

Chapter 6: Testing & Start-Up

6 Post-Installation GREEN MACHINE Testing & Start Up

6.1 VST Control Panel Initial Start-Up Power:

When the power is turned ON to the VST Control Panel, the Main Screen will show on the PLC Screen with the label **GREEN MACHINE DISABLED: ENTER CODE**. See **Figure 6-1**. The Start-Up process can be completed with the GM DISABLED. The code to the VST Control Panel must be entered before the GREEN MACHINE can become operational. The code will be supplied to the Start-Up Contractor via e-mail after Appendix B is submitted online.

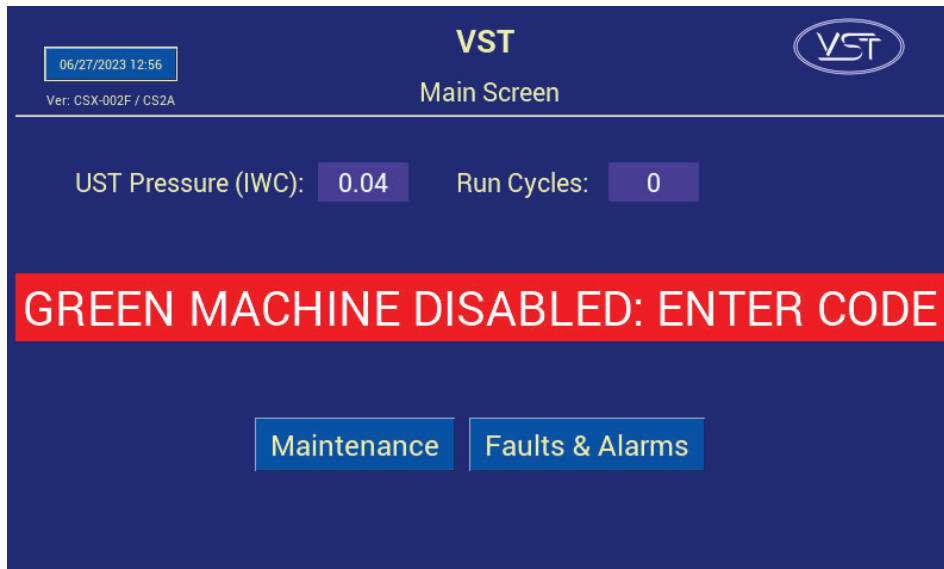


Figure 6-1: Main Screen with Disabled Message

6.2 Before beginning the Testing and Start-Up procedures

Follow the steps below to prepare the GREEN MACHINE and VST Control Panel for Testing & Start-Up:

STEPS	DESCRIPTION
1.	Unscrew the 8 cover screws and remove the cover on the GREEN MACHINE.
2.	Close the three (3) ball valves between the GREEN MACHINE and the vent risers. Reference Figure 6-3.
3.	Remove the caps from the 3 tees. Reference Figure 6-3.
4.	Turn ON the GREEN MACHINE breaker at the Main Distribution Panel.
5.	At the PLC Main Screen, push the Maintenance Screen button to access the Password Screen. See Figure 6-1.
6.	Enter 878 at the Password Screen to access the Maintenance Screen. (The GREEN MACHINE will now be in the Manual OFF mode.)
7.	The GREEN MACHINE cannot operate in the Automatic Mode when the Maintenance Screen is showing regardless of the UST pressure.

6.3 Post Installation Start-Up Tests

During post-installation testing, the GREEN MACHINE will use outside air (no gasoline vapor from the USTs) to conduct these tests.

The following tests must be conducted in the order shown below to avoid damage to the equipment.

6.5	Functionality Test
6.6	Programming the Fuel Management System for the GREEN MACHINE Overfill Alarm Relay
6.7	Test the Overfill Alarm on the GREEN MACHINE VST Control Panel
6.8	Changing the Date and Time Procedure
6.9	Submitting Appendix B and Verification Code Retrieval

The final step in the installation process is to start up the GREEN MACHINE and get it field commission ready.

This final commissioning process requires a Verification Code that will be entered into the PLC.

6.4 How to get a Verification Code:

STEPS	DESCRIPTION
1.	Go to https://vsthose.com/education-gm3-cs2a-usa/
2.	Click on "Start-Up Contractor."
	Note: If you have not been trained to conduct Start-Up or Appendix B, Watch the training videos under "Start-Up Contractor", then go to Step 3.
3.	Click on "Appendix B - Start-Up Contractor Check-Out Form."
4.	Fill out Appendix B with the required photos then click on Submit. VST will verify Appendix B and approve before sending the code.
5.	Receive an email from VST with the Verification Code and a copy of the filled-out Appendix B.

These items are to be checked in Appendix B as they are completed.

6.5 Functionality Test

6.5.1 The Purpose of the Functionality Test

The purpose of the Functionality Test is to verify that the Control Panel, Vacuum Pump, and the Control Valves are working properly.

