



UPS Ford F59 CNG Package Car Familiarization Training

2019 Model Year

Landi Renzo Low & High Pressure Fuel System



Center	# Units
SMART	100
Montgomery	30
Greensboro	22
SLC	49



Course Objective

- Familiarization training in the following areas:
 - Natural Gas and CNG Background
 - Driver Information
 - Maintenance Intervals and Procedures
 - Landi Renzo CNG Fuel System
 - Major Components
 - Electronics
 - Repair Assistance
 - Service Parts
 - Warranty Coverage & Process
 - Ford Dealer Reference
 - Support Resources

- Natural Gas and CNG Background
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Natural Gas is a Safe Fuel

Natural Gas

- Lighter than air => rises=> if it accumulates it is in high places away from people
- Requires more heat to ignite without a spark (~1000F)
- Requires richer air-fuel mixture to ignite from spark or flame
- Non toxic

Gasoline & Diesel

- Heavier than air => descends => if it accumulates it is in low places potentially where people are standing
- Requires less heat to ignite without a spark (~500F)
- Requires leaner air-fuel mixture to ignite from spark or flame
- Toxic

Compressed Natural Gas (CNG) Safety Background

■ Fire Hazard

- While natural gas requires richer air fuel mixtures than gasoline and diesel for ignition, these mixtures can still occur where there is a leak in the system posing a fire hazard.
- Any process or procedure that generates sparks, flames, or heated particles should not be practiced in areas designated for CNG.

■ High Pressure

- Depressurize fuel system before servicing (more to come on this)
- Never attempt to depressurize or vent a system by loosening a fitting.

Compressed Natural Gas (CNG) Safety Background

■ Suffocation Risk

- Although natural gas is non-toxic it is an inert gas and can cause suffocation in concentrations $>21\%$ (visible vapor cloud)
- Low risk as vehicle fuel system will unlikely contain enough gas to achieve this concentration in the area where it is parked

■ Detection

- The odorant (Mercaptan) is added to pipeline natural gas giving it the rotten egg smell aiding in leak detection



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Driver Information

This section will cover the main differences between gasoline package cars and CNG package cars from a driver's perspective

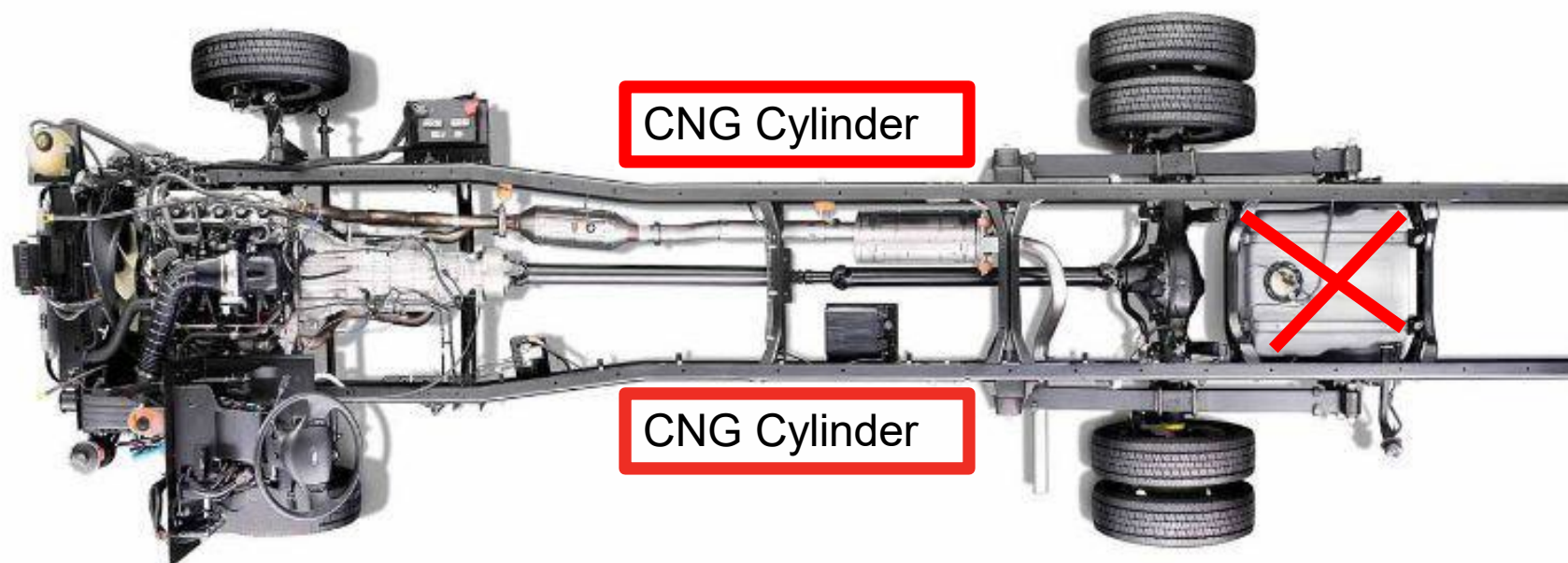
- Fuel storage
- Fuel venting
- Range
- Fuel Gauge
- Fueling

A hazardous material (HAZMAT) drivers license is NOT required to drive Alternative Fuel vehicles

Driver GEMS Code 0375 for New Vehicle Familiarization Training

Fuel Storage

- Instead of a fuel tank, CNG powered package cars store fuel in cylinders.
- Model Year 2019 Ford F59 package cars with the Landi Renzo high and low pressure fuel system have 2 identical CNG cylinders mounted on both sides of the outside of the frame rails



