



9.8 Vacuum Pump (Only) Replacement

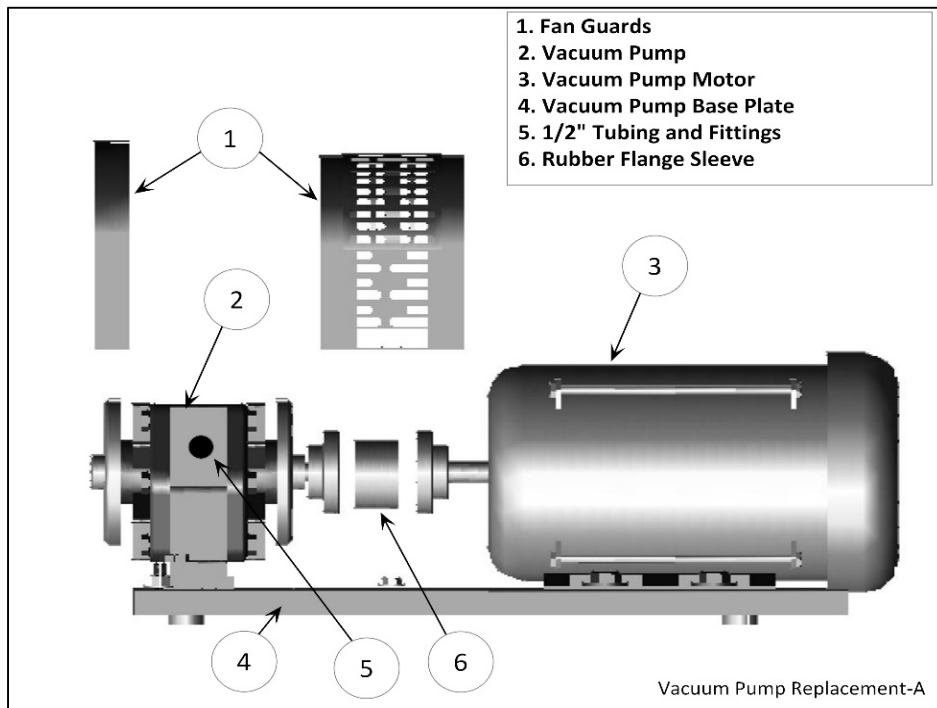


Figure 9-19: Vacuum Pump Components

9.8.1 Preparation for Cleaning the Tubes and Manifold

1. Turn OFF power to the VST Control Panel at the Power Switch located on the front of the VST Control Panel. (The power, ground, and neutral will be completely disconnected from the GREEN MACHINE).
2. Use Lockout/Tagout Procedures prior to starting work.
3. Unlock and close the 3 isolation valves between the GREEN MACHINE and the vent risers.
4. Unlock the hasps and remove the cover from the GREEN MACHINE.
5. Remove tubes 1, 2, 3, 4, 5, and 6 from the GREEN MACHINE. **See Figures 9-20 & 9-21.**

CAUTION: The tube ends are a Parker 45° flare, use caution not to damage the flared ends on the tubing or the threads on the nuts after removal.