6.5.2 Preparation for the Functionality Test

1. At the VST Control Panel, make sure the Maintenance Screen is showing on the PLC. **See Figure 6-2.** (The GREEN MACHINE is now in the Manual OFF mode and will not operate.)
 - If the PLC is not in the Maintenance Screen: At the Main Screen, push the Maintenance Screen button to access the Password Screen, then enter the password to access the Maintenance Screen: The password is 878.
2. At the GREEN MACHINE, make sure the locks from the three ball valves have been removed, all three valves are closed, and the caps from the three tees have been removed. **See Figure 6-3.**
3. Unscrew the 8 bolts and remove the cover from the GREEN MACHINE.

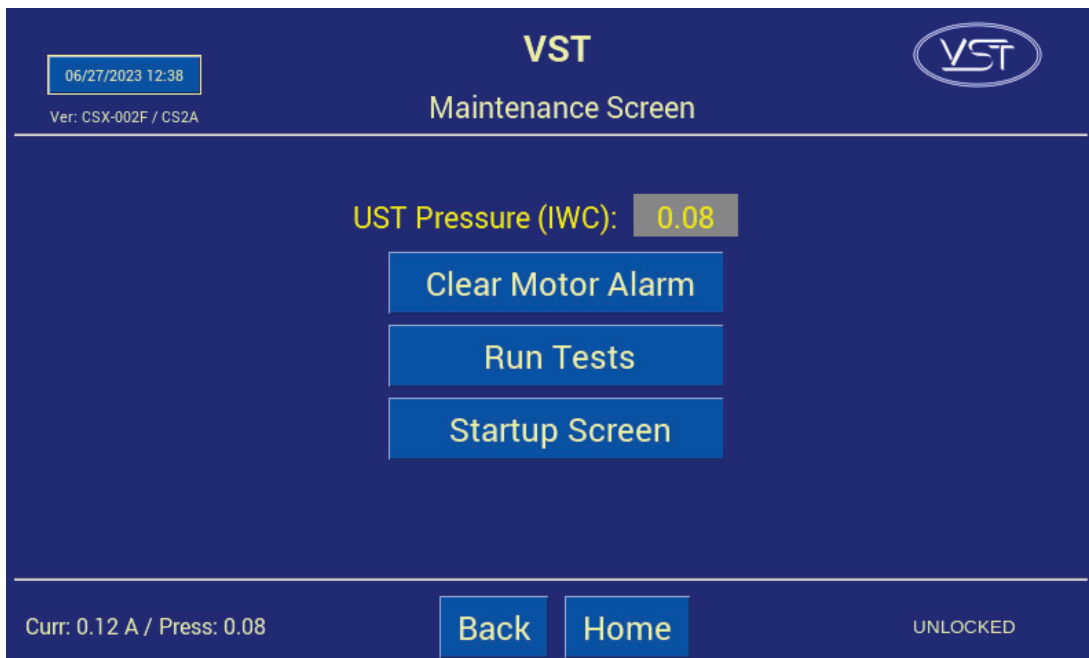
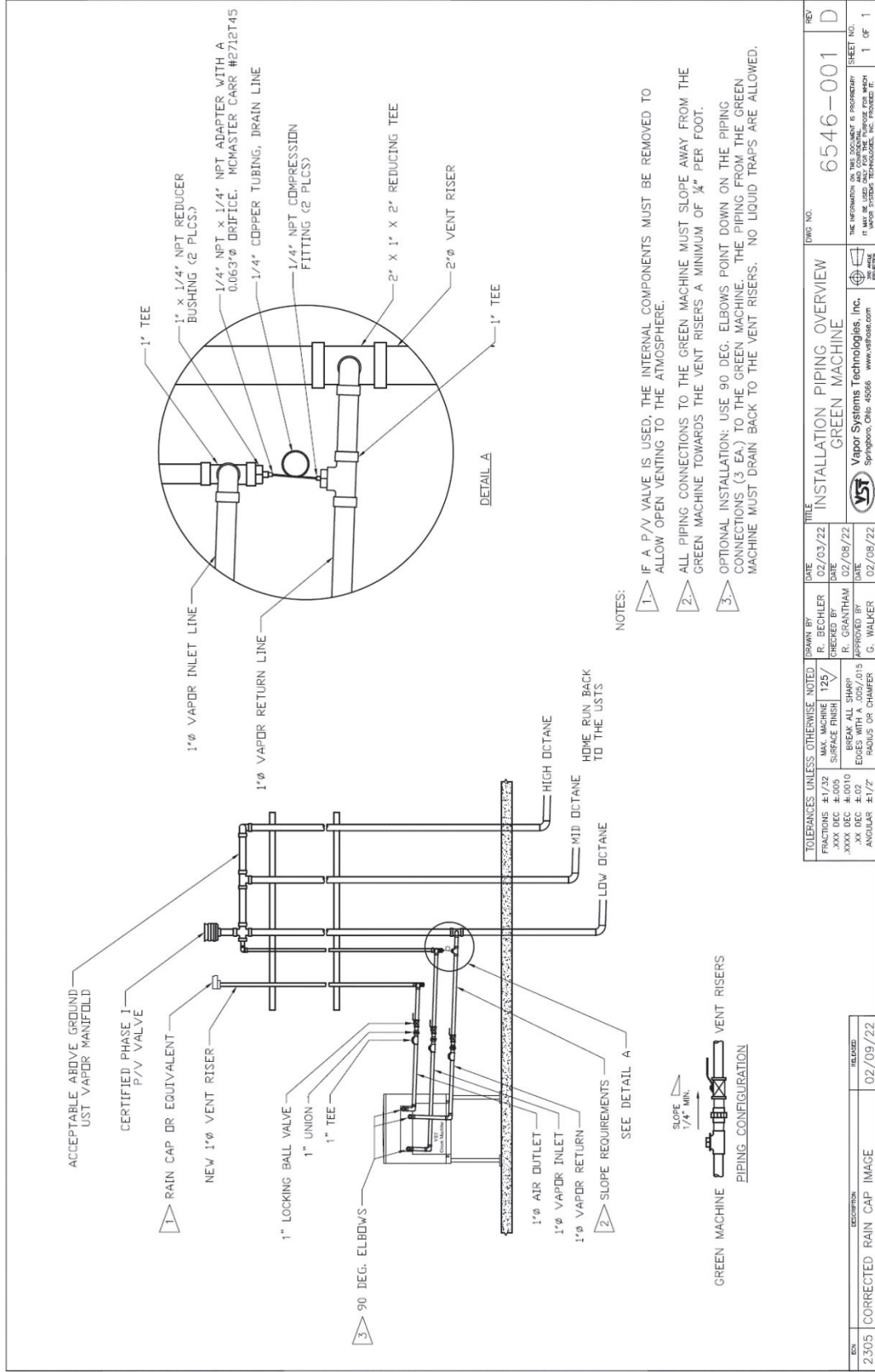


