitoring System (VRM) consists of the following components.

Vapor Recovery Monitoring Application[1]

The Vapor Recovery application uses data from the Vapor Flow Meters (VFMs) and the Vapor Pressure Sensor (VPS) to perform assessments on the site's vapor recovery system. VRM is an optional application on the console and may be accompanied by Fuel Management System or Secondary Containment Monitoring.

Console

The Console consist of either the TS-550 or TS-5000 Fuel Management Systems or the TS-EMS, Environmental Monitoring System. The console options for ISD monitoring will always include the VRM application and at least one of each of the following components. (See Figure 1)

- AC Input Module
- Relay/10A Relay Module
- Probe Module
- 4-20mA Module
- Dispenser Interface Module
- Printer
- Touchscreen

Vapor Flow Meter

The Vapor Flow Meter (TS-VFM) is a volume measuring meter. When a mixture of air and gasoline vapors are returned from an automobile's gasoline tank to the underground storage tank during a dispense, the vapors are measured and analyzed. The console uses the Vapor Flow Meters to monitor for a 50% reduction of vapor return as compared to the amount of fueling being dispensed. The VFM is used to perform the following CP-201 assessments.

Assessment Type	Duration	EVR System	Threshold
Daily Vapor Collection	Daily	Balance	50% reduction in vapor return

There shall be one VFM per dispenser, and they wire into the Probe Module. Refer to document Vapor Flow Meter Install Guide (p/n 000-2144) for installation methods.

Vapor Pressure Sensor

The Vapor Pressure Sensor (TS-VPS) is a low vapor pressure transmitter. The primary purpose of the VPS is to continually measure the underground storage tank's vapor containment pressure. This vapor containment area includes the tank ullage area, and the vapor piping. The VRM continually samples the VPS and performs assessments for Over Pressurization and leakage in the vapor containment area.

Assessment Type	Duration	Threshold
Weekly Over-pressurization	Calendar Week	Pressure > 1.3" wcg for 5% of week
Monthly Over-Pressurization	Calendar Month	Pressure > 0.3" wcg for 25% of month
Weekly Leak Test	Calendar Week	Pressure Leak is greater than 2x TP-201.3

There is only one VPS per ISD installation. The VPS connects to the 4-20mA Module, refer to the Vapor Pressure Sensor Install Guide (p/n 000-2143). The pressure sensor shall be installed in the dispenser closest to the underground storage tanks.

[1] INCON TS-VRM software version 1.1.0 is approved for, and shall be used and installed only with uni-hose dispensers

AC Input Module

The AC Input Module is used to monitor the dispenser hook signals. Dispenser hooks are the signals from the dispensers that are normally used to activate the submersible pumps. For the VRM application they are also used to signal the start and end of a transaction for gasoline products only. Vapor Recovery does not apply to Diesel and Kerosene products so the hook signals for these grades do not need to be monitored. Dispenser Hook Signals are to be wired to the AC-Input Module and the installation directions are in the *TS-5xxx Installation Guide* (p/n 000-2150).

Dispenser Interface Module

The Dispenser Interface Module (TS-DIM) is used to acquire the volume of gasoline that was pumped during each transaction. Refer to the *TS-5xxx Installation Guide* (p/n 000-2150) for wiring the TS-DIM.

Ullage Volume

The VRM system uses ullage volume for performing vapor containment leak detection. The console gathers ullage volume from the internal inventory probes or an external ATG. When using an existing ATG for collecting ullage, the ATG must have an available RS-232 port and have the ability to respond to the TLS-250 or TLS-350 inventory command.

Relay/10A Relay Module

Power to the dispensers will be controlled by the console in the event of a VRM Failure alarm. The dispenser power is to be wired through the Relay Module per the installation directions in the *TS-5xxx Installation Guide* (p/n 000-2150). Electrical current through the Relay Module is not to exceed the maximum rated value of 2 amps. If options in the dispensers will cause the current to exceed 2 amps, then the 10A Relay module will need to be used instead. See the *TS-5xxx Installation Guide* (p/n 000-2150) for installation instructions for the Relay Module and 10A Relay Module.

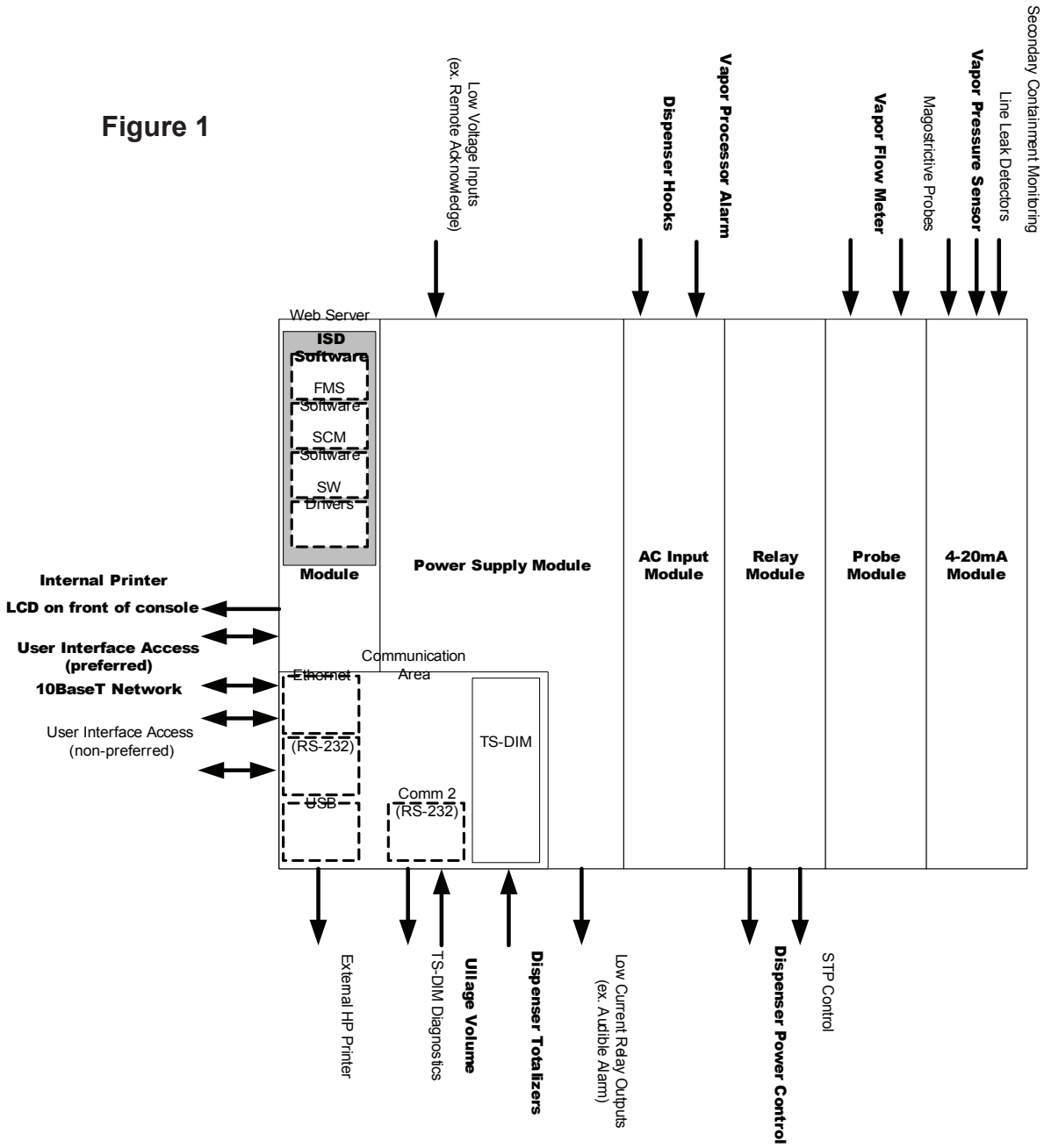
Alarms

The user will be automatically notified of VRM or other system alarm conditions via the alarm LEDs and touchscreen display. An audible alarm will sound and the system can also be setup to print or E-mail alarms (Ethernet connection required). Dispenser power is controlled by VRM and cannot be disabled.

VRM System Specification

The required equipment to be installed for the INCON VRM system is discussed below. Figure 1 shows the different components and where they attach to the Console. All items in bold are items directly related to the VRM application.

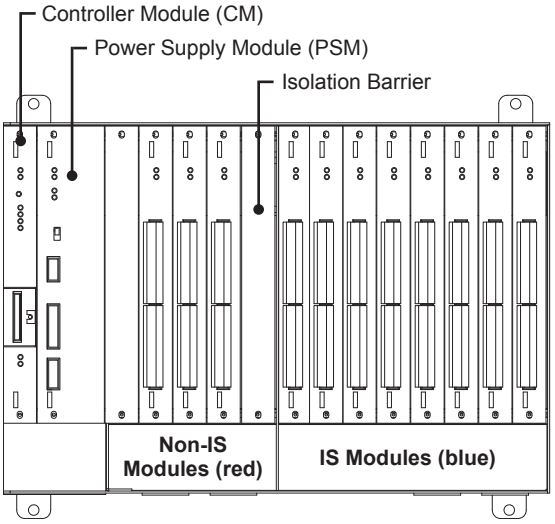
Figure 1



Installation & Startup

TS-550/5000/EMS Console Installation

The console will be shipped with all modules installed and tested. Refer to the *TS-5xxx Installation Guide* (p/n 000-2150) for mounting and wiring instructions.



TS-5000 (front view with cover removed)

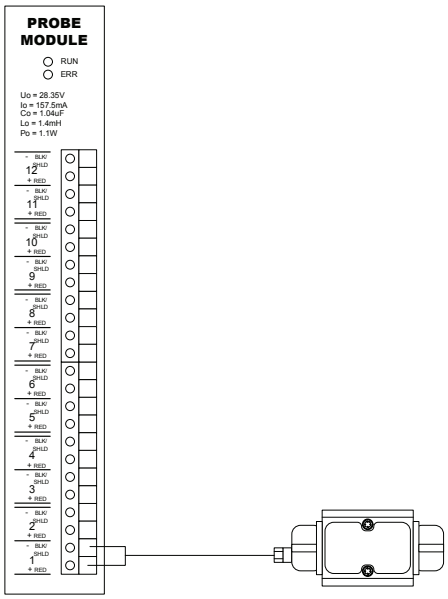
TS-VFM Installation

Field Installation

To mount the Vapor Flow Meter (VFM) in the dispenser and make the field wiring connections, follow the instructions in the *TS-VFM Install Guide* (p/n 000-2144).

Console Wiring

See Probe Module diagram at right. The VFM is wired to the Probe Module inside the Console. Wire the Red wire to the + terminal and the Black wire to the – terminal.



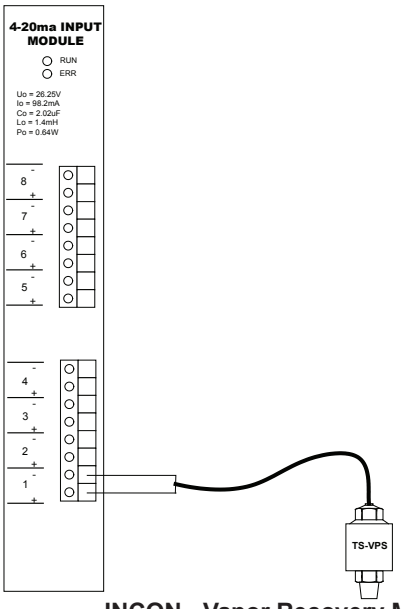
TS-VPS Installation

Field Installation

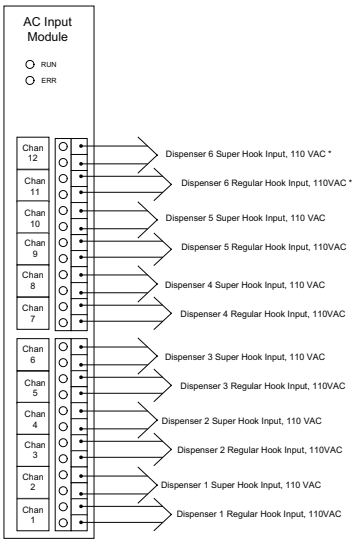
To mount the Vapor Pressure Sensor (VPS) and make the field wiring connections, follow the instructions in the, *TS-VPS Install Guide* (p/n 000-2143). There will be only one pressure sensor per ISD System.

