



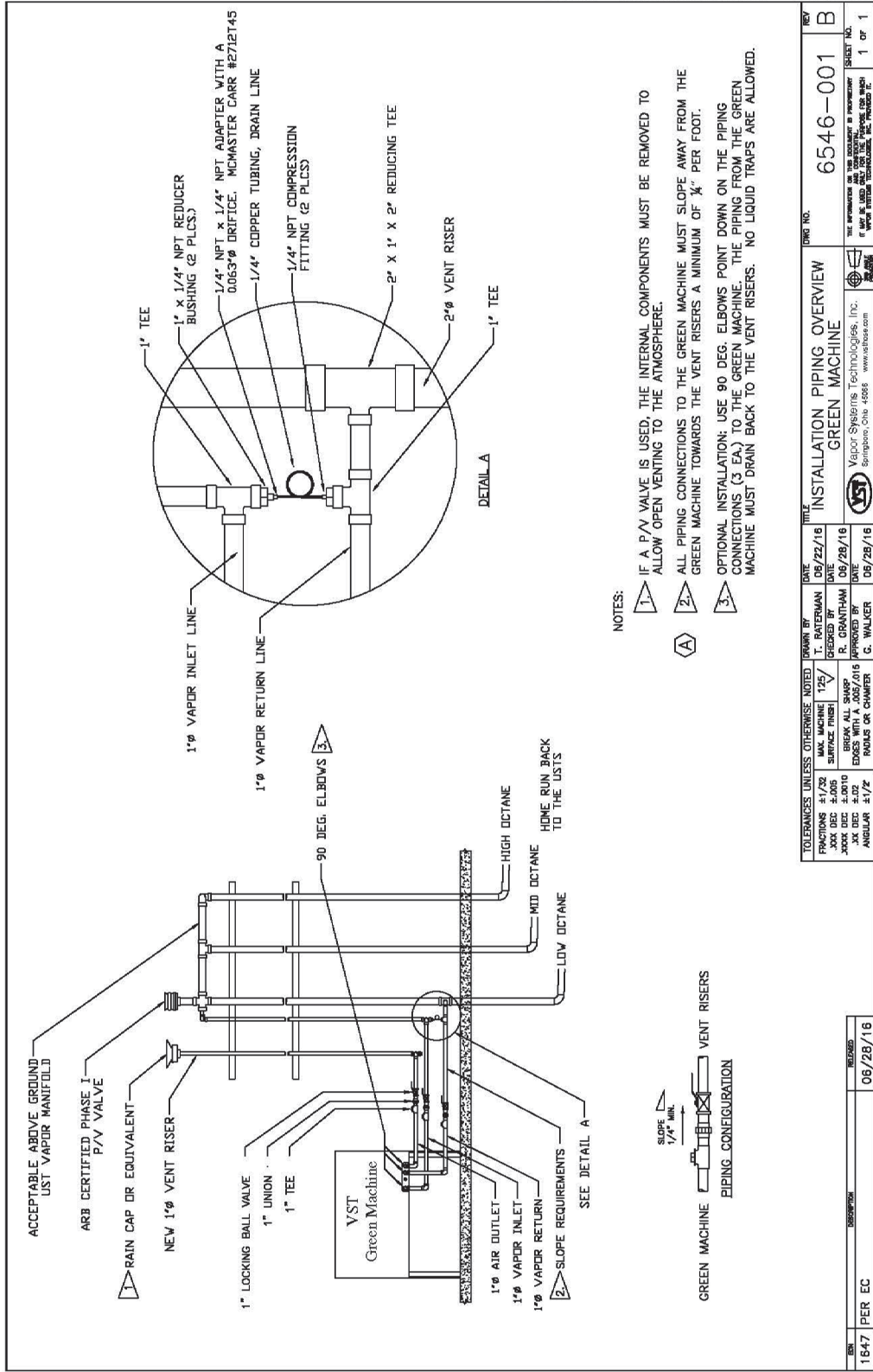
# Chapter 2: Vapor Piping Installation

## 2 Vapor Piping Installation Overview

- There are 3 piping connections to be made to the GREEN MACHINE. **See Figures 2-1 & 2-2:**
  - Vapor Inlet (supply) from the UST's
  - Vapor (concentrate) Return to the UST's
  - Air Outlet to atmosphere
- All the GREEN MACHINE piping connections are 1" diameter National Pipe Thread (NPT).