Figure 6-2: Maintenance Screen



SCALE: NONE TITLE: INSTALLATION PIPING OVERVIEW FILENAME: 6546-001

NOTES:

1. IF A P/V VALVE IS USED, THE INTERNAL COMPONENTS MUST BE REMOVED TO ALLOW OPEN VENTING TO THE ATMOSPHERE.
2. ALL PIPING CONNECTIONS TO THE GREEN MACHINE MUST SLOPE AWAY FROM THE GREEN MACHINE TOWARDS THE VENT RISERS A MINIMUM OF 1/4" PER FOOT.
3. OPTIONAL INSTALLATION: USE 90 DEG. ELBOWS POINT DOWN ON THE PIPING CONNECTIONS (3 EA.) TO THE GREEN MACHINE. THE PIPING FROM THE GREEN MACHINE MUST DRAIN BACK TO THE VENT RISERS. NO LIQUID TRAPS ARE ALLOWED.

TOLERANCES UNLESS OTHERWISE NOTED		DRAWN BY		DATE		TITLE		DWG NO.		REV	
FRAMES ±1/32	MAX. MACHINE 1/32	R. BECHLER	02/03/22	02/03/22		INSTALLATION PIPING OVERVIEW		6546-001		D	
SURFACE FINISH ±.010	BREAK ALL SHARP EDGES WITH A .035/.015 RADIUS OR CHAMFER	R. GRANHAM	02/08/22	02/08/22		GREEN MACHINE				SHEET NO.	
ANGULAR ±1/2°		C. WALKER	02/09/22	02/09/22		Vapor Systems Technologies, Inc.				1 OF 1	
THE INFORMATION ON THIS DRAWING IS PROPRIETARY TO VAPOR SYSTEMS TECHNOLOGIES, INC.											