Console Wiring

See diagram at right. The VPS is wired to the 4-20ma Module inside the Console. Wire the sensor's Black wire to the + terminal and the sensor's White and shield wires to the - terminal.



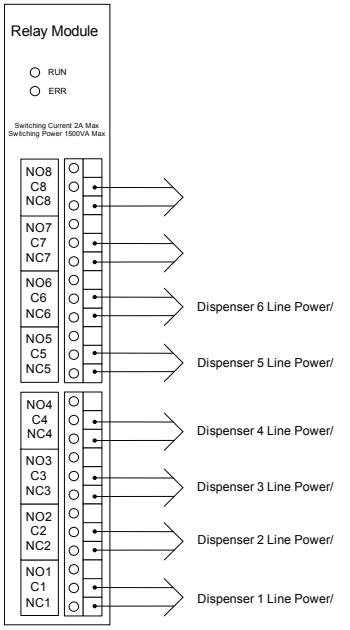
There are several different wiring schemes that may be encountered when connecting the AC Input Module and Relay Module. These are dependent upon the use of optional features like Dispenser Hook Isolation, Line Leak Detection (LLD) and Turbine Pump Interface that can affect the way these modules are wired. The description below assumes that this is strictly a VRM system that is sensing the dispenser hook signals from gasoline products only and not controlling the Submersible Turbine Pumps. For more information on the different wiring options see the *TS-5xxx Installation Guide* (p/n 000-2150) or contact Franklin Fueling Systems Technical Support at 1-800-984-6266.



Dispenser Hook Signals

The dispenser hook signals are sampled by the AC Input Module so that the VRM can monitor the start and end of gasoline sales transactions. Follow the instructions below to tap into the Dispenser Hook Signals with a parallel wire to the AC Input Module. This method will not take control of the Submersible Pumps.

1. Locate the gasoline product only dispenser hook signals at a point where they are still separated by dispenser. This may be a dispenser hook isolation box or other method or they may just all be connected with a wire nut.
2. Separate them by dispenser number then by fueling grade.
3. Connect a wire in parallel from the line and neutral of each dispenser hook signal to the AC Input Module. All existing wiring should remain as is.
4. When wiring the Dispenser Hook signals to the AC Input Module, make dispenser 1 signals (all gasoline grades) go to the first set of terminals. For example, if there are two hooks per dispenser (Regular and Super) then wire Dispenser 1 to positions 1 & 2, then Dispenser 2 to positions 3 & 4.
5. If the dispenser hook signal fills up an entire AC input module, a second AC input module will be needed.



Dispenser Power Control

In order for the console to shutdown a dispenser or all the dispensers in response to an alarm condition, the dispenser power must be routed through the Relay Module. Run the Dispenser Power into the Common and out of the Normally Closed contact of each required Relay Module channel.

The Relay Module is rated for 2A of continuous current. If the dispenser options created a need for more than 2A, then the 10A Relay Module will be needed. It is a good practice to wire the dispenser power in a logical order such as Dispenser 1 to Relay Channel 1, Dispenser 2 to Relay Channel 2, etc.

Vapor Processor Connection

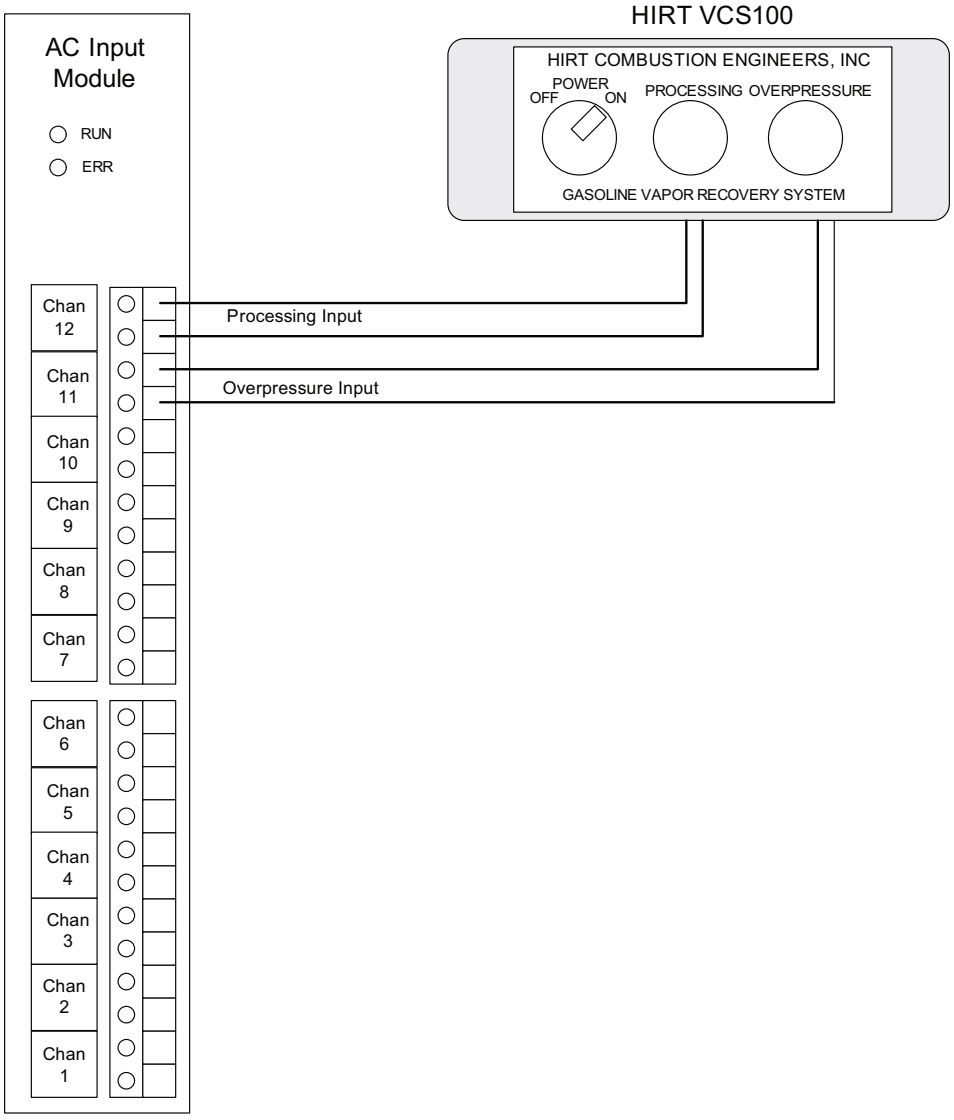
The ISD system monitors the VCS100 through two high voltage inputs and a pressure based monitoring. Two input lamps need to be wired to the AC Input Module for monitoring of run time and alarm state of the VCS100. The first input signals to the ISD system when the VCS100 is running and is called the Processing Lamp. The second input signals when the VCS100 is in alarm or the input has lost power and is called the Overpressure Lamp. If the Overpressure Lamp goes to 0 VAC, then the ISD system will issue a Vapor Processor Warning alarm. This alarm is cleared when the input signal goes back high.

The ISD system also has a pressure monitoring function to ensure the VCS100 is running and processing vapors. The ISD system monitors on a daily basis that the 90th percentile pressure does not exceed 2"WCG. If the pressure does exceed 2”wcg then a Vapor Processor Malfunction Warning will be generated at the ISD assessment time. If a second consecutive day the 90th percentile pressure exceeds 2"WCG, then the ISD system will issue a Vapor Processor Malfunction Failure and shutdown all fueling points.

Wiring Input Lamps

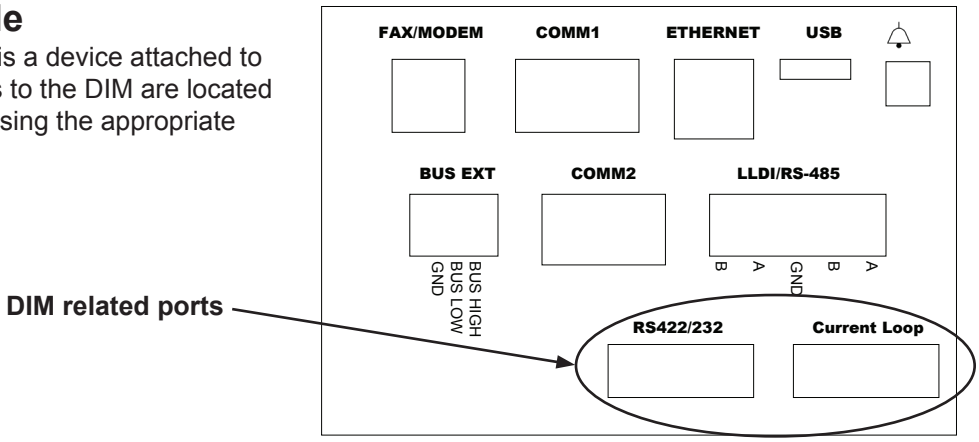
Two input lamps need to be wired to the AC Input Module for monitoring of run time and alarm state of the VCS100.

1. The connection of the VCS100 must be made to the AC Input Module after all the dispenser hook signals have been assigned.
2. Wire the Line Voltage and Neutral from the processing lamp to a spare input channel.
3. Wire the Line Voltage and Neutral from the Overpressure lamp to a spare input channel.



Dispenser Interface Module

The Dispenser Interface Module (DIM) is a device attached to the Power Supply Module. Connections to the DIM are located on the bottom left side of the Console using the appropriate cable kit based on the dispenser type.



Ullage Volume Input

The console can gather ullage volume from either the internal inventory probes or from existing inventory probes through an External ATG.

Using Internal Magnetostrictive Probes

To use internal magnetostrictive probes, you must have Fuel Management System (FMS) enabled in the registration.

See the TS-5xxx Programming Manual for instructions for programming the FMS section. The FMS section must be programmed before the VRM section.**Using an External ATG**

There are certain requirements in order to retrieve ullage volume from an external ATG.

- Continuous access to a RS-232 connection
- Ability to respond to one of the following serial Commands:

  Command: **i201TT** - *In-Tank Inventory Report, TLS-350 command set*

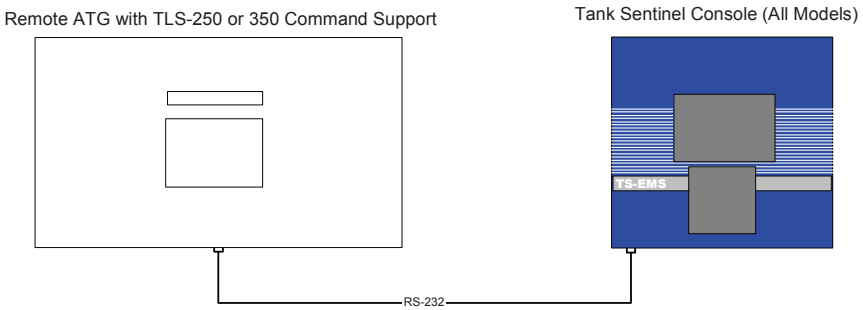
  Command: **10T** – *Inventory Report*, TLS-250 command set
- Serial Cable with the following specifications:

  Cable must be a 'Null' Serial

  DB9 Male (INCON Console) to either DB25 Male or DB9 Male (ATG)

Use the following steps to connect an External ATG to a Console:

1. Connect the DB9 male end of the cable to Comm 2 on the Console.
2. Connect the other end of the cable to the serial port of the External ATG.
3. Set the serial port parameters to match between the Console and the External ATG, see *TS-5xxx Setup Programming Guide*.
4. Validate there is no "External ATG Communication" alarm.



