

CNG Gen 2 FOB Refuse Fuel System PRD Retrofits

Affected Vehicles

Refuse vehicles equipped with Hexagon Agility® p/n 23106000 and p/n 23106000-WM Gen 2 Front of Body (FOB) CNG fuel systems.

Introduction

Agility Fuel Solutions LLC, a subsidiary of Hexagon Agility Inc. (Hexagon Agility®), has determined that certain OMB pressure relief devices (PRDs) have been observed to crack or fracture. The PRD failure mode—seen to occur at or near first fill—can result in a sudden release of the high-pressure gas contained in the CNG fuel system to the atmosphere.

Hexagon Agility® has created a PRD retrofit kit, p/n 23106024, to correct this issue on Hexagon Agility® Gen 2 front of body (FOB) refuse fuel systems.

This bulletin also provides instructions for authorized Hexagon Agility® personnel to install PRD retrofit kit, p/n 23106024.

Warning Statements Used in this Bulletin

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.



NOTICE is used to address practices not related to physical injury, such as best practices or tips to help an operation or procedure go smoothly and prevent equipment damage.



CRITICAL CHARACTERISTIC – Product feature directly affects:

- Safety of vehicle users, people nearby and maintenance personnel, or
- Regulatory compliance.



MANUFACTURING CHARACTERISTIC

- A product feature solely used to improve manufacturability or maintain process control.
- A process parameter or step that has a significant effect on achieving a Critical Characteristic or Significant Characteristic, or maintaining material identification/traceability.

Required Tools and Materials

Item	Purpose
Safety glasses	Eye protection
Scaffolding	Safe access to fuel system
Fall restraints	Safe access to fuel system
Combination and socket wrenches	Remove and install fuel system fittings, fasteners, and components
Torque wrench	Accurately tighten fuel system fittings, fasteners, and components
Crow foot wrenches	Use with torque wrench
Swagelok® Snoop® leak detection fluid	Perform leak test
Battery powered impact wrench	Remove and install fuel system cover
Permanent marker	Mark compression fittings
Torque Seal marker	Indicate fittings and fasteners are tightened to specifications
Shop rags	Clean fuel system tubing before and after retrofit

Warranty Information

This procedure and the retrofit kits are covered under the provisions of the fuel system warranty.

Prior to Beginning Work

1. Verify contents of Retrofit Kit, Emer PRD, Gen 2 FOB, Hexagon Agility® p/n 23106024 is present in the correct quantities. **FIGURE 1**

Item	Part Number	Description	QTY
1	10200063	Fitting, Connector, Male	2
2	10200181	Fitting, Elbow	2
3	10200236	Fitting, Adapter, Male	2
4	10240625	Fitting, Straight, Male	2
5	10306997	PRD, Emer, Remote	2
6	23106022	Tube Subassembly, PRD to Tee, lower cylinder	1
7	23106023	Tube Subassembly, PRD to Tee, upper cylinder	1

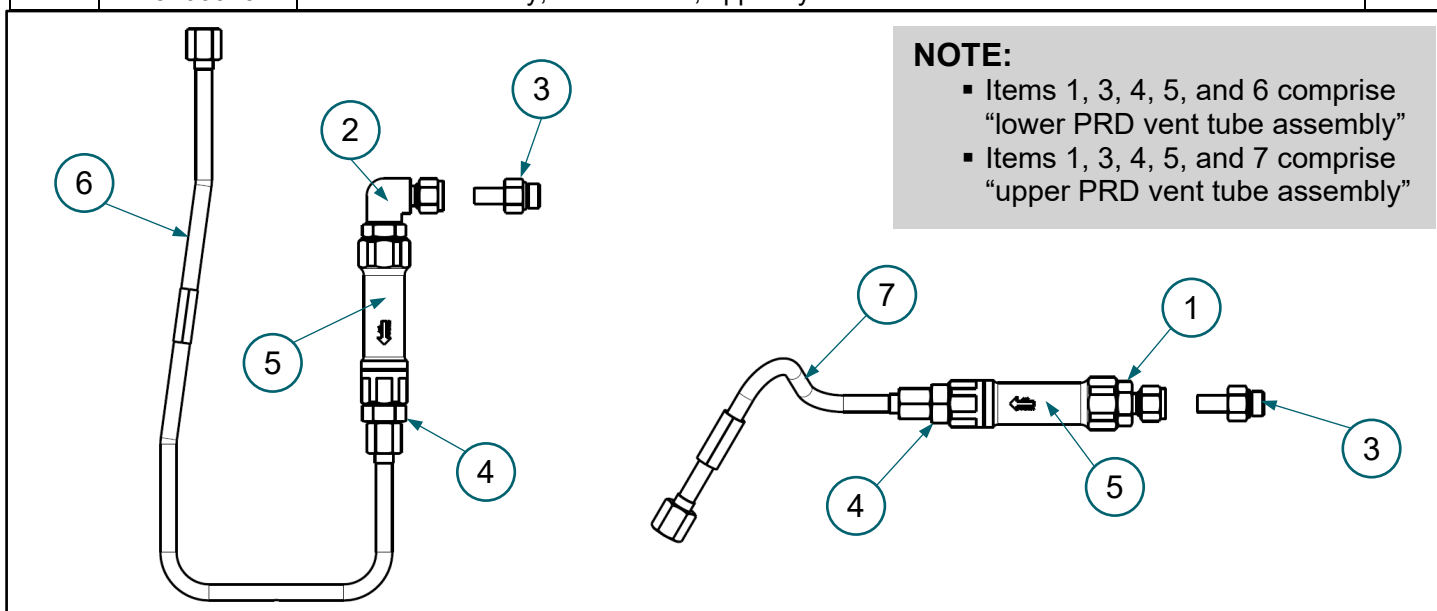


FIGURE 1. Parts List — Retrofit Kit, Emer PRD, Gen 2 FOB, Hexagon Agility® p/n 23106024

2. If any parts are missing or unusable, contact Hexagon Agility® Customer Care and Technical Services (CCTS) for replacement.

NOTICE

Do not remove components from original packaging until necessary. Any components to be reinstalled must be thoroughly cleaned, inspected and stored in a satisfactory manner until reinstallation.

⚠ WARNING

Wear approved personal protective equipment (PPE) including safety glasses.

Secure Vehicle**⚠ WARNING**

Set emergency brake.

⚠ WARNING

Place wheel chocks under vehicle tires.

⚠ WARNING

Use approved scaffolding and fall restraints.