ECO	2305	CORRECTED RAIN CAP IMAGE	02/09/22
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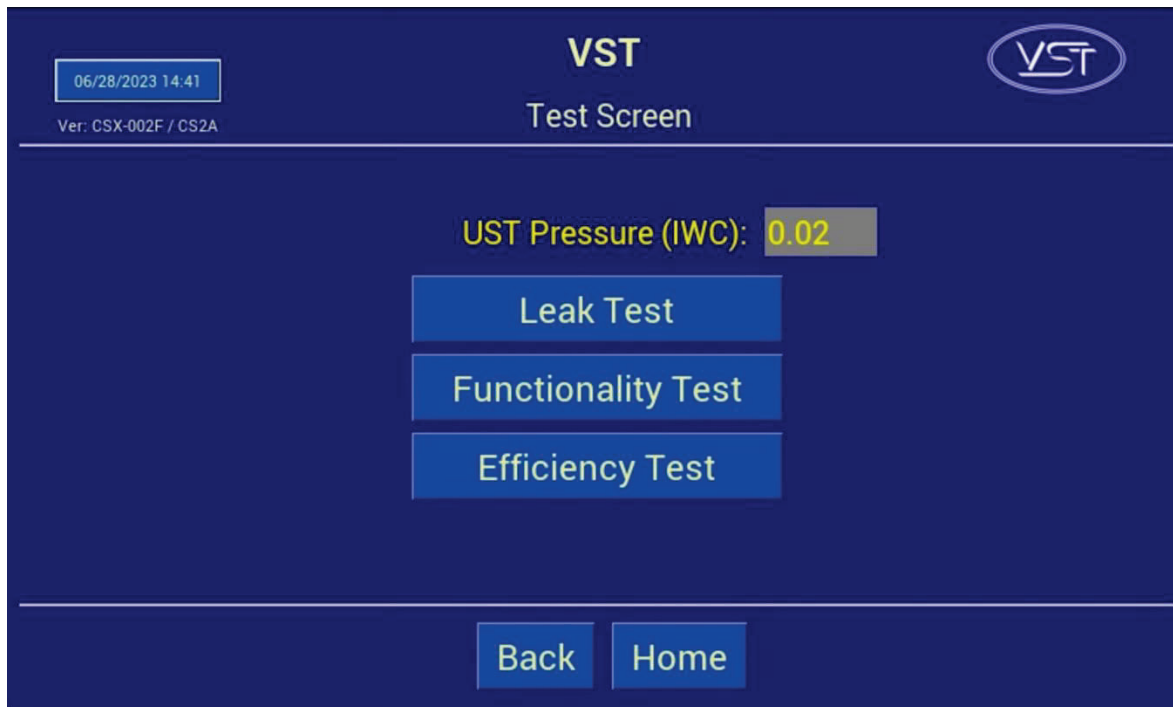
Figure 6-3: GREEN MACHINE Vapor Piping Layout

6.5.3 Functionality Test Procedures

1. Press the “Run Tests” button on the Maintenance Screen. **See Figure 6-2.**
2. Select the Functionality Test from the menu. **See Figure 6-4.**
3. To start the Functionality Test, push the Start Button **See Figure 6-5.**
4. The GREEN MACHINE will run for 60-seconds then purge for 60-seconds (this is one cycle).
5. The GREEN MACHINE will continue to cycle 5 times or until the “stop” is pushed to end the test.
 - There are 5 cycles to provide enough time to conduct the test.
 - The Back button or Home button can also be pressed to end the test.
6. During the 60-second Run Cycle: **See Figure 6-6.**
 - Place your hand over the tee opening at the Vapor Inlet and feel for suction.
 - Next, place you hand over the tee opening at the Vapor Return and feel for zero airflow.
 - Next, place your hand over the tee opening at the Air Outlet and feel for air blowing.
7. During the Run Cycle:
 - 1) Suction at the Vapor inlet: NORMAL
 - 2) Air blowing out the Air Outlet: NORMAL
 - 3) No air blowing/suction at the Vapor Return: NORMAL
 - 4) If these conditions are not found at the respective openings, check the following items:
 - Make sure the Vacuum Pump is not in alarm. If so, see Chapter 8: Troubleshooting.
 - Check the Control Valves to make sure they are all operational. See Chapter 8: Troubleshooting.
 - Make sure there is no debris in the valve seat. Clean the valves as shown in Chapter 7: Maintenance.
 - Make sure the flare nuts are tight. Check each 45° flare nut to make sure they are snug but not over tightened.
8. During the 60-second Purge Cycle: **See Figure 6-6.**
 - After the Purge Cycle has begun, place your hand over the tee opening at the Vapor Return and feel for air blowing. The blowing air will reduce to zero flow soon after the Purge Cycle begins.
 - Next, place your hand over the tee opening at the Vapor Inlet and feel for zero airflow.
 - Next, place your hand over the tee opening at the Air Outlet and feel for zero airflow.

Functionality Test, continued...

9. During the Purge Cycle:
 - 1) No air blowing/suction at the Vapor Inlet: NORMAL
 - 2) No air blowing/suction at the Air Outlet: NORMAL
 - 3) Momentary blowing at the Vapor Return: NORMAL
 - 4) If these conditions are not found at the respective openings, check the following items:
 - Make sure the Vacuum Pump is not in alarm. If so, see Chapter 8: Troubleshooting.
 - Check the Control Valves to make sure they are all operational. See Chapter 8: Troubleshooting.
 - Make sure there is no debris in the valve seat. Clean the valves as shown in Chapter 7: Maintenance.
 - Make sure the flare nuts are tight. Check each 45° flare nut to make sure they are snug but not over tightened.
10. After the Functionality Test has ended:
 - Lock open the three ball valves between the GREEN MACHINE and the Vent Risers, and replace the caps on the three tees.
 - At the PLC, push the Home button to return to the Main Screen.

