HEALY

Franklin Fueling Systems

Vapor Recovery Assist System

Manual for 110 Volt Integrated Control Applications

VP1000-5-IC

Manual #	Revision	Date	Changes from previous revision
405004002	3	March 2012	Removed reference to pipe tape brand

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Contents

Important Safety Messages

Franklin Fueling Systems (FFS) equipment is designed to be installed with volatile hydrocarbon liquids such as gasoline. Installing, servicing or testing this equipment means working in an environment where 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.

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 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 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 in dispensers, 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.

Introduction

This procedure describes the tools, methods and skill levels required to install a Healy Systems, Inc. Model VP1000-5-IC Vapor Recovery Pump in existing or reconditioned dispensers. Only Healy trained and certified contractors may perform these retrofits or the warranty will be voided. The installer must also be a skilled petroleum technician and thoroughly familiar with federal and local code requirements for the installation and repair of gasoline dispensing equipment. In addition, they shall be aware of all the necessary safety precautions and site safety requirements in order to assure a safe, trouble-free installation.

Description of Operation

The Healy Systems VP1000-5-IC Vacuum Pump is typically mounted in the lower hydraulic area of a dispenser or self-contained gasoline pump. It works as a component of a complete Stage II system which also includes Healy hanging hardware (Figure 1).

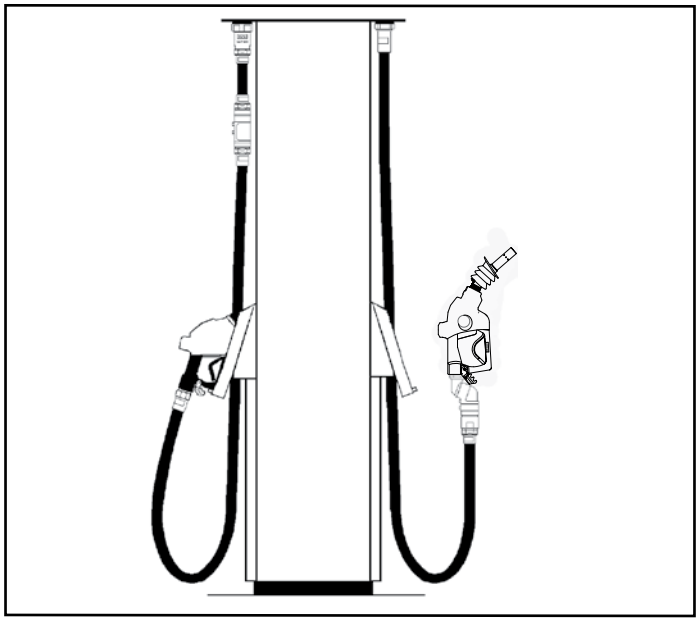


Figure 1: Hanging Hardware

It is intended for use by either OEM dispenser / pump manufactures or as an aftermarket retrofit to make existing equipment compatible with Healy Systems technology.

Specifications: 1/8 Hp, 110 VAC input, 2 Amp AC

Note: All electrical and hydraulic plumbing fittings referred to in these instructions must be UL “listed” or “recognized”.

Note: The VP1000-5-IC will increase the current draw of the dispenser by 2 amps.

The preferred mounting position of the VP1000-5-IC Vacuum Pump is with the vacuum pump inlet and electrical connections facing upwards, towards the top of the dispenser (see Figure 2 below). If other mounting positions are desired because of mechanical constraints within the dispenser, please contact FFS Technical Services at 1-800-984-6266.

Vacuum Pump Features

- Operates at two speeds: Low Speed if one fueling point has been activated, or High Speed if both fueling points are activated simultaneously.
- Contains performance protection devices that will shut off the vacuum pump and disable dispensing if the vacuum pump is not operating properly.
- Contains internal control and operates as a ‘stand alone’ Vacuum pump.
- Contains low temperature activation circuits that turn the vacuum pump on at slow speed when the temperature drops below 40° F (4º C) to prevent freezing.