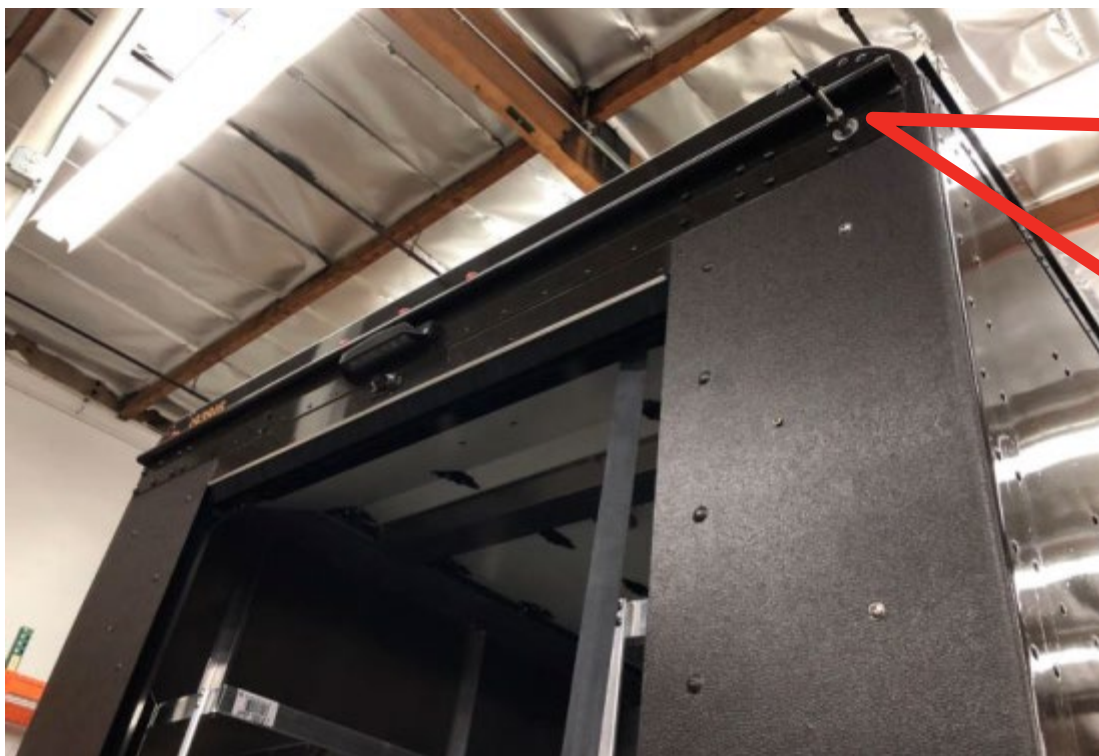
Fuel Storage – CNG Cylinders

- Type 2 CNG cylinders are used
 - The cylinders are made of steel with a fiber wrap
 - The steel liner is capable of withstanding a pressure which exceeds the actual filling pressure protecting against the danger of a burst even in case of the total loss of the fiber wrapping.
- Gasoline Gallon Equivalent (GGE): 17 (each) x 2 = 34 GGE total
- Dimensions: 18" diameter x 60" long
- Weight:
 - w/o fuel: 302 lb each
 - w/ fuel: 397 lb each
- Safety
 - Meet FMVSS 304 (49 CFR 571.304), Compressed Natural Gas Fuel Container Integrity and ANSI/CSA NGV 2
 - Tests include: Vibration, Corrosion, Fast fill/empty, Overpressurization, Fire, Pressuring cycling @ 185F to -40F, Impact from pendulum and firearm, Drop from 6 feet.



PRD Vent

- All CNG cylinders have pressure relief devices (PRDs) that are connected to a vent line that exits at the rear of the car as shown.
- PRDs are ***thermally*** activated at 230°F
- Part of the driver's pre-trip is to check that the PRD vent cap is present. If it is missing, the car can still be used but the driver must note that PRD cap is missing on the DVIR as non-safety related.

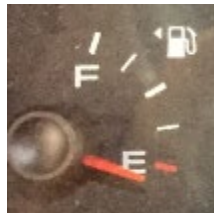


Range



- Conservative assumptions
 - Car mpgge = 5.0 (Initial estimate based on gasoline and CNG data)
 - 500 psi minimum needed for proper engine operation
- Calculation
 - 3600 psi per 34 gge = 106 psi / gge
 - Starting useable pressure = 3,600 – 500 = 3,100 psi
 - 3,100 psi / 106 psi / gge * 5.0 mpgge = 146 mi
 - **Conservative Range = 150 mi**
- Rule of thumb: Each 100 psi above 500 = approx 5.0 mi range.
- Gasoline comparison: Ford F59 gasoline has a 40 gallon fuel tank and averages 8 mpg = 320 mi so a CNG car will have about ½ (50%) of the range that a gasoline car does.

Dash Fuel Gauge

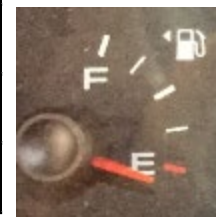


- Similar to how the level of gasoline determines how full a gasoline tank is, the amount of pressure determines how full a CNG cylinder is.
- The amount of pressure in the cylinder will determine the fuel gauge reading in the dash
- CNG cylinder pressure will fluctuate with temperature.
 - Pressure increases as it warms and decreases as it cools.

Using rule of thumb (each 100 psi above 500 = 5.0 mi), the Low Fuel Warning will come on with approx. 20 mi range left

Pressure (psi) @ 70F	Fuel Gauge Reading
3200-3600	F
2700	3/4
2000	1/2
1300	1/4
950	Low Fuel Warning
500	E

NOTE: Fuel will typically be warmer than 70F when filling, so a full pressure of 3,600 psi may be achieved at the station but after cooling may drop to below 3,600.



Fuel Level Low Message & Miles to Empty



- A “Fuel Level Low” message will be displayed when the fuel gauge needle is at 1/8th or about 950 psi cylinder pressure with about 20 mi to empty.
- DO NOT USE the miles to empty dash display to determine available range, it is not accurate as a result of the CNG conversion
- If actual range seems drastically less than expected, makes sure one of the cylinder valves is not turned off.
 - For example: Only 75 miles per fill-up or ½ way through normal route



Fueling

CNG vehicles use a different fueling dispenser than diesel, gasoline and LNG

- It is not possible to put CNG in diesel, gasoline or LNG vehicle and vice versa
- The filling station will fuel to about 3,600 psi (may drop after gas cools)
 - Temperature compensated stations may fill above or below 3,600 depending on ambient temperature
- **If the fill cap is not reinstalled the engine will NOT crank**
 - If fill cap comes off after engine starts, engine will stay running



Fueling Information

- Plant Engineering Role for Fueling
 - Train-the-trainer
 - Shop evacuation (alarms & procedures)
 - Fueling process (train-the-driver trainer)
 - Watch video:
 - <https://youtu.be/Ha2G3wwUwLg>



Learning Check

- The engine will not crank if the fuel cap is not installed: True or False
- What should be done if the PRD plastic vent cap is missing?
- The range of a Ford F59 CNG car is about ____ compared to a Ford F59 gasoline car?
- The engine should run at a cylinder pressure of ____ and above?
- A “Fuel Level Low” message will be displayed when the fuel gauge needle is at ____ or about ____ psi cylinder pressure with about ____ mi to empty.