Note: A DB25 to DB9 Null Serial Cable may be purchased from INCON, PN 600-0099. See the *TS-5xxx Series Installation Manual* "Communication Ports" section for pinouts of Comm Port 2.

Setup and Programming

Startup

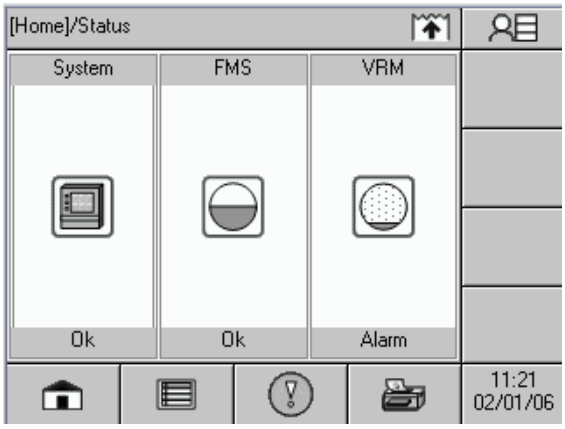
Upon completing the installation of the Vapor Recovery Monitoring (VRM) System and powering up the Console, programming the setup is the next step.

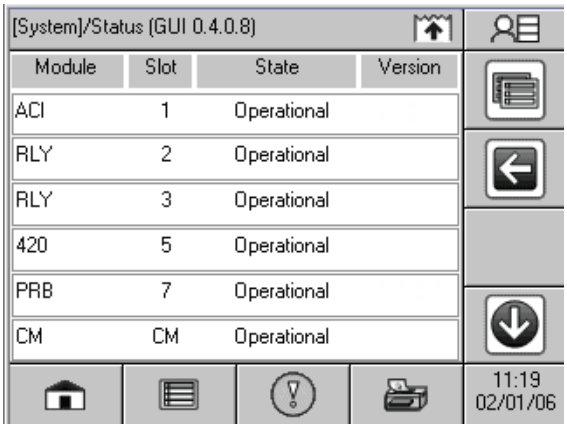
System Status

The Console will arrive at the site with the VRM application already enabled. Upon first powering up the console you may see a screen that looks like the one in Figure 2a. The system with the screen in Figure 2a has the VRM application as well as the Fuel Management System (FMS) application enabled. These applications are set by a registration key at the time of purchase.

The first step before programming the VRM is to check to see if all the modules are powered up and operational. Select the ***System*** box which brings up the ***System Status*** page as shown in Figure 2b.

Figure 2a and 2b





Verify all the modules are present and operational. If all the modules are “Operational” then you may proceed to setup and programming. If not, refer to the Alarm Codes and Troubleshooting section of this manual.

Programming the Console for Vapor Recovery Monitoring

The following programming instructions are specifically intended for the Vapor Recovery Monitoring (VRM) System. For additional programming refer to the *TS-5xxx Programming Manual* (p/n 000-2142). This manual covers both the hardware programming and the application programming. The method shown below is the same whether the user programs through the local touchscreen or a Web Browser. Inclusion of other options like the FMS application, Dispenser Hook Isolation and Line Leak Detection (LLD) will effect the programming of the VRM system. The *TS-5xxx Programming Manual* (p/n 000-2142) describes the proper programming and sequencing for the console setup. The following sections show how to program the setup as it relates to the VRM system. Contact Franklin Fueling Technical Support at 800-984-6266 for assistance with these applications.

INCON TS-VRM software version 1.1.0 is approved for, and shall be used and installed only with uni-hose dispensers.

Dispenser Hooks Mapping

Mapping the gasoline dispenser hooks signals correctly is important for the VRM to properly identify active fueling points. The dispenser hooks must be wired correctly as explained in the *TS-5xxx Installation Guide* (p/n 000-2150).

Group Name			Parameter Name	Parameter Value	Explanation
AC Input Modules			Number Gasoline Hooks per dispenser	2 or 3	Select the number of gasoline hooks coming from each dispenser
	Module #		Channels	(n)	Select number of gasoline dispenser hook signals available from each dispenser. The Vapor Recovery Monitor does not use any non-gasoline products.
		Channel #	Name	Ex. Dispenser 1 Hook Regular	Unique name for the hook signal
			Enabled	Yes	Select “Yes”
			Active High	Yes	Set to “Yes”
			Action	None	The VRM application automatically generates an action

Input Setup for Vapor Processor

The AC Input Module is the input device for a balance vapor processor run input and alarm input. The following example shows how to setup the inputs on the console for a VCS100 vapor processor.

Group Name			Parameter Name	Parameter Value	Explanation
AC Input Modules					
	Module #		Channels	2	Two channels need to be configured for a balance vapor processor.
		Channel 1	Name	Ex. VCS100 Processing	This channel would have the runtime input wired to it.
			Enabled	Yes	Select “Yes” to enable the channel.
			Active state	High	Select “High” for run time.
			Action	None	Select none, the VRM application automatically generates an action.
		Channel 2	Name	Ex. VCS100 Overpressure	This channel would have the alarm input wired to it.
			Enabled	Yes	Select “Yes” to enable the channel.
			Active state	Low	Select “Low” if the alarm is active high.
			Action	None	Select none, the VRM application automatically generates an action.

Vapor Flow Meter Select

The Vapor Flow Meter (VFM) select is located under the Probe Module. This is where we define the number of input channels and select the VFM. Go to the Probe Module setup and make the following changes. If the FMS application is also running, some of the channels will be designated for probes.

Group Name			Parameter Name	Parameter Value	Explanation
Probe Modules					
	Module #		Channels	(n)	Select the number of flow meters/probes at the site
		Channel #	Name	Ex. VFM Disp 1	Unique name for Vapor Flow Meter
			Type	TS-VFM	Select Vapor Flow Meter type

Vapor Pressure Sensor Select

The Vapor Pressure Sensor (VPS) Select is located under the 4-20mA module setup. This is where we define the input channel and select the VPS. Go to the 4-20mA Module setup and make the following changes. If Electronic Line Leak detection is being installed, some channels will be used for the LLD transducers.

Group Name			Parameter Name	Parameter Value	Explanation
4-20mA Input Modules					
	Module #		Channels	(n)	Select “1” for the Vapor Pressure Sensor
		Channel #	Name	Ex. ISD Pressure Sensor	Unique name for VPS
			Service Type	Vapor Recovery Monitor	Select correct service type for application

Remote ATG Serial Port Settings (for External ATG method)

If the Console will be getting ullage volume from a Remote ATG then the serial port must match that of the other tank gauge.

Group Name		Parameter Name	Parameter Value	Explanation
Power Supply Module				
	COMM 2	Baud Rate	9600	Set to match External ATG
		Data Bits	8	Set to match External ATG
		Parity	None	Set to match External ATG
		Stop Bits	1	Set to match External ATG
		Response Timeout	8	Leave as default

Relay Mapping

Relay mapping is necessary for proper shutdown of dispensers. The programming of the Relay Module will tell the VRM which Vapor Flow Meter will control which Dispenser. As you will see this is why we enter a unique name for each Flow Meter so we can easily identify the channel.

Note: By mapping the relay to the VFM in the following setup, we now enable the VRM to automatically shutdown dispensing upon ISD alarms.

Group Name			Parameter Name	Parameter Value	Explanation
Relay Module					
	Module #		Channels	(n)	Select number of dispensers
		Channel #	Name	Dispenser 1 Power	Unique name for relay’s purpose
			Enabled	Yes	set to “Yes”
			Type	Dispenser	Set to “Dispenser”
			Polarity	Normal	Set to Normal
			Logic	OR Logic	Set to OR
			Physically Wired As	Normally Closed	Set to Normally Closed
			Number of Inputs	1	Set to 1
		Input 1	Type	Probe Module	Select Probe Module
			Channel	VFM Disp 1	Select the VFM associated with this Dispenser

Additional relays may be used for other purposes such as submersible pump control or external alarms. See the *TS-5xxx Installation Guide* (p/n 000-2150) for more information.

Dispenser Interface

The Dispenser Interface setup is where the Dispenser Interface Module is programmed. For this setup, you will need to know what kind of D-Box the Dispenser Interface module is connecting up to and what type of communication interface it is using. For more information on the installation and setup of the Dispenser Interface Module, see the *TS-5xxx Installation Manual* and *TS-5xxx Setup and Programming Manual*.

Group Name	Parameter Name	Parameter Value	Explanation
Dispenser Interface			
Precision	Volume Precision	3	Leave as default
	Dispenser Volume	Gross	Leave as default
Dispenser Interface Module			
DIM 1	Type	Wayne	Select Dispenser Manufacturer
	Communication	Current Loop	Select type of Communication Method
Grades	Number of Grades	3	Select number of different gasoline only grades at facility
Grade 1	Name	Regular Unleaded	Enter a Name for the Grade
Grade 2	Name	Premium Unleaded	Enter a Name for the Grade
Grade 3	Name	Super Unleaded	Enter a Name for the Grade
Fueling Points	Number of Fueling Points	12	Enter the number of gasoline fueling points
Fueling Point 1	Number of Hoses	3	
Hose 1	Grade Association	Regular Unleaded	Select a Name for the Grade
	Position	0	Select position of Grade
Hose 2	Grade Association	Premium Unleaded	Select a Name for the Grade
	Position	1	Select position of Grade
Hose 3	Grade Association	Super Unleaded	Select a Name for the Grade
	Position	2	Select position of Grade
Fueling Point 2	Number of Hoses	3	

Vapor Recovery Monitoring Setup

This is the final setup to get the Vapor Recovery Monitor (VRM) to work properly. This is where we select the type of vapor recovery system and call in the appropriate external sensors.

Group Name	Parameter Name	Parameter Value	Explanation
Vapor Recovery Monitor	Method Type	**Balance**	Select balance method type.
Dispenser Configuration	Type	Wayne or Gilbarco	Select the dispenser model
	Number of Dispensers	0 (1 to 48)	This is equal to the number of flow meters installed
Dispenser 1	Flow Meter	Unique Name	Select Meter by name from list of enabled meters
	First Fueling Point	1	Select correct fueling points for dispenser number.
	Second Fueling Point	2	Select correct fueling points for dispenser number.
Grades			
Regular Unleaded	Include in Vapor Recovery	Yes	Select all the gasoline grades and exclude all non-gasoline (ex. diesel)
Premium Unleaded	Include in Vapor Recovery	Yes	Select all the gasoline grades and exclude all non-gasoline (ex. diesel)
Super Unleaded	Include in Vapor Recovery	Yes	Select all the gasoline grades and exclude all non-gasoline (ex. diesel)
Ullage Pressure Input	Sensor	Sensor name	Select the correct sensor name
Ullage Volume Input	Acquire Ullage	Internal, external	Select internal if using LL2 probes or external if connected to remote ATG.
	Security Code	Blank	If the serial port requires a security code
	Number of tanks	#	Select the number of tanks installed at the site, including diesel.
	Tank Capacity	10,000	Combined capacity of gasoline tanks in gallons
Pressure Management System	Enabled	Yes or No	Yes
	Type	EMCO-VCS100	Select EMCO VCS100
	Run Input Module	AC Input Module	Select the AC Input module
	Run Input Channel	VCS-100 Processing	Select the Processing Lamp Input
	Active Run State	High	Select high
	Alarm Input Module	AC Input Module	Select the AC Input module
	Alarm Input Channel	VCS-100 Overpressure	Select the Overpressure Input
	Active Alarm State	Low	Select Low

Managing Rules

Alarms will be generated automatically and can be seen on the touchscreen display or the Alarm pages on the web browser. These alarms can be programmed to generate various outputs based on the Rules setup.

Note: VRM alarms will automatically disable dispensers and this feature cannot be turned off per CP-201 requirements.

Additional actions can be created by setting up Rules. Rules are the way to create actions and notifications based on specific events change. Events are the inputs to the rule, for example it can be a failed test or a sensor gone bad, but it can also be a simple test completion notification. Actions are the outputs for the Rules, for example you can program the console to send e-mail, trip relays, or sound alarms. The Rules are entirely flexible and allow stations owners to customize the alarm notification process.

