



Franklin Fueling Systems



Healy VP1000-5 Troubleshooting Guide

Manual #	Revision	Date	Changes from Previous Revision
405291001	2	Mar. 2012	Remove pipe tape brand reference

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Important Safety Messages

Please refer to the California Air Resources Board (CARB) Installation, Operation, and Maintenance (IOM) manuals within Executive Order VR-201 or other applicable VP1000-5 documentation for proper safety information.

Warning  Always secure the work area from moving vehicles. This equipment is mounted on and in dispensers, which 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  Follow all federal, state, and local laws governing the installation of this equipment. When no other regulations apply, follow NFPA codes 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.

References

Franklin Fueling Systems:

<http://www.franklinfueling.com>

Tech Support: 1-800-984-6266

California Air Resources Board (CARB)

<http://www.arb.ca.gov/vapor/vapor.htm>

CARB Phase II EVR Executive Orders

<http://www.arb.ca.gov/vapor/eo-evrphasell.htm>

VR-201 Healy EVR Phase II without ISD

VR-202 Healy EVR Phase II with ISD

Introduction to the Guide

The purpose of this guide is to inform installers, operators, and other personnel about the CARB certified VP1000-5 vacuum pump for Phase II (Stage II) vapor recovery systems. For complete installation, operation, and maintenance details refer to CARB Executive Order VR-201 or other applicable VP1000-5 documentation.

A Healy EVR Phase II system in California includes one VP1000-5 vacuum pump per dispenser, one Clean Air Separator (CAS) per site, and the appropriate Healy hanging hardware, including Model 900 nozzles, at each fueling point per CARB Executive Orders VR-201 and VR-202.

A Healy Phase II System outside California in North America includes one VP1000-5 vacuum pump per dispenser and the appropriate Healy hanging hardware, including Model 800 nozzles, at each fueling point per CARB Executive Order G-70-191-AA.

Notes:

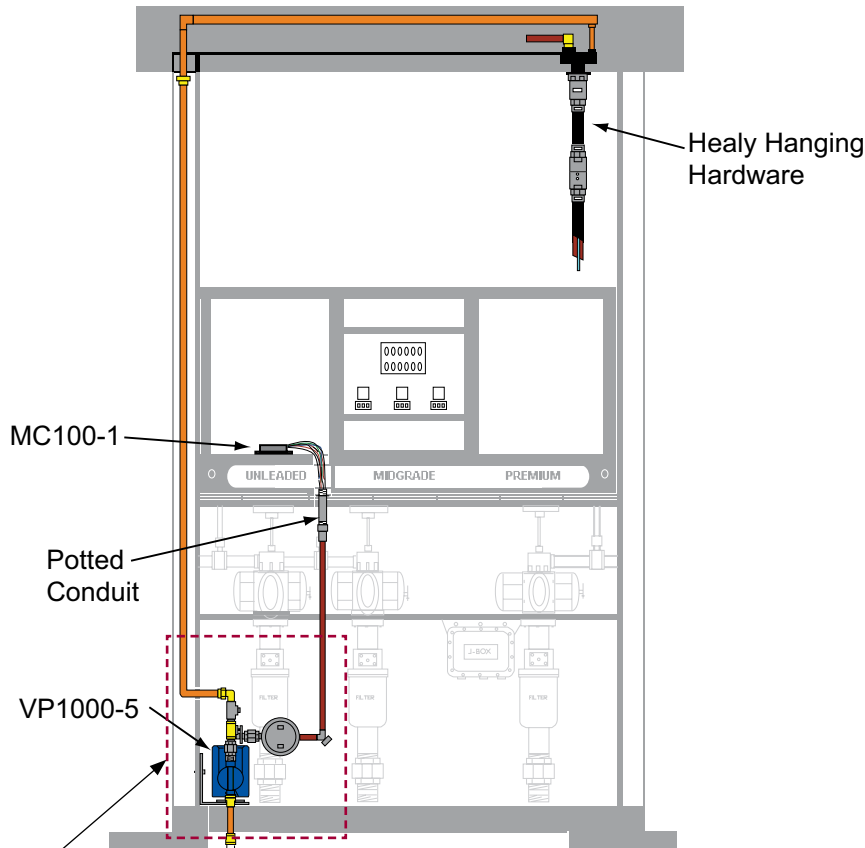
- Installation and service of system components, including testing and replacement of such components, shall be performed by technicians certified by the appropriate manufacturer. Additionally, the technician must be skilled with thorough knowledge of applicable State, Federal, and local requirements of installation and repair of gasoline dispensing equipment, including safety precautions.
- All VP1000-5 warranty service must be completely documented by the technician on the VP1000 Returned Goods Product Tag (FFS-0120). See Appendix G for further information.

Section One: Introducing the System Components

Introduction to VP1000-5 Vacuum Pump

The VP1000-5 Vacuum Pump runs on a 110 VAC source, is controlled by the MC100-1 control module, and is activated for each transaction to provide the appropriate vacuum for the Healy nozzle to collect vapors at the vehicle fillpipe. The VP1000-5 is typically installed in the lower hazardous area of a pressure or suction dispenser as shown in Figure 1.

One VP1000-5 pump is installed per dispenser to accommodate the vapor recovery needs for both sides of the dispenser. When the dispenser is authorized, the MC100-1 will activate the VP1000-5 simultaneously and run at a low speed (approximately 10 GPM). If both sides of the dispenser are authorized the VP1000-5 will run at a high speed (approximately 20 GPM). The VP1000-5 has a thermistor circuit that allows the pump to activate when temperatures are less than approximately 40°F in order to keep internal parts from locking up.



See Appendix A
for Installation and
Testing Details

Figure 1: Healy Components Installed at Dispenser

Introduction to MC100-1 Control Module

The VP1000-5 is interfaced with the dispenser through the MC100-1 control module. The MC100-1 is directly wired to the dispenser power and typically the solenoid valve signal and neutral wires located in the upper electronics area as shown in Figure 1. This allows the Healy equipment to recognize when a dispenser is authorized to dispense product. The MC100-1's solenoid disconnect relay provides interruption of the solenoid valve neutral circuit when the VP1000-5 is in a fault state. Figure 2 describes the meanings of the indicator lights on the MC100-1.