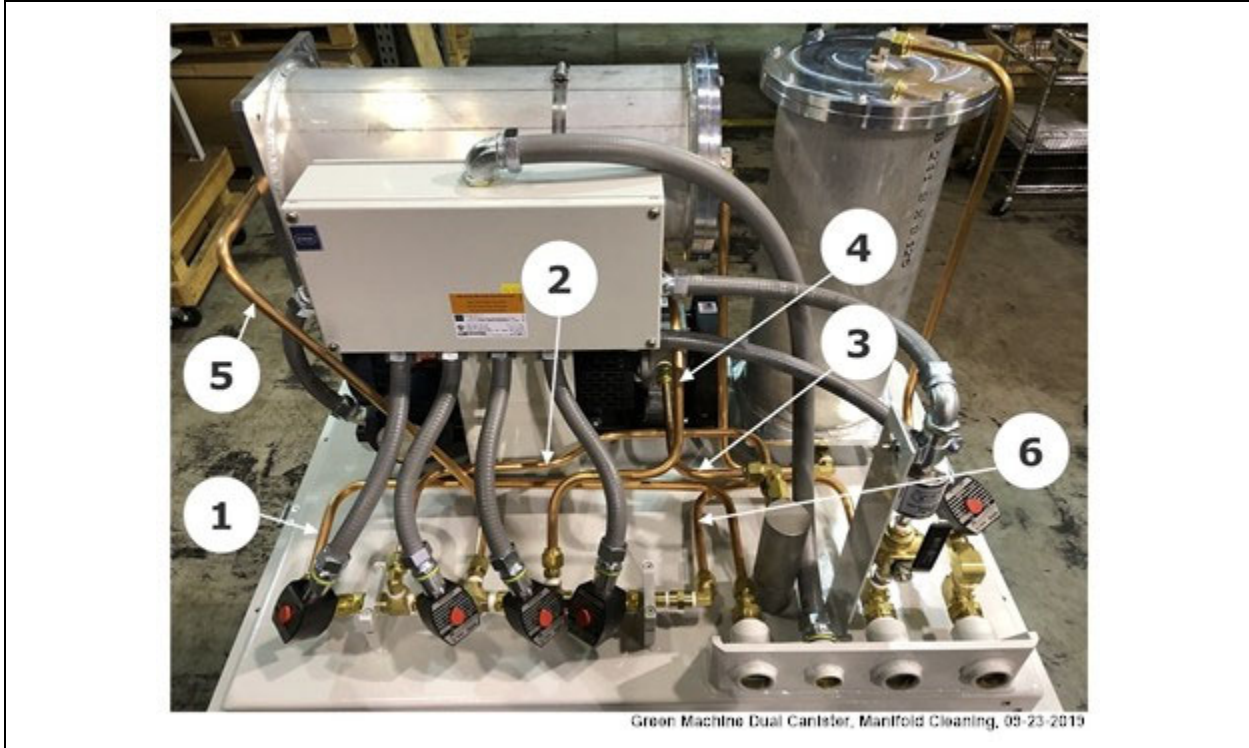


Figure 9-20: Items Associated with Cleaning the GREEN MACHINE Tubing and Manifold

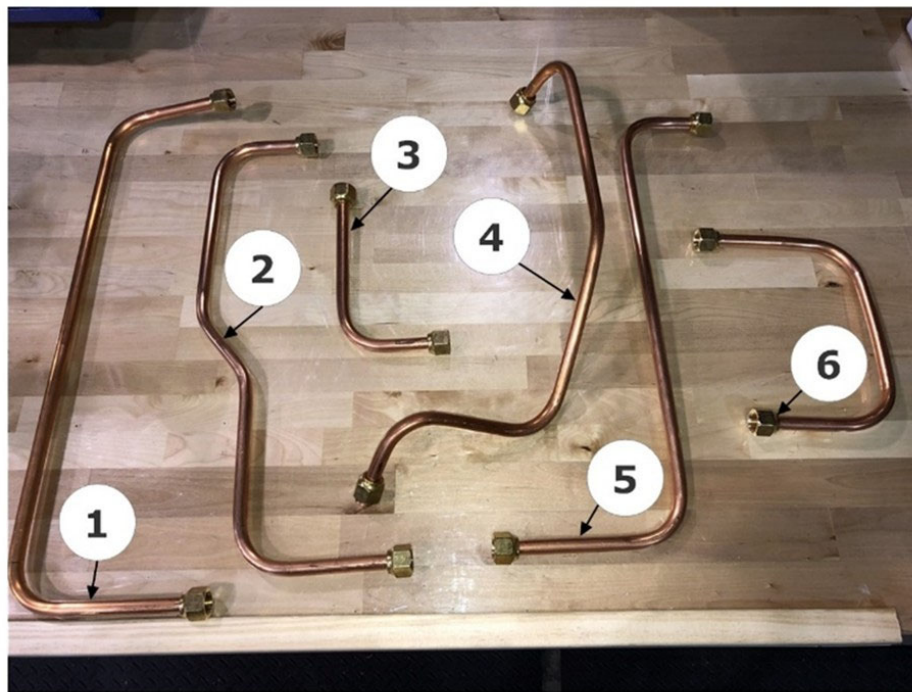


Figure 9-21: Tubes 1-6 Removed



9.8.2 Removing the Vacuum Pump

1. For the Vacuum Pump Assembly and Components, **See Figure 9-22.**
2. Make sure the power is OFF to the VST Control Panel at the Power Switch located on the front of the VST Control Panel.

NOTE: The Motor will not be affected during the replacement of the Vacuum Pump.