**Figure 6-4: Test Screen**

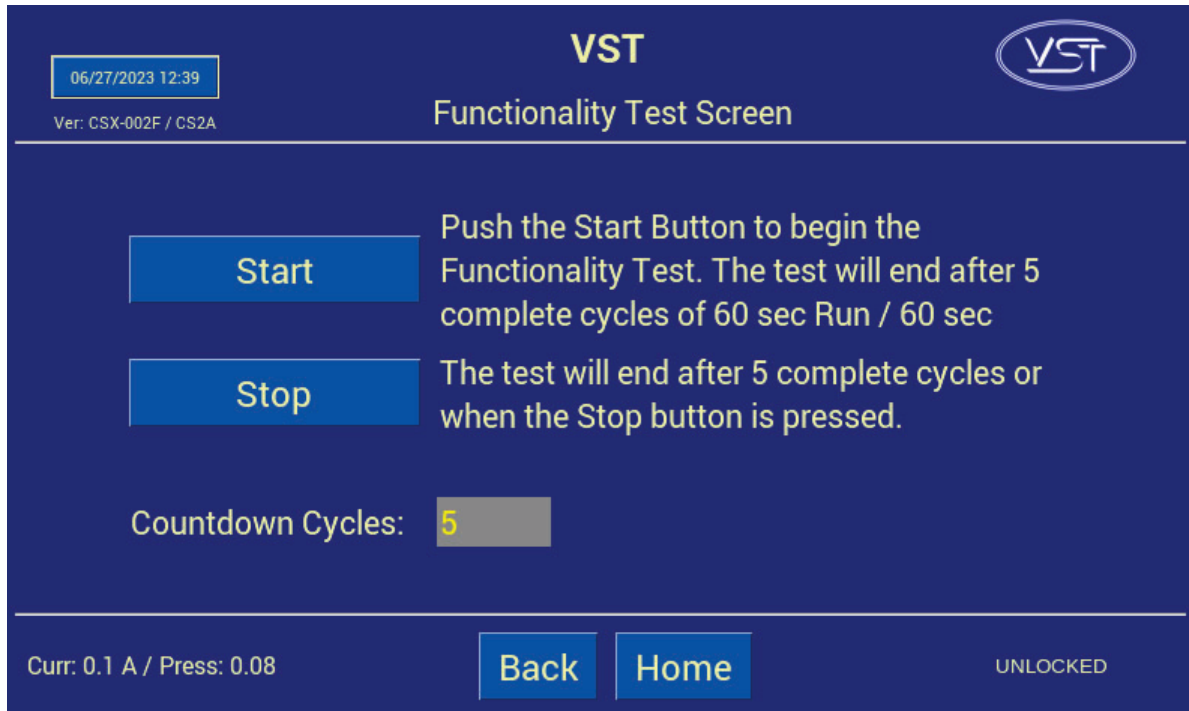


Figure 6-5: Functionality Test Screen

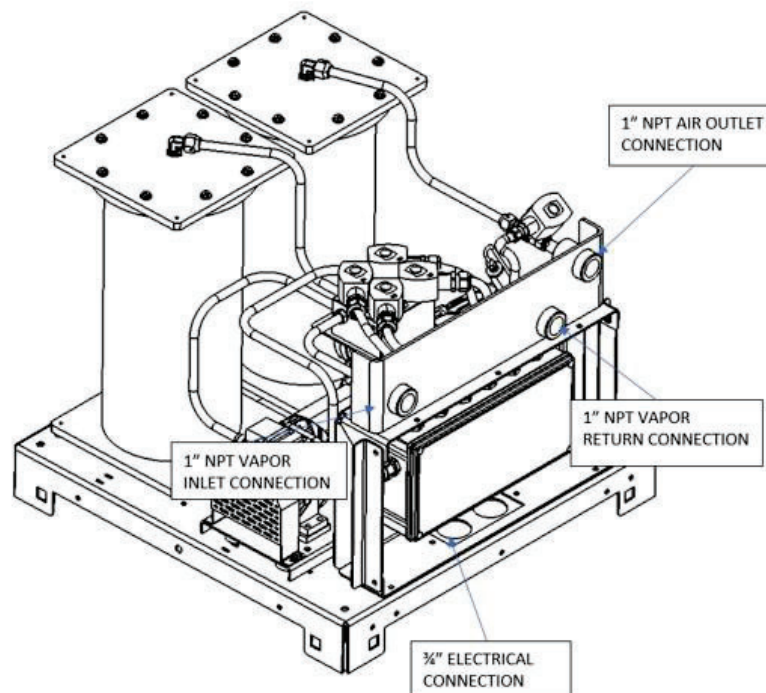


Figure 6-6: GREEN MACHINE Operation Diagram

6.6 Programming the Fuel Management System Overfill Alarm Relay for the GREEN MACHINE

OVERFILL ALARM RELAY CIRCUIT

- The TLS Overfill output relay (N.C.) must be programmed and tested by a TLS Certified Technician.
- The Electrical Contractor has installed the Overfill Alarm signal wiring from the VST Control Panel to the “Fuel Management System Overfill Alarm” output module.
 - The VST Control Panel supplies 24 VDC to the Overfill Alarm relay.
 - The Overfill Alarm output “dry” relay (N.C.) shuts down the GREEN MACHINE when a UST reaches the Overfill Level (90%) during a fuel drop.
 - Label the Overfill relay “GM Overfill Alarm”
 - The wiring from the VST Control Panel to the Fuel Management System MUST be installed before the Start-Up of the GREEN MACHINE can be complete.
 - Reference Overfill terminal block wire numbers:
 - 24 VDC (+) – (Wire Number 03030)
 - 24 VDC (signal) – (Wire Number 05050)
 - Shielded drain (bare) to ground