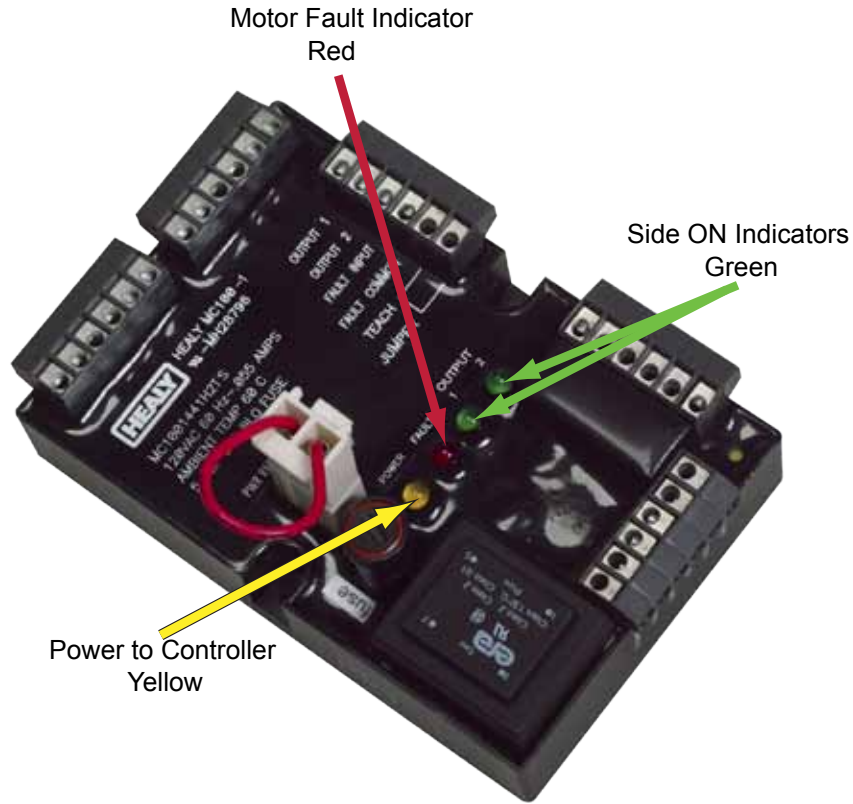
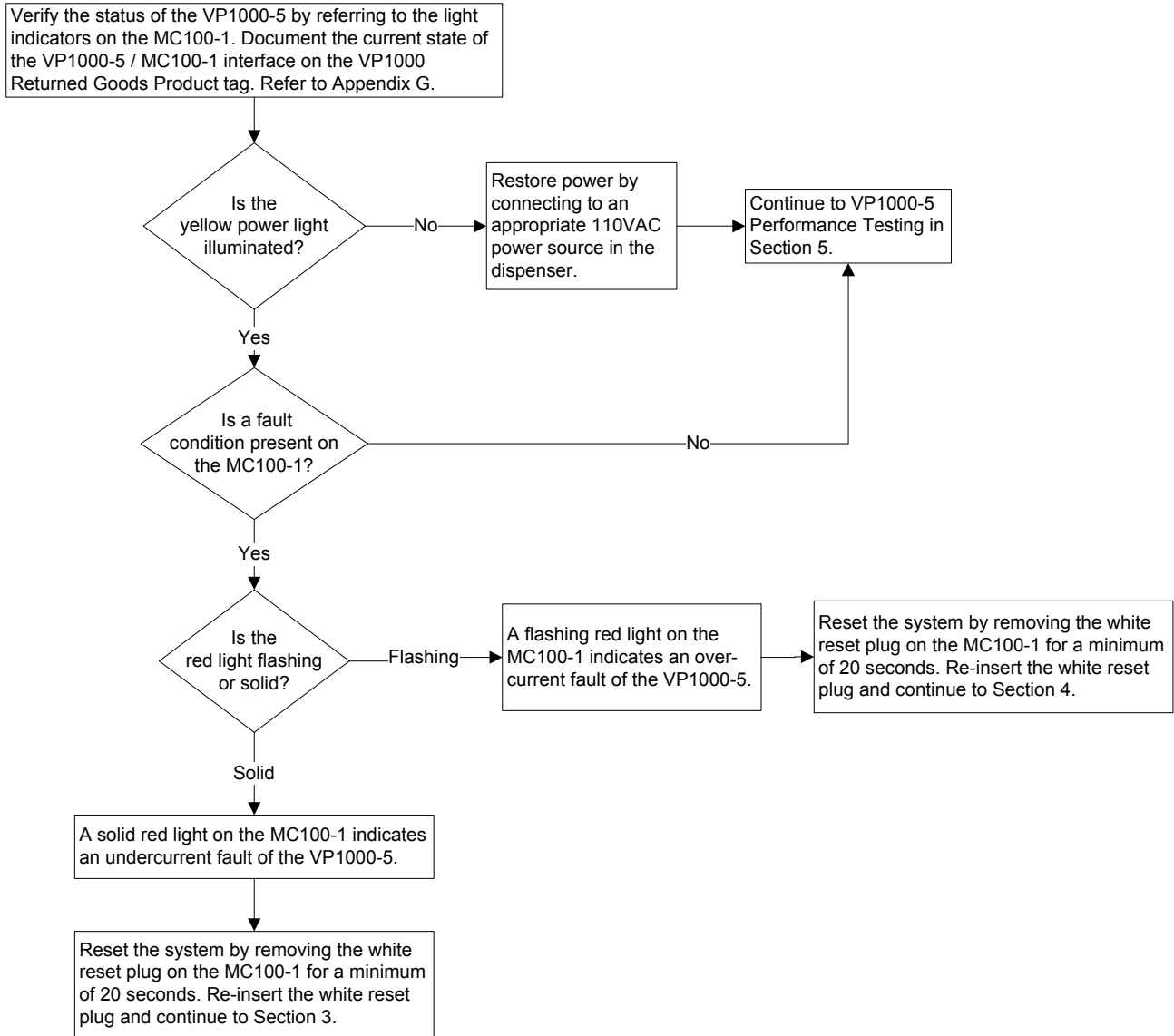


Figure 2: MC100-1 Control Module

If the VP1000-5 vacuum pump encounters an issue during operation it will communicate a fault condition to the MC100-1 which will visually display either a solid or flashing red light. This assists service personnel in the troubleshooting of fault conditions.