Defuel Vehicle**⚠ WARNING**

Refer to defueling sections of *ENP-516, Truck and Tractor CNG Fuel System Operation, Maintenance & Inspection Manual*.

Install PRD Retrofit Kit, p/n 23106024

1. Use a battery powered impact tool with 7/16-in and 9/16-in impact sockets to remove fuel system cover fasteners securing (*shaded*) valve end panel and set aside in a safe place. **FIGURE 2**

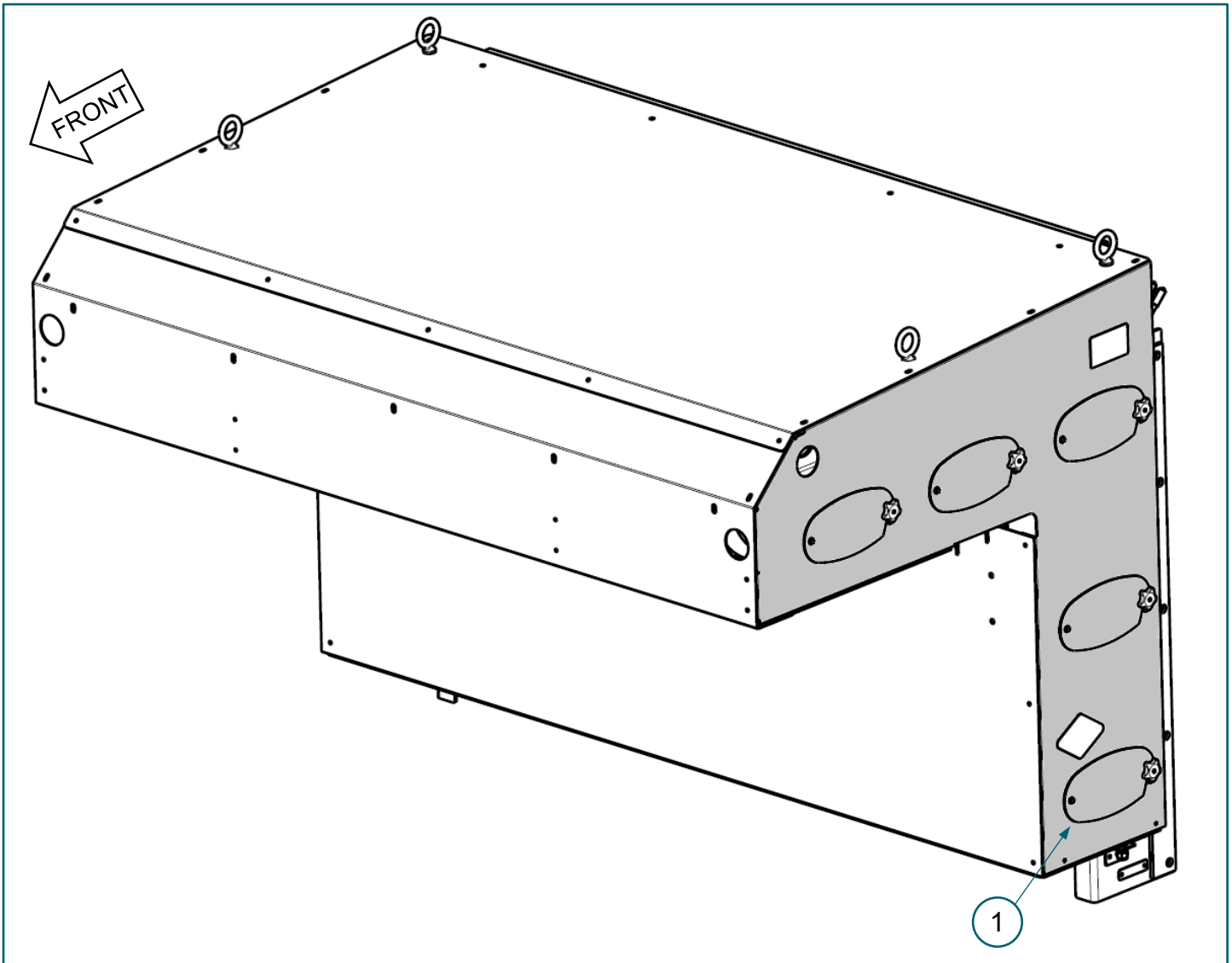


FIGURE 2. Fuel system cover with valve end panel *shaded*

2. Remove (1) valve end panel to expose cylinder valve end plumbing. *Refer to OEM instructions.* **FIGURE 2**

⚠ WARNING NEVER put a wrench on a fuel system fitting without first confirming the system has been depressurized.