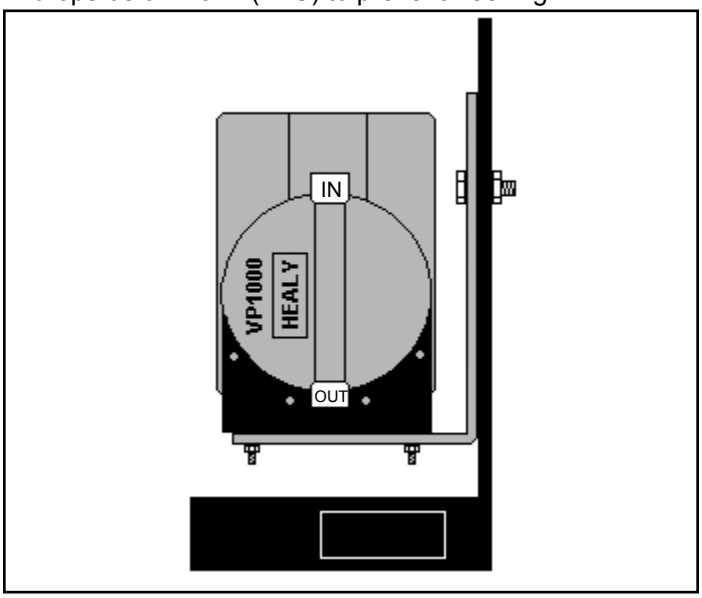


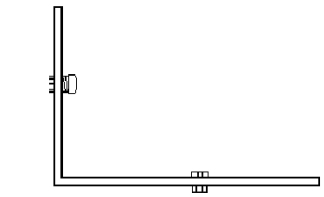
Figure 2: VP1000-5-IC Typical mounting

Preparation

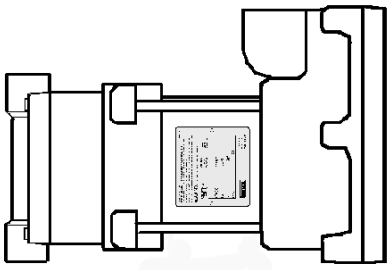
Parts List

This section illustrates the basic components needed to retrofit a VP1000-5-IC Vacuum Pump into any new, replaced, retrofitted, or reconditioned dispenser. This system can be installed in any “Non-Vapor or Vapor Ready” dispenser including dispensers with existing “Balance” or “VacAssist” piping. Three items are required for complete retrofit installations: VP1000-5-IC, Vapor kit, and Electrical kit. Other supplies beyond these items may also be needed to complete your installation (i.e. electrical nipples and, possibly, additional vapor connections).

Assorted lengths of “UL Listed” electrical nipples as well as pipe or electrical elbows and couplings will be required to complete vacuum pump installation.



Mounting Bracket & Hardware



VP1000-5-IC Vacuum Pump

Figure 3: VP1000-5-IC Mounting Parts

Electrical Kit Z070E for 110VAC Applications

Part	Quantity
Explosion Proof Junction Box	1
Capped 90° Elbow	1
1/2" Union	1
Potted Conduit Nipple	1
1/2" x 3/4" Reducing Bushing	1
3/4" Coupling	1
3/4" Close Nipple	1
Electrical Wire Nuts	12
Scotchlok™ Wire Connectors	18

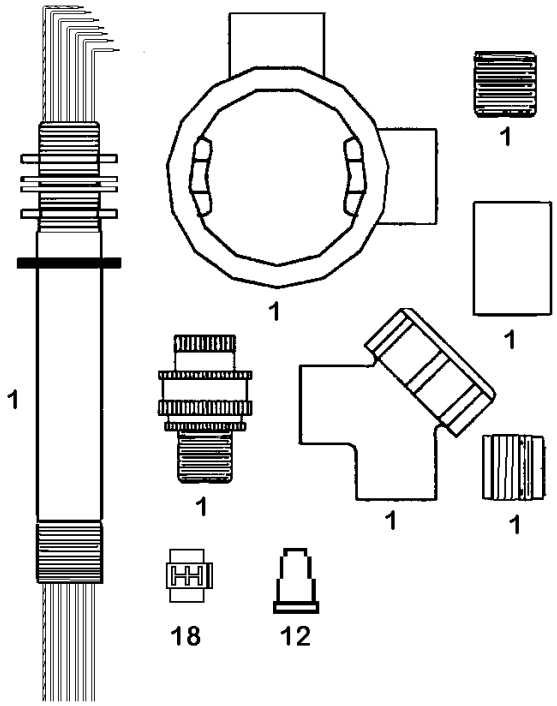


Figure 4: Electrical Parts

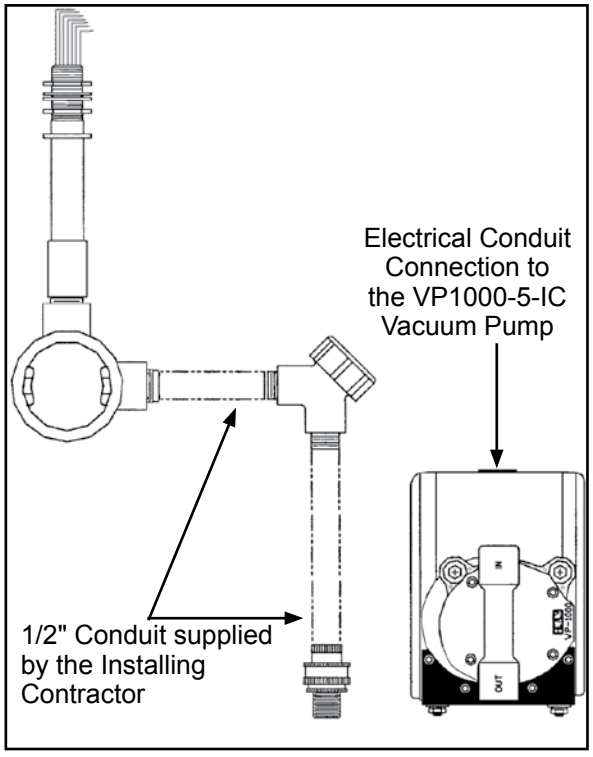


Figure 5: Universal Electrical Kit Z070E

Vapor Kit Z071V

Part	Quantity
12' Length type “L” Copper Tubing	1
1/2" Ball Valve	1
1/2" x 1/4" x 1/2" NPT Tee	1
1/4" NPT Hex Pipe Plug	1
1x1/2" NPT Reducing Bell	1
1x1/2" NPT Reducing Bushing	1
5/8" Flare Tee	1
1/2" NPT Street Elbow	1
Sheet Metal Screw	1
Cushioned Hold Strap	1
3/4"x1/2" NPT Bushing	2
1/2" NPT Close Nipple	3
1/2" NPT x 5/8" Flare Elbow	4
1/2" NPT x 5/8" Flare Straight	5
5/8" Flare Nut	8