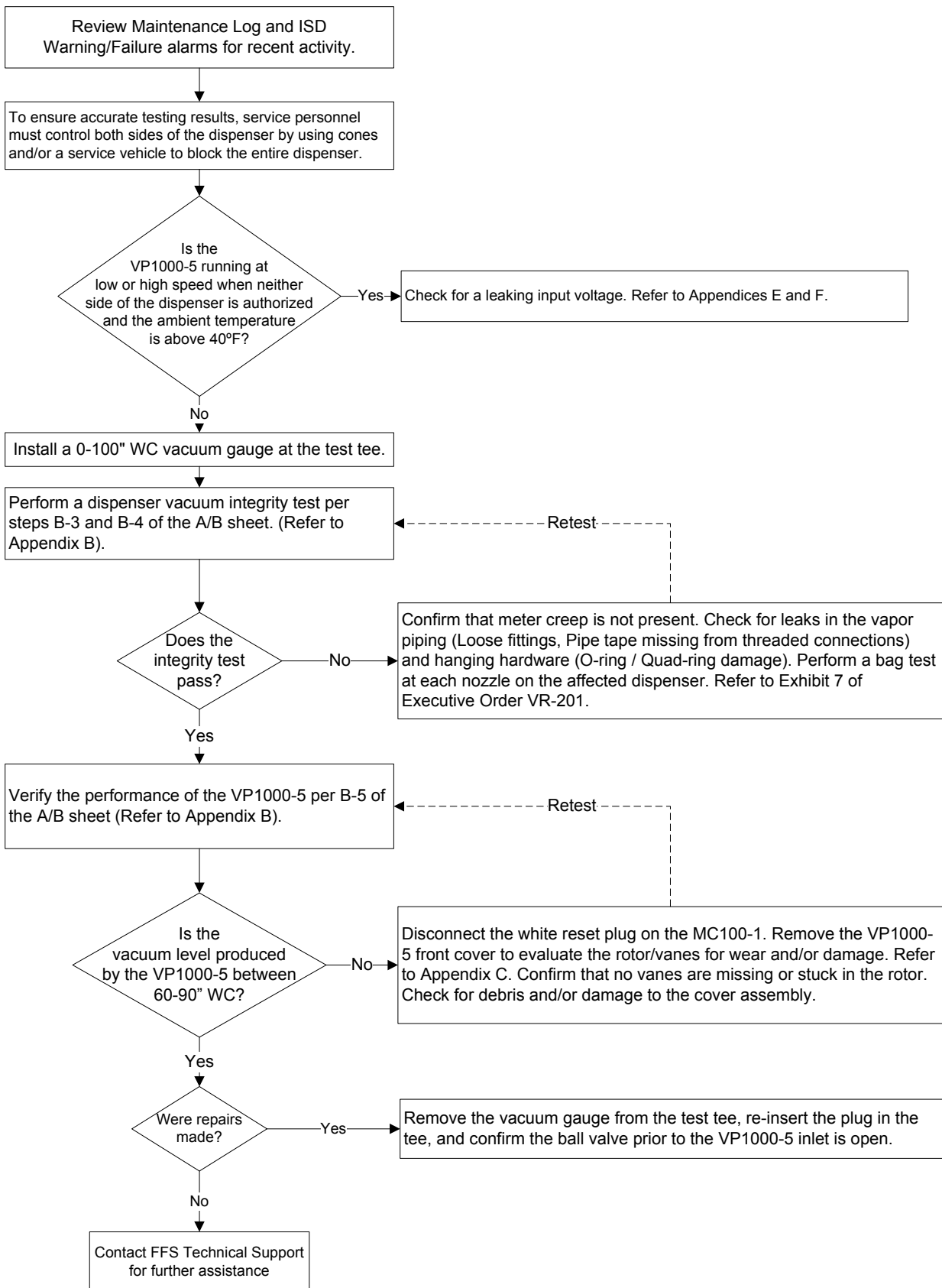
Section Two: Identifying VP1000-5 Alarms

This section of the guide is to assist installers, operators, and other personnel on how to identify VP1000-5 alarms by referring to the indicator lights on the MC100-1.



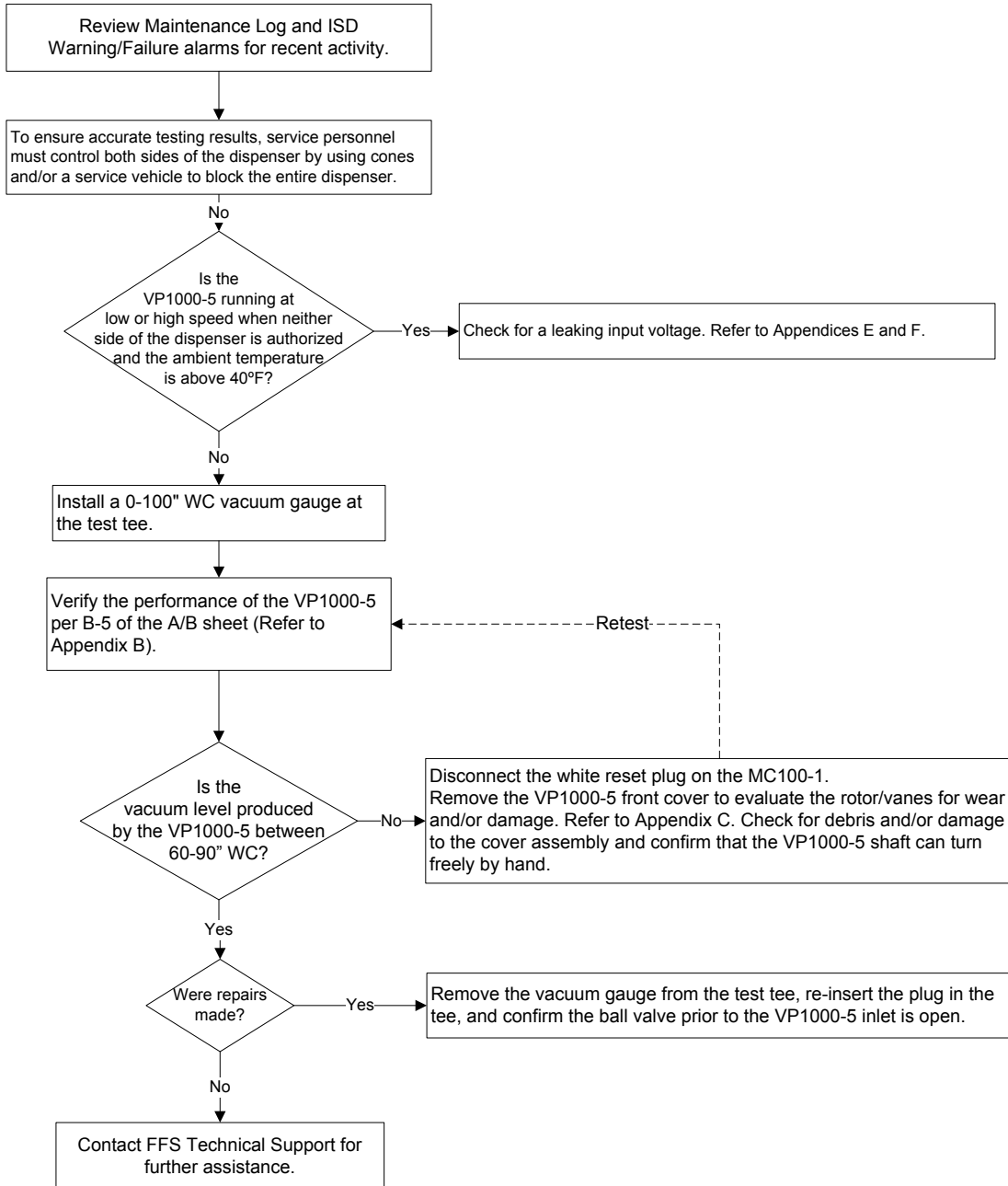
Section Three: Under-Current Fault Troubleshooting