6.7 Testing the Overfill Alarm on the GREEN MACHINE VST Control Panel

- Test the output relay that was programmed in the previous step.
- The VST Control Panel will show an Overfill Alarm, and this alarm will persist until 2 hours after the alarm condition (in this case the test) ends.
- To manually override the Overfill Alarm once the test is complete, navigate to the Startup Screen. **See Figure 6-9.**
- The Startup Screen can be accessed from the Maintenance Screen by pushing the Startup Screen Button and entering the password “1793.”
- On the Startup Screen, press the Overfill Override Button.

6.8 Changing the Date and Time Procedure

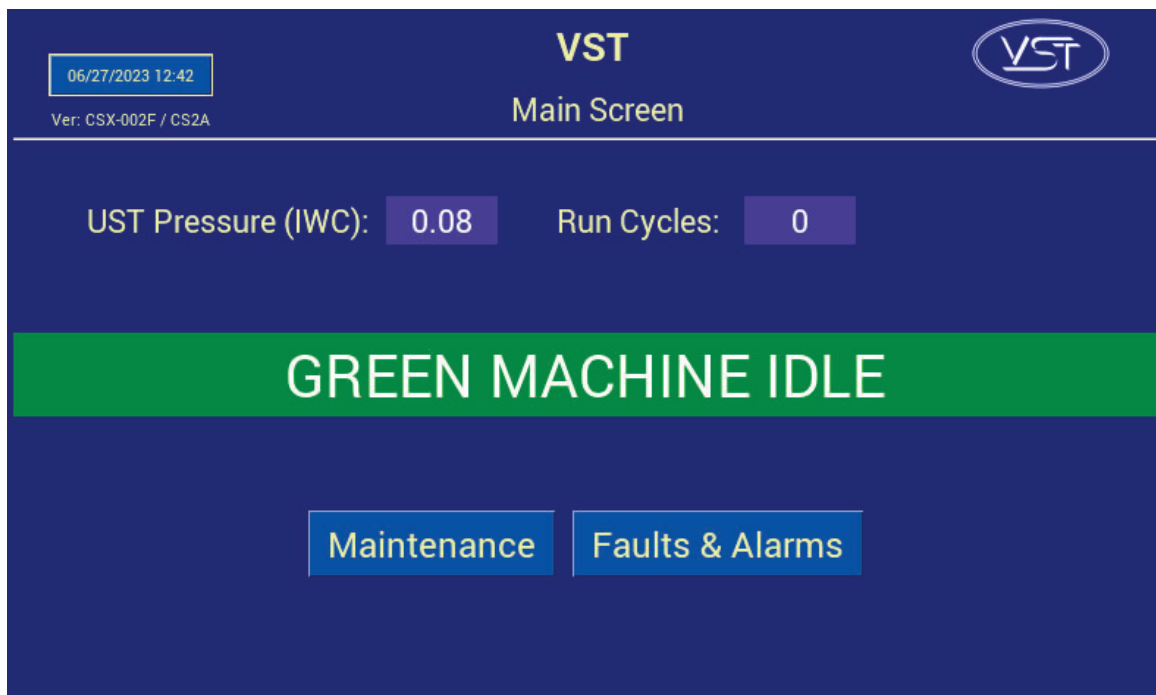


Figure 6-7: Main Screen

1. From the Main Screen, push the Date and Time button. This will bring up the Date and Time Interface Screen. **See Figure 6-7.**
2. On the Date and Time Interface Screen, insert the Date: (MM/DD/YY) then the Time: (HH:MM). **See Figure 6-8.**
3. After the Date and/or Time has been set, push Enter to accept the change(s) and return to the Main Screen.
4. After returning to the Main Screen, check to see if the Date and Time are correct.

