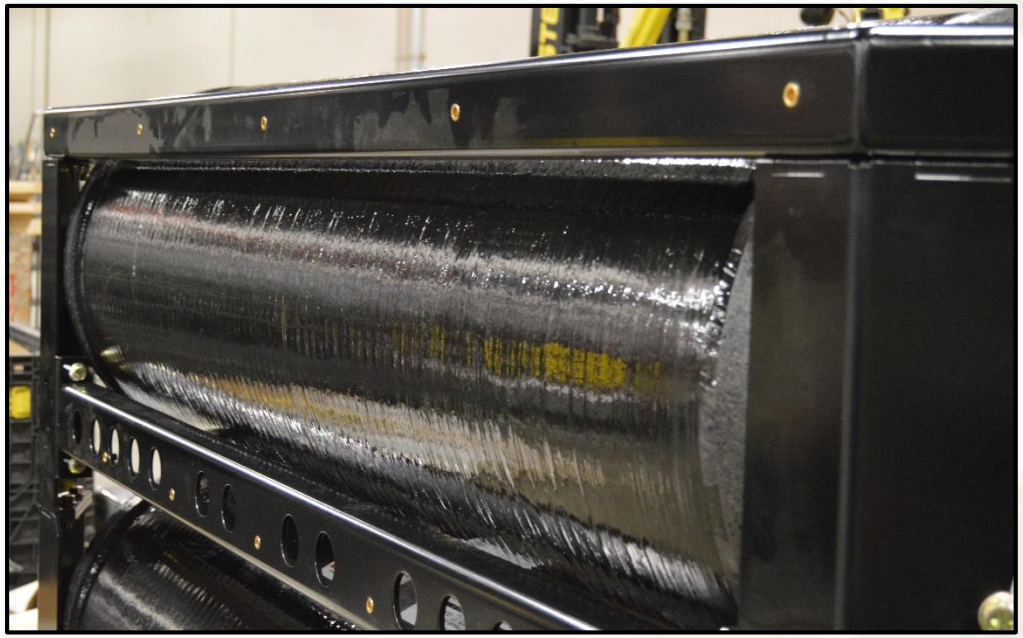

Tank #4 Replacement Procedure

MAINSTAY
FUEL TECHNOLOGIES

Tank Valve Replacement Procedure

This document provides instructions for replacing a CNG tank valve.

Parts necessary to complete the replacement include:

Part #		Description
	Qty. 1	Replacement Tank
CP-OR-03880-8	Qty. 2	Size 8 O-ring
CP-OR-03872-6	Qty. 4	Size 6 O-ring
CP-OR-03860-4	Qty. 4	Size 4 O-ring

Call Mainstay's 24 hour line for technical assistance: **1-844-332-3775**

Please review the safety precautions before beginning ANY repair or replacement procedures!

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Safety Precautions

Danger

THE CNG FUEL MODULE SYSTEM CONTAINS SOME LINES THAT ARE UNDER CONTINUOUS HIGH PRESSURE. CAREFULLY FOLLOW INSTRUCTIONS TO RELEASE PRESSURE BEFORE PERFORMING MAINTENANCE.

Danger

ALL LINES MARKED AS ALWAYS UNDER HIGH PRESSURE REMAIN UNDER HIGH PRESSURE EVEN IF THE TANK VALVE IS CLOSED!

Danger

DO NOT STAND IN DIRECT CONTACT WITH THE HOSES DURING THE DEFUELING PROCESS. AVOID LEANING INTO OR OVER THE FUEL LINE WHILE DEFUELING OR DISCONNECTING.