This section of the guide is to assist installers, operators, and other personnel on properly troubleshooting VP1000-5 under-current fault conditions. The root causes typically include vapor leaks, a breach in the product and vapor paths of the hanging hardware, and issues with the rotor/vanes. When the VP1000-5 is operating at a low speed, a high vacuum level typically indicates an issue with the cover assembly, while a low vacuum level typically indicates a vapor leak or stuck/missing vanes.



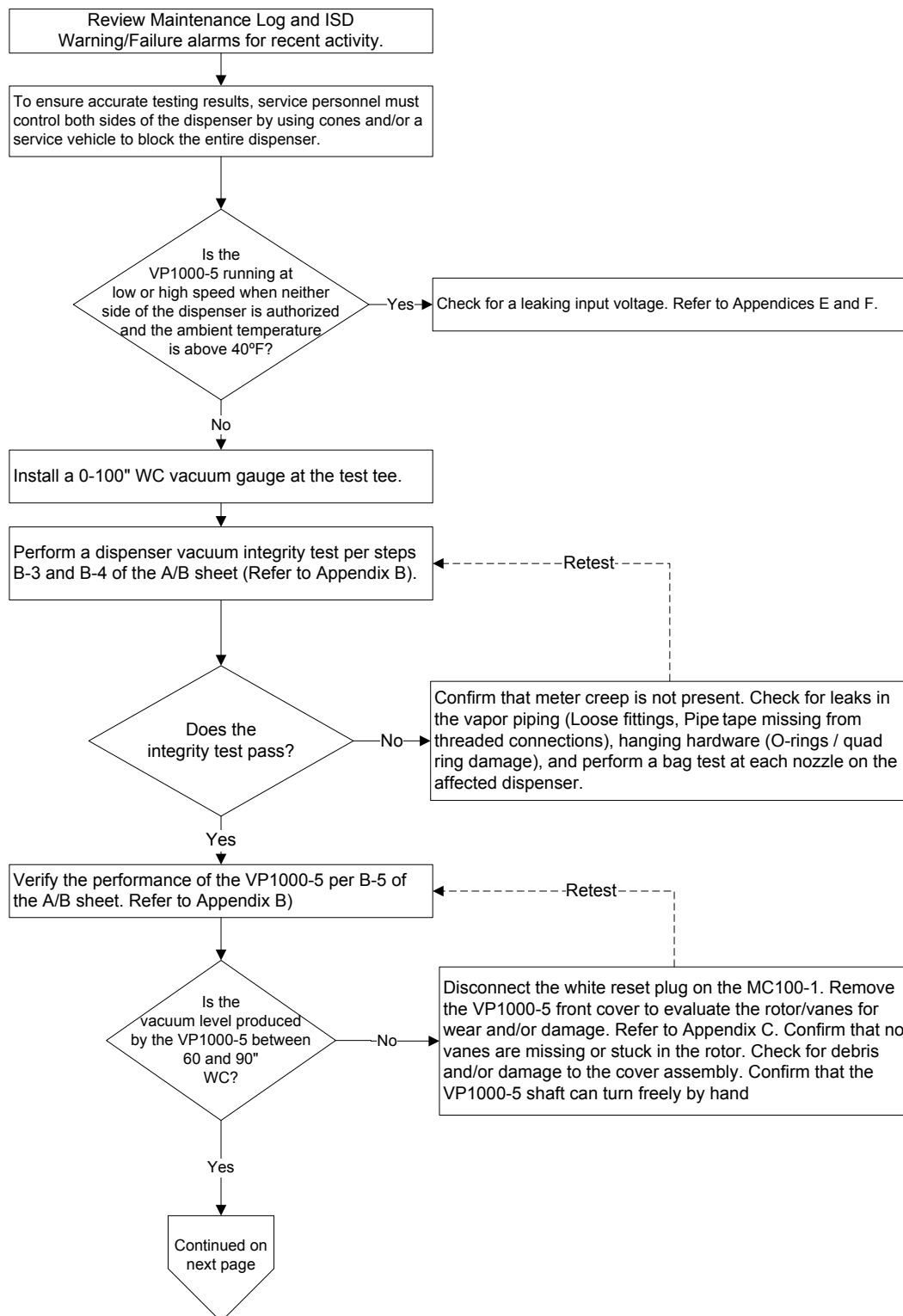
Section Four: Over-Current Fault Troubleshooting