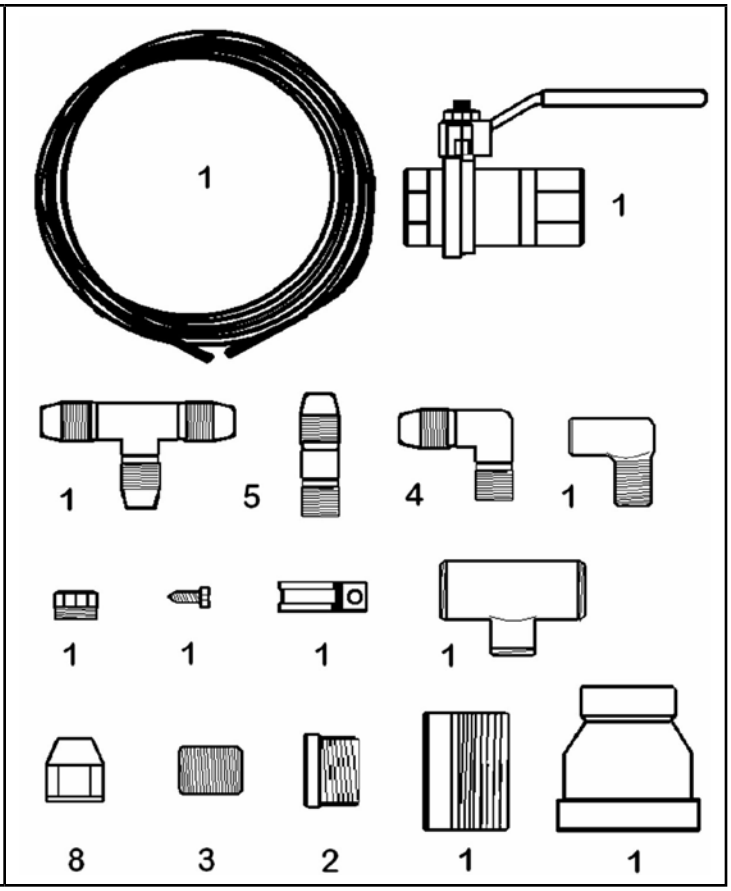


Figure 6: Vapor Kit Components with Quantities

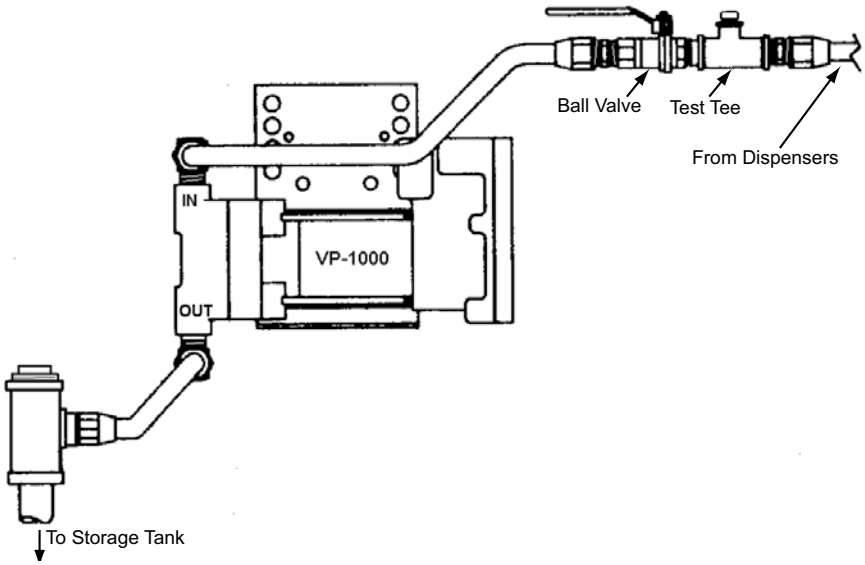


Figure 7: Vapor Piping Inlet/Outlet Configurations

- VP1000-5-IC inlet and outlet piping/tubing can be installed in many different configurations to adapt to the available space within a dispenser/pump.
- Inlet piping must contain a test port and ball valve in the order shown in Figure 7.
- Use PTFE tape on all threaded vapor connections for both the inlet and outlet ports of the VP1000-5-IC vacuum pump. NO PIPE DOPE ALLOWED.
- Both Inlet and Outlet Piping require the use of 5/8” O.D. “Type L” copper tubing in combination with ½” NPT x 5/8” Flare Fittings when connecting to existing dispenser vapor piping. NO COMPRESSION FITTINGS ALLOWED.
- Additional connectors or fittings may be required to adapt to the original dispenser piping.

Tools Required

- 0-100" Water Column Vacuum Gauge
- 9" Lineman's Pliers
- Assorted Open End Wrenches 1/4" through 3/4"
- Assorted Allen Wrenches
- Wire Cutters/Strippers 18 AWG and 26 AWG
- 3/8" Drill Assembly
- Assorted Drill Bits 1/16" through 7/16"
- 1/2" (5/8" O.D.) Copper Tube Bending Tool
- 1/2" (5/8" O.D.) Copper Flaring Tool
- Assorted Screwdrivers (Flat blade-one must be 1/8" wide)
- 1 1/8" Sheet Metal Hole Punch (for Potted Conduit Assembly)
- Copper Tubing Cutter
- Electrical Multi-Meter
- 12" Adjustable Wrench
- 18" Channel Lock Pliers
- (2) 18" Pipe Wrench
- Hand Pipe Threader (for up to 1" pipe)
- Pipe Cutter (for up to 1" pipe)
- Tape Measure
- PTFE PipeTape
- 1/2" or 3/8" Ratchet set w/Sockets 1/4" through 9/16" + 3" Extension

Dispenser Access

- Lock-out and tag-out all electrical power to dispenser being modified.
- Secure dispenser access keys from station management.
- Remove dispenser panels and open doors as required for installation.