There are three default rules enabled on the Console. These rules all have actions to sound the internal audible alarm. These rules can be disabled or can have their action changed. New Rules can be added for complete customization for notification. Below is an example of a new rule that will e-mail a notification on any new VRM alarm. A more descriptive explanation on Rules can be found in the *TS-5xxx Programming Guide* (p/n 000-2142).

Rules

Variable					+ or -	Explanation
Rules					+	
	Rule – Power On »					Default Rule, Internal audible alarm output
	Rule – Application Events »					Default Rule, Internal audible alarm output
	Rule – New Alarm Occurred »					Default Rule, Internal audible alarm output
	Rule – New Rule #1				-	
		Name				Enter a name for the rule. Once entered, the name will appear next to the above Rule.
		Enabled				Select whether the rule is to run or not
		Events			+	By pressing the + sign, you can have one or multiple events
			Event		-	Below is an example of a new rule to send an email for any new VRM alarms
				Type		Select “New Alarm Occurred”
				Category		Select VRM
				Code		Select “Any”
				Device		Select “Any”
				State		Select “Active”
		Actions			+	
			Action		-	
				Type		Select “E-Mail” (See next section for setting up email notification)
				Address		Enter in your email address
				Content		Select “Generated” to have the Console automatically produce the contents in the email. Otherwise you can have the email contain exactly what you specify.
				Template		Select “HTML”. You can have either a text or HTML email.

Setting Up E-mail Notification

The E-mail notification is a feature that allows store owners and managers to receive e-mails from their console. These e-mails include alarms, events and test results. In order for the system to send e-mails and text messages based on the Rules configurations, certain parameters need to be configured. These parameters will tell the console how to transmit e-mails to the outside.

Email

Variable	Description
"From" Address	Unique e-mail address to identify the VRM console (e.g. Site@city.state)
SMTP Host	This is to be provided by network administrator or ISP
SMTP Port	Check with network administrator or ISP
Enable Authentication	Some e-mail providers require authentication in order to send e-mails. See Internet Service Provider
Maximum Queue Size	The number of e-mails that can be waiting to be sent
Retry Timeout	The number of seconds to wait between failed tries. Default is 3600 seconds or 1 hr.
Watchdog Timeout	This is the inactivity timeout.

System Operation

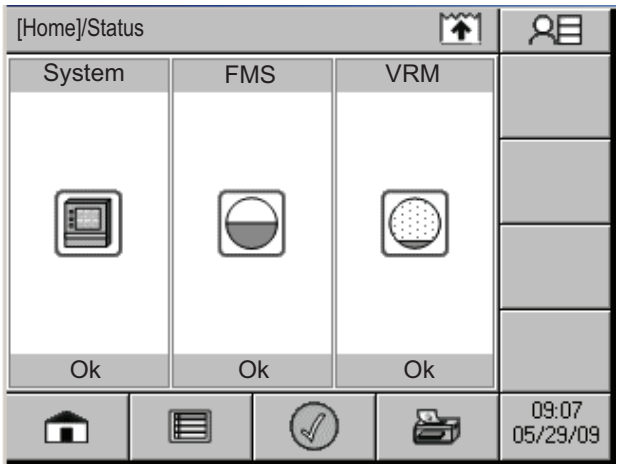
Run-Time Status

The VRM application has several useful run–time menus to check status or to get current test status.

Home»Status

The home-status page shows the current status of all applications running in the Console, see Figure 3. Depending on the applications that are running on the console, the Home-Status will display only the ones enabled. In Figure 3 below, we have FMS (Fuel Management System), and VRM (Vapor Recovery Monitoring). At anytime you can get to the Home Status menu by pressing the **Home Box**.

Figure 3 – Home Status LCD View



System»Status

The System-status window shows the state, slot location, and module version number of each module inside the physical console.

VRM»Status

The VRM-Status window gives the current status of each Vapor Flow Meter, pressure sensor, and other VRM related data. See Figure 5b.

Vapor Recovery Web Pages

VRM Status Page (Web Page View)

The ***VRM»Status*** page will show up to date status for each fueling point. The status is based on the previous days results. In the Current Status column a Pass (✓), Failure (**X**), Warning (**!**), or Insufficient (*****) symbol will show up for each fueling point. The final assessment for each fueling point will occur at the end of the day and can be viewed in the ISD reports. The following describes the remaining information in the VRM status page. Refer to Figure 4 - VRM Status Page.

Auto Refresh: The LCD automatically refreshes the screen with the latest data. Using the web version, the VRM Status page has an optional Auto Refresh mode and can be enabled by selecting the “Auto Refresh” link in the upper right-hand corner. The default refresh rate is set to 30 seconds but can be changed to a faster or slower rate. To change the refresh rate go to the ***Preferences*** page.

Dispenser: This is the dispenser number as associated with the Point of Sale system.

Dispenser Status: Shows the activity of the dispenser, Idle (or inactive), Dispensing, or Shutdown. This status is linked to the dispenser hook signals only.

TS-VFM: Shows the state of the vapor flow meters and is only in the web-based view. There are four possible states:

Operational – The VFM has no alarms

Missing – The VRM has lost communication with the vapor flow meter. This may occur during an open circuit or the vapor flow meter is not installed on the port in which it was programmed for.

No Data – The VRM is unable to understand the input data. This may occur when a port is programmed for a flow meter but a magnostrictive probe is connected instead.

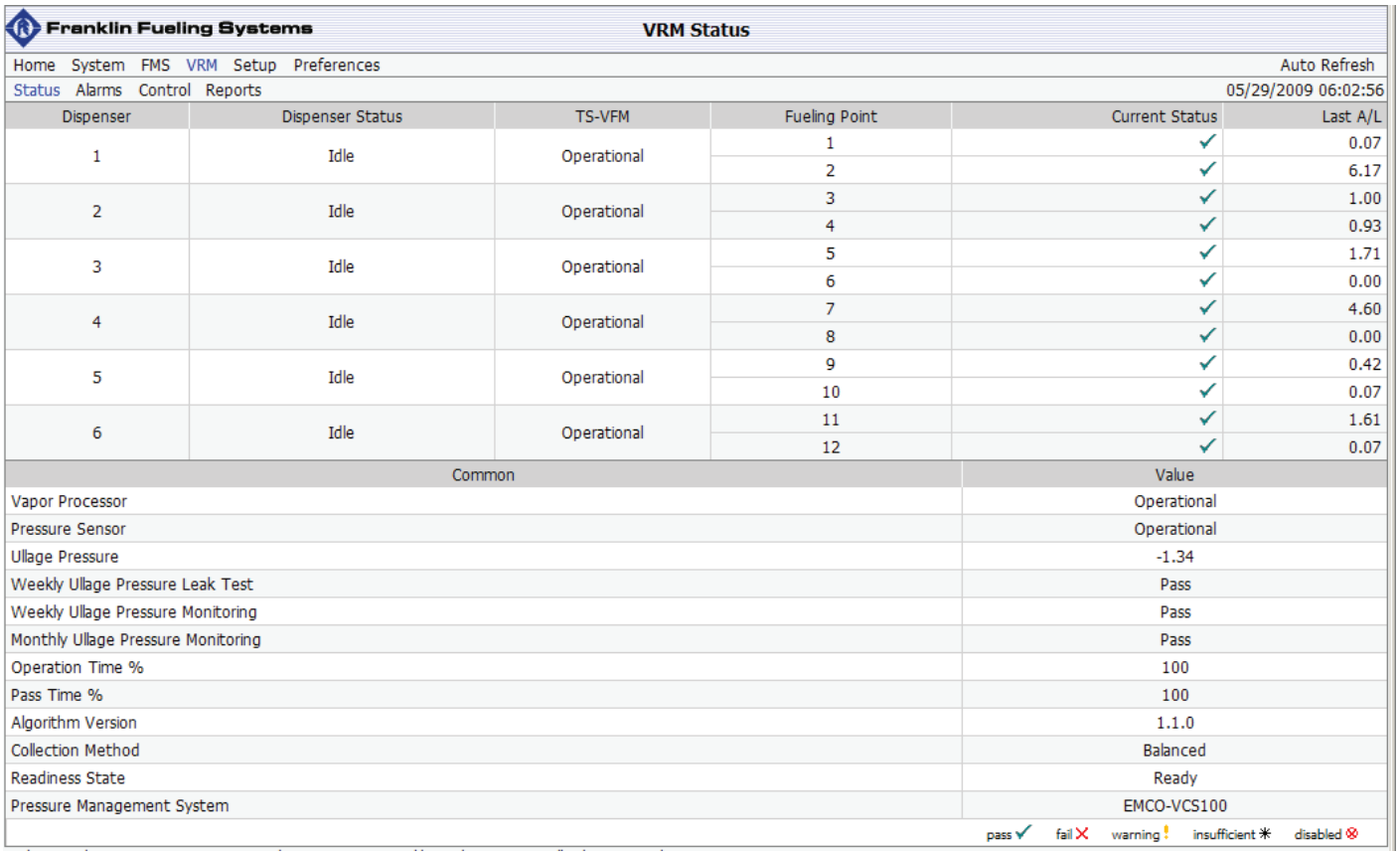
Error – The flow meter data was not sent correctly. This may occur when with excessive noise in the system or it is an indication that the flow meter is not functioning correctly.

Fueling Point: This is the assigned fueling point number from setup.

Current Status: The current status shows what state the fueling point is in with respect to the VRM. One of the four symbols will be displayed for each fueling point and is based on the previous day's result.

Last A/L: This value is the fueling point's last calculated A/L ratio result. The value is based only on a single transaction.

Figure 4 - VRM Status Page



Franklin Fueling Systems — VRM Status

Home System FMS VRM Setup Preferences — Auto Refresh

Status Alarms Control Reports — 05/29/2009 06:02:56

Dispenser	Dispenser Status	TS-VFM	Fueling Point	Current Status	Last A/L
1	Idle	Operational	1	✓	0.07
			2	✓	6.17
2	Idle	Operational	3	✓	1.00
			4	✓	0.93
3	Idle	Operational	5	✓	1.71
			6	✓	0.00
4	Idle	Operational	7	✓	4.60
			8	✓	0.00
5	Idle	Operational	9	✓	0.42
			10	✓	0.07
6	Idle	Operational	11	✓	1.61
			12	✓	0.07

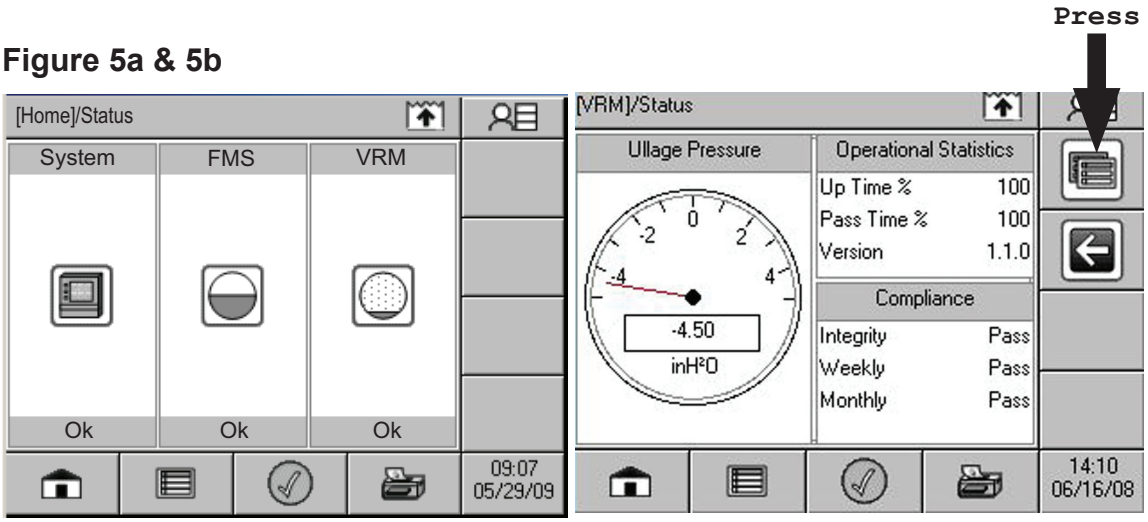
Common	Value
Vapor Processor	Operational
Pressure Sensor	Operational
Ullage Pressure	-1.34
Weekly Ullage Pressure Leak Test	Pass
Weekly Ullage Pressure Monitoring	Pass
Monthly Ullage Pressure Monitoring	Pass
Operation Time %	100
Pass Time %	100
Algorithm Version	1.1.0
Collection Method	Balanced
Readiness State	Ready
Pressure Management System	EMCO-VCS100

pass ✓ fail ✗ warning ! insufficient ✳ disabled ⊗

VRM Status (LCD View)

The LCD view provides the same information as the web page but is broken into two different screens. The VRM-Status on the LCD will show the real time information for the ullage pressure and last run pressure test results as shown in Figure 5a & 5b. The VRM-Dispenser is the second screen which shows current status of the dispensers as shown in Figure 6a & 6b.