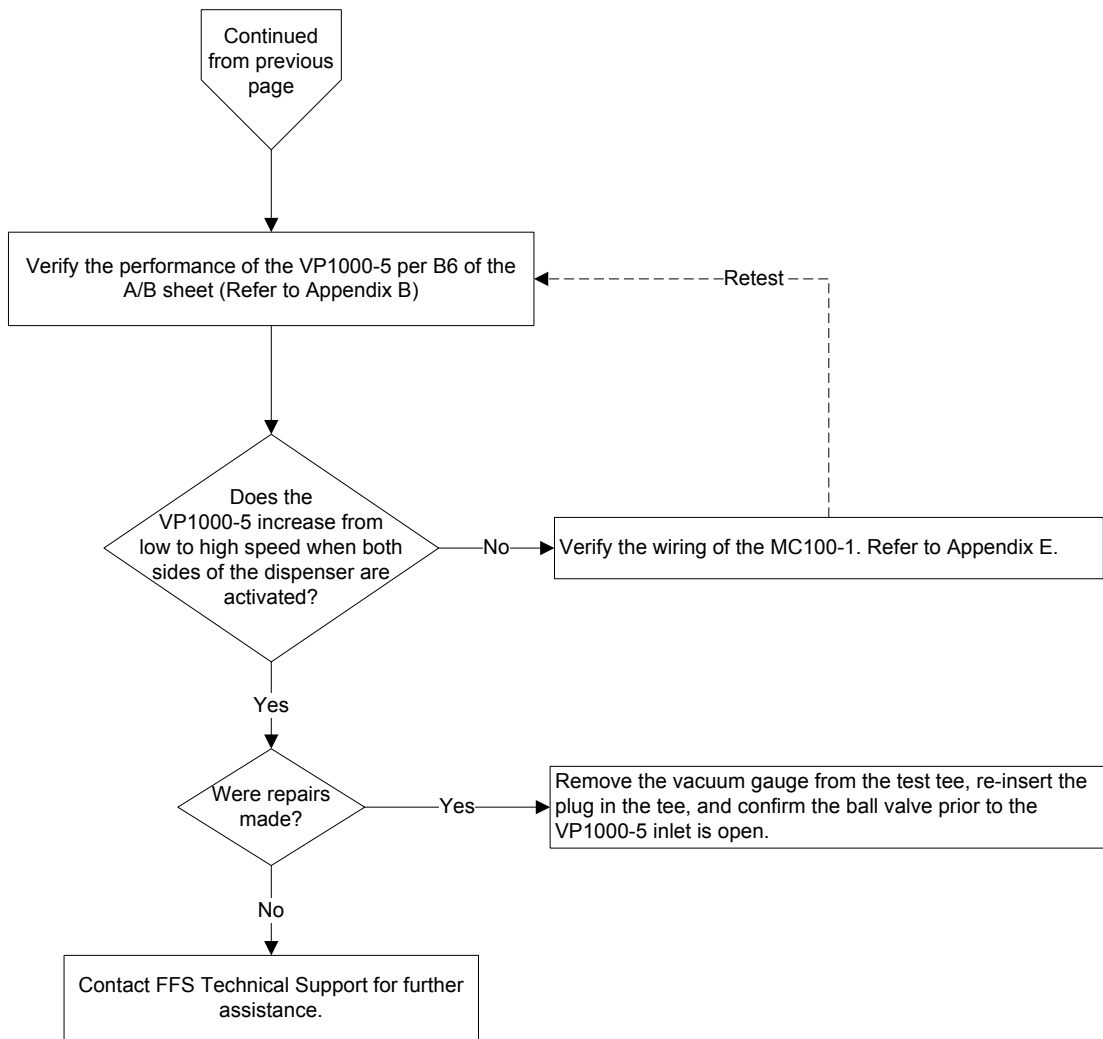
This section of the guide is to assist installers, operators, and other personnel on properly troubleshooting VP1000-5 over-current fault conditions. The root causes typically include a blockage in the vapor path and debris/damage to the rotor/vanes. When the VP1000-5 is operating at a low speed, a high vacuum level typically indicates an issue with the cover assembly, while a low vacuum level typically indicates a locked rotor due to damage/debris present in the rotor cavity or the presence of a fluid blockage due to a breach in the product and vapor paths. A breach can be confirmed by the presence of meter creep on the dispenser totalizer.



Section Five: VP1000-5 Performance Testing

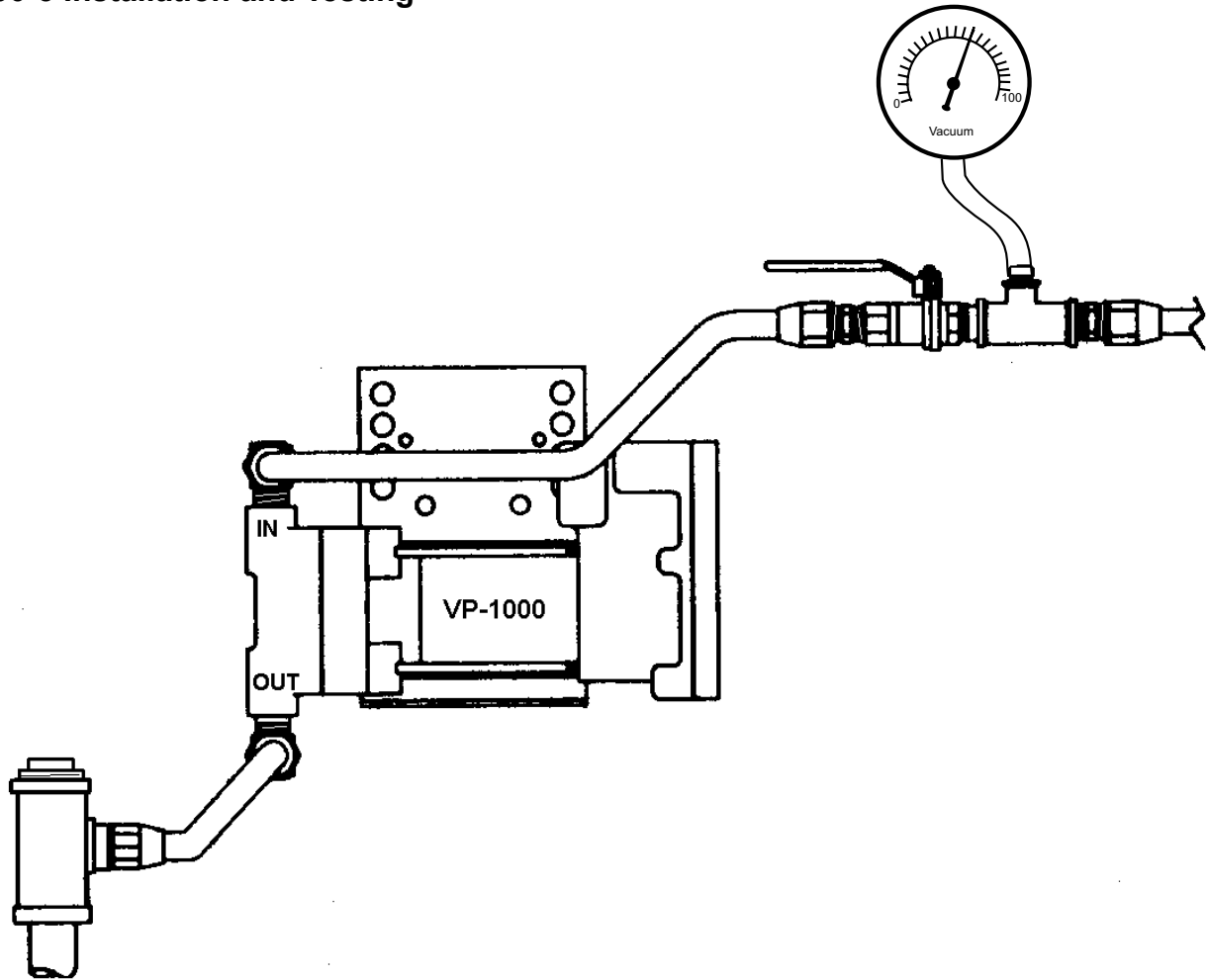
This section of the guide is to assist installers, operators, and other personnel on properly troubleshooting the VP1000-5 when no fault condition is present upon arrival at the site.