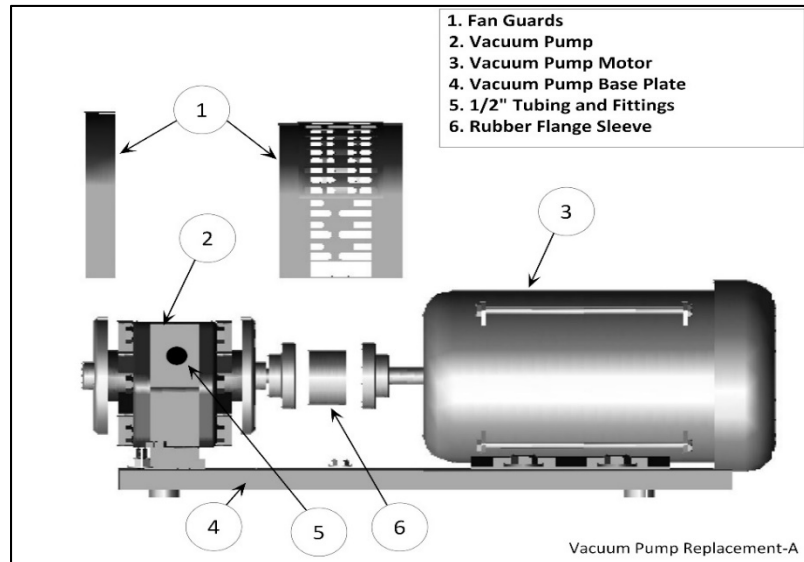


Figure 9-22: Vacuum Pump Assembly and Components

3. Remove the brass pipe fittings from both sides of the Vacuum Pump and keep for reuse.

CAUTION: The fittings are a Parker 45° flare, use caution not to damage the 45° flare fittings or the threads after removal.

4. Remove the fan guard (the large center guard #1 in **Figure 9-22**) for access to the coupling flanges and removal of the Vacuum Pump.
5. Loosen the drive coupling set screws on the motor side of the rubber flange sleeve, then slide the drive coupling towards the motor. Penetrating oil may be needed to slide the flange sleeve.
Remove the rubber flange sleeve and discard.
6. The rubber flange sleeve between the Vacuum Pump and the motor must be replaced with each new pump.
7. Remove the 4 mounting bolts from the Vacuum Pump base and keep for re-use.

CAUTION: There may be metal shims under the Vacuum Pump. They must be marked for location and saved for re-use.

8. Slide the Vacuum Pump towards the motor and remove.



9.8.3 Replacing the Vacuum Pump

1. The new pump will come with a drive coupling and rubber flange sleeve.
See Figure 9-22.
2. Install the flange coupling on to the pump shaft. Then install the rubber flange sleeve into the pump flange coupling so that when the pump is installed, the rubber flange sleeve mates with the motor flange coupling.
3. Place the new Vacuum Pump on the base and align the mounting holes. Remember to re-install the shims under the Vacuum Pump.
4. Reinstall and tighten the 4-Vacuum Pump mounting bolts so the pump shaft aligns with the motor shaft.
Slide the drive-coupling flange over the rubber flange sleeve so both halves of the coupling are snug (not tight) against the rubber flange sleeve and tighten the set screws. Double check to make sure both coupling set screws are tight.
5. Wrap the pipe fitting threads with gasoline resistant PTFE tape a maximum of three revolutions and reinstall the pipe fittings. The 90° fitting must be installed on the back of the Vacuum Pump, and the straight fitting must be installed on the front.
CAUTION: Do not use any thread sealing compound when assembling the 45° flare nuts.
CAUTION: When tightening the 45° flare nuts: Clamp the tube flare between nut and nose body of the tube by screwing the nut on finger tight. Tighten with a wrench an additional ¼ turn for a metal-to-metal seal.
6. Reinstall and tighten the 4-Vacuum Pump mounting bolts so the pump shaft aligns with the motor shaft.
7. Re-install the fan guard.