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CNG Fuel System Maintenance

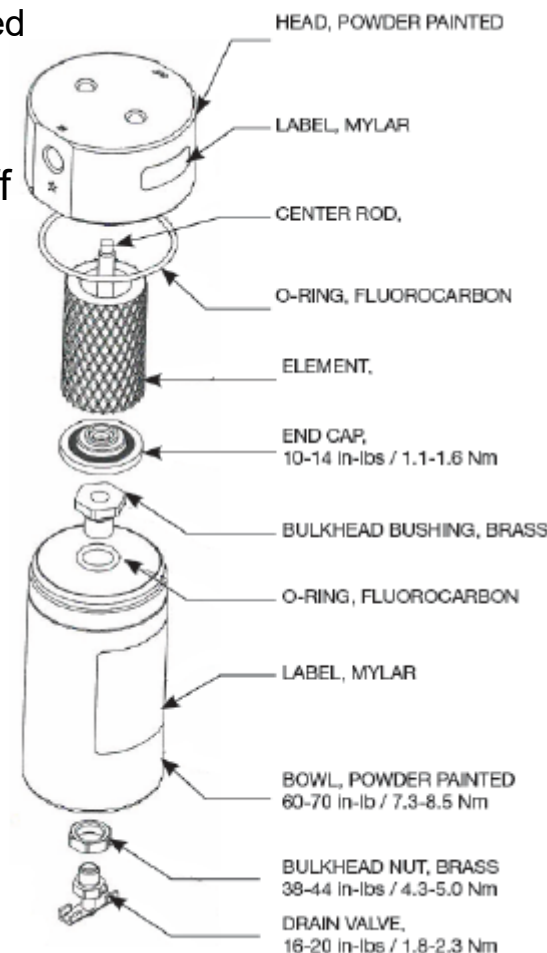
CNG System Maintenance / Inspection Item	Frequency
Replace Low and High Pressure Fuel Filters Low: UPS part # 4821237 (incl o-rings) High: UPS part # 4817451 (incl o-rings)	UPS PMI for LOF (4,000-5,000 mi)
Spark plugs	50,000 mi
Leak Test	UPS PMI
Component Visual Inspection	UPS PMI
CNG System Inspections*	Every 3 years or 36,000 miles

* Also after any accident or thermal event

Low Pressure Fuel Filter Element Replacement

■ Replacing the Element

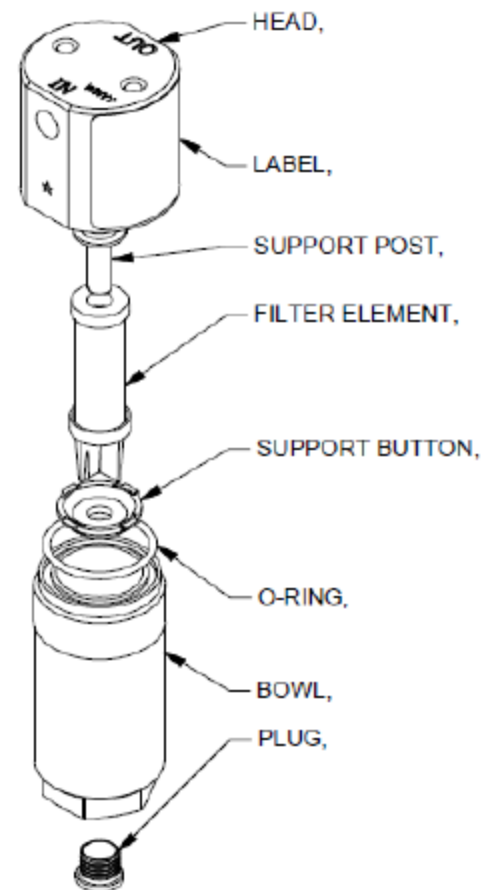
- Open petcock to drain any fluid that may be present
 - NOTE: If oil present, contact PE to have filling station inspected for passing oil.
- Relieve system pressure **BEFORE** removing filter by shutting off main valve, start and run until engine shuts off
- With a strap wrench, unscrew bowl and remove the old element and o-ring
- Replace with new components supplied in UPS part # 4821237 (includes o-rings) and install bowl
- Torque to 60-70 in-lbs
- Turn on main valve. Start vehicle and shut off. Test for leaks by using leak detection fluid or methane detection equipment



High Pressure Fuel Filter Element Replacement

▪ Replacing the Element

- Relieve system pressure **BEFORE** removing filter by shutting off main valve, start and run until engine shuts off
- Remove drain plug with 1/4" hex key wrench to drain any liquid that may be present
 - NOTE: If oil present, contact PE to have filling station inspected for passing oil.
- Using a crescent wrench and the flat sections located on the bottom of the bowl, unscrew the bowl and remove old element and o-ring
- Replace with new components supplied in UPS part # 4817451 (includes o-rings) and install bowl
- Torque bowl to 30 ft-lbs
- Torque drain plug to 27 ft-lbs
- Test for leaks, with system pressurized, by using leak detection fluid or methane detection equipment