Appendix A

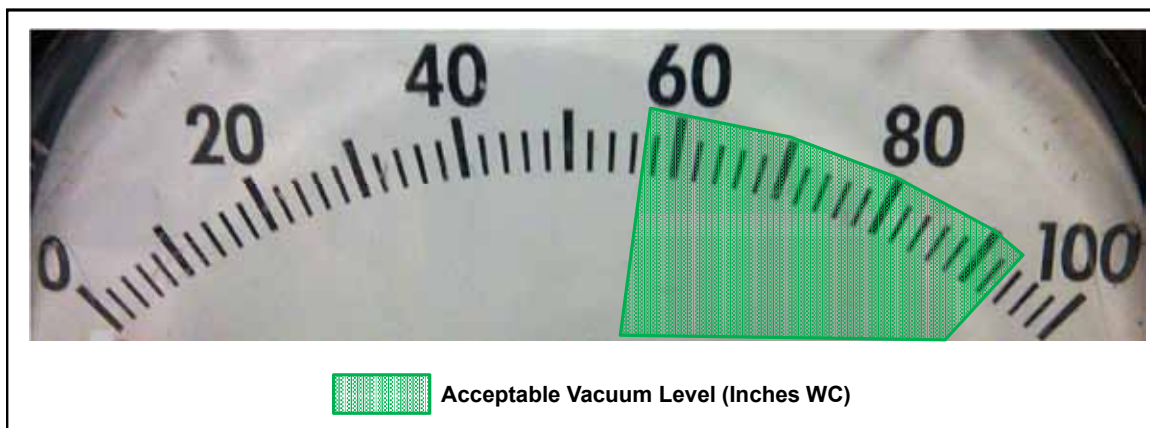
VP1000-5 Installation and Testing



VP1000-5 with Vacuum Gauge Installed for A/B Sheet Testing

Note: VP1000-5 is shown from a side view with natural piping slope. Outlet piping slope may be tilted away provided all other applicable tests pass as described in the associated Executive Order.

The figure below shows a vacuum gauge face with the acceptable vacuum level highlighted when measured with a VP1000-5 vacuum pump. The acceptable vacuum level from the VP1000-5 is between 60 and 90" WC. Readings of +/- 3" WC due to gauge accuracy or needle movement should be considered normal operation. This indicates that the VP1000-5 is operating appropriately. If the vacuum level is below 60" WC or greater than 90" WC this would indicate some type of issue with this particular pump, dispenser, or hanging hardware.



Appendix B

Side B of the VP1000 A/B Sheet

START-UP/NEW INSTALLATION/ WARRANTY/ ANNUAL TESTING FORM (Rev. 10/07)
HEALY VP1000 VACUUM PUMP

Date _____

BOTH SIDES OF THIS TEST FORM MUST BE COMPLETED FOR NEW INSTALLATIONS

- **Start-up / New installations – Complete Sections 3, 4, 5 and 6 of SIDE B. Submit forms to Healy Systems.**
- **Warranty Service or Annual Testing – Conduct the appropriate tests specified on SIDE B. Submit Forms to Healy Systems.**

SIDE B			
<i>Warranty Service</i> Complete Troubleshooting Sections B-1 and B-2		<i>Start-up/ New Installations/ Annual Testing</i> Complete Sections B-3 through B-6	
B-1	<p style="text-align: center;">Control Module Fault Light (Circle one) Flashing (LED) Steady (LED)</p> <p>1. All fault conditions require removal and cleaning or replacement of the rotor and vanes located inside the vacuum pumps round front cover assembly. Use the VP1000 ROTOR & VANE SERVICE AND REPLACEMENT GUIDE in the applicable dispenser retrofit manual of the ARB Approved Installation, Operation and Maintenance Manual for Executive Orders VR-201 and VR-202.</p> <p>2. Clean all surfaces including vanes, rotor, rotor housing, and cover assembly.</p> <p>3. Manually spin and inspect the motor shaft for bearing wear before re-installing the rotor kit.</p> <p>4. Replace motor when bearings or shaft are damaged or worn.</p> <p>5. Check O-ring seal before replacing rotor cover assembly.</p>		
B-2	<p>Re-Assemble / Reset Vacuum Pump and Module. (Power must be removed from both the vacuum pump and the module for 20 seconds to reset the system) using the power reset switch on the MC100 module.</p>		
B-3 Dispenser Vapor Line Integrity Test	<p>1. Install 0-100 inch water column (" wc) vacuum mechanical gauge at the VP1000 test port.</p> <p>2. Authorize the dispenser for fueling. The VP1000 will begin to run.</p> <p>3. Close the ball valve at the pump inlet.</p> <p>4. Record the initial vacuum reading on the gauge – observe and record the final vacuum reading after 60 seconds.</p> <p>5. Open the ball valve at the pump inlet.</p> <p>6. Leaks must be repaired when the vacuum reading falls more than 4" wc in 60 seconds.</p> <p>7. Retest until all leaks have been repaired.</p> <p>8. Record data in Section B-4.</p> <p>Note: If the initial vacuum reading is less than 60" wc, it could indicate a problem with the VP1000. Remove the dispenser from service. Use the troubleshooting section of the manual to investigate problem or contact the FFS Technical Help Desk at 800-984-6266 for assistance.</p>		
B-4	VACUUM TEST Using VP1000 as vacuum source	Initial Vacuum test reading (" wc)	Vacuum test reading after 60 sec. (" wc)
B-5 Dispenser Vacuum Test	<p>With one side of the dispenser authorized (VP1000 running) and the ball valve at the pump inlet open, dispense in handheld position a minimum of 0.5 gallons of fuel into a vehicle or test tank. Record the vacuum level while dispensing. Repeat test for the other side of the dispenser.</p> <p>1. Side "A" Dispensing Vacuum _____" wc</p> <p>2. Side "B" Dispensing Vacuum _____" wc</p> <p>Note: If the dispensing vacuum is less than 60" wc, remove the dispenser from service. See the troubleshooting section of the manual or contact FFS Technical Help Desk at 800-984-6266 for assistance.</p>		
B-6 Audible Increase Test	<p>Test the VP1000 Vacuum Pump for normal operation. Use the 6 step procedure titled, "Testing the VP1000 Vacuum Pump for normal operation using the following test procedure:" in Section 1.1 (Weekly Inspection and Testing) of the Healy Systems Scheduled Maintenance document in the ARB Approved Installation, Operation and Maintenance Manual for the Healy Phase II EVR System not Including ISD. This is to verify that the pump recognizes when both sides of the dispenser are activated for fueling.</p> <p>Does the VP1000 Vacuum Pump change speeds (audible increase) when both sides are activated for fueling? Yes No</p> <p>If the answer is no, use the troubleshooting section of the manual to investigate problem or contact the FFS Technical Help Desk at 800-984-6266 for assistance.</p>		