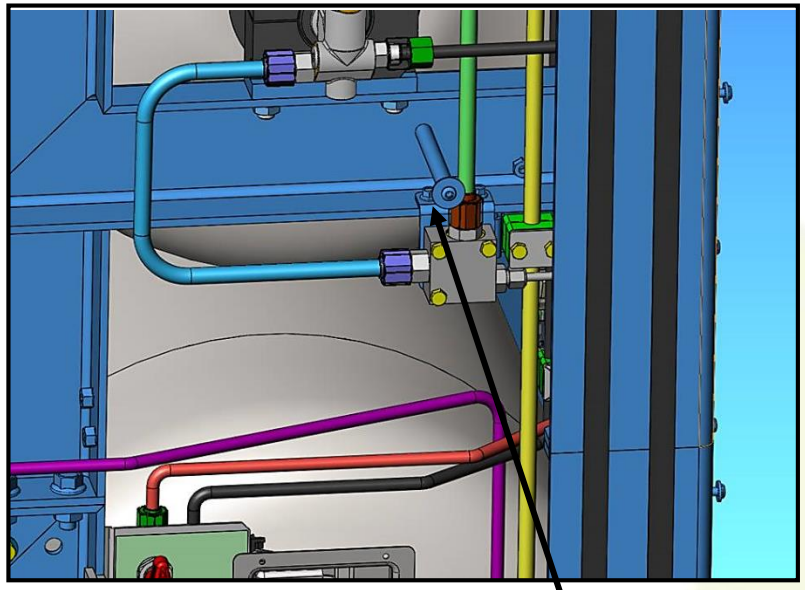
Danger

NATURAL GAS IS FLAMMABLE AND EXPLOSIVE. NEVER USE AN OPEN FLAME, MATCH, LIGHTER, OR OTHER TO LIGHT A WORK AREA NEAR THE CNG FUEL STORAGE SYSTEM.

Danger

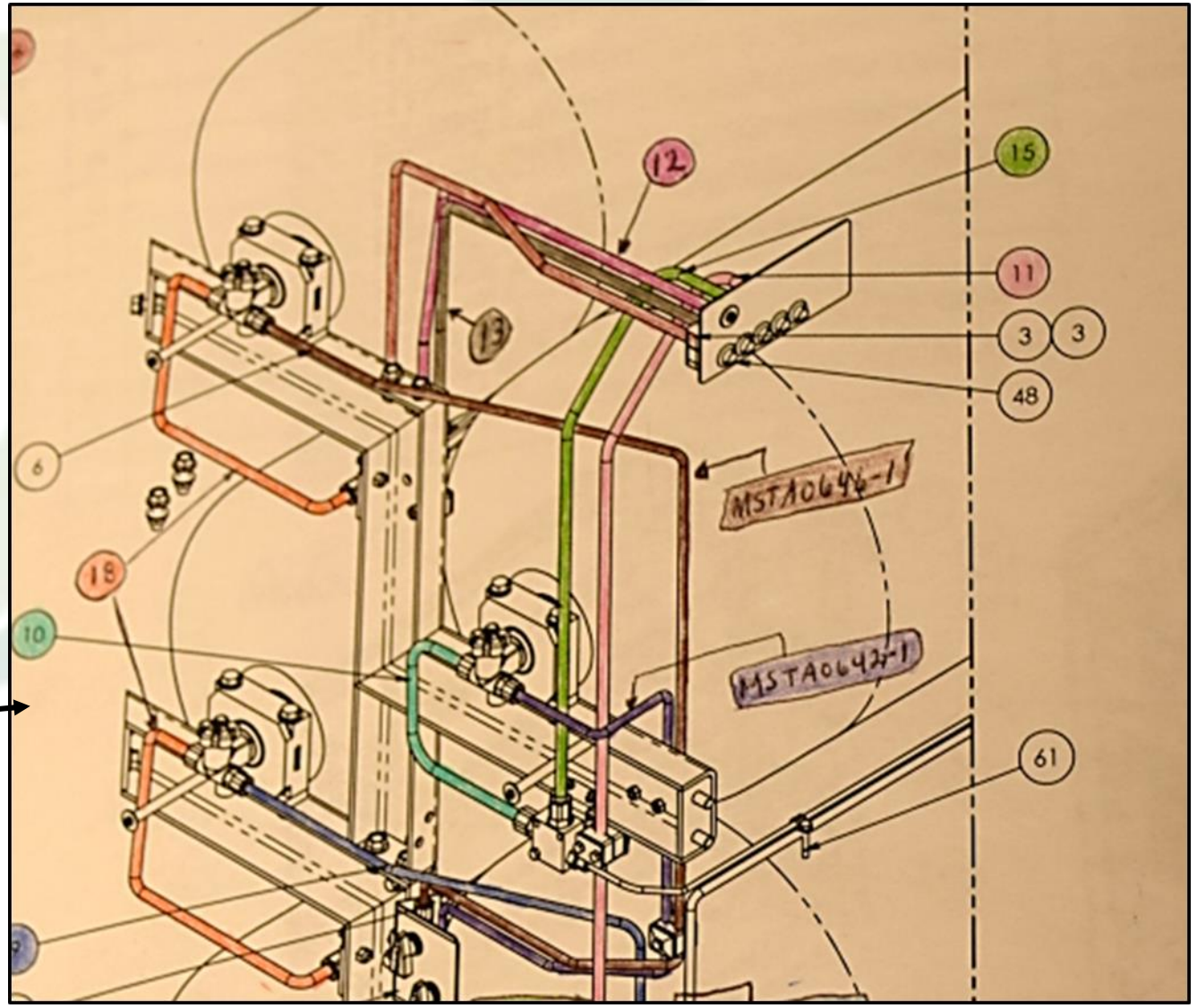
KEEP WORK AREA WELL VENTILATED TO AVOID ASPHYXIATION DUE TO CONCENTRATED LEVELS OF CARBON MONOXIDE.