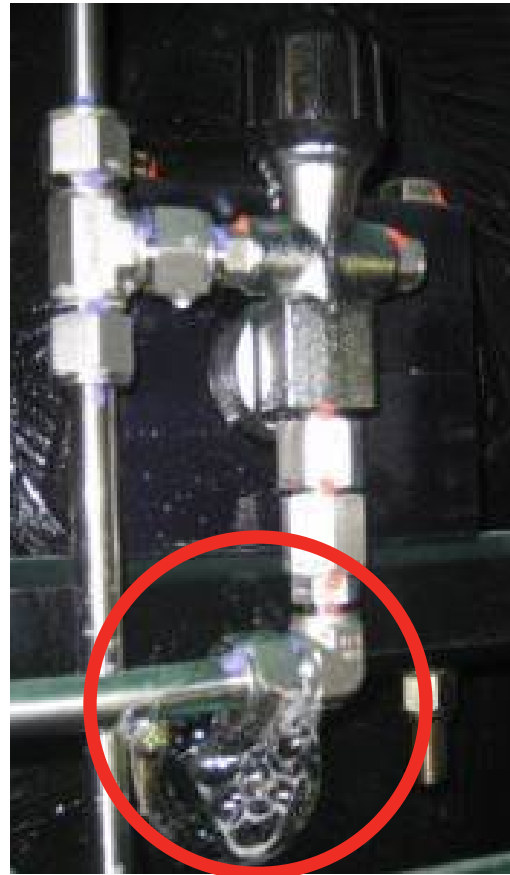
Leak Testing: PMI

- Check for leaks using combustion gas detector
- If leak detected, check fittings and connections for leaks using leak detection solution (available at MDC. Part # 3026700)
- When a leak is present the solution will cause bubbles
- Always give it at least 10 minutes
- Not all leaks will be apparent
- After a few minutes even a tiny leak will appear in a foam like manner not necessary bubbles
- Example on next slide



Leak example with leak detection solution:

- Look for bubbling or foaming at point of leak
- Check for signs of damage to tubing



Component Visual Inspection: PMI

- Check wiring harnesses, fuel and coolant hoses
 - Securely attached
 - Free from abrasion
 - Free flowing – not kinked
- Check CNG cylinders and mounting system
 - Unacceptable
 - Dents in the outer wrap
 - Damage to boss end
 - Any visible crack in frame or any other component
 - Damage to any plumbing component
 - Damage to the cylinder mounts

CNG Cylinder Inspection: 3yr / 36K mi

- Technicians must be trained and qualified to perform CNG cylinder inspections.
 - NGVi or comparable outside training
- Questionable findings during cylinder inspections must be communicated to local shop management.

6.8L V10 Engine Maintenance

Same for gasoline and CNG (including oil)



Mileage Interval	Service (change or replace)
5,000	Engine Oil (7 qts)
	Engine Oil Filter
60,000	Spark Plugs
150,000	Transmission Fluid & Filter (2017 Model year and newer, 6R140 6 speed) (8.2 qts)
As Needed	Coolant (30.6 qts)
	Rear Axle Fluid (7 qts)
	Accessory drive belt
	Front wheel bearings and seals
	Air Filter
	Front wheel brg grease



UPS Alt Fuel Vehicle Tool and Supply List

- Most current copy is always posted to iGate
- Products are available from MDC

UPS Alternative Fuel Vehicles - Tools and Supplies					
Component	OEM Part #	UPS Part #	CNG	LNG	Propane
Lighted Inspection Mirror	Ullman HTS-2LT	3027825	Yes	No	No
Video Inspection Camera (Bore scope)	Autel Maxi Video. MV-208	3027771	Yes	No	No
Electronic Depth Gauge	Fowler FDW74-225-500	3027834	Yes	No	No
OPW Fill Receptacle Gauge (go-no-go) OPW-FC.com	KASRINGGO0001	3027828	Yes	No	No
Cylinder/System Inspection Form			Yes	No	No
Cylinder/System Inspection Decal		3148090	Yes	No	No
CNG Diamond Decal		3460927	Yes	No	No
LNG Diamond Decal		3460930	No	Yes	No
Propane Diamond Decal		3460933	No	No	Yes
Leak Detector (Liquid)		3026700	Yes	Yes	Yes
Combustible Gas Detector (Electronic)		3026628	Yes	Yes	Yes
Dielectric Grease		3020386	Yes	Yes	Yes
Thread Tape (Nickel)		3145999	Yes	Yes	No
Cylinder Repair Epoxy		3132613	Yes	No	No
Welding Blanket	KAS596B6X6	3027831	Yes	Yes	Yes
5/8" Magnetic Spark Plug Socket		3002865	Yes	Yes	Yes
1" Prep Pads Alcohol Wipes (Choctaw Kaul Distribution PO35-1239741, Supplier Part # 178924)	UPS Oasis Supply		Yes	Yes	No
Fluid Exchange Coolant Fill Machine (Corp bulletin T11-17)	2V700	3023794	Yes	Yes	No
LPI Service Tool Kit (GM 6.0L & 8.1L propane engine)	SVK0012X02	3027225	No	No	Yes
LPI Service Tool 8.1L Adapter Kit (GM propane engine)	SVK0017X01	3027228	No	No	Yes
Electrical Harness Test & Repair Kit		3017903	Yes	Yes	Yes
Torque Wrench 1/4 Drive (Electronic angle/torque)	ATECH1FR240B	3027090	Yes	Yes	Yes
Torque Wrench 3/8 Drive (Electronic angle/torque)	ATECH2FR100B	3027093	Yes	Yes	Yes
Torque Wrench 1/2 Drive (Electronic angle/torque)	ATECH3FR250B	3027093	Yes	Yes	No
Engine Brake & Valve Lash Feeler Gauge Set - ISX 12G		3027558	Yes	Yes	No
Air Handling Clean Care Kit (cover valve cover holes with coils removed) - ISX 12G	Cummins 4919508	4629193	Yes	Yes	No
Digital Multimeter	Cummins 3377161	3023439	Yes	Yes	Yes
Pressure Transducer - ISX 12G	Cummins 3824645	3002514	Yes	Yes	No
M10 CompucHECK Fitting - ISX 12G	Cummins 3824842	4801335	Yes	Yes	No
Ignition Coil Test Kit - ISX 12G	Cummins 3164486	3026430	Yes	Yes	No

Update 5/6/15



Learning Check

- Low and high fuel pressure filters are changed every ____?
- Anyone can inspect the CNG cylinders: True or False?
- Soapy water in a spray bottle should be used to check for CNG leaks: True or False
- The entire fuel system must be depressurized when replacing the low and high pressure fuel filters: True or False
- The CNG compressor is the biggest variable in high and low pressure CNG filter life: True or False
- Engine maintenance is the same on gasoline and CNG vehicles: True or False

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CNG Major Components

Fuel Rails

Key:

Low pressure (70 psi) —

High Pressure (up to 3600 psi) —

PRD —

Coolant —

CNG Cylinder

CNG Cylinder

Regulator Assembly

Contains:

- High pressure filter
- Low pressure filter
- Regulator
- High pressure sensor
- Shutoff solenoid

Manual
Shutoff Valve

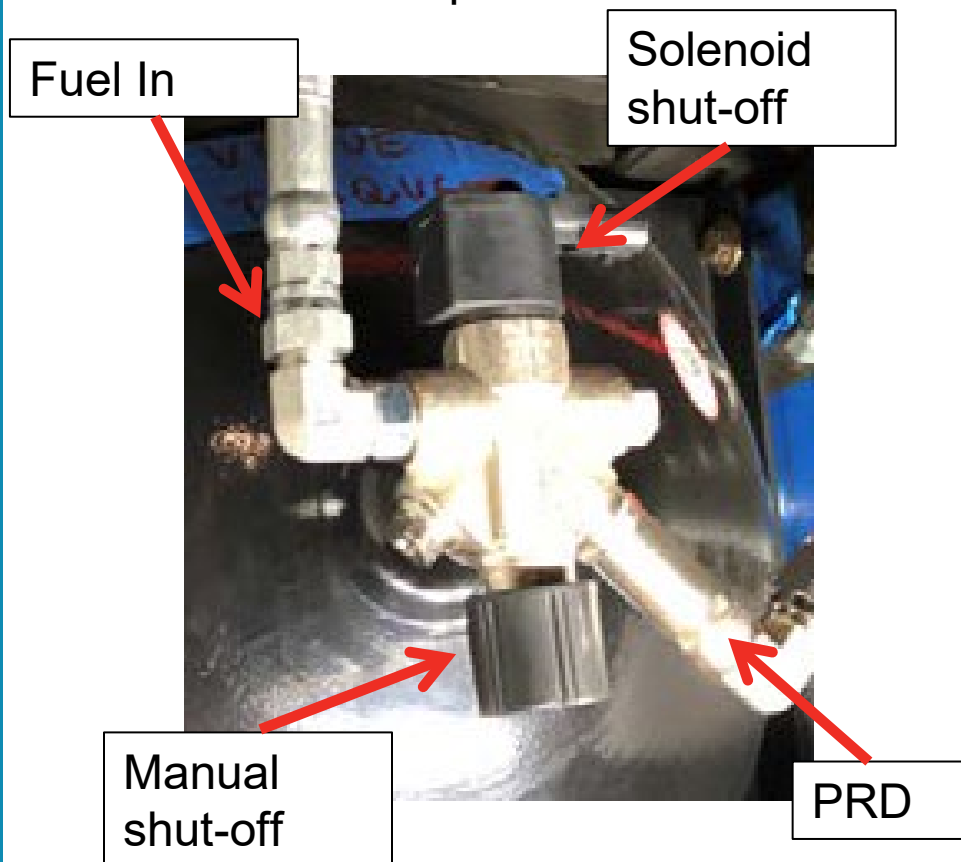
Fuel Fill Box

Contains:

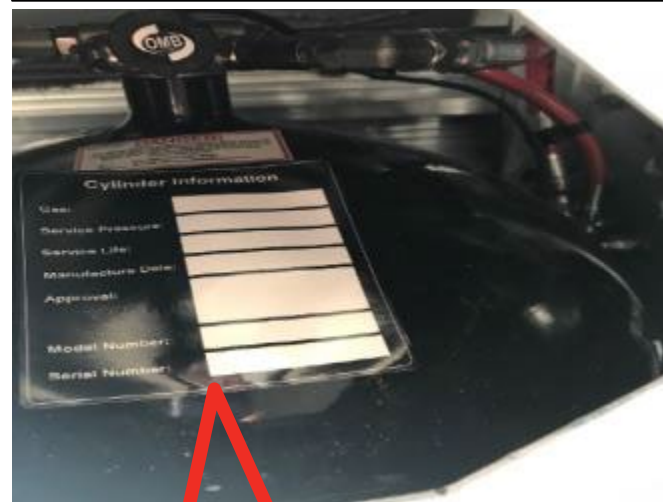
- High pressure gauge
- Fill receptacle
- Defueling receptacle
- Defueling manual valve

Cylinders & Cylinder Valves

- 20 year type 2 (steel w/ fiber wrap) cylinders
- Cylinder valves have:
 - Manual shut off
 - Solenoid shut-off controlled by FICM, powered by relay (shown later in wiring diagram)
 - Fuel In port
 - PRD out port



View from bottom of cylinder shield octagonal access port



CYLINDER INFORMATION	
Gas:	
Service Pressure:	
Service Life:	
Manufacture Date:	
Approval:	
Model Number:	
Serial Number:	