3. Use a pair of 11/16-in wrenches to remove (3) lower PRD vent tube from (4) lower PRD and (5) tee fitting.
FIGURE 3

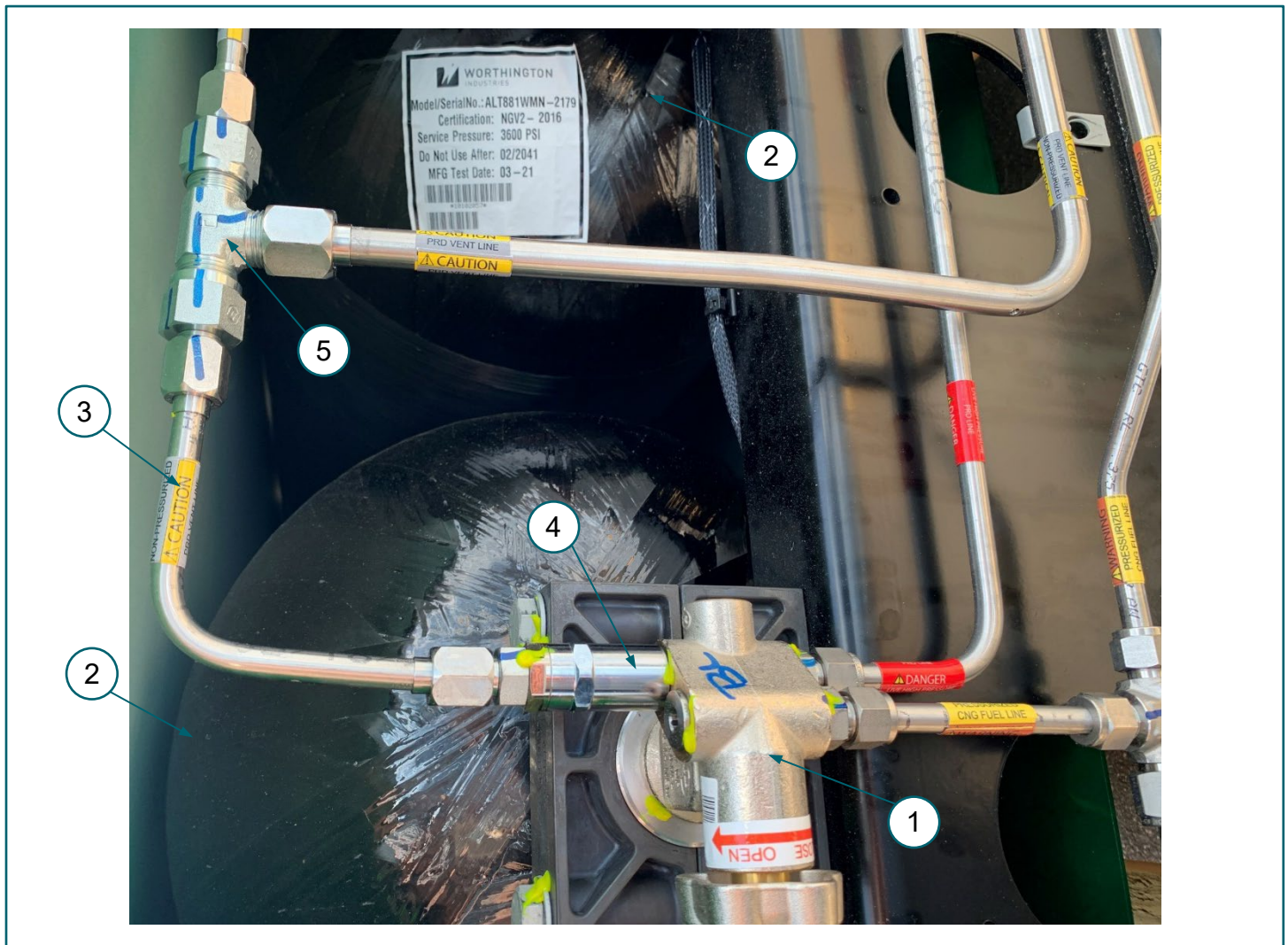


FIGURE 3. Lower cylinder valve end plumbing components

- | | | |
|------------------------|-----------------------|---------------|
| 1 lower cylinder valve | 3 lower PRD vent tube | 5 tee fitting |
| 2 cylinder | 4 lower PRD | |

NOTICE

Reuse, recycle, or discard tube assemblies removed according to authority having jurisdiction (AHJ) and/or organizational guidelines.

4. Use a 7/8-in wrench to remove (4) lower PRD from (1) lower cylinder valve. FIGURE 3

NOTICE

Reuse, recycle, or discard PRD according AHJ and/or organizational guidelines.

5. Use a 9/16-in wrench to install (3) male adapter fitting, p/n 10200236, from retrofit kit on lower cylinder valve (*not shown*). FIGURE 4 and FIGURE 5



Torque male adapter fitting to 26 ft-lbs (35.3 Nm).

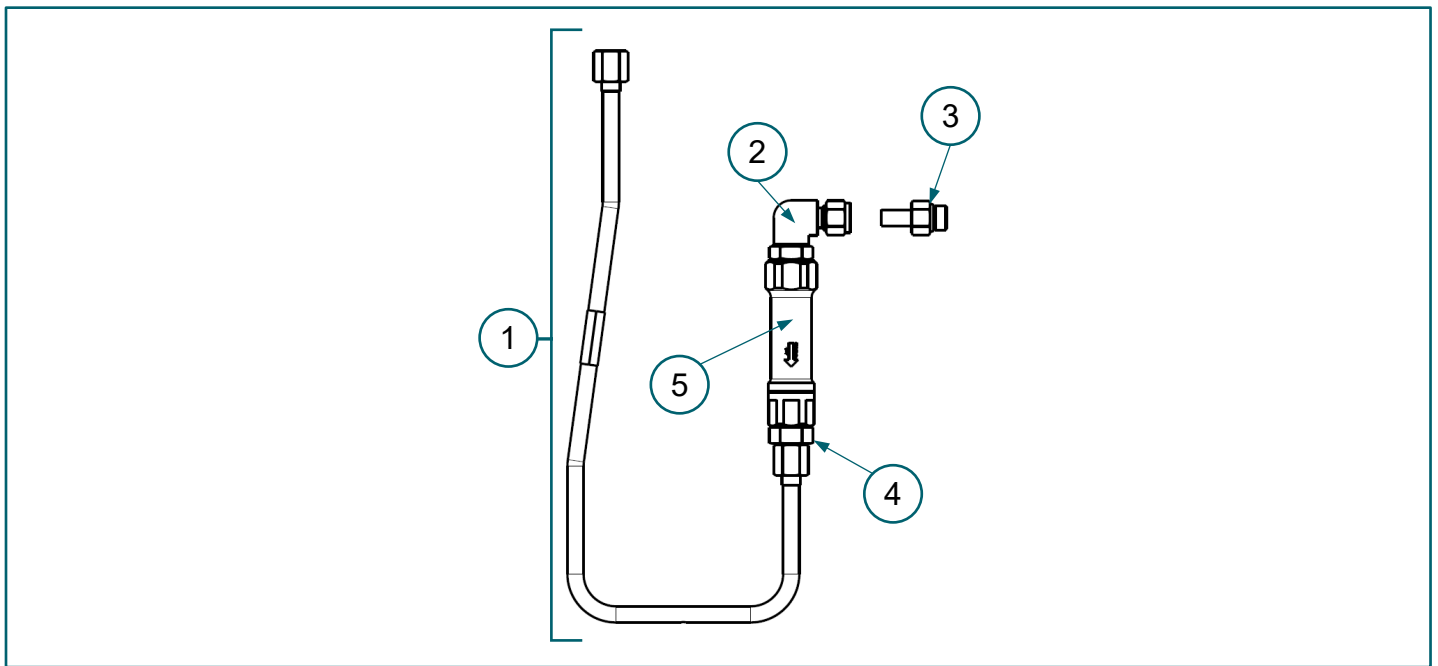


FIGURE 4. Lower PRD vent tube assembly and male tube adapter fitting

- | | | |
|--------------------------------|---------------------------------------|-----------------------------------|
| 1 lower PRD vent tube assembly | 3 male adapter fitting, p/n 10200236 | 5 PRD, Emer, Remote, p/n 10306997 |
| 2 elbow fitting, p/n 10200181 | 4 male straight fitting, p/n 10240625 | |

6. Use a 11/16-in wrench to install (1) lower PRD vent tube assembly while using a 5/8-in wrench to hold (2) elbow fitting, p/n 10200181. **FIGURE 4** and **FIGURE 5**