Before Mounting the Vacuum Pump

- The vacuum pump inlet cover must be accessible for service.
- Allow spacing for inlet piping test port and ball valve.
- An unobstructed path for the installation of vapor tubing.
- Allow space for electrical conduit components.
- Access point for the potted conduit through the vapor barrier.

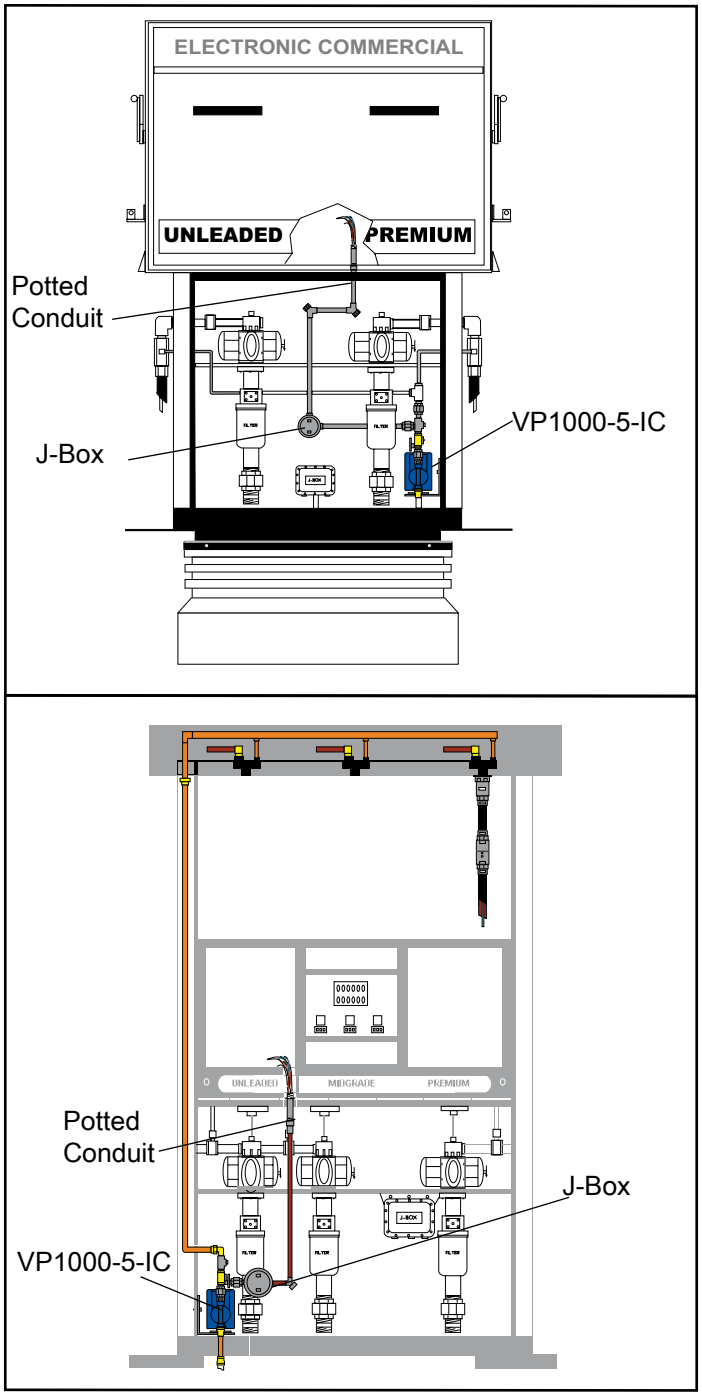


Figure 8: VP1000-5-IC Mounting Examples

Installing the VP1000-5-IC System

Mounting the Vacuum Pump & Electrical Conduit Assembly

The VP1000-5-IC System must be installed by a licensed petroleum technician following all applicable federal and local codes / regulations.

Warning **Disable and tag-out all electrical feeds into the dispenser. No electrical power is allowed to the dispenser during the installation of the vacuum pump and control module.**

The recommended mounting position of the VP1000-5-IC vacuum pump is with the vacuum inlet and the electrical connection facing upwards towards the top of the dispenser.

- The vacuum pump's performance is not affected by the mounting location within a dispenser.
- The vacuum pump can be mounted at any location within the hazardous area of a dispenser if all applicable NFPA codes are followed.
- The installation must use "UL" approved electrical conduit, explosion-proof junction box, and electrical union as required components connecting the VP1000 vacuum pump to the potted conduit.

The vacuum pump can be mounted on any solid surface or dispenser brace suitable to support the weight of the pump (32 lbs / 14.51 kg). The black steel bracket that is attached to the VP1000-5-IC Vacuum Pump can be removed and rotated (3 different mounting positions) so as to achieve the recommended mounting position of the pump. If additional support is needed, the use of the universal steel bracket supplied in the universal hardware kit is recommended.