Scan for Video

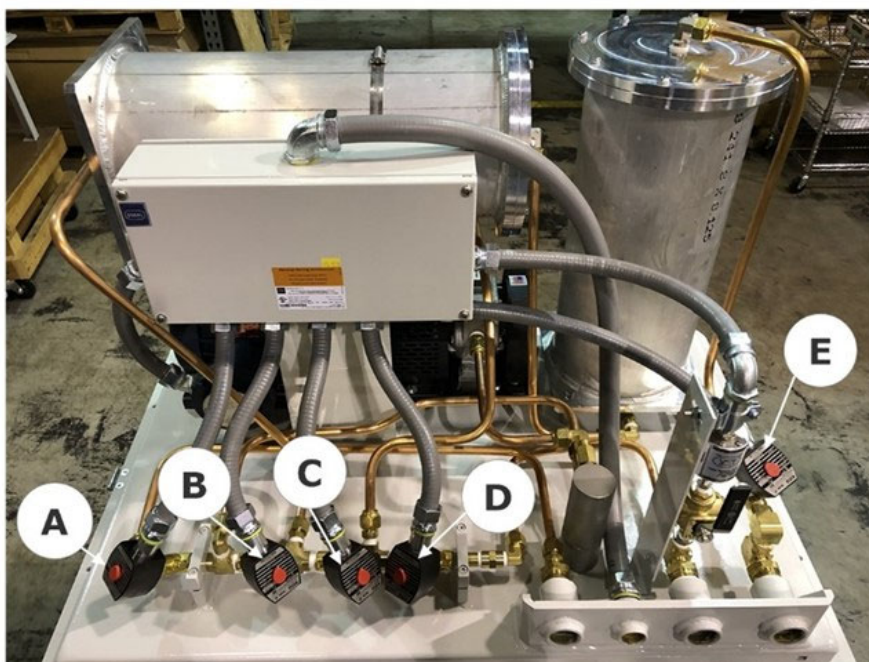
9.8.4 Preparation for Cleaning the Tubes and Manifold

1. On the manifold, remove the Solenoids A, B, C, and D from the 4 Control Valves located on the manifold. Do not remove Solenoid E. **See Figure 9-23.**
2. GM Control Valve Assembly and Components. **See Figure 9-24.**
3. Remove the RED Cap from the Solenoid Base and the Nameplate/Retainer and keep for reuse. **See Figure 9-25.**
4. Slide the Solenoid off the Solenoid Base. Do not remove the flexible conduit from the Solenoid.
5. Remove the Spring Washer from the Solenoid Base and keep for reuse.
6. Use a 1" wrench to remove the Solenoid Base from the Valve Body. Keep the Solenoid Base, the Core Assembly and Body Gasket for reuse. **See Figures 9-26.**
7. Place the empty Solenoid Base inside the Solenoid, then attach the RED Cap. Do this for all four Solenoids. **See Figures 9-27 and 9-28.**

WARNING: The Solenoid Base MUST BE INSTALLED inside the Solenoid so the magnetic field around the Solenoid will not breakdown when power is applied to the Solenoid.

8. Move the four Solenoids out of the way of the manifold. **See Figure 9-29.**
9. The Manifold is now ready to clean. **See Figure 9-30.**
10. Install the provided Blowout Tube with the clear plastic tubing attached to the discharge side of the Vacuum Pump. Tighten the 45° nut on the fitting hand tight. **See Figure 9-31.**

CAUTION: Do not use any thread sealing compound when assembling the 45° flare nuts on the tubes