### 2.1 General Notes

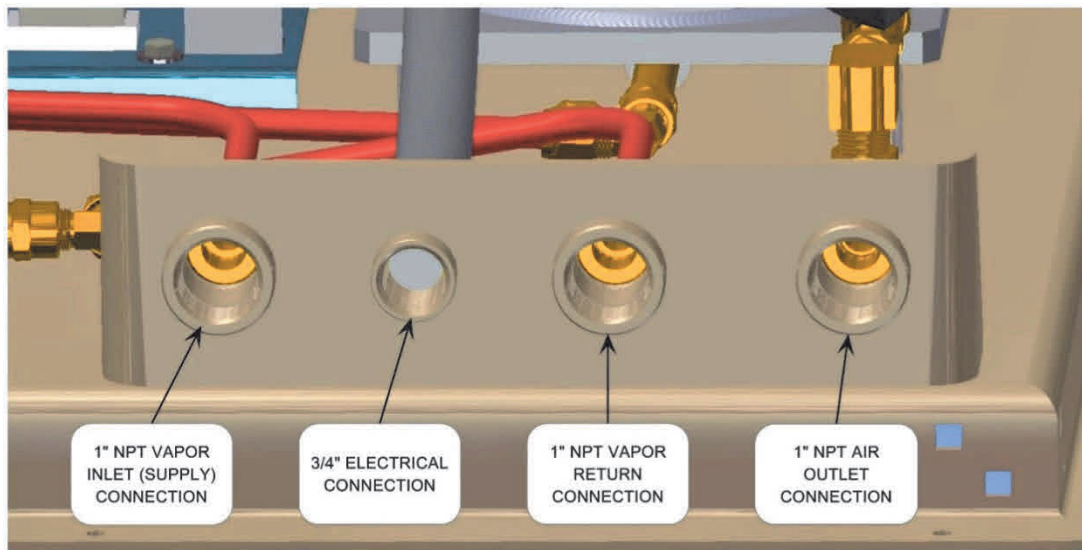
- The piping contractor is responsible for providing all necessary piping, non-hardening pipe-joint compound, and pipe fittings.
- Make sure the gasoline UST tanks vapor piping is manifolded either above ground or below ground.
- Locks must be installed on the valves to prevent unauthorized tampering of the equipment.
- Under normal operation, the valves must be locked in the OPEN position.
- VST requires a minimum slope of 1/4" per foot on all vapor-piping away from the GREEN MACHINE to the vent risers or to any other UST piping connection.
- The 1/4" diameter drain line with the supplied adapter must be installed per **Figure 2-1**.



- 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 1/8" 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.

DATE	06/22/16	DATE	06/29/16	DATE	06/29/16
DRAWN BY	T. PATERNAN	DESIGNED BY	R. GRANTHAM	APPROVED BY	C. WALKER
MAX. MACHINE SURFACE FINISH	125/	BREAK ALL SHARP EDGES WITH A .0625" RADIUS OR CHAMFER			
FRACTIONS ±1/32		ANGULAR ±1/2°			
XXX DEC ±.005		XXX DEC ±.010			
XXX DEC ±.02					
DATE	06/28/16	DATE	06/28/16	DATE	06/28/16
BY	PER EC	BY	PER EC	BY	PER EC
NO.	1847	NO.	1847	NO.	1847
DESCRIPTION	INSTALLATION PIPING OVERVIEW	DESCRIPTION	INSTALLATION PIPING OVERVIEW	DESCRIPTION	INSTALLATION PIPING OVERVIEW
PROJECT NO.	6546-001	PROJECT NO.	6546-001	PROJECT NO.	6546-001
SHEET NO.	1 OF 1	SHEET NO.	1 OF 1	SHEET NO.	1 OF 1