Tighten connector fitting nut per Appendix A: WI.0441 Tightening of Tube Fittings

7. Use a 11/16-in wrench to install (a) nut fitting of (1) lower PRD vent tube assembly on (5) tee fitting, p/n 10200181. **FIGURE 5**



Tighten connector fitting nut per Appendix A: WI.0441 Tightening of Tube Fittings

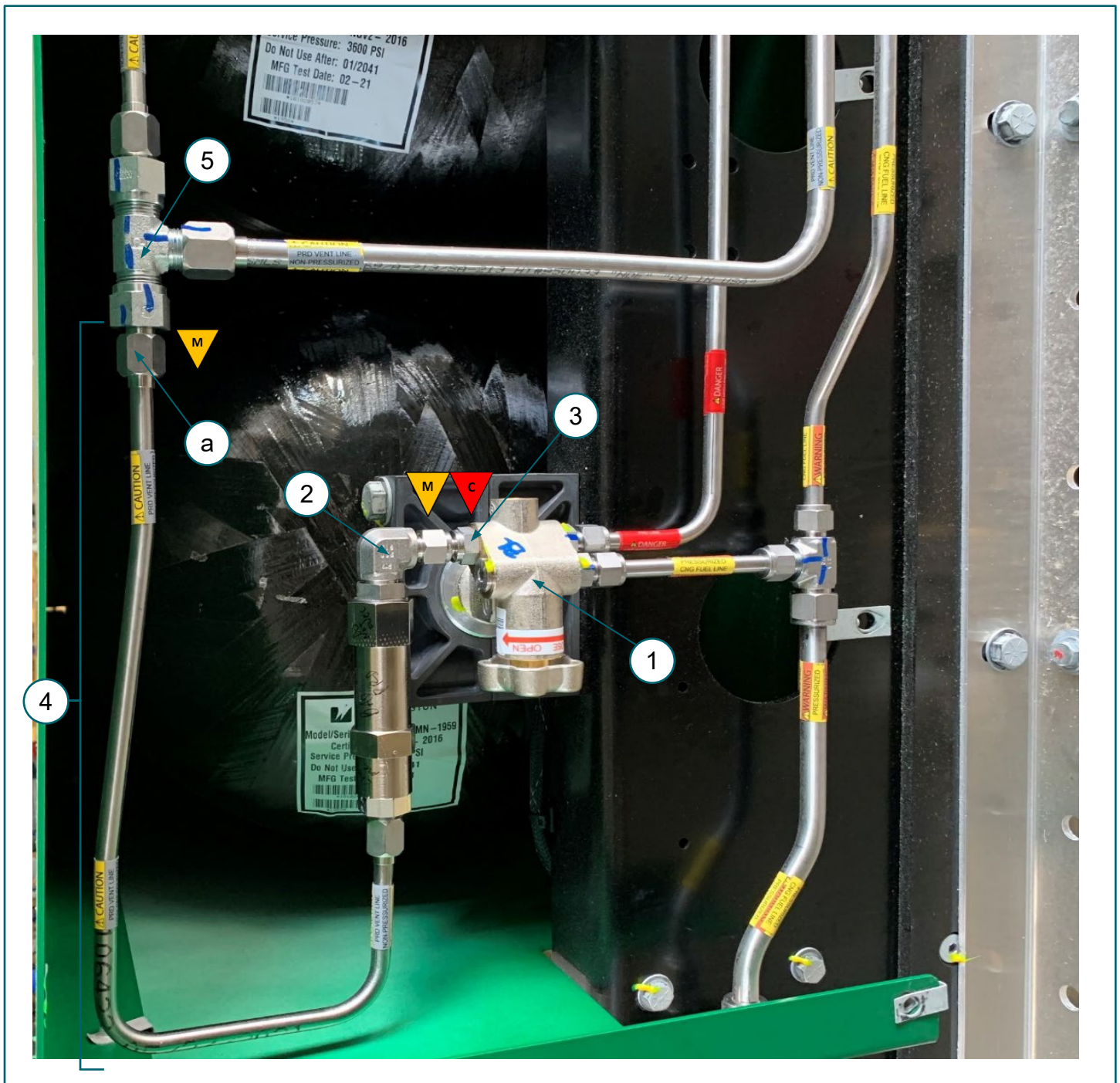


FIGURE 5: Lower cylinder valve plumbing after installation of lower PRD vent tube assembly

1 lower cylinder valve
2 elbow fitting, p/n 10200181

3 male adapter fitting, p/n 10200236
4 lower PRD tube assembly

5 tee fitting
a nut fitting

8. Use a pair of 11/16-in wrenches to remove (3) upper PRD vent tube nut fittings from (4) upper PRD and tee fitting (5). **FIGURE 6**