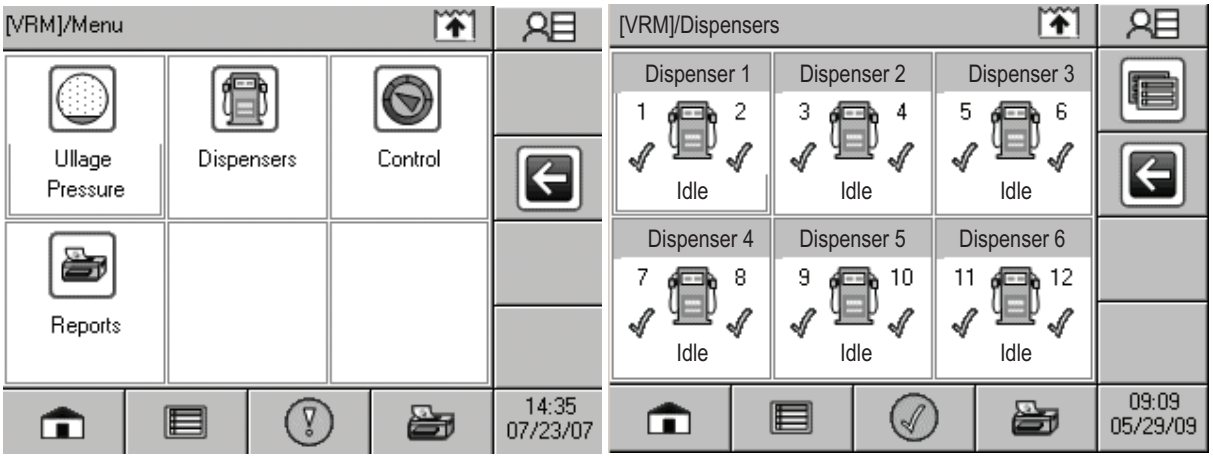
Figure 5a & 5b



VRM»Dispensers (LCD View)

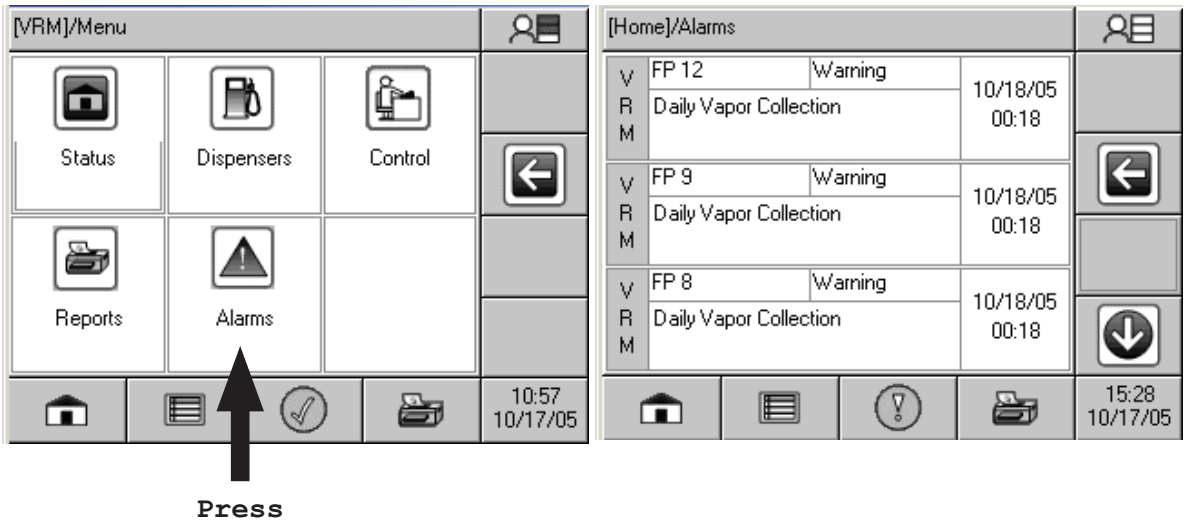
By pressing the Application Menu button  in the upper right-hand corner of the ***VRM»Status*** screen it will bring you to a page of several submenus for VRM. The Status box is the same page as shown in Figure 5b. The Dispensers page will bring up a new page that looks like the one in Figure 6b.

Figure 6a & 6b



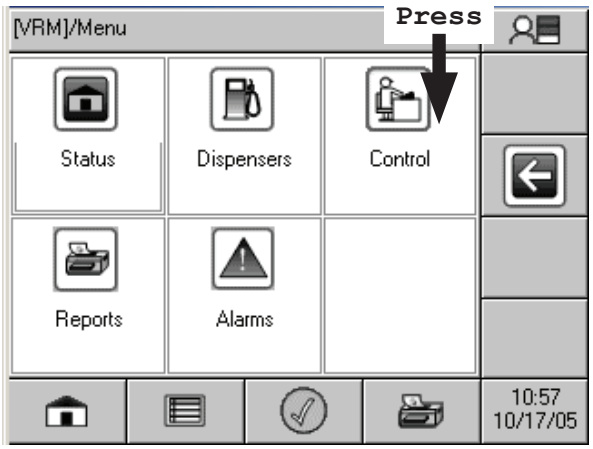
VRM»Alarms Page (LCD View)

The ***VRM»Alarms*** page shows all current alarms for the Vapor Recovery Monitor. When an alarm clears it will be removed from this page but will be kept in memory. The Alarm History report will provide information on previous alarms.



VRM»Control (LCD View)

The VRM control page is setup to run manual test and calibrate the pressure sensor. These features are described later in this manual.



Alarms, Warnings, and Failures

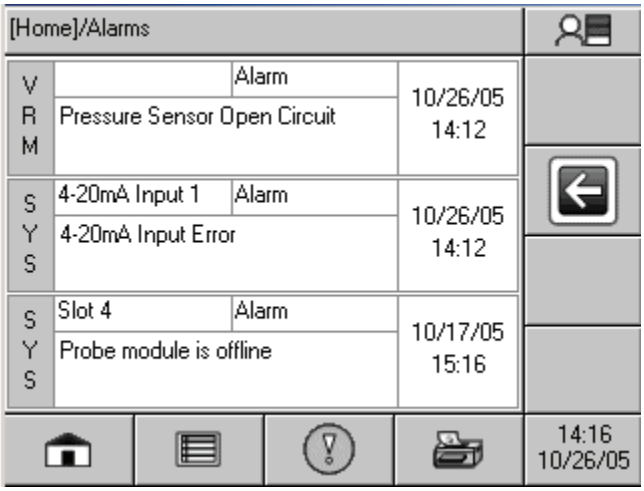
Alarms, warnings, and failures are designed to alert you with specific details when a problem occurs so that you can take appropriate corrective action. System alarms, VRM alarms, VRM warnings, and VRM Failures will always notify the user in certain ways, other notification options are programmable.

Figure 7 shows an example of two System Alarms, and one VRM alarm. All active alarms can be viewed from the LCD by pressing the Alarm button,  , at the bottom of the LCD. Once the alarm goes inactive it will disappear from the **Home/Alarm** page but will remain stored in memory. Any outputs that are programmed to activate based on alarms will go active. These outputs can be customized to activate based on specific alarms or all alarms in the Rules setup.

System Alarms

System alarms are non-application related alarms. These alarms are usually related to hardware such as an internal module is offline or a printer problem. Is the printer problem corrected? Check also for wiring connection problems or programming error.

Figure 7



VRM Alarms

Vapor Recovery alarms are hardware problems related to the Vapor Recovery Monitoring application. VRM alarms will be generated immediately with a flashing RED LED. A VRM alarm will not cause a dispenser(s) shutdown.

VRM Warnings and Failures

VRM Warnings and Failures are monitoring alarms related only to the Vapor Recovery Monitoring application. These Warnings and Failures are directly related to the CP-201 ISD requirement to monitor collection and containment of the vapor recovery system. A VRM warning will occur when either a fueling collection point or the entire vapor containment does not meet the operating thresholds. A warning is the first sign of a vapor recovery problem. A VRM failure will follow the warning if the specific problem with the vapor recovery component does not get fixed within the monitoring time period. This failure will cause either a single or site shutdown, depending on the type. The following provides more detail on the specific warning and failure types.

Vapor Collection Warnings or Failures (Balance)

Vapor Collection Warnings or Failures on a balance configuration generally occur due to blockages in the vapor recovery lines between the nozzle and the underground storage tank. The VRM system makes only daily assessment for a 50% reduction in flow. On a daily basis, if the console determines a blockage in a line, it will issue a Vapor Collection Warning. If a second consecutive day the console determines a blockage in vapor recovery line it will issue a Failure alarm and shutdown the Dispenser.

Upon a Vapor Collection Warning condition, it is highly recommended to get the fueling point(s) serviced as soon as possible. If a fueling point goes untreated, then the VRM will issue a failure alarm and shut down the affected dispenser. If this condition occurs, the entire dispenser should be placed out of service until a Franklin Fueling Systems certified technician can troubleshoot the problem. All other dispenser will remain in operation. See Appendix A for the Alarm Code description and possible solution, or the *Vapor Recovery Monitoring Troubleshooting and Diagnostics Guide* available on the Franklin Fueling Systems Web site: www.franklinfueling.com.

Vapor Pressure Containment Warnings and Failures

A Weekly or Monthly Ullage Pressure warning or failure occurs when the vapor pressure exceeds the operating threshold. The VRM system makes both a weekly and monthly assessment on the amount of time the vapor containment pressure exceeds a threshold over a specific period of time. If the containment pressure rises above the overpressure limits for either the weekly or monthly thresholds, then the VRM will issue a warning. A second consecutive period of exceeding the overpressure threshold will result in a failure alarm and a shutdown of all dispensers.

A Weekly Ullage Pressure Leak Test warning or failure is an indication that the containment space (vapor space) is leaking vapors beyond the allowable limit. This assessment is performed on a weekly basis. If a vapor containment is leaking, the VRM will issue a warning at the end of the first week and if it is not fixed by the end of the second week then all dispenser will become disabled.

See Appendix A for the Alarm Code description and possible solution, or the *Vapor Recovery Monitoring Troubleshooting and Diagnostics Guide* available on the Franklin Fueling Systems Web site: www.franklinfueling.com.

Re-enabling Dispenser(s)

Dispensers can be re-enabled by the following method. Note that this procedure does not clear any warnings or failures, it only re-enables dispensing.