Manual Shutoff Valve

On / Off valve between cylinder pressure and regulator assembly

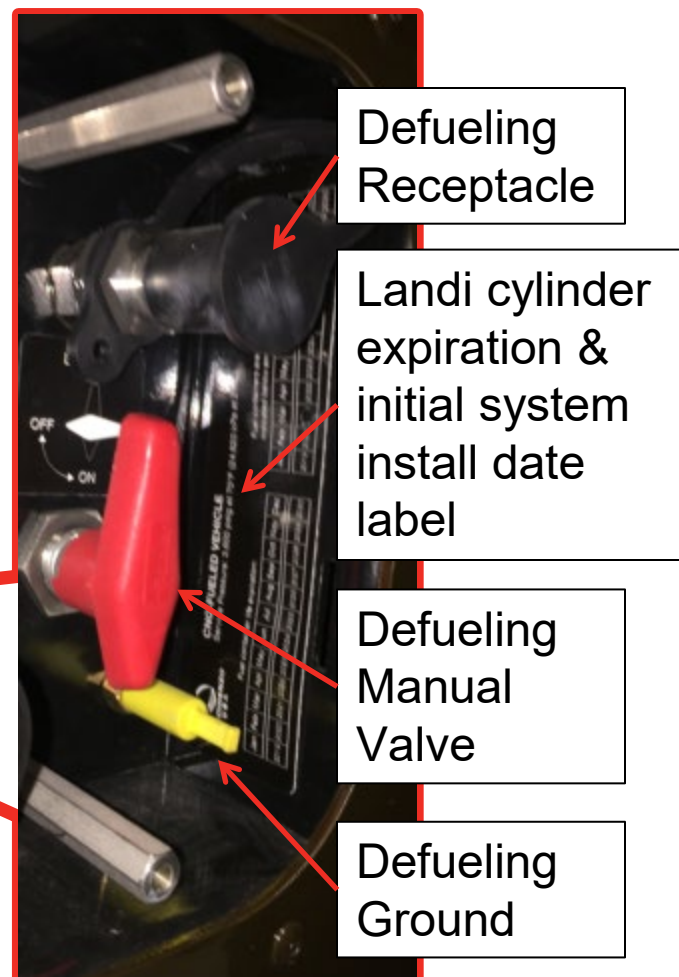
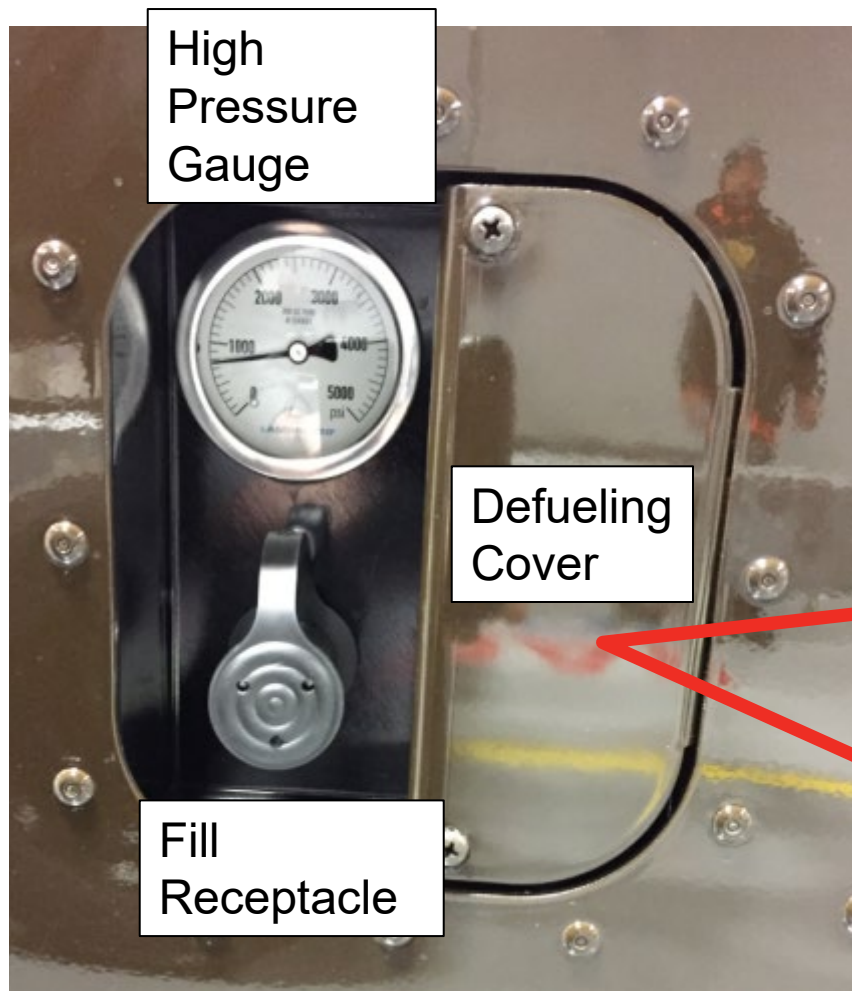
View from outside vehicle



View from underneath vehicle

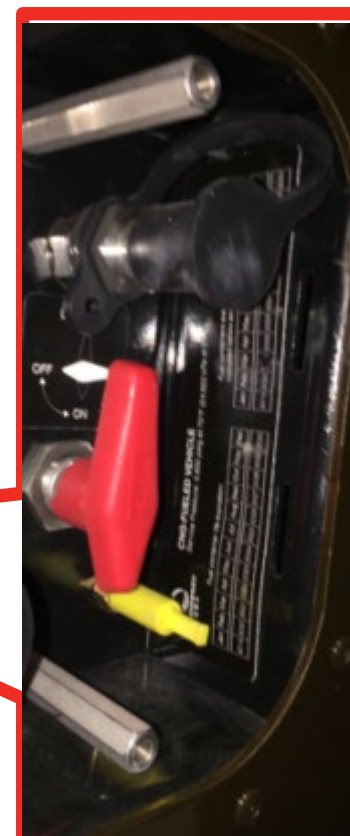



Fuel Fill Box



NOTE: If fill receptacle cap is not reinstalled after fueling, engine will not crank.

Fuel Fill Box - Landi cylinder expiration & initial system install date label. Hole punches indicate month and year.





CNG-FUELED VEHICLE

Service Pressure: 3,600 psig at 70°F (24,820 kPa at 21°C)