1. Begin the installation by mounting the vapor pump in the hazardous portion of the dispenser. Do not final tighten the mounting bolts at this time.
2. Install the Potted Conduit Assembly in an available barrier knockout (Figure 10). The potted conduit assembly is used for the electrical conduit transition from the hazardous area into the electronic area where the VP1000-5-IC will be interfaced with existing dispenser electronics.
3. The opening required through the vapor barrier for the potted assembly must be 1-1/8" in diameter. Installers can use a sheet metal punch to create the opening or use an existing knock-out if available.
4. Remove the top hex nut and washer from the potted conduit assembly. Guide the assembly through the knock-out, replace the washer, and thread the hex nut back onto the assembly, and hand-tighten the assembly into place. If the dispenser has dual vapor barriers, the rubber washer is installed on the top side of the lower deck. (See Figure 9)

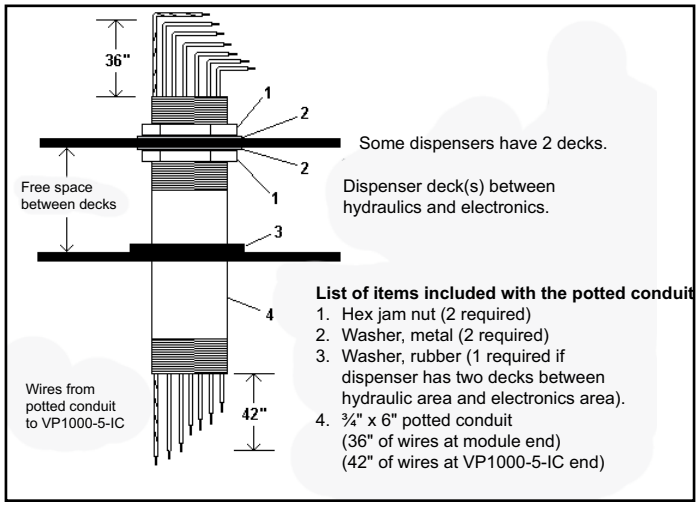


Figure 9: List of items Included with Potted Conduit

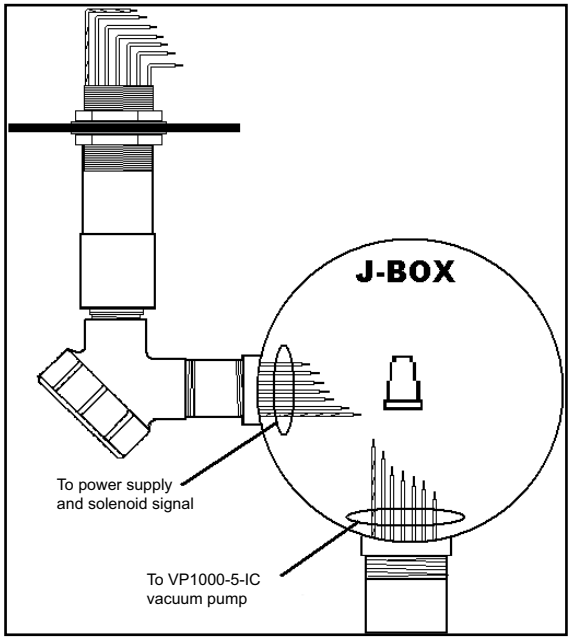


Figure 10: Junction Box Wiring

5. After the potted conduit and the VP1000 vacuum pump are in place (not final tightened), you can begin to make up the electrical conduit that will connect the two components. Keep in mind that an electrical union and the explosion proof junction box must be installed between the two points.

6. Measure and select the proper size “UL” listed electrical nipples (not included). Feed the wiring from the potted conduit and the vacuum pump through the necessary electrical conduit components and nipples making sure that each piece is connected by a minimum of five threads. All electrical conduit connections must have at least five threads of engagement to be in compliance with the installation procedure.
7. Final tighten the mount for the VP1000-5-IC vacuum pump and also the hex locking nuts for the potted conduit assembly only after all the electrical conduit components have been correctly installed according to NFPA codes.

Wiring Installation

1. Pull the excess wire from the potted conduit and the vacuum pump through to the explosion proof junction box as required.
2. After the electrical conduit connections are completed and the wiring has been pulled into and through the explosion proof junction box the excess wire can be measured and cut. The length of the wires should allow for stripping and a wire nut connection for each wire (approximately 6” or 15.24 cm). Refer to Figure 11 (Junction Box Connections) for connections from bottom portion of the potted conduit and VP1000-5-IC wires at the explosion proof junction box.
3. In the non-hazardous portion of the dispenser, locate the solenoid valve board that controls the signals (AC or DC) entering or exiting the product solenoid valves.
4. Locate the dispenser wire harness that carries the signals from the solenoid valve control to the individual solenoid valves on each side of the dispenser. Refer to Figure 11 (Connection to Electronics).

A Side

5. Starting on the “A” side of the dispenser and using a multi-meter, determine which harness wire is carrying the voltage signal to the “A” side – grade 1 solenoid valve.
6. If a solenoid valve assembly has more than one signal wire, the signal wire that is first energized and remains energized throughout the fueling is labeled.
7. Select one of the red 22 AWG wires from the potted conduit and the signal wire. Splice these wires together.