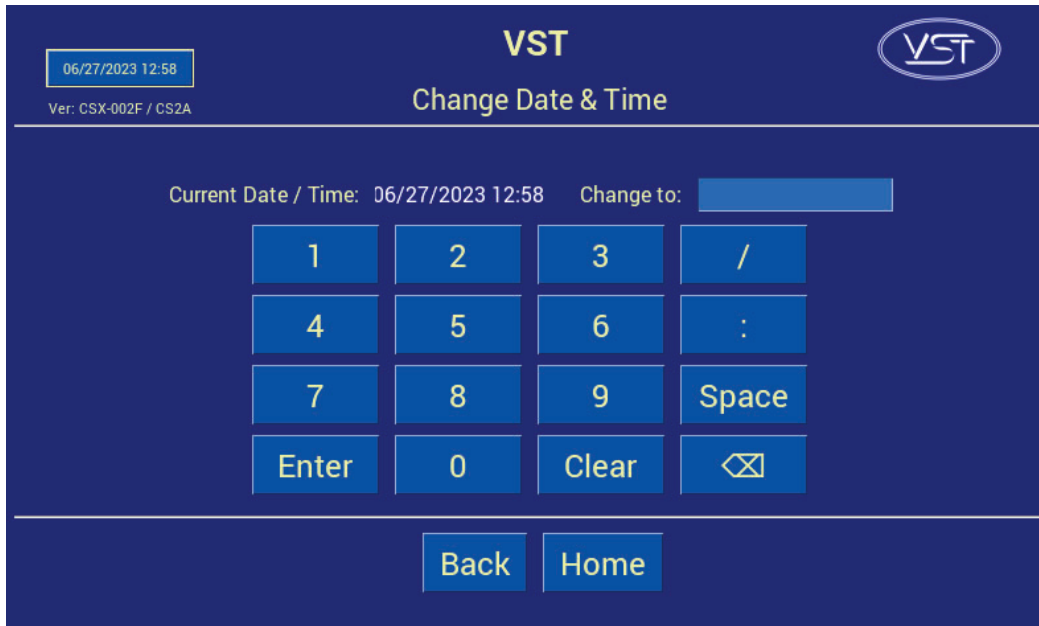


Figure 6-8: Date and Time Screen

6.9 Submitting Appendix B to VST for the Verification Code

6.9.1 Start Up of the GREEN MACHINE

1. Go to <https://vsthose.com/education-gm3-cs2a-usa/>
2. Click on “Start-Up Contractor.”
Note: If you have not been trained to conduct Start-Up or Appendix B, watch the videos under “Start-Up Contractor” then go to Step 3.
3. Click on “Appendix B - Start-Up Contractor Check Out Form.”
4. Fill out and submit Appendix B with the required photos. VST will verify Appendix B and approve before sending the code.
5. Receive an email from VST with the Verification Code and a copy of the filled-out Appendix B.

6.9.2 Procedures

1. Apply power to the VST Control Panel
The PLC starts up in the Main Screen where the GREEN MACHINE is shown to be DISABLED.
See **Figure 6-1**.
2. Push the Maintenance button, then enter 878 on the Password Screen to go to the Maintenance Screen.
3. Using Chapter 6: Testing and Start-Up, complete the following sections:
Chapter 6 Sections for Reference:

Section	Title
6.5	Conduct the Functionality Test
6.6	Programming the Fuel Management System Overfill Relay for the GM Overfill Alarm
6.7	Conduct the Overfill Alarm Test
6.8	Change the Date/Time per the time-zone
6.9	How to submit Appendix B to VST to obtain the Verification Code
4. Complete Appendix B Checklist Form, then push the SUBMIT button.
(All the fields contained in Appendix B MUST BE CHECKED OR FILLED OUT, INCLUDING PICTURES.)
5. An email with the Verification Code is sent to the person conducting the Start-Up after Appendix B is SUBMITTED to VST.
6. On the Maintenance Screen, push the “Startup” button to navigate to the Startup Screen. The password for this screen is “1793.” See **Figure 6-2**.
7. Push the “Startup Code” button. See **Figure 6-9**.
8. At the Verification Code Screen, enter the Code that was received in the email, then push ENTER.
See **Figure 6-10**.
9. If the correct Code was entered, the PLC will show the Main Screen and the GREEN MACHINE will now be operational.
10. If the incorrect Code is entered, the Verification Code Screen will be blank again.
11. Once the correct Verification Code is entered, the PLC returns to the Main Screen and the GREEN MACHINE is now fully operational.
12. At the Main Screen, the GREEN MACHINE will turn ON if the UST pressure is at or above 0.20 IWC, or remain OFF if the UST pressure is below 0.20 IWC.
13. The GREEN MACHINE:
 - Is Operational
 - Start-Up is complete and verified
 - The Overfill protection is installed and tested