Repairs - Comments	To Obtain Returned Materials Authorization number (RMA#) Call 800-984-6266 Forms can be faxed to Franklin Fueling Systems Customer Service at 800-225-9787
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Note: See CARB Executive Order VR-201 for complete installation, operation, and maintenance (IOM) details.

Appendix C

VP1000 Vane & Rotor Service & Replacement Guide

Caution  **Disconnect power before beginning service.**

1. The work area **must** be clean and have sufficient lighting.
2. Disconnect the vapor piping connected to the **IN** and **OUT** ports of the VP1000 cover assembly.
3. Remove the four Allen head screws and lock washers that secure the pump cover assembly to the pump housing and remove the cover carefully.

Caution  **Use a spill cloth when removing the cover, as there may be some gasoline inside the pump cavity.**

4. Carefully turn the rotor assembly by hand until the shaft key notch is at the 12 o'clock position. (See Figure 1)
5. Remove the rotor, vanes and shaft key from the pump housing.

Note: Place your hand or a container under the rotor while removing. Do not use any sharp objects that would scratch the surfaces of the pump cavity, pump shaft, rotor, or vanes.

6. Rotate the shaft by hand. If the shaft does not rotate freely, the entire vacuum pump needs replacement (p/n VP1000-5).
7. If the rotor and vanes are cracked, chipped, excessively worn or excessively dirty, the rotor and vanes should be replaced because cleaning will not remedy these conditions (p/n VP1000VRC or VP1000VRC-P).
8. If there is no visible damage, use a lint-free cloth with isopropyl alcohol to clean the rotor and vanes.
9. Using a lint-free cloth with isopropyl alcohol, thoroughly clean: the inside of the pump ring and rear of the pump cavity, the rotor shaft, and the inside of the pump cover.
10. Reposition the shaft (if necessary) so that the shaft key notch is in the 12 o'clock position. Install the cleaned original or new shaft key onto the shaft.
11. Carefully install the cleaned original or new rotor onto the shaft followed by the cleaned original or new vanes into the rotor.

Note: The rotor assembly should slide on to the shaft easily, without excessive force. (Rotors and vanes are reversible)

12. Lightly lubricate and install the new O-Ring for the pump housing.

Note: Do not allow any lubricant to get inside the pump housing.

13. Install the pump cover using the four Allen head screws and lock washers removed in step 3 and cross tighten.

Note: Use caution when sliding the pump cover over the O-Ring seal to prevent cutting or tearing.

14. Re-connect the vapor piping to the **IN** and **OUT** ports of the pump cover assembly that was removed in Step 2.
15. Re-apply power. Test for normal operation. (See VP1000 Vacuum Performance Test Procedure)

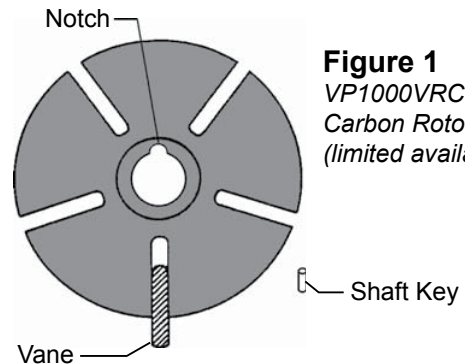


Figure 1
VP1000VRC
Carbon Rotor
(limited availability)

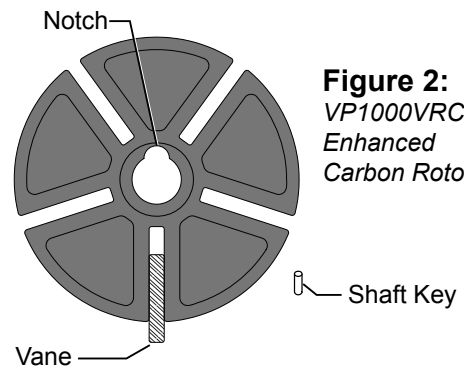


Figure 2:
VP1000VRC-P
Enhanced
Carbon Rotor

Note: See CARB Executive Order VR-201 for complete installation, operation, and maintenance (IOM) details.

Appendix D

Testing the System

Testing the System

1. Carefully review all work completed, making sure that all mechanical joints are thoroughly tightened and that all electrical connections are sealed.
2. Open the product crash valves and restore power to the dispenser.
3. With the power on, but no nozzles authorized, the VP1000-5 should not be running (unless the ambient temperature is below 40°F), but the power LED (yellow) should be energized on the interface module.
4. Authorize one handle and the vacuum system should activate when the gasoline flow control valve is engaged. Repeat for all other nozzles, individually testing each nozzle on each side of dispenser. With each authorization, one of the green LED's on the interface module should illuminate and the VP1000-5 activate.

Note: For unihose dispensers, conduct individual tests for each product grade on each side of the dispenser to ensure that the same LED activates for all grades on the same side. If the other LED activates, wiring needs to be corrected.

5. Authorize one nozzle and listen to the speed of the VP1000-5. With only one nozzle activated, the speed will be slower than if a nozzle on each side is activated. Activate a nozzle on the other side of the dispenser and listen for the speed to change.
6. To test the tightness of the vapor plumbing installed on the suction side of the system requires a 0-100" water column gauge. Connect the gauge into the 1/4" test port of the adaptor tee installed earlier (see Figures 6 and 7 for reference on test port installation and location). Continue by following and completing the START-UP / NEW INSTALLATION / WARRANTY / ANNUAL TESTING FORM.