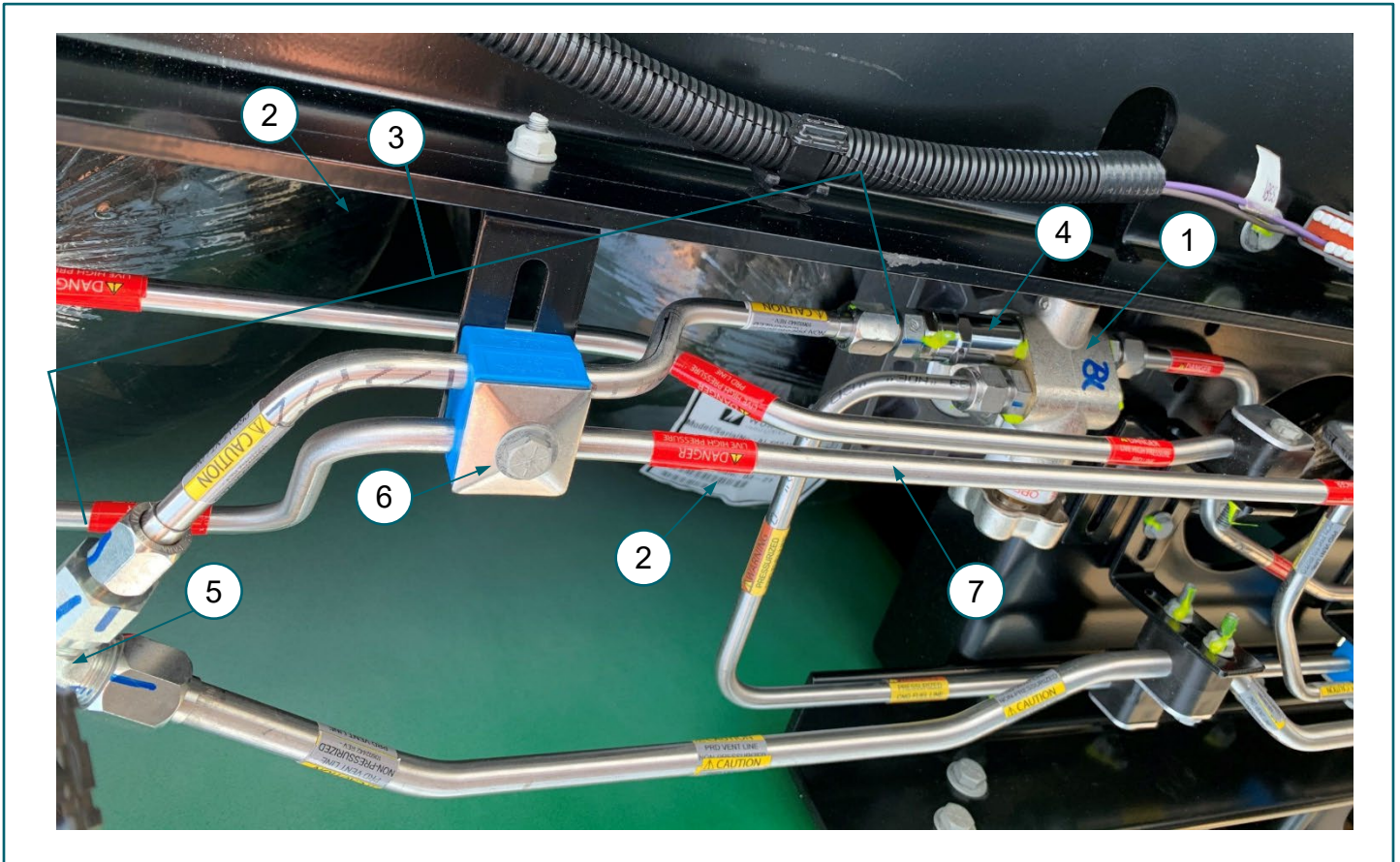


FIGURE 6. Upper cylinder valve end plumbing components

- | | | |
|------------------------|---------------|-----------------|
| 1 upper cylinder valve | 4 upper PRD | 7 live PRD tube |
| 2 cylinder | 5 tee fitting | |
| 3 upper PRD vent tube | 6 tube clamp | |

9. Use a wrench to remove fasteners securing (6) tube clamp and (3) upper PRD vent tube to (7) live PRD tube and set aside fasteners and tube clamp for reuse. **FIGURE 6**

10. Remove (3) upper PRD vent tube. **FIGURE 6**

NOTICE

Reuse, recycle, or discard tube assemblies removed according to authority having jurisdiction (AHJ) and/or organizational guidelines.

11. Remove (4) upper PRD from (1) upper cylinder valve. **FIGURE 6**

NOTICE

Reuse, recycle, or discard PRDs according AHJ and/or organizational guidelines.

12. Install (7) male adapter fitting, p/n 10200236, from retrofit kit on (1) upper cylinder valve. **FIGURE 7**



Torque male adapter fitting to 26 ft-lbs (35.3 Nm).

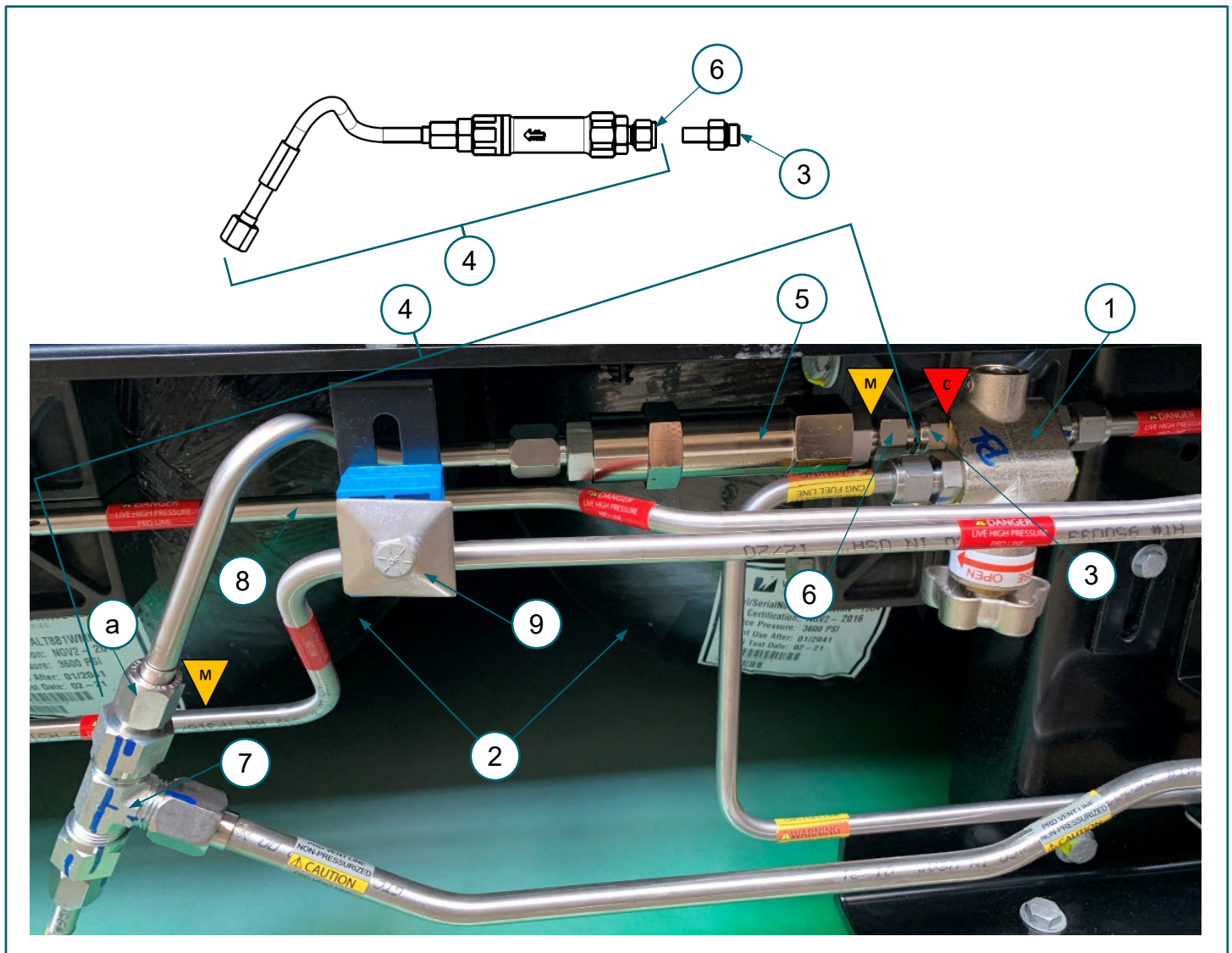


FIGURE 7. Upper cylinder valve end plumbing components after installation of upper PRD vent tube assembly