Label Landi part # 1003259

Fuel container life expiration

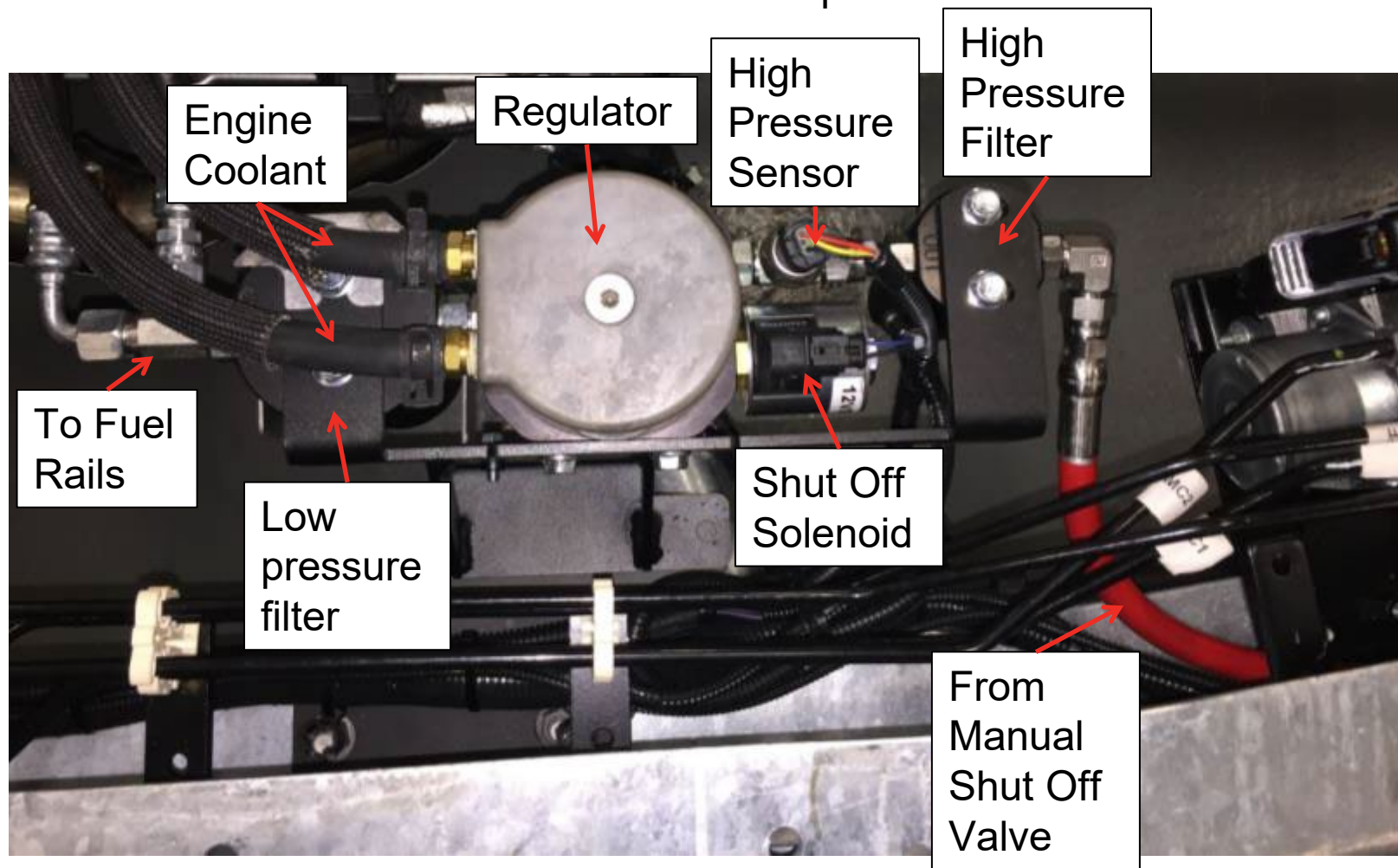
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029

Fuel containers are to be inspected by the date indicated below and each 36 months thereafter.

Subsequent UPS inspections will use UPS label posted on bulkhead wall

Regulator Assembly

- Engine coolant is used to keep the fuel regulator from freezing. Loss of engine coolant to the regulator will cause the regulator to freeze and loss of fuel system pressure to the engine
- View shown with driver's station floor panel removed.



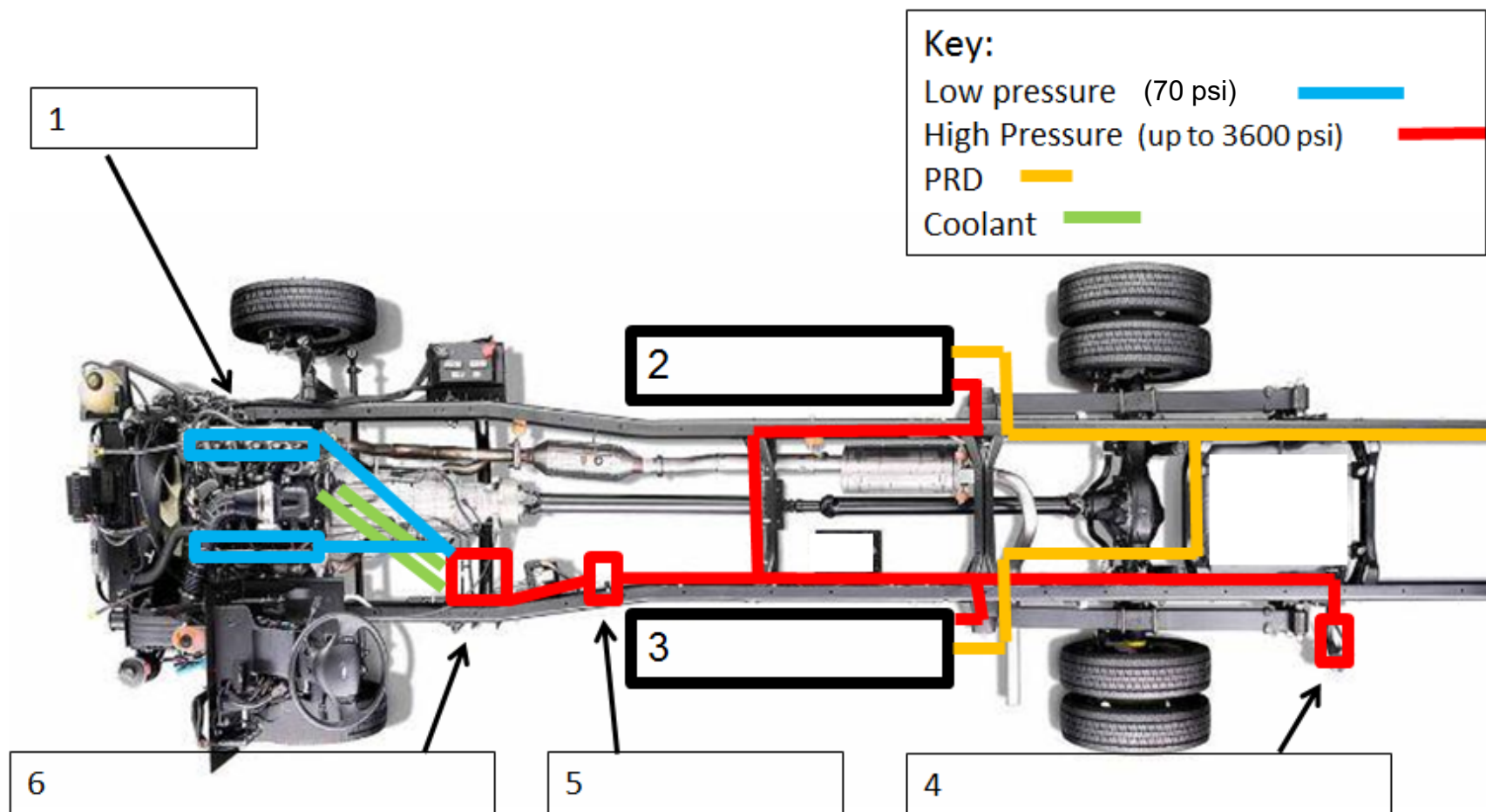
Fuel rail & injectors





Learning Check

Fill in the blanks for the Landi Renzo CNG fuel system major components



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CNG Electronics (pictures on following slides)