Green Machine Dual Canister Manifold Valves, 09-23-2019

Figure 9-23: Manifold Valves



Figure 9-24: GM Control Valve Assembly and Components

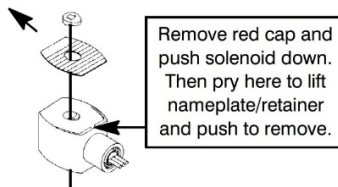


Figure 9-25: How to remove the Red Cap from the Solenoid Base

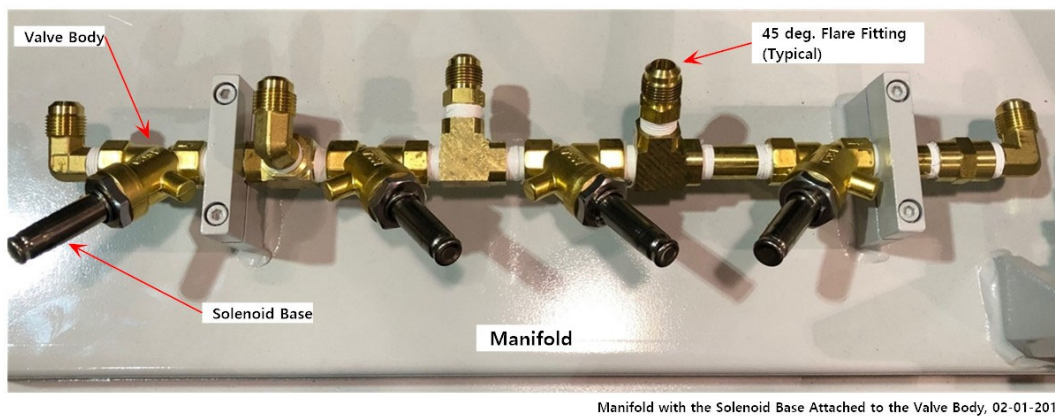


Figure 9-26: Manifold with the Solenoids Removed, showing the Solenoid Bases



Figure 9-27: Solenoid with Solenoid Base and RED Cap

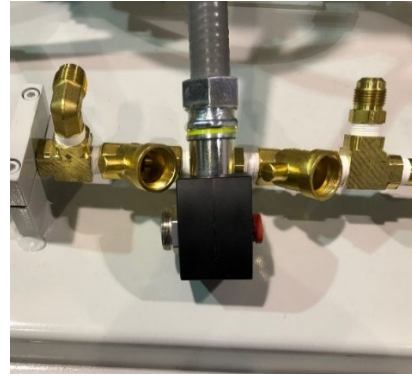


Figure 9-28: Solenoid with the Solenoid Base and RED Cap Installed

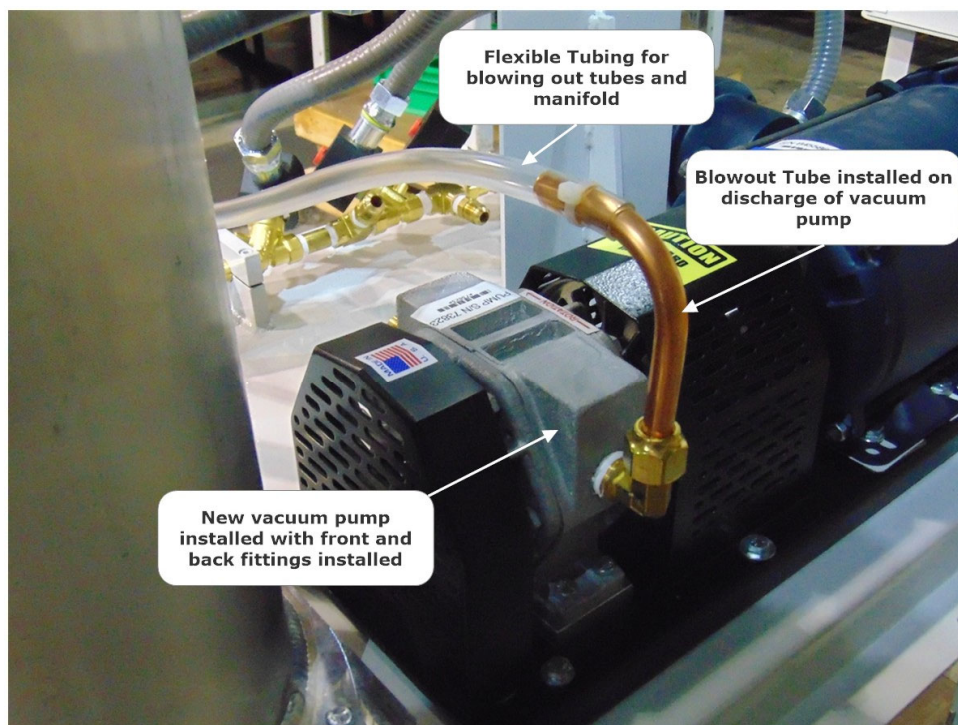


Figure 9-29: Solenoids (with the Solenoid Bases Installed) Arranged Out of the Way



Valve Manifold with Everything Removed, 01/24/2019

Figure 9-30: Manifold Ready for Cleaning



Vacuum Pump with Fittings and Blowout Tube Installed, 3-20-2019

Figure 9-31: Vacuum Pump with the Blowout Tube Installed



9.8.5 Cleaning the Tubes and Manifold

1. At the VST Control Panel, remove the Lockout/Tagout lock(s).
2. Turn ON power to the VST Control Panel at the Power Switch.
3. Make sure the Maint. Switch is turned ON.
4. At the Main Screen, push the Maintenance Screen button to access the Password Screen, then enter the password to access the Maintenance Screen: Password is 878.
See Figure 9-32.
(The password is 123 on older models of the VST Control Panel.)
5. At the Maintenance Screen, push the grey Manual ON so the Vacuum Pump will operate. This will allow the Vacuum Pump to blow outside air through the plastic tube.
WARNING: Safety Glasses MUST BE USED when blowing out the Tubes and Manifold.
6. Using the plastic tube, blow air through the 6 removed copper tubes to remove any potential debris. **See Figure 9-31.**
7. Using the plastic tube, blowout each of the openings in the manifold starting at right side, and progress to the other end. **See Figure 9-30.**
8. Then blowout each of the manifold openings again starting at the left side and progress to the other end.
9. The Cleaning of the tubes and manifold is complete.
10. At the VST Control Panel Maintenance Screen, push the Manual OFF button to turn OFF the Vacuum Pump.
11. At the VST Control Panel, turn the Maint. Switch to OFF.
12. At the GREEN MACHINE, remove the blowout fitting from the Vacuum Pump.