Warning **The Failed fueling point requires immediate attention and should be bagged so it is not used until the problem has been fixed by a certified Service Technician. Continuous use of a failed Fueling Point will result in another shutdown.**

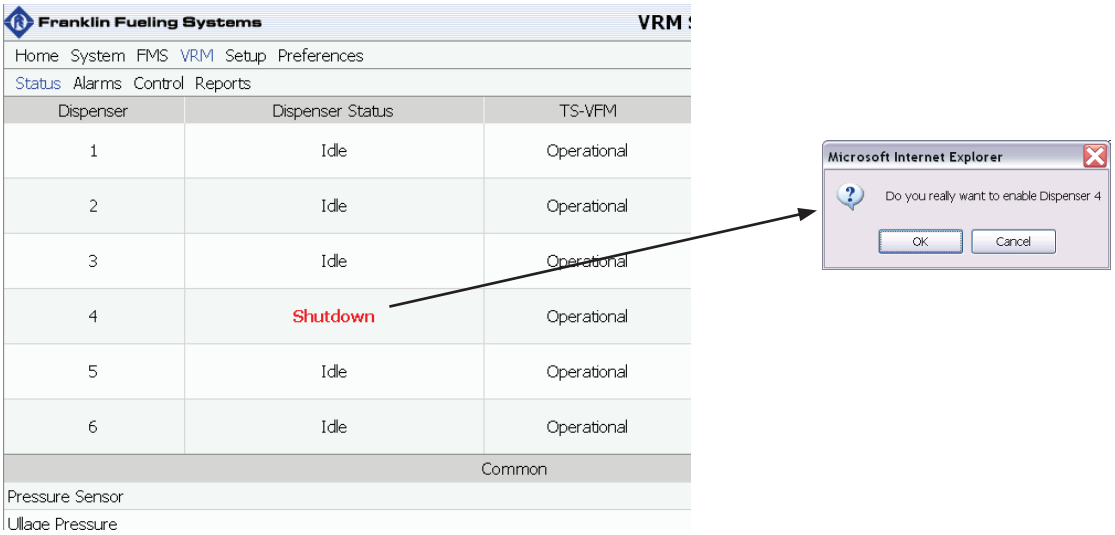
Warning **Refer to local districts before putting a shutdown dispenser back into operation.**

From the LCD:

1. Go to the ***VRM»Dispensers*** menu (see Figure 5a & 5b and Figure 6a & 6b).
2. Press the dispenser showing “Shutdown”.
3. Press “Yes” on the confirmation box.

From the Web Browser:

1. Go to the ***VRM»Status*** page.
2. Press the red “Shutdown” for each dispenser showing shutdown.
3. Press “Yes” to enable the dispenser or all dispensers.



Note: If a dispenser shutdown was caused by poor vapor collection, you will only be able to enable one dispenser at a time. If the shutdown was caused by a pressure failure, you will be able to enable all dispensers at the same time by pressing any dispenser.

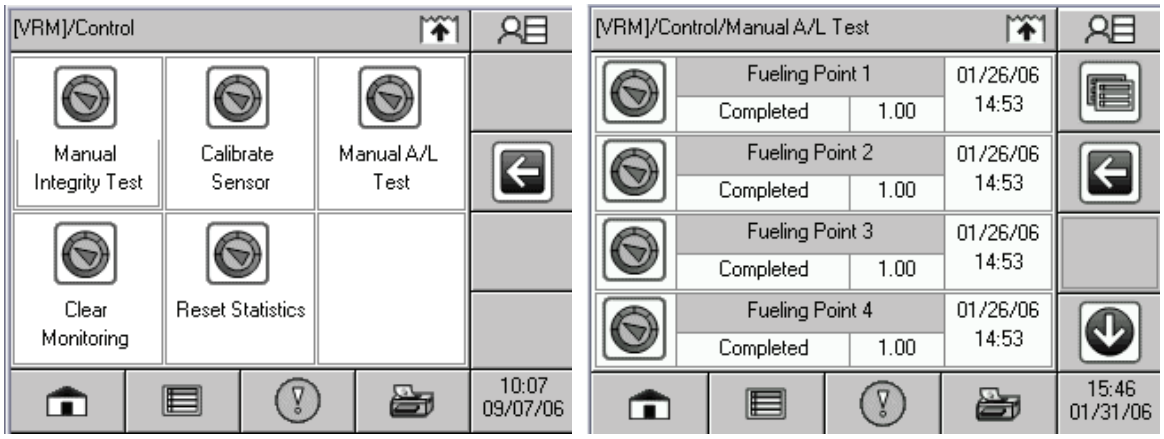
Clearing Alarms

Vapor Flow and Vapor Pressure alarms can be cleared by running the respective manual test or by waiting until the next assessment period has passed.

Clearing Vapor Collection (A/L) Alarms

Once a certified technician has repaired the cause of the vapor flow problem, the alarm can be cleared by two methods: running a manual test or letting the fueling point go through a full day of transactions. The manual A/L test is much faster and will allow the technician to clear the alarm before leaving the site. To run a manual test, go to ***VRM»Control*** then select **"Manual A/L Test"**. Now select the fueling point(s) that are in alarm and on the next dispense, if there is an A/L passes then the alarm will clear. See Figure 8a & 8b.

Figure 8a & 8b



Note: The manual A/L test should be done on either a known non-ORVR vehicle or test container that will return air/vapor mixture back to the UST. If the A/L does not meet the required threshold then the fueling point will remain in alarm.

Clearing Pressure Related Alarms

A technician will also have two methods of clearing pressure related alarms by either letting the system go through its normal assessment period or manually clearing pressure alarms.

To clear a Pressure Related Alarms, do the following:

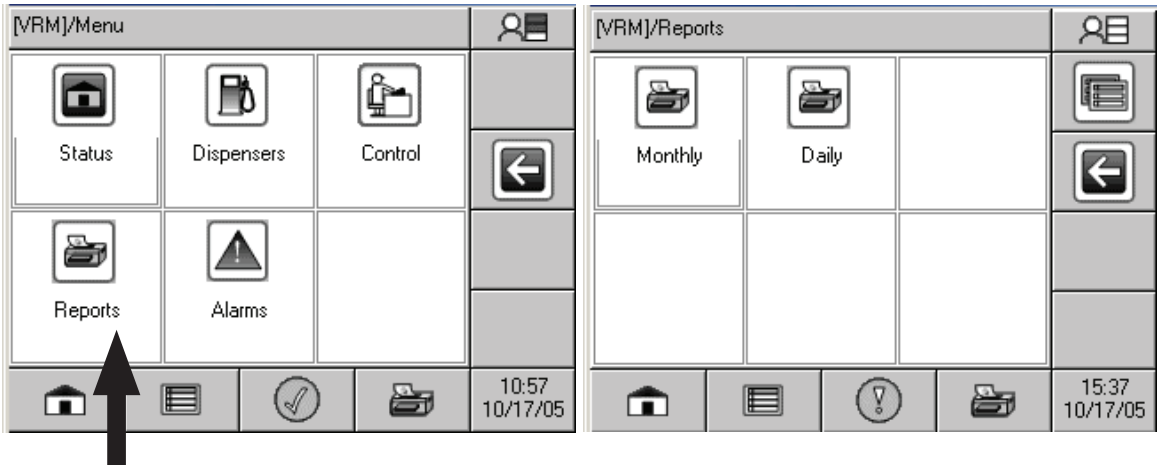
1. Go to the ***VRM»Control*** Page and select **"Clear Monitoring"**.
2. Enter in your Franklin Fueling Systems technician ID number.
3. Enter in the administrator password.
4. All the Pressure Monitoring Alarms shall clear.

Reports & Printing

Creating Reports

Reports can be generated and printed based on the last 30 days, by month, or by year. The console stores ISD history for twelve months.

Figure 9a and 9b - VRM Reports LCD View



Alarm Reports

Alarm reports can be generated either from the ***System»Reports*** page or the ***VRM»Alarms*** web page. The ***System»Reports*** page will generate both the system alarms and application alarms while the ***VRM»Alarms*** will only generate VRM related application alarms.

VRM Reports

There are two different VRM reports that can be generated, a Daily Report and a Monthly Report. The Daily Report generates a list of results for each day on a rolling 30 day basis. The information included in the report is:

Daily Report

ISD Up-Time

The ISD up-time is the percentage that the ISD System is running the VRM application. It calculates the up-time based on actual run-time during a 24-hour period. It is stated in CP-201 that the ISD system must be running 95% of the time on an annual basis.

Highest and Lowest Ullage Pressure

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

75th and 95th Percentile Ullage Pressure

The VRM records and stores the 75th and 95th highest ullage pressure for each day.

Fueling Point Assessments

This shows the daily status of each fueling point. There are four assessments that each fueling point can be classified into; pass, failure, warning, or insufficient data.

Monthly Report

ISD Operation Time, %

The ISD operation time is the cumulative operation time of the VRM application. It is stated in CP-201 that the ISD system must be running 95% of the time on an annual basis.

EVR Operating Requirements

The EVR operating requirements list what EVR components are installed at the site and what each component should be operating at if applicable.

EVR Pass Time, %

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

ISD Monitoring Requirements

The ISD monitoring requirements are the limits in which alarms are triggered by.

Warning, Failures

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

Event Log

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

Printing Reports

Printing from a Web Browser

Printing reports can be done directly from the web browser. Once a report is generated it can simply be printed by going to the ***File>Print*** on the on the web browser's tool bar.

Printing from the Local LCD

To print from the local LCD to the internal printer, press the print button  and it will navigate you to the print menu. From the print menu, you can choose the type of report you want to print.

Balance Internal Report Sample

{Site Name}
{ID Line 1}
{ID Line 2}
{ID Line 3}
{ID Line 4}
{ID Line 5}
12/26/2005 11:25:39

VRM Daily Report
From: {date}
To: {date}

Pressure: in H20
ISD Version: 1.1.0
ISD Up Time 100%

12/26/2005
ISD Up Time 100.00
ISD Pass Time 100.00
Vapor Processor PASS
Pressure Max 0.26
Pressure Min -2.53
Pressure 75th -0.77
Pressure 95th -0.11

FP1 P
FP2 P
FP3 P
FP4 P
FP5 P
FP6 P
FP7 P
FP8 P
FP9 P
FP10 P
FP11 P
FP12 P

12/25/2005
ISD Up Time 100.00
ISD Pass Time 0.00
Pressure Max 0.22
Pressure Min -2.67
Pressure 75th -0.90
Pressure 95th -0.21
FP1 P
FP2 P
FP3 P
FP4 P
FP5 P
FP6 P
FP7 P
FP8 P
FP9 P
FP10 P
FP11 P
FP12 P

{Site Name}
{ID Line 1}
{ID Line 2}
{ID Line 3}
{ID Line 4}
{ID Line 5}
12/20/2005 11:25:39

VRM Monthly Report
From: {date}
To: {date}

Statistics
December 2005
Operation [%] 100
Pass [%] 100

Operation Requirements
Vapor Collect Method
Balanced
Vapor Collection Limit

0.50

Monitoring Requirements
Daily Flow Performance
Low
0.50

Wkly Ullage Press. Mon.
High
1.30

Mthy Ullage Press. Mon.
High
0.30

Warning Alarms
Occurred
12/09/2005 00:05:00
Cleared
12/10/2005 02:15:00
Daily Vapor Collection
Fueling Point 10

Failure Alarms
11/27/2005 00:00:05
Weekly Ullage Pressure Leak

Events
Occurred
12/20/2005 07:07:14

Maintenance

General Inspection

Maintenance is not required on the ISD equipment. All ISD Vapor Flow Meters and Vapor Pressure Sensors are checked every day for proper operability. The Console also does a self-check on all the internal modules as well on a daily basis.

If the Console identifies a problem with any components or Vapor Recovery Sensors, they will need to be diagnosed. See the replacement part numbers for the failed component and contact Technical Service.