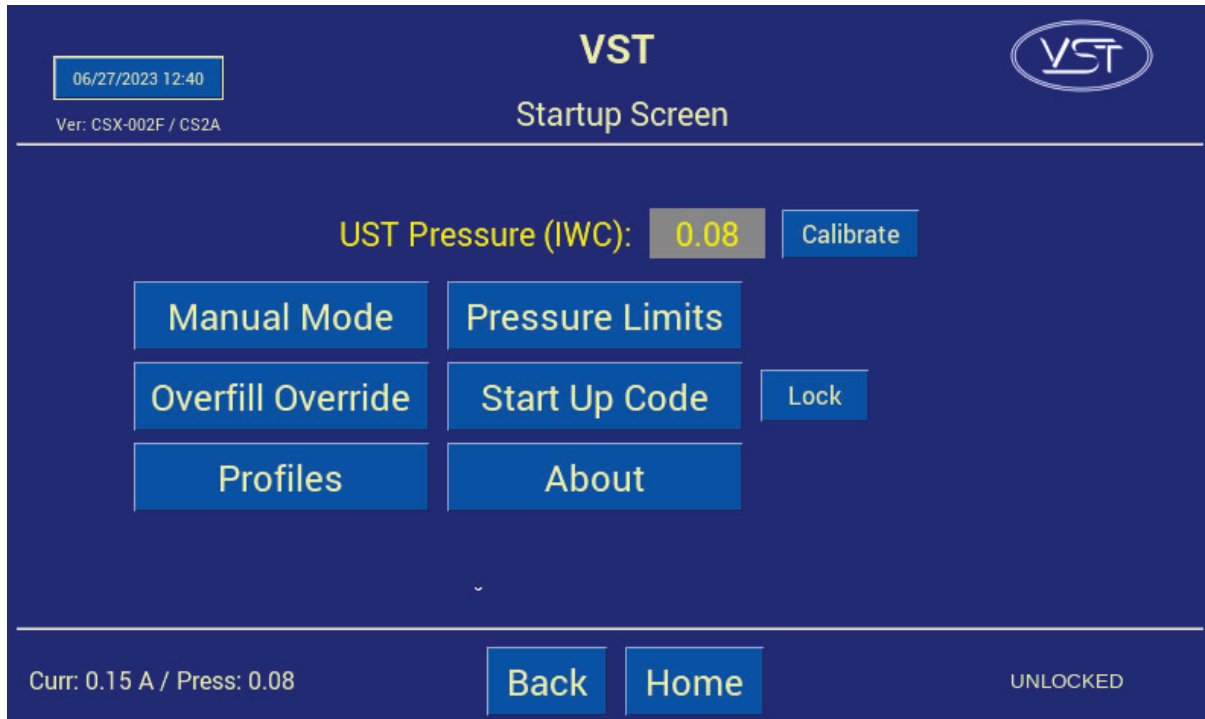


Figure 6-9: Startup Screen

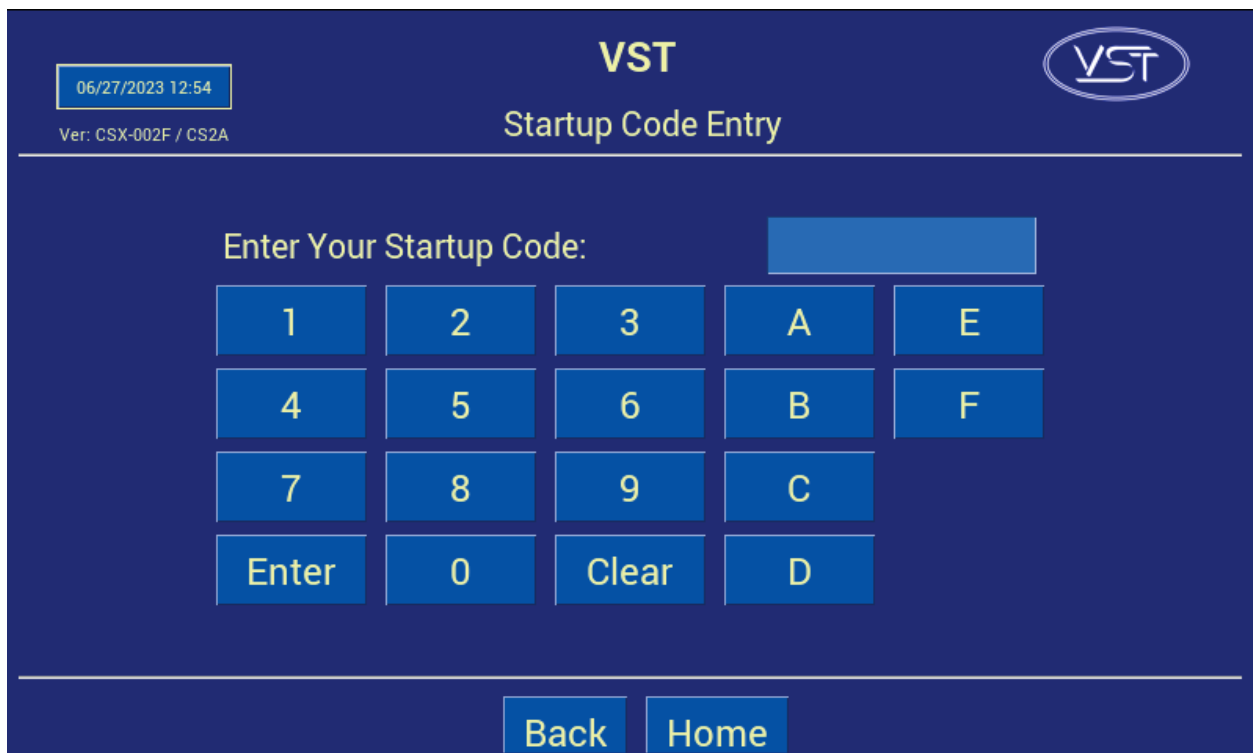


Figure 6-10: Startup Password Screen