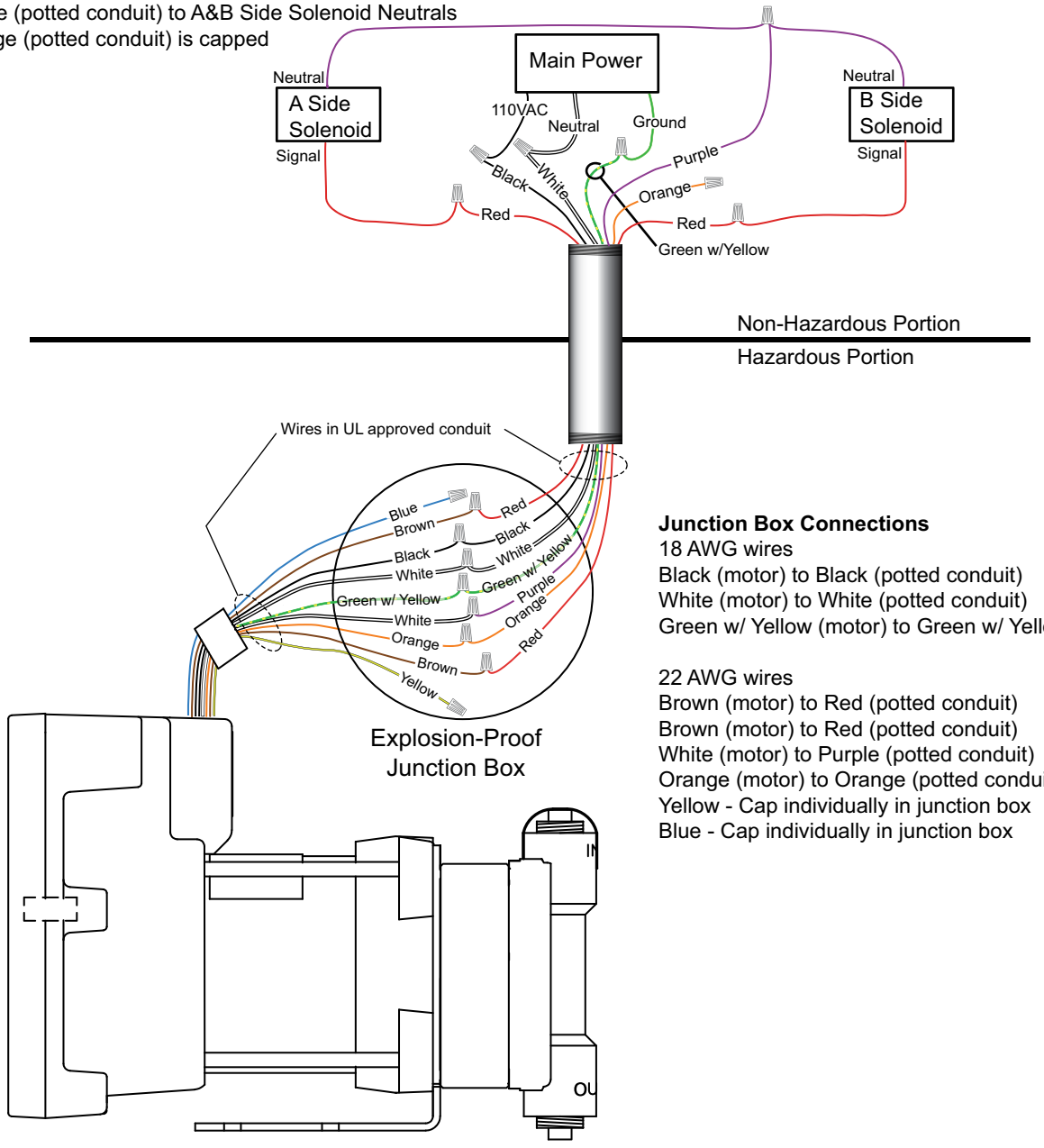
B Side

8. Repeat previous steps 3-5 for the “B” side solenoid valve signal wire using the second red potted conduit 22 AWG wire.
9. Locate the common neutral from both of the solenoid signals and the purple 22 AWG from the potted conduit. Splice these wires together.

Note: For dispensers with more than one grade, use an appropriately rated relay that accepts multiple inputs and one output to interface with the potted conduit. One relay would be required per dispenser side.

Connections to Electronics
18 AWG wires
Black (potted conduit) to Main Power 110 VAC
White (potted conduit) to Main Power Neutral
Green w/ Yellow (potted conduit) to Main Power Ground

22 AWG wires
Red (potted conduit) to A Side Solenoid Signal
Red (potted conduit) to B Side Solenoid Signal
Purple (potted conduit) to A&B Side Solenoid Neutrals
Orange (potted conduit) is capped



Junction Box Connections
18 AWG wires
Black (motor) to Black (potted conduit)
White (motor) to White (potted conduit)
Green w/ Yellow (motor) to Green w/ Yellow (potted conduit)

22 AWG wires
Brown (motor) to Red (potted conduit)
Brown (motor) to Red (potted conduit)
White (motor) to Purple (potted conduit)
Orange (motor) to Orange (potted conduit)
Yellow - Cap individually in junction box
Blue - Cap individually in junction box

Figure 11: Potted Conduit Connections

Installing Dispensing Hanging Hardware

Dispensing Hanging Hardware is defined as the connecting point on a dispenser where the Healy System Hose Assembly or the Healy System Hose Adapter connects to the original dispenser product outlet casting.