Console and Vapor Recovery Equipment Replacement Parts

Part Number	Description
TS-PRB	12 Input Probe Module
TS-420IB8	8 Input 4-20ma Module
TS-RLY	8 Channel Relay Module
TS-ACI	12 Channel AC Input Module
TSSP-CM	Control Module
TSSP-PS	Power Supply Module
TSSP-LCD	LCD Display
TSSP-IFB5X	TS-550/EMS Interface Board
TSSP-IPPTR	Impact Printer Assembly
TSSP-T550MB	TS-550/EMS Motherboard
TSSP-T5000MB	TS-5000 Motherboard
TS-VFM	Vapor Flow Meter
TS-VPS	Vapor Pressure Sensor
TS-DIMIB	Internal Dispenser Interface Module
TSSP-BAT	3V Lithium Battery
TSSP-F4	Fuse, 3A (Relay and Power Supply)
TSSP-ISBS	I.S. Barrier Shield
TS-TP5000	TS-EMS/550/5000 Impact Printer Paper
TS-INKRB	TS-EMS/550/5000 Inker Ribbon
TSSP-TRMBLK	Package of 10 Terminal Blocks

START-UP/NEW INSTALLATION FORM

INCON VAPOR RECOVERY MONITORING (VRM) SYSTEM

DATE_____

INCON VRM Startup Checklist

Service Company Name	Telephone Number
Service Technician	INCON Tech Cert #
Station Address	City
Phase I EVR Equipment Manufacturer	Phase II EVR Equipment Manufacturer

Dispenser Equipment Checklist		YES	NO	Initials
1	Is the INCON Vapor Recovery Monitoring System installed per the CARB Approved Executive Order?			
2	Is the Vapor Pressure Sensor test port installed in the correct direction? When the ball valve is closed it should isolate the Vapor Pressure Sensor from the containment area. See Figure 11 of the procedure. If it is not then it must be configured such that the pressure sensor is isolated when the valve is closed.			
3	Is the Pressure Sensor in the Open position with the plug in the test port? See Figure 11 of the procedure.			
4	Was Teflon Tape used on the threads for the Vapor Flow Meter rather than pipe dope?			
5	Was a pressure decay test run per TP201.3?			
6	Was the balance pressure drop test run to check for allowable pressure drops?			

Tank Sentinel Equipment Checklist		YES	NO	Initials
7	Was the dispenser maximum load current measured and recorded? Be sure the proper size Relay Module is used. Use the 10A Relay Module if the current exceeds 2 Amps.			
8	Were the Gasoline Dispenser Hook Signals wired **individually** to the AC Input Module with dispenser 1 wired to the first set of channels? Verify all non-gasoline hook signals are installed after the last gasoline hook signal.			
9	Has the Administrator Password been set?			
10	Was the External ATG alarm able to be generated and cleared?			

Appendix A: Alarm Codes

Device	Description	Category	Type	Definition	Possible Cause and Solution
Fueling Point [n]	Daily Vapor Collection [1]	VRM	Warning or Failure	This Vapor Recovery alarm occurs when the vapors being return to the UST are blocked or a reduction in flow has been determined.	May be caused by leaking hanging hardware, blocked hoses or vapor recovery lines, jammed flow meter. Run Exhibit 10 of VR-208 to verify a blockage. Check for leaks by viewing the vanes through the site glass on the VFM.
	Weekly or Monthly Ullage Pressure [1]	VRM	Warning or Failure	This vapor recovery alarm occurs when the UST ullage pressure exceeds the alarm threshold for the time period specified in the alarm.	May be caused by a malfunction in the VCS100. Perform a check on the processor and make sure it is turned on and processing vapors.
	Weekly Ullage Pressure Leak Test [1]	VRM	Warning or Failure	This vapor recovery alarm occurs when the Vapor Recovery Monitor determines a leak greater than the allowable.	May occur when there is an excessive leak in the vapor recovery containment area. Perform a pressure decay test per TP-201.3.
	Vapor Processor Warning [1]	VRM	Warning	Occurs when the processor runtime exceeds 62 continuous minutes in a single day or processor is shutoff or input to ISD console is disconnected.	Vapor Leak, Processor is shut off or input is disconnected.
	Vapor Processor Malfunction [1]	VRM	Warning or Failure	When ullage pressure exceeds 2 inches WC for 10% of the day on a daily basis.	Vapor Processor is not running
Channel [n]	Error	VRM	Alarm	The Vapor Recovery Monitor does not understand the data transmission.	This may happen when a channel is programmed for a magnostrictive probe but has a vapor flow meter connected instead.
	Pressure Sensor Open Circuit	VRM	Alarm	The pressure sensor is not connected to the Vapor Recovery Monitor.	Usually due to a bad connection or a broken wire. In some cases the sensor may not be working. First check the connections inside the dispenser junction box then at the Console terminal block. Second, measure the voltage at the terminal blocks and verify the voltage. See page 17.
	External TS-DIM Connection Down	VRM	Alarm	No communication between the TS-DIM and the Console.	Occurs with bad connection, TS-DIM does not have power, TS-DIM is not working. Check the wiring between the TS-DIM and the Console. Check the jumper settings in the TS-DIM, see installation manual.
	TS-DIM Read Data Error	VRM	Alarm	Bad communication to the Console.	Most likely a baud rate problem. Check the baud rate in the Console as well as the jumper settings in the TS-DIM.
	External ATG Connection Down	VRM	Alarm	No communication or bad communication between the ATG and the Console.	Check the comm. Port settings in both the ATG and the Console. These comm. Port settings should match. Make sure there is a straight serial cable between the ATG and the Console.
Slot [n]	[i] Module is offline, *where i is the module number*	System	Alarm	Occurs when a module is not communicating with the controller.	If RED LED is on or Green LED is blinking try cycling power.
	[i] Module number mismatch, *where i is the module number*	System	Alarm	Occurs when the number of modules does not match the programmed number of modules.	Check the setup at ***System Configuration»Modules*** *Expected* to see if the correct numbers are programmed.

[1] ISD Shutdown Alarms

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TS-VFM

Installation Guide

This install guide provides necessary installation instructions for the mounting of the INCON Vapor Flow Meter inside a dispenser or inside a dispenser sump. This manual covers installation in both Vacuum Assist and Balance configurations. Information regarding the cabling and the connection to the Tank Sentinel Console is found in the Tank Sentinel Installation Guide (p/n 000-2150). All documentation relating to operability, maintenance, and testing of the Vapor Flow Meter is found in the Vapor Recovery Monitor Operator's Guide (p/n 000-2058).

Important: See the Vapor Recovery Install / Operators Manual or Tank Sentinel Installation Manual for Important Safety Messages.

Required Tools

- Pipe joint tape (Teflon Tape)
- Pipe Wrench
- Small screwdriver (terminal block connection)
- Slip joint pliers (crimping splice connector)

Related Documents

- 000-2058: *Vapor Recovery Monitor Operators Guide*
- 000-2150: *Tank Sentinel Installation Guide - TS-5XXX Series*
- 000-2142: *Tank Sentinel Programming Guide - TS-5XXX Series*
- 000-2151: *Tank Sentinel Operator's Guide - TS-5XXX Series*

Preparation

Only use approved pipe joint tape (Teflon Tape) for joints connecting to the Vapor Flow Meter. The use of non hardening, "pipe-dope," thread sealant is strictly prohibited and will void the warranty.

1. Perform a site inspection. Determine how the Vapor Flow Meter will be installed. The preferred installation method for this product is to install above the vapor shear valve. If there is not enough room between the vapor shear valve and the vapor pump, installation below the shear valve may be needed.
2. If the Vapor Recovery equipment is going to be installed on an existing service station, verify that there is a run of intrinsically safe conduit going back to the console. Vapor Flow Meter wiring can share the same space with other intrinsically safe cables, but cannot be run with non-intrinsically safe cables.
3. Make sure that all contractor-supplied piping materials are compatible with California fuels and meet all local codes. If existing vapor piping in the dispenser requires modification, consult the dispenser manufacturer for approved retrofit kits.

Parts List and Materials Needed

Table 1 - Above Shear Valve

Item Description	Supplied By	Quantity
Vapor Flow Meter, TS-VFM	INCON	1
Sensor Installation Kit, 020-1509	INCON	1
Weatherproof Junction Box	Contractor	1
1.5" to 1" reducing bushing	Contractor	1
1.5" to __" reducing bushing*	Contractor	1
1" pipe nipple	Contractor	1
__" pipe nipple*	Contractor	1
Pipe Union	Contractor	1

Table 2 - Below Shear Valve

Item Description	Supplied By	Quantity
Vapor Flow Meter, TS-VFM	INCON	1
Sensor Installation Kit, 020-1509	INCON	1
Weatherproof Junction Box	Contractor	1
1.5" pipe nipple	Contractor	2
1.5" pipe union	Contractor	1

* Piping size is dependent on vapor piping size inside the dispenser. Typically the connection to a Healy VP1000 is a 1/2" NPT. Thus the bushing size will be 1.5" to 0.5".

Installation Steps

Above Shear Valve

1. Lock and tag out power to the dispenser and the console before attempting any work on the dispenser.
2. Refer to Figure 1 for reference.
3. Do not remove the protective caps on the Vapor Flow Meter until you are ready to thread the nipples into the Flow Meter.
4. Begin by connecting the two 1.5" to 1" reducing bushings to the Vapor Flow Meter's body. Be sure to use only Teflon tape when sealing these threads. Take special precaution not to let any foreign material fall inside of the Vapor Flow Meter.
5. Next, start assembling the hardware from the bottom up. Connect a short, 1" NPT threaded nipple to the top of the vapor shear valve and to the 1.5" to 1" reducing bushing on the flow meter.
6. Connect another 1" pipe nipple to the top reducing bushing followed by a 1" pipe union. The existing dispenser piping can now connect to the top of the union.
7. If there is not already a watertight junction box for the intrinsically safe cables, then install one as described earlier in Tools Required.
8. Pull the black Vapor Flow Meter cable through the supplied cable grip and into the junction box. Using the supplied crimp connectors, splice the flow meter cable to the field cable. The color codes on the black flow meter cable are: Red = + (plus) and Black = – (minus)

Below Shear Valve

1. Lock and tag out power to the dispenser and the console before attempting any work on the dispenser.
2. Refer to Figure 2 for reference.
3. Do not remove the protective caps on the Vapor Flow Meter until you are ready to thread the nipples into the Flow Meter.
4. Begin by connecting two 1.5" NPT pipe nipples to the Vapor Flow Meter's body. Be sure to use only Teflon tape when sealing these threads. Take special precaution not to let any foreign material fall inside of the Vapor Flow Meter.
5. Next, prepare the piping inside of the dispenser sump to connect to the Vapor Flow Meter. If flexible piping is currently installed, make sure, when adding the Vapor Flow Meter, that there are no bend radii that are too sharp, kinks, or traps. The contractor may need to replace the existing flexible piping with a shorter length in order to avoid potential flow restrictions.
6. Add the Vapor Flow Meter between the existing piping in the sump and the bottom of the vapor shear valve. In most cases the vapor shear valve will need to be temporary removed in order to assist with making the connection. Add a union to either the top of the shear valve or below the shear valve.
7. If there is not already a watertight junction box for the intrinsic safe cables, then install one as described earlier in Tools Required.
8. Pull the black Vapor Flow Meter cable through the supplied cable grip and into the junction box. Using the supplied crimp connectors, splice the flow meter cable to the field cable. The color codes on the black flow meter cable are: Red = + (plus) and Black = – (minus)