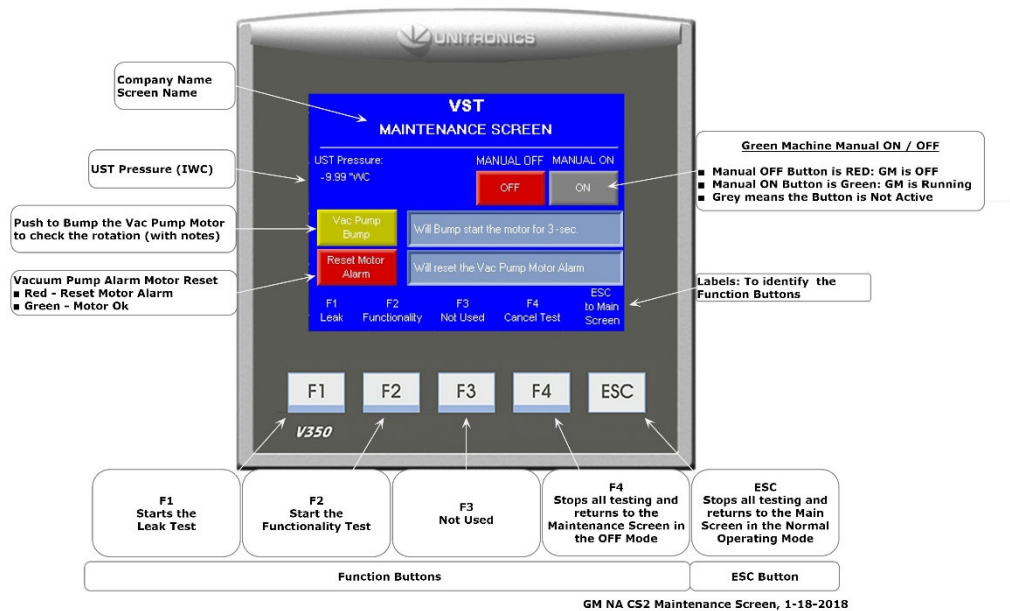


Figure 9-32: Maintenance Screen



9.8.6 Reassemble the Tubes and Valve Components

1. Remove the Solenoid Bases from the Solenoids. Save the Solenoid Bases and RED Caps for reuse.
2. Install the Body Gasket, Core Assembly, and Solenoid Base in the Valve Body. (Typical on all 4 Valve Bodies). **See Figure 9-24.**
CAUTION: The Body Gaskets must be clean and apply fresh Petroleum Jelly lubricant.
3. Install the Solenoids on to the Solenoid Bases, then install the Nameplate/Retainers and RED Caps.
4. Reinstall the 6 tubes. **See Figures 9-20 and 9-21.**
CAUTION: When tightening the 45° flare nuts: Clamp the tube flare between nut and nose body of the tube by screwing the nut on finger tight. Tighten with a wrench an additional ¼ turn for a metal-to-metal seal.

9.8.7 Conduct a Functionality Test

Conduct a Functionality Test as shown in Chapter 6 of this document.

9.8.8 Ending Stage

1. Lock open the three ball valves between the GREEN MACHINE and the Vent Risers and replace the caps on the three tees.
2. Open the 3-way valve below the Pressure Sensor so the handle is turned VERTICALLY (ON or OPEN).
CAUTION: Make sure the 3-way valve below the Pressure Sensor is turned VERTICAL (ON or Open). Leaving the valve turned OFF at the Pressure Sensor will not allow the GREEN MACHINE to operate in the Normal Operating Mode.
3. Put the cover on the GREEN MACHINE and lock the hasps.
4. Remove the lock(s) and tags from the lockout & tagout.
5. After the work is completed, turn ON power to the VST Control Panel. Make sure the Main Screen is showing on the PLC.
Make sure the Maint. Switch on the VST Control Panel is turned ON. (Or the GREEN MACHINE will not operate.)
6. The GREEN MACHINE is now operational.