- | | | |
|--------------------------------------|---|-----------------|
| 1 upper cylinder valve | 4 upper PRD vent tube assembly | 7 tee fitting |
| 2 cylinder | 5 (upper) PRD, Emer, Remote, p/n 10306997 | 8 live PRD tube |
| 3 male adapter fitting, p/n 10200236 | 6 male connector fitting, p/n 10200063 | 9 tube clamp |
| a nut fitting | | |

13. Use an 11/16-in wrench to install (6) male connector fitting, p/n 10200063, of (3) upper PRD vent tube assembly while using a 5/8-in wrench to hold (3) male adapter fitting, p/n 10200236. **FIGURE 7**



Tighten connector fitting nut per Appendix A: WI.0441 Tightening of Tube Fittings.

14. Use an 11/16-in wrench to install (a) nut fitting of (3) upper PRD vent tube assembly on (5) tee fitting.

FIGURE 7



Tighten nut fitting per Appendix A: WI.0441 Tightening of Tube Fittings.

15. Use a 7/16-in socket and 7/16-in wrench to secure (8) live PRD tube using (9) tube clamp and fasteners.

FIGURE 8



Tighten tube clamp fasteners to 8 ft-lbs (10.85 Nm) and mark bolt with Torque Seal.

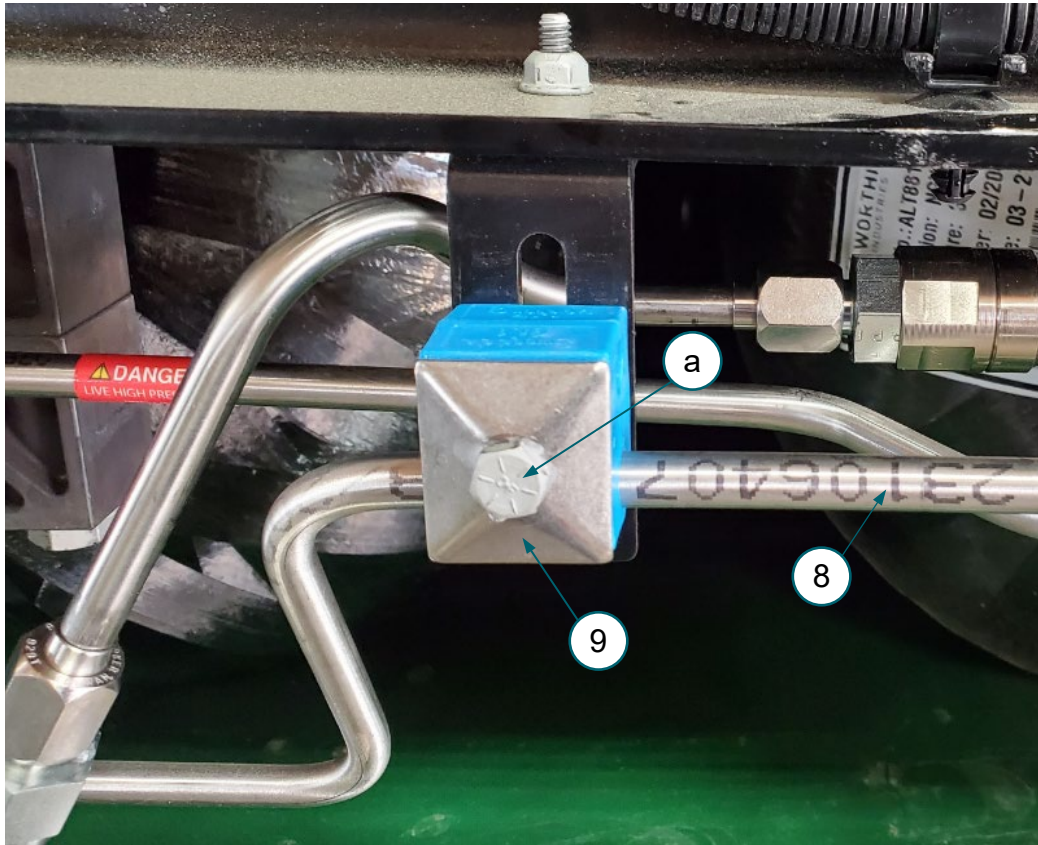


FIGURE 8. (9) live PRD tube secured with (8) tube clamp and (a) 7/16 hex cap screw and nut (*not visible*).

16. Perform **Leak Test Procedure**.

Leak Test Procedure

1. Fuel vehicle to 500 psi (3.45 MPa). *Refer to ENP-516, Truck and Tractor CNG Fuel System Operation, Maintenance & Inspection Manual, "CNG System Fueling" section.*
2. Listen for hissing as a sign of a system leak.
3. Spray all fuel system connections with Swagelok® Snoop® leak detection solution and wait 10 minutes.
4. Inspect all fuel system junctions for bubbles as an indicator of a leak.
 - a. If no leaks are found, proceed to Step 5.
 - b. If a leak is found, depressurize fuel system. *Refer to ENP-516, Truck and Tractor CNG Fuel System Operation, Maintenance & Inspection Manual, "Depressurizing CNG Systems" section.*

⚠ WARNING NEVER attempt to tighten fittings while system is pressurized.