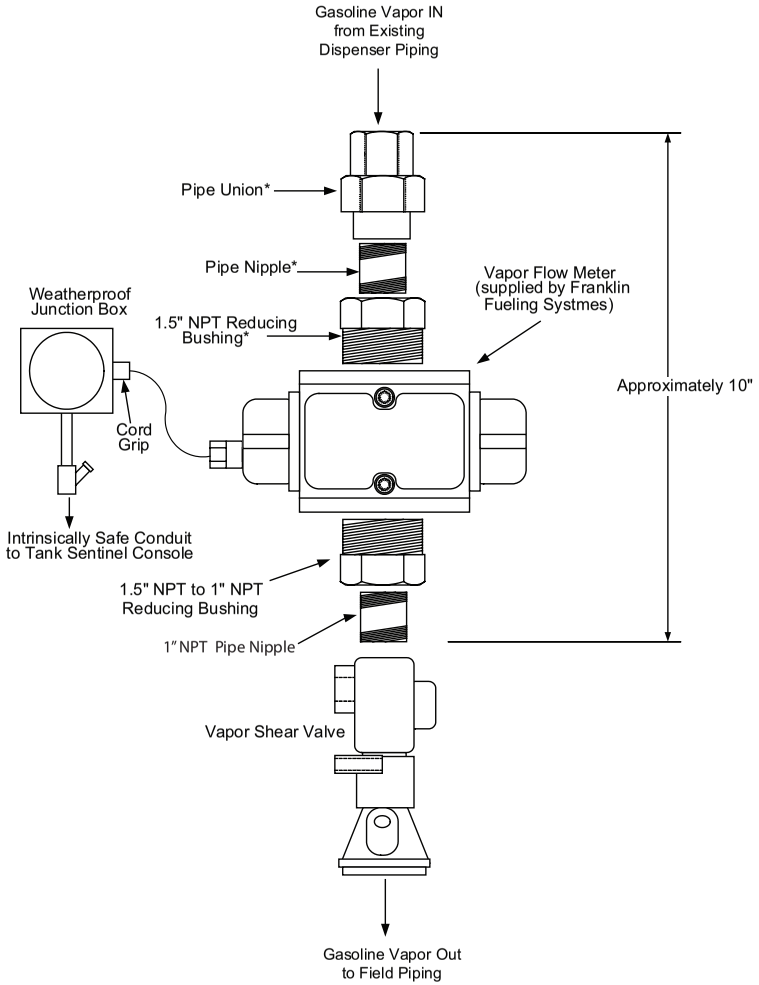


Figure 1
Flow Meter Above Shear Valve

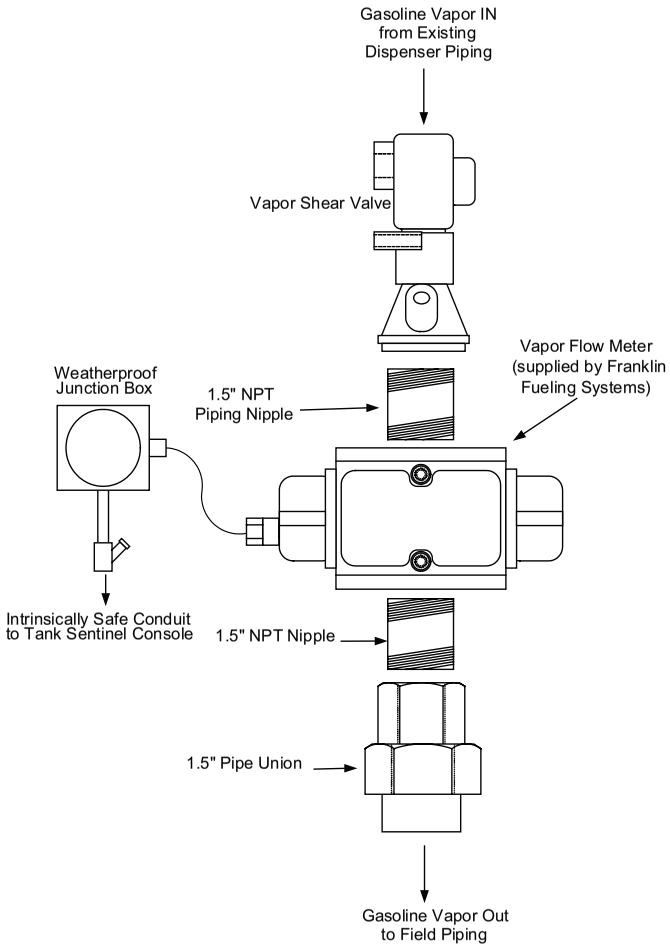
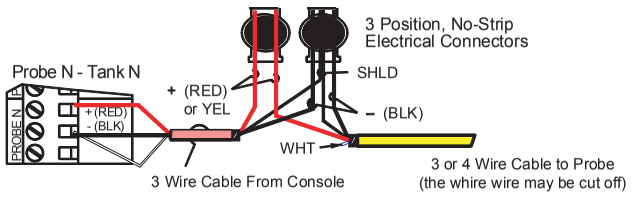
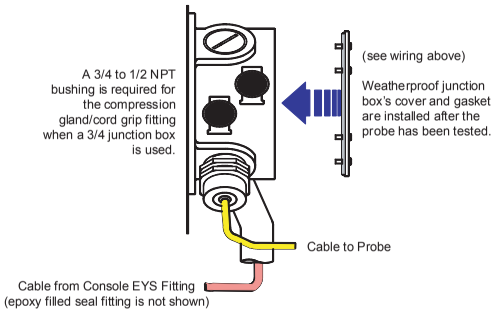


Figure 2
Flow Meter Below Shear Valve



To splice: Insert unstripped wires and use a slip-joint pliers to seat the black piece.



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TS-VPS

Installation Guide

This install guide provides necessary installation instructions for the mounting of the INCON Vapor Pressure Sensor inside a dispenser, inside a dispenser sump, or on the top of a tank riser. Information regarding the cabling and the connection to the Tank Sentinel Console is found in the *Tank Sentinel Installation Guide*, (p/n 000-2150). All documentation relating to operability, maintenance, and testing of the Vapor Pressure Sensor is found in the *Vapor Recovery Monitor Operator's Guide* (p/n 000-2058).

Important: See the Vapor Recovery Install / Operators Manual or Tank Sentinel Installation Manual for Important Safety Messages.

Required Tools

- Pipe joint tape (Teflon Tape)
- Adjustable Wrench
- Small screwdriver (terminal block connection)
- Slip joint pliers (crimping splice connector)

Related Documents

- 000-2058 : *Vapor Recovery Monitor Operators Guide*
- 000-2150 : *Tank Sentinel Installation Guide - TS-5XXX Series*
- 000-2142 : *Tank Sentinel Programming Guide - TS-5XXX Series*
- 000-2151 : *Tank Sentinel Operator's Guide - TS-5XXX Series*

Preparation

1. Perform a site inspection. Determine how the Vapor Pressure Sensor will be installed. The preferred installation method for this product is to come off the horizontal 1" port of the vapor shear valve. If this is not possible, then a piping tee may need to be installed below the Vapor Flow Meter.
2. If the Vapor Recovery equipment is going to be installed on an existing service station, verify that there is a run of intrinsically safe conduit going back to the console. Vapor Flow Meter wiring can share the same space with other intrinsically safe cables, but cannot be run with non-intrinsically safe cables.
3. Make sure that all contractor-supplied piping materials are compatible with California fuels and meet all local codes.

Parts List and Materials Needed

Table 1 - Off Shear Valve

Item Description	Supplied By	Quantity
Vapor Pressure Sensor, TS-VPS	INCON	1
Sensor Installation Kit, 020-1509	INCON	1
Weatherproof Junction Box	Contractor	1
1" to 0.5" reducing bushing	Contractor	1

Table 2 - Below Shear Valve

Item Description	Supplied By	Quantity
Vapor Pressure Sensor, TS-VPS	INCON	1
Sensor Installation Kit, 020-1509	INCON	1
Weatherproof Junction Box	Contractor	1
1" to 0.5" reducing bushing	Contractor	1
1.5" Piping Tee	Contractor	1

Installation Steps

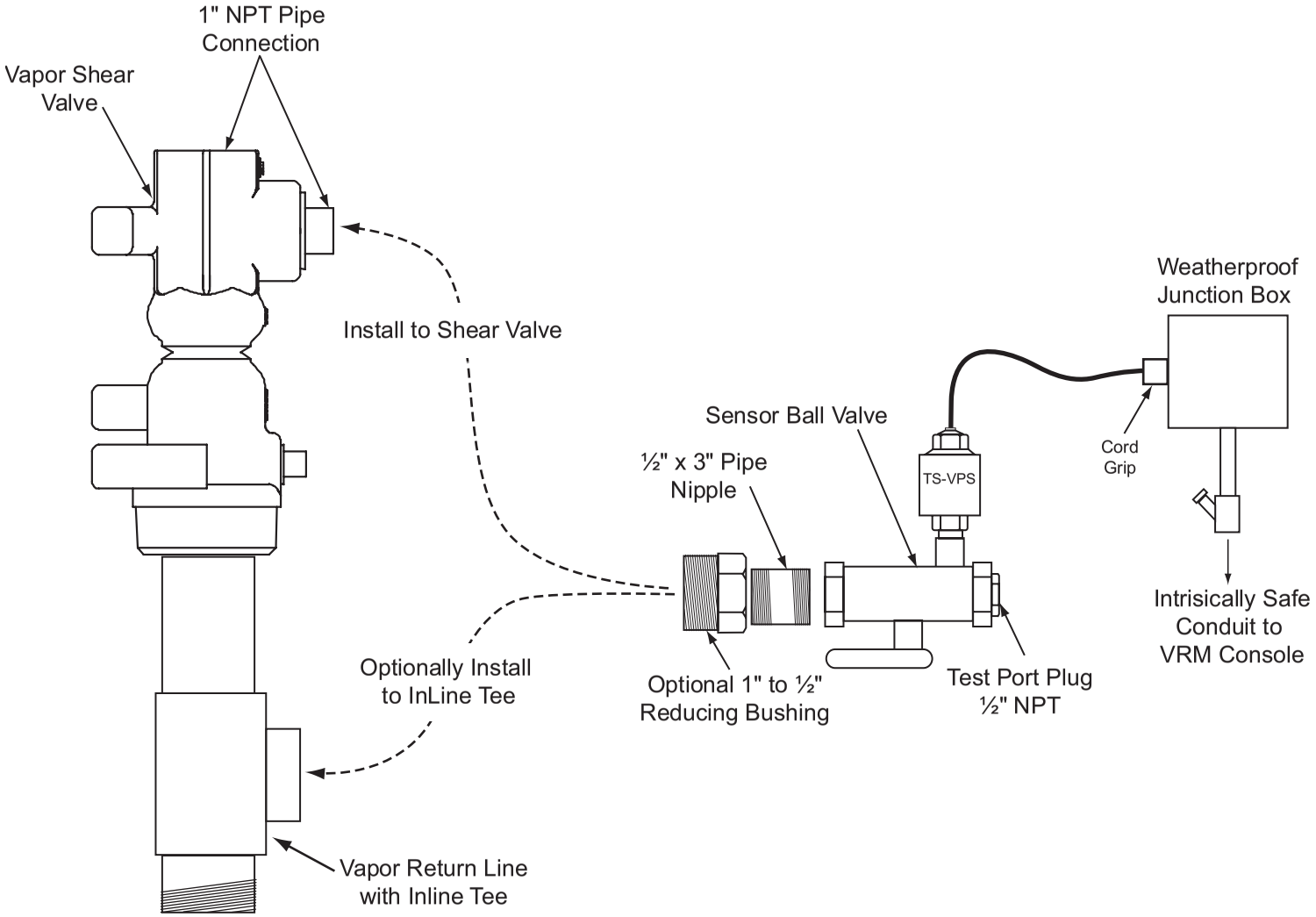
Installation Steps Off the Vapor Shear Valve

1. Lock and tag out power to the dispenser and the console before attempting any work on the dispenser.
2. Refer to Figure 1 for reference.
3. Begin by removing the 1" plug from the vapor shear valve and installing a 1" to ½" reducing bushing.
4. If there is not already a watertight junction box for the intrinsically safe cables, then install one as described earlier in Tools Required.
5. Pull the black Vapor Pressure Sensor cable through the supplied cable grip and into the junction box. Using the supplied crimp connectors, splice the flow meter cable to the field cable. The color codes on the black Vapor Pressure Sensor are: Black = + (plus) and White = - (minus).

Installation Steps Below the Vapor Shear Valve

1. Lock and tag out power to the dispenser and the console before attempting any work on the dispenser.
2. Refer to Figure 1 for reference.
3. Install a 1.5" piping tee below the Vapor Shear Valve.
4. Install an appropriate bushing sized to get to the supplied ½" piping nipple.
5. If there is not already a watertight junction box for the intrinsically safe cables, then install one as described earlier in Tools Required.
6. Pull the black Vapor Pressure Sensor cable through the supplied cable grip and into the junction box. Using the supplied crimp connectors, splice the flow meter cable to the field cable. The color codes on the black Vapor Pressure Sensor are: Black = + (plus) and White = - (minus).

Figure 1



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