Installing Dispensing Equipment

1. Completing the connection of Healy Systems dispensing equipment requires the installation of Healy Systems Phase II dispenser adapters, coaxial hoses, and nozzles (Hanging Hardware). If applicable, remove existing non-Healy hanging hardware (from the dispenser product outlet adapter to, and including, the nozzles).
2. Vapor ready dispensers will require a Healy Systems adapter to make the hose threads compatible with other Healy Systems equipment. Install the adapter according to the instructions that come with it. Various adapters are available, depending on how the dispenser is configured: M34 metric (Healy designation F3 or S3) or balance ready (Healy designation S4).
3. Healy Vapor Recovery Hoses are available in various lengths to meet local ordinances. Install Healy Vapor Recovery Hoses according to the included instructions.
4. Breakaways are required; install either a model 8701VV Breakaway or a model 807 Swivel Breakaway. Install the breakaway using the instructions supplied with the unit.
5. Last, install the Healy Systems nozzle. Check to be sure that the nozzle holster (boot) is mounted in the highest position. Check for proper fit in the nozzle holster (boot) and that the nozzle can be locked in the off position. Also be sure that when the nozzle is locked, the dispenser cannot be activated from the locked position.

Hose Adapters

- Use the CX6-A for “Non-Vapor Ready” dispensers with NPT connections.
- Use the CX6-AE for Non-Vapor ready dispensers with BSP connections.
- Dispensers containing existing “VacAssist” or “Balance” Stage II piping DO NOT use this adapter.

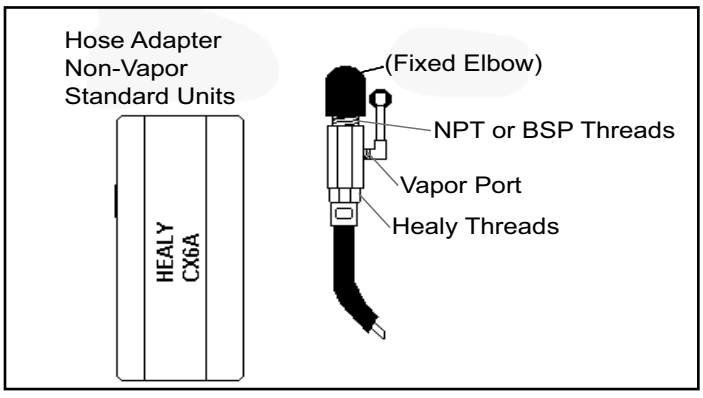


Figure 12: Non-Vapor Ready Adapter

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. Restore power to the dispenser.
3. With the power on, but no nozzles authorized, the VP1000-5-IC should not be running (unless the ambient temperature is below 40ºF [4ºC]).
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 side of the dispenser.
5. Authorize one nozzle and listen to the speed of the VP1000. 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. Continue to the Start-Up / New Installation/ Warranty / Annual Testing Form and perform items B3-B6.

VP1000-5-IC Troubleshooting

Important:

Use extreme care and caution when performing the tests listed below.

- With power applied to the dispenser, but no products authorized, there should be 110 VAC between the 18 AWG black and white wires in the junction box.
- With a product authorized, hook signal voltage (12-120 Volts AC or DC) should be present between either red and purple wires.
- The electronics of the motor will make three attempts to start the pump. If it detects a problem, on the fourth unsuccessful start, the pump will be in a fault condition and shut down.
- To remove a fault condition on the VP1000-5-IC, remove power to the dispenser for 15 seconds and restore power.
- Continue to the Start-Up / New Installations / Warranty / Annual Testing Form and perform items B1-B6.

VP1000-5-IC 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 VP1000-5-IC 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 13)
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-IC).
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 405266901).
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. (Refer to Start-Up / New Installation / Warranty / Annual Testing Form).

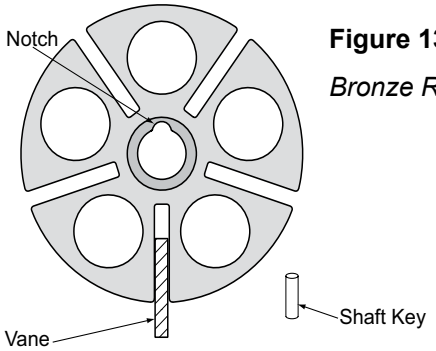


Figure 13

Bronze Rotor

START-UP/NEW INSTALLATION/ WARRANTY/ ANNUAL TESTING FORM (Rev. 05/07)
HEALY VP1000-5-IC VACUUM PUMP

Date_____

- **Start-Up / New Installations — Complete sections 3, 4, 5 and 6 of SIDE B.**
- **Warranty Service or Annual Testing — Conduct the appropriate tests specified on SIDE B.**

SIDE B

Warranty Service	*Start-up/ New Installations/ Annual Testing*
Complete Troubleshooting Sections **B-1 and B-2**	Complete Sections **B-3 through B-6**

B-1

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 manual of the ARB Approved Installation, Operation and Maintenance Manual for Executive Orders.
2. Clean all surfaces including vanes, rotor, rotor housing and cover assembly.
3. Manually spin and inspect the motor shaft for bearing wear before re-installing the rotor kit.
4. Replace motor when bearings or shaft are damaged or worn.
5. Check O-ring seal before replacing rotor cover assembly.

B-2

Re-Assemble / Reset Vacuum Pump and Module. (Power must be removed from both the vacuum pump and dispenser **for 20 seconds to reset the system**).

B-3 Dispenser Vapor Line Integrity Test

1. Install 0-100 inch water column (“ wc) vacuum mechanical gauge at the VP1000-5-IC test port.
2. Authorize the dispenser for fueling. The VP1000-5-IC will begin to run.
3. Close the ball valve at the pump inlet.
4. Record the initial vacuum reading on the gauge – Record the final vacuum reading after 60 seconds.
5. Open the ball valve at the pump inlet.
6. Leaks must be repaired when the vacuum reading falls more than 4” wc in 60 seconds.
7. Retest until all leaks have been repaired.
8. Record data in Section B-4.