- c. Repair leak(s). *Refer to ENP-516, Truck and Tractor CNG Fuel System Operation, Maintenance & Inspection Manual, "Leak Repair" section.*
5. Fuel vehicle to 3600 psi (24.6 MPa).
6. Repeat Steps 2 through 4 until no leaks are present.
7. When the system passes the leak test, use shop rags to clean all Swagelok® Snoop® from fuel system components.
8. Use a Torque Seal marker to mark properly tightened fuel system fittings. **FIGURE 9**

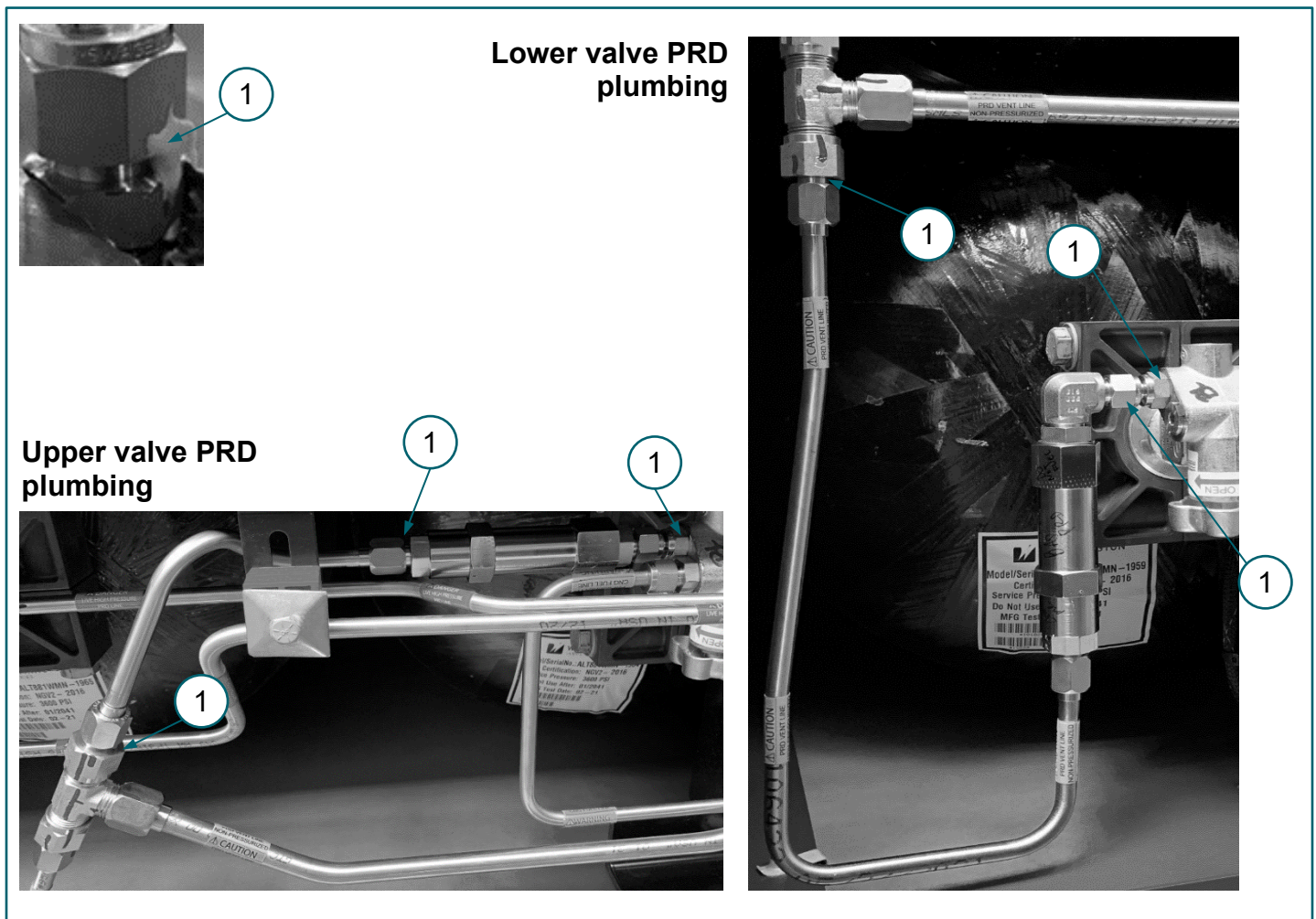


FIGURE 9. New fitting junctions marked with (1) Torque Seal.

Finish Installation

1. Use a battery-powered impact wrench with 7/16-in and 9/16-in impact sockets to reinstall valve end panel using stainless steel fasteners. **FIGURE 10**