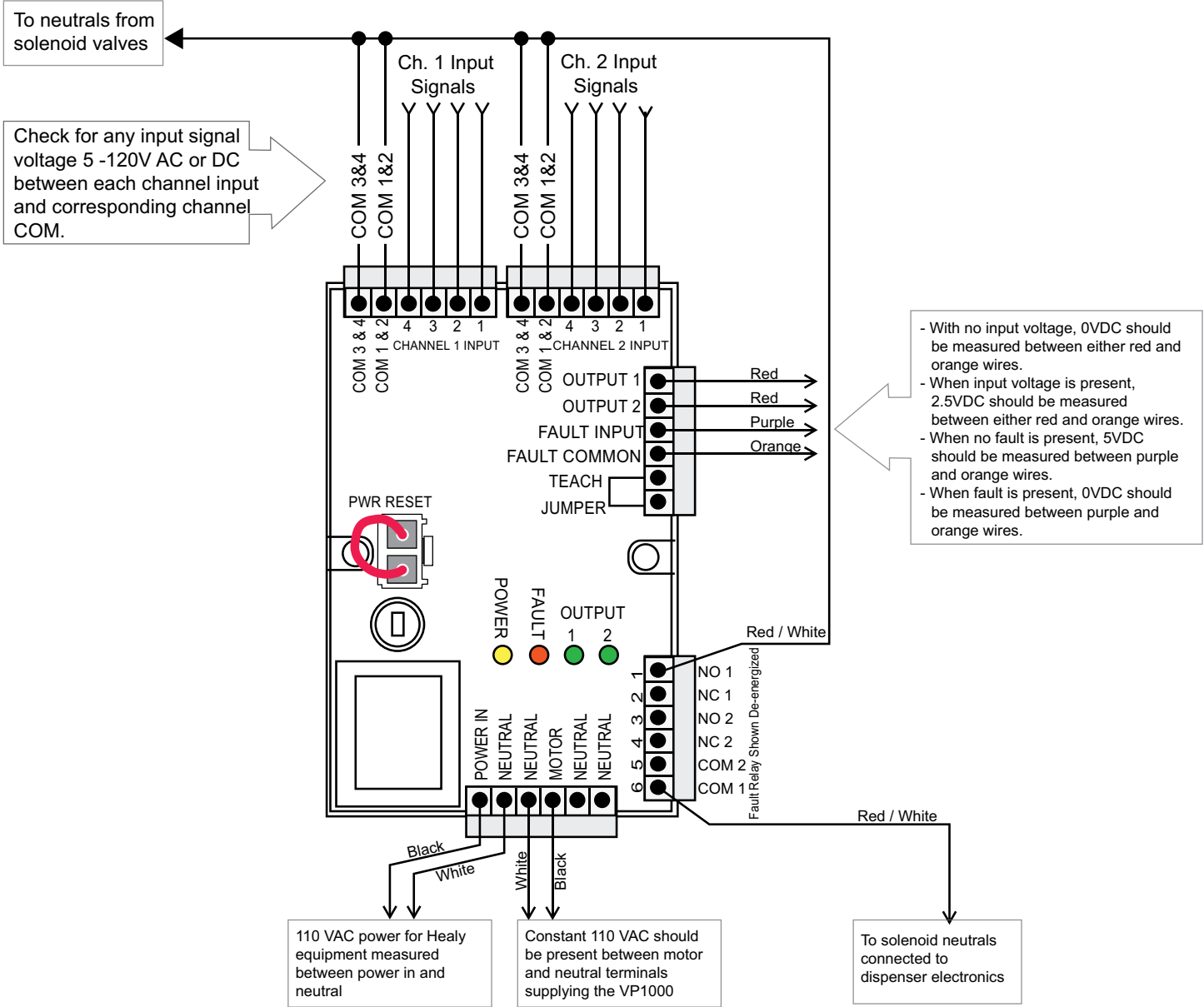
Note: See CARB Executive Order VR-201 for complete installation, operation, and maintenance (IOM) details.

Appendix E

MC100-1 Voltage Checks

Warning ⚡ Use extreme care and caution when performing the voltage checks listed below. Up to 110 VAC is present creating a risk of electrical shock.


Caution ⚠ If 110 VAC is accidentally applied to the fault or DC terminals, the module will be damaged.



(Universal Wiring Shown)

Appendix F

Performing the Learn/Teach Function on MC100-1

Warning  Use extreme care and caution when performing the functions below. Up to 110 VAC is present creating a risk of electrical shock.

On extremely rare occasions the VP1000-5 may be running at low or high speed when neither dispenser side is authorized. This may be due to a leaking incoming signal voltage. A technician can perform the following learn/teach function to try to correct this.

1. Remove the white reset plug from the MC100-1. No lights should be illuminated on the MC100-1.
2. Insert a jumper wire between the TEACH and JUMPER terminals to create a short.
3. With the jumper wire in place, re-insert the white reset plug. The yellow power light should now be illuminated.
4. Authorize a nozzle on Side A of the dispenser. The green light associated with OUTPUT 1 should be illuminated.
5. Remove the jumper wire. The VP1000-5 should be running at low speed. Hang up the nozzle to de-energize the dispenser. Seconds later the VP1000-5 should turn off. The VP1000-5 should not be running and neither green OUTPUT light should be illuminated.

Appendix G

VP1000 Returned Goods Product Tag

Franklin Fueling Systems

VP1000 Returned Goods Product Tag FFS-0120 rev 1

Returned Goods Authorization # _____

Product Return Date _____ Contact FFS Tech Support for RGA# _____

FFS Part Number _____

Distributor Name _____

Location (Branch) _____


Phone _____ e-mail _____

If product is returned within warranty period and FFS determines manufacturing defect, a replacement product will be shipped at no charge.


If product returned is outside warranty period, I would like (check one):

Core Credit to account Return Product after Rebuild (charge to PO# _____)

*This side for FFS Distributor use.
Reverse side must also be completed.*



Franklin Fueling Systems



Service Company _____ Site Name & Location _____

Service Tech _____ Tech. Cert. #. _____

Service Date _____ Original Install Date _____

Date Code / Serial # _____

Model # / Description _____

Refer to FFS Technical Bulletin TB0709-03 for details of the following required troubleshooting steps: What is the current state of the VP1000 / MC100 interface? (check one)

Red Light is FLASHING (over-current) Red Light is SOLID (under-current) Red Light is OFF

Dispenser Integrity (inches of water column): Starting Vacuum _____ Ending Vacuum _____


Vacuum Readings (inches of water column): Side A - Deadhead _____ Side A - Dispensing _____

Side B - Deadhead _____ Side B - Dispensing _____

Side A and B activated: Audible High Speed Change: Yes No Both Green Lights ON: Yes No

Service Notes: _____

*This side for Service Company use.
Must be completed for prompt processing.*



Example of Return Tag (FFS-0120)



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