Note: If the initial vacuum reading is less than 60” wc, it could indicate a problem with the VP1000-5-IC.

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.

B-4

VACUUM TEST Using VP1000-5-IC as vacuum source	Initial Vacuum test reading (“ wc)	Vacuum test reading after 60 sec. (“ wc)

B-5 Dispenser Vacuum Test

With one side of the dispenser authorized (VP1000-5-IC running) and the ball valve at the pump inlet open, dispense in handheld position a minimum of 0.5 gallons (1.9 liters) of fuel into a vehicle or test tank. Record the vacuum level while dispensing. Repeat test for the other side of the dispenser.

1. Side “A” Dispensing Vacuum _____” wc
2. Side “B” Dispensing Vacuum _____” wc

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.

B-6 Audible Increase Test

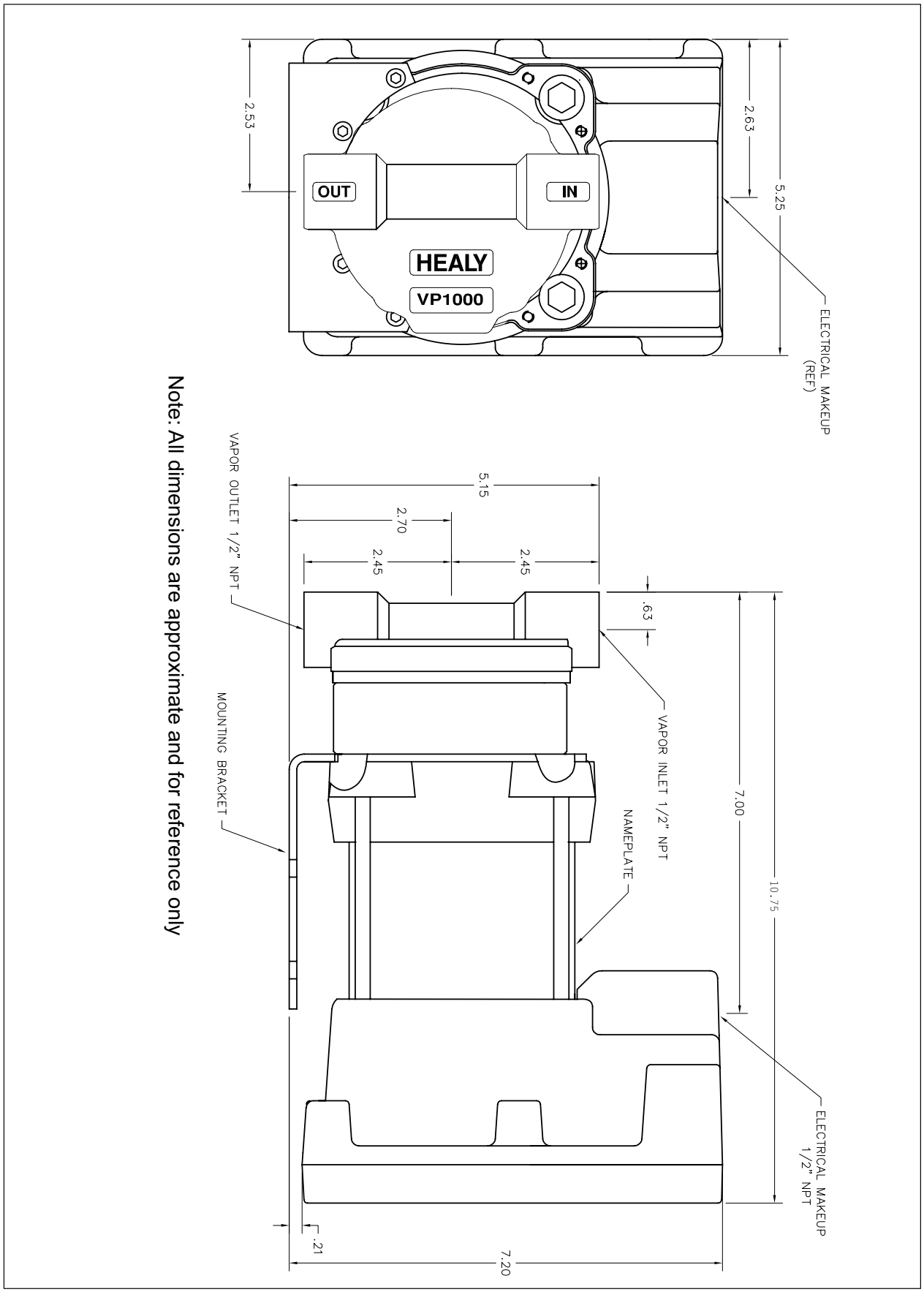
Test the VP1000-5-IC Vacuum Pump for normal operation. Use the 6 step procedure titled, “Testing the VP1000-5-IC Vacuum Pump for normal operation using the following test procedure:” in Section 1.1 (Weekly Inspection and Testing) of the Healy Systems Scheduled Maintenance document in the ARB Approved 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.

Does the VP1000-5-IC Vacuum Pump change speeds (audible increase) when both sides are activated for fueling?

Yes No

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.**

Repairs - Comments	To Obtain Returned Goods Authorization number (RGA#) Call (800) 984 -6266



Note: All dimensions are approximate and for reference only

Figure 14: VP1000-5-IC Dimensions

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