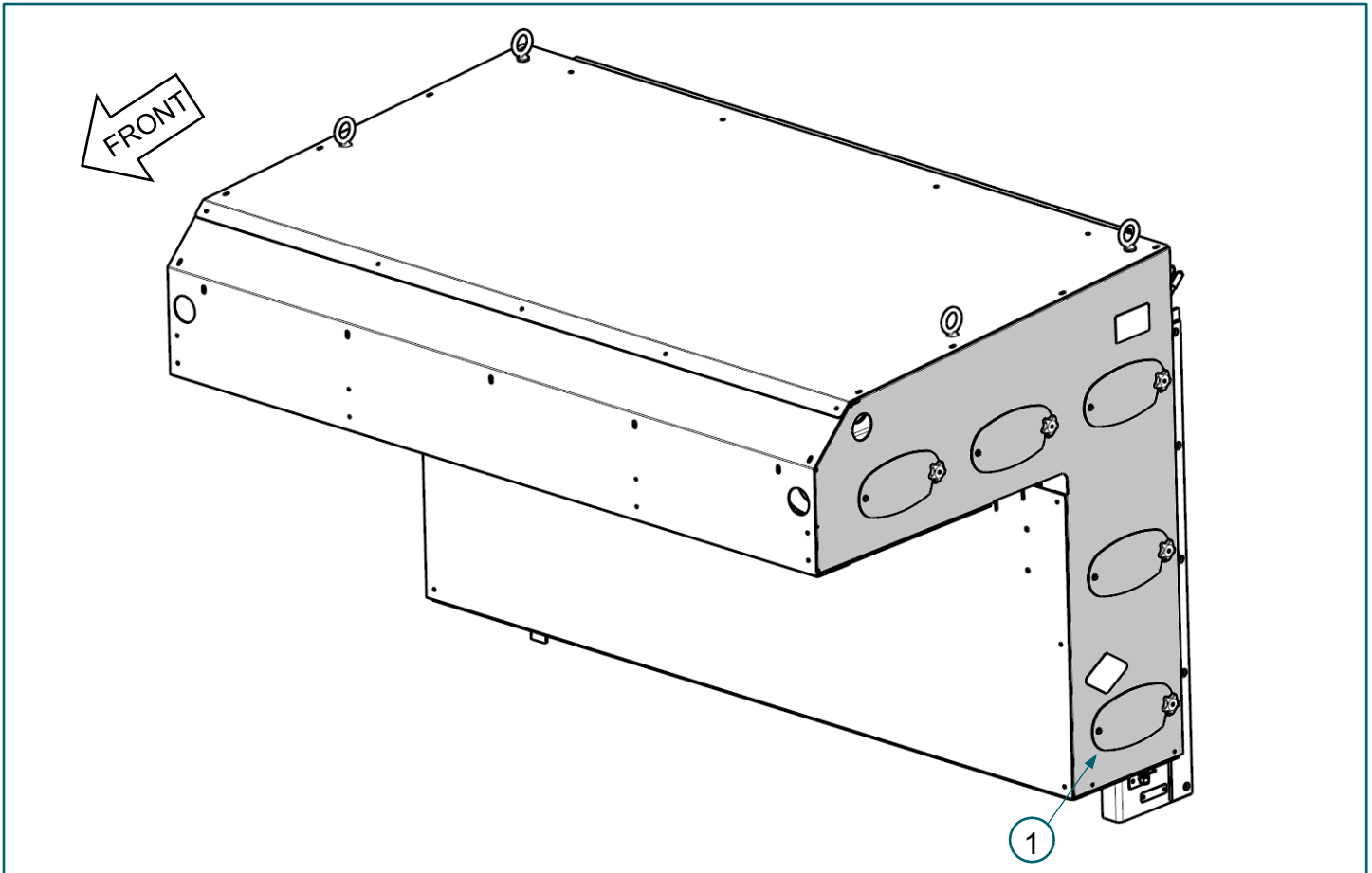


FIGURE 10. Fuel system cover with valve end panel *shaded*

2. Road test vehicle using the procedure described below.

Road Test Procedure

1. Remove wheel chocks from tires.
2. Start engine and verify proper fuel system operation.
3. Road test the vehicle until it reaches operating temperature.
4. **If a fuel system fault appears**, contact Hexagon Agility® CCTS.
5. If the system is operating properly, release vehicle into service.
6. Update vehicle maintenance and repair records.

Appendix A: WI.0441 Tightening of Tube Fittings

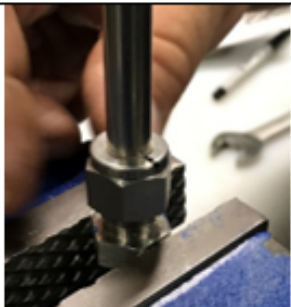
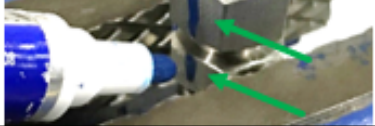
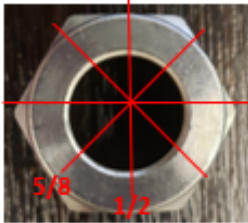
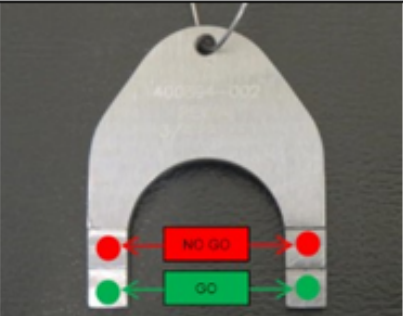


Tightening of Tube Fittings

Scope: Tightening of 1/2" Swagelok fittings, port connectors and port adaptors.

Note: "Substitute from WI.0198"

Standard Work Instruction

1	Install swaged tube into fitting. Verify that both nut and fitting have same manufacturer markings. C		2	Tighten nut (by hand or with wrench) until top of nut is aligned with the bottom of the DMT mark. C
WHAT			WHAT	
WHY	Swagelok/Parker fittings and nuts are NOT interchangeable.		WHY	This line shows the nut's correct starting location prior to tightening.
3	Mark across nut and fitting with blue paint pen M		4	Put a "backing wrench" on the adjacent fitting. M
WHAT			WHAT	
WHY	The marks are needed for step 5 and inspection.		WHY	The backing wrench prevents the fitting from rotating. This ensures that the nut is NOT under-tightened.
5	Using the blue marks as a visual reference, turn nut between 1/2 and 5/8 of a turn C	 	6	Check gap between nut and fitting with the GO-NOGO gap gage. If the GO section fits AND the NOGO section does not fit, the part is good. If the NO-GO section fits, then tighten the fitting and recheck. If the GO section does not fit, the tube must be removed and scrapped. C
WHAT			WHAT	 
WHY	If the nut is turned less than 1/2 turn, it may pass a leak test, but leak later in the field.		WHY	

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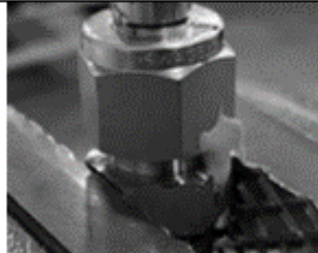
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**Tightening of Tube Fittings**

Scope: Tightening of 1/2" Swagelok fittings, port connectors and port adaptors.

Note: "Substitute from WI.0198"

Standard Work Instruction

7	WHAT	Add torque seal between nut and fitting (only when specifically required by customer).		8	WHAT	---
WHY	---			WHY	---	

Equipment List:

Description	Manufacturer	Manufacturer's Part Number
1/4" gap inspection gage	Agility Fuel Solutions	TBD
3/8" gap inspection gage	Agility Fuel Solutions	TBD
1/2" gap inspection gage	Agility Fuel Solutions	TD 400394
Blue paint pen	Dykem	84001
Ultra-fine tip permanent black marker	Sharpie	37001
Yellow torque seal	Dykem	83317
Open-ended wrenches	Any	---
Vise	Any	---

Job Breakdown:

Important Steps	Key Points	Reasons Why
1. Tube into fitting	1. Same manufacturers	Swagelok and Parker fittings are not interchangeable.
	2. Tube bottomed out in fitting	The tube must be fully inserted into the fitting.
	3. DMT line fully showing	Provides correct starting point.
2. Mark parts	1. Across nut and fitting	Provides visual aid to start tightening.
3. Turn nut	2. Use backing wrench	Holds everything in place to prevent leaks.
	3. 1/2 turn	Incorrect turns could cause a leak.
	4. Marks on opposite sides	Provides visual aid to finish tightening.
	5. Verify gap	Verify tightening is complete, but not too much.
4. Torque seal	1. Across nut and fitting	Shows if fitting was loosened.

Hexagon Agility® Customer Care and Technical Services

Fuel system warranty or non-warranty product support may be obtained by calling or emailing Hexagon Agility® Customer Care and Technical Services (CCTS). Please provide **your name, phone number, email address, and complete vehicle information: VIN, year, make, model, mileage, unit number vehicle owner, and current vehicle location**. A service advisor will contact you to arrange vehicle repair or ship a part.

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