Figure 2-1: Vapor Piping Overview



GM 4-PORT CONNECTIONS, 2/18/2016

Figure 2-2: GREEN MACHINE Connections

## 2.2 Flexible Piping

- If flexible piping is required by the local authority to meet seismic requirements, install the flexible piping between the GREEN MACHINE locking ball valve and the vent riser(s).
- The flexible connector must be approved for a service station above-ground application.
- Support the flexible piping per manufacturer's recommendation.
- The slope of the flex connection from the GREEN MACHINE back to the vent riser must be a minimum of 1/4" per foot slope.
- Liquid traps are not allowed.



## 2.3 Vapor Inlet and Vapor Return Piping Installation

- Install a 1" vapor inlet pipe and a 1" vapor return pipe as shown in **Figure 2-1** from the vapor inlet and vapor return connections on the GREEN MACHINE to an existing vent riser.
- An existing vent riser that connects to the GREEN MACHINE must be modified by:
  - Adding the first tee (near the bottom of the vent riser) for connecting the 1" vapor return pipe. The first tee must be installed to allow the vapor return to slope away from the GREEN MACHINE.
  - Adding a second tee/cross (just below the P/V valve) for connecting the 1" vapor inlet pipe. The second tee/cross must be installed at the top of the vent riser, but below the P/V valve.
- Both the vapor inlet and the vapor return lines have: a 1" union, a 1" locking ball valve, and a 1" tees/caps, and any other piping fittings to complete the installation.
- The 1" vapor return pipe connecting to the bottom of the vent riser **MUST BE INSTALLED** below the 1" vapor inlet pipe that connects to the top of the vent riser.
- A ¼" drain line **MUST BE INSTALLED** between the vapor inlet and the vapor return so any condensate from the vapor inlet line can drain into the vapor return line. VST is supplying a ¼" NPT x ¼" NPT adapter with a 0.063 orifice. The orifice will eliminate any vapor flow between the vapor inlet line and the vapor return line.
- Install a tee into the vent riser that will connect to the GREEN MACHINE Vapor Inlet using 1" NPT pipe.
- The new tee must be installed to allow for slope away from the GREEN MACHINE to the vent riser.
- If there are multiple-grade UST's and multiple vent risers, VST recommends connecting the GREEN MACHINE to the lowest octane vent riser.
- From the vent riser, install the 1" locking ball valve, then the 1" union, then the 1" tee.  
**See Figure 2-1.**



## 2.4 Air Outlet Piping Installation

- Install a new vent riser next to an existing vent riser (if possible).
  - The 1" piping must slope away from the GREEN MACHINE a minimum of ¼" per foot. **See Figure 2-1.**
- Install the new dedicated vent riser so that the discharge opening is at least as high as the existing riser and a minimum of 1" diameter.
- Install a tee with a cap at the bottom of the new air outlet vent riser to provide for manual drainage.
- Make sure the ¼" drain line is installed between the vapor inlet and the vapor return lines.
- Install piping from the 1" NPT Air Outlet fitting on the GREEN MACHINE to the new vent riser.
- From the vent riser, install the 1" locking ball valve, then the 1" union, then the 1" tee as shown in **Figure 2-1.**
- A rain cap or equivalent must be installed on the new air outlet vent riser.
  - If a PV vent valve is used, the internal components must be removed to allow open venting to the atmosphere.