Reference Drawings



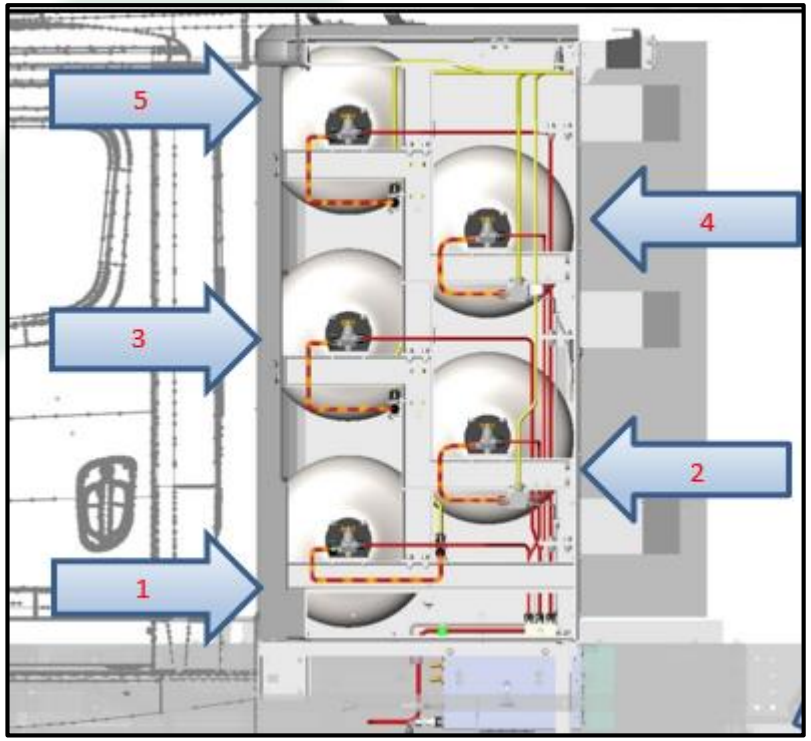
Drawing of tank and lines.

PRD tube mounting block.



Truck Preparation

Please reference the drawing at right. This document provides specific instructions to remove Tank #4.



Truck Preparation to remove the damaged tank includes several steps: removing external fairings and skins, removing some of the internal plumbing and support braces, and removing the tank. Included in the following instructions is the "best practice" method to safely accomplish tank replacement.

Evacuation of Fuel Lines:

1. Close all tank valves, turning them 'OFF'.

➢ Note: Leave the secondary tank valve that controls #4 & #5 tanks 'OPEN'.

➢ Note: Leave the Main Shut Off valve on the fuel module 'ON'.

2. Crank the truck and let it run until it stalls.
3. Try to restart the truck.

➢ If the engine does not restart, the system is evacuated.

3. As an added safety precaution, open the system purge valve, located inside the Side Access Maintenance Door of fuel module to ensure that all pressure has been relieved.
4. Ensure the high pressure gauge on the fuel control module reads 0 psi.

Truck Preparation

Removal of Add-ons:

1. Remove any fairings that are attached to the back of cab (BOC) unit, including top, driver side, and passenger side fairings.
2. Remove the fairing mounting brackets, including the upper, driver side, and passenger side brackets.
3. Remove any attachments on the rear skins of the BOC unit – handles, brackets, etc.
4. Remove any trailing edges.

- All skin fasteners are T27 Torx and 6 ft.-lb. torque.

Truck Preparation

Removal of exterior "skin" components:

Remove skin components in the following order:

1. The top must be removed first. It is held in place with 5 fasteners on the ridge directly behind the cab, 2 on the driver side, 2 on the passenger side, and 5 on the rear. Remove all of these fasteners and lift the top off.
2. Remove 8 fasteners securing the passenger side rear skin (facing the trailer).

- Tip the panel only far enough to reach inside and disconnect the wire harness that powers the light, then remove.

3. Remove 5 fasteners securing the driver side rear skin.

- Tip the panel only far enough to reach inside and disconnect the wire harness that powers the light, then remove.

4. The driver side skin is a rolled skin, with a hinged door. Remove 3 fasteners on the cab side of the skin, 2 on the bottom face side, and 4 fasteners around the door.

- Hold the stiffeners behind the skin with a pair of channel locks or vice grips when loosening fasteners.

5. Remove the passenger side rolled skin; remove 3 fasteners on the cab side and 2 fasteners on the bottom face side.
6. Remove the vent tube plate.

- Retain the 5 rubber grommets and caps for use when reinstalling.

Truck Preparation

Plumbing Removal:

Plumbing components need to be removed before the tank can be lifted out of the BOC unit:

1. Remove the PRD vent tube clamp mount.
2. Remove the racked tank topper frame. It is held in place with 2 fasteners per corner (8 total) and 2 fasteners per side of center brackets (4 total).
3. Remove PRD vent tube #MSTA0548-1 (light pink on drawing). Pull out through the top of the frame.
4. Remove PRD vent tube #MSTA0557-1 (green on drawing). Pull out through the top of the frame.
5. Remove #4 tank vent tube connecting valve and PRD #MSTA0536-1 (teal green on drawing).
6. Use 3/8" wrench to remove ¼" - 20 fasteners securing the PRD bracket.
7. Pull lightly on the PRD line until it just clears the tank support bracket. Let the PRD line dangle.

- Avoid ANY damage or stress on the PRD line while manipulating or while it is hanging without supports to avoid neutralization of the trip device in the tube.

- NOTE: If the truck has a passenger side saddle, use 7/16" wrench to remove the nuts across the PRD support rail.

8. Remove tank #5 supply tube #MSTA0646-1 (brown on drawing) from tank and Upper Tank Isolation Valve.
9. Remove tank #4 supply tube #MSTA0642-1 (purple on drawing) from tank and Upper Tank Isolation Valve.

Truck Preparation

Tank Preparation for Removal:

1. Remove rear cross frame using ¾” socket and wrench to remove total of 3 (½”) fasteners per side and total of 2 (1”) fasteners per side.
2. Use ¾” socket and wrench to remove fasteners securing tank.