## 2.5 Vapor Piping Post-Installation

- After all the piping has been installed, make sure the 3 lockable ball valves are locked and in the OPEN position.
- Make sure all the pipe connections are tight.
- Make sure the slope is a minimum 1/4" per foot away from the GREEN MACHINE to the vent risers.
- Make sure there are no traps between the GREEN MACHINE and the vent risers.
- If flex piping is used, make sure the flexible piping is adequately supported.
- Make sure the ball valve below the Pressure Sensor is OPEN, or the handle is vertical. **See Figure 2-3.**
- The ¼" diameter drain line with the supplied adapter must be installed per **Figure 2-1.**

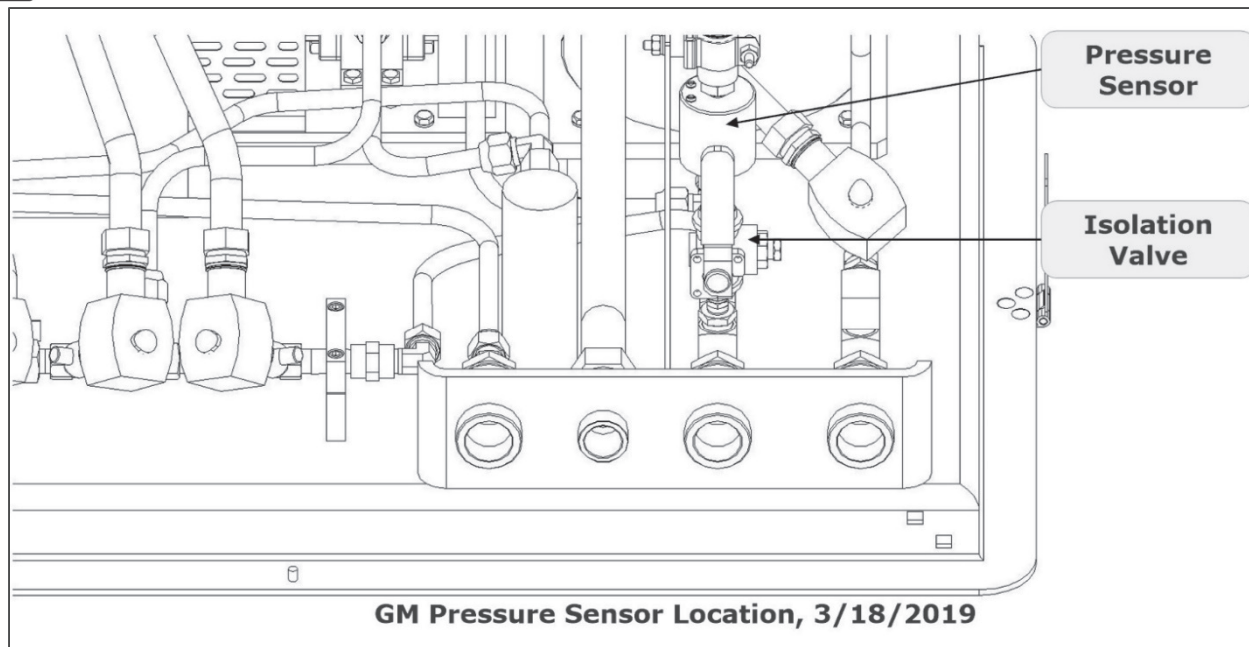


Figure 2-3: Pressure Sensor w/ 3-Way Isolation Valve Open

## 2.6 Vapor Piping Bill of Material

<b>Contractor Supplied</b>
1" diameter straight tees with caps
1" diameter unions
Straight tee (sized to match existing vent riser)
Straight tee with cap (sized to match new vent riser)
Rain cap (on the new air outlet vent riser)
1" diameter pipe, elbows, and misc. pipe fittings
Vent Stack pipe supports and hardware (as required)
¼" NPT Compression Fittings (2 each)
1" x ¼" NPT Reducer Bushing
¼" Diameter Copper Tubing
<b>Vapor Systems Technologies Supplied</b>
¼" x ¼" NPT Brass Adapter, with a 0.063" diameter orifice
(6) Locks (3-Ball Valves, 2-Cover, and 1-ON/OFF Safety Switch)
(3) 1" Brass Full Port Ball Valves, Locking



---

*This page left intentionally blank*

---