- Leave fasteners in place until tank is ready to be removed.
- Mainstay recommends using a forklift and a double strap as pictured to safely lift the tank, stationing a person on each end of the tank to help control the tank’s movements and prevent damage to the BOC framing.

3. When the tank is supported by the forklift, slide it out the back of the unit.

- Discard all O-rings at points of disconnect. They will be replaced when tubes are reinstalled.
- Reserve ALL plugs and fittings in the tank’s valve for reuse with new tank.

When removing and installing tank, use a double strap and person to guide the tank

New Tank Installation

To Install the New Tank:

1. Create a sling to lift the new tank.
2. Adjust mounting block on the valve end of the tank so only 2 threads are showing between the mounting block and end of the collar.
3. Insert fasteners in the mounting block.
4. Place tank in unit through the rear of the unit.

- Station a person on each end of the tank to help control and manipulate it as it is lowered into place in the frame.
- Avoid damage to frame, plumbing, or adjacent tanks.

5. When the tank is properly seated in the frame, put nuts back on the fasteners in the mounting block.
6. Snug tighten.
7. Push mounting block toward the back (trailer side) of the unit to ensure a gap between tank #4 and adjacent tanks.

- Visually inspect, before tightening the mounting blocks to ensure the gap is adequate to allow for expansion and that no tanks are touching.

5. Rotate the tank until the valve is plumb.
6. Tighten the valve side mounting block fasteners using torque wrench set to 90 ft.-lb.
7. Reinstall all reserved valve fittings and plugs.

- All tank fittings should be torqued at 24 ft.-lbs.

New Tank Installation

Reinstall Plumbing:

1. Replace O-ring and reposition tank #4 supply tube #MSTA0642-1 (purple on drawing).
2. Use torque wrench with a 13/16” crow’s foot set to 32 ft.-lbs. to secure tube.
   - Back hold fitting with a ¾” wrench.
3. Replace O-ring and reposition tank #5 supply tube #MSTA0646-1 (brown on drawing).
4. Use torque wrench with a 13/16” crow’s foot set to 32 ft.-lbs. to secure tube.
   - Back hold fitting with a ¾” wrench.

Reinstall Framing & Plumbing

Reinstall Framing & Plumbing:

1. Place rear cross frame back in place.
2. Reinsert 1 (½” x 1 ½”) fastener on both sides.

➢ Do not tighten.

3. Using a punch to line up the tank support frame.
4. Install 1 (½” x 1”) fastener in place on both sides.
5. Install remaining fasteners using a punch if necessary to line up the holes.

➢ Do not tighten.

6. Install the ¼”-20 fasteners in the PRD bracket.
7. Tighten the ¼”-20 fasteners.
8. Replace PRD vent tube from tank #4 to PRD #MSTA0536-1 (teal green on drawing) to proper position.
9. Back hold and torque to 40 ft.-lbs.
10. Replace PRD vent tube #MSTA0557-1 (green on drawing) to proper position.

➢ Do not tighten.

11. Replace PRD vent tube #MSTA0548-1 (light pink on drawing) to proper position.

➢ Do not tighten.

11. Place Racked Tank Topper Frame back in proper position.
12. Insert center top fastener.

➢ Do not tighten.

Reinstall Framing & Plumbing

Reinstall Framing & Plumbing:

1. If necessary, use a punch to line up all holes on the corners of the frame and insert fasteners.
2. When all fasteners are in place, torque all 1 ½” fasteners to 90 ft.-lbs.
3. Torque PRD vent lines (at block) to 40 ft.-lbs.

Re-pressurize & Test Unit

1. Close purge valve (accessed through side maintenance door of fuel module).
2. Open tank valves.
3. Pressurize system.
4. Use ‘SNOOP’ or equivalent leak detector to check system for leaks.
5. Upon successful leak test, reinstall aluminum skins in exact reverse order of that which they were removed.
6. Loosely install fasteners until all skins and fasteners are reinstalled.
7. Torque fasteners to 6 ft.-lbs.