1. Powertrain Control Module (PCM)

- Ford PCM has been recalibrated for CNG conversion
 - Sticker installed by OBD connector and on firewall raising awareness

2. Fuel Injection Control Module (FICM)

- Supplied by Landi Renzo
- Associated components
 - FICM harness – **NOTE: Loom has white tape at connectors**
 - Fuse and relay block
 - Fuel rail pressure / temperature sensor
 - High pressure sensor
 - Regulator shut-off solenoid
 - Fuel level emulator (has its own harness)

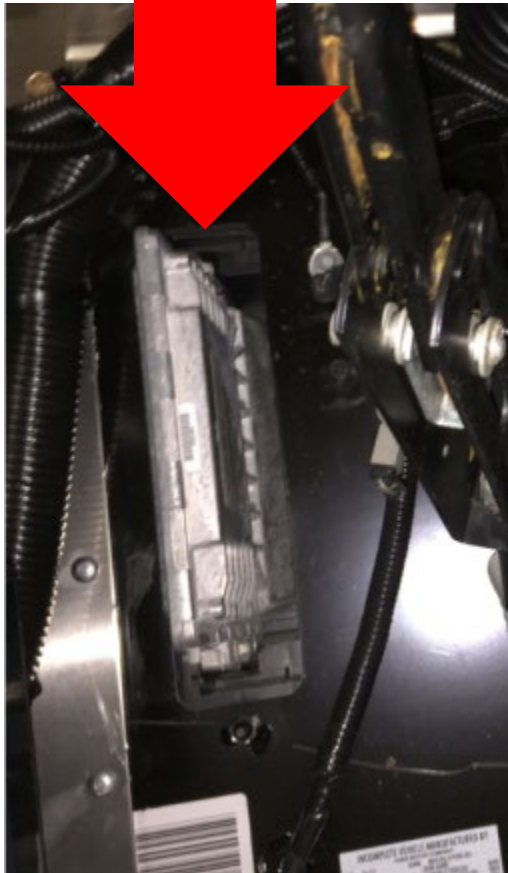
3. Starter interrupt module (has its own harness)

- Supplied by Landi Renzo

Ford Powertrain Control Module (PCM)



View from inside
cab – PCM located
to left of e-brake



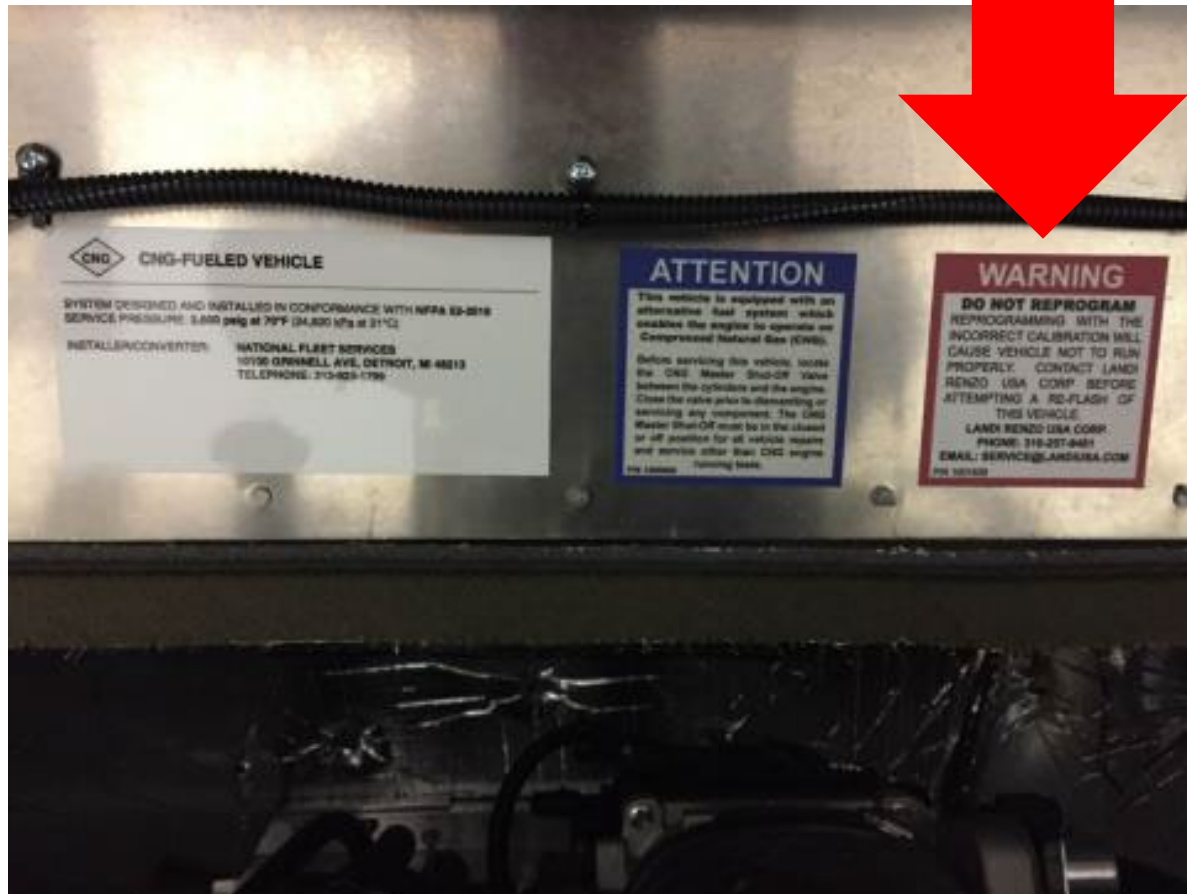
View from driver's side engine
compartment– PCM located to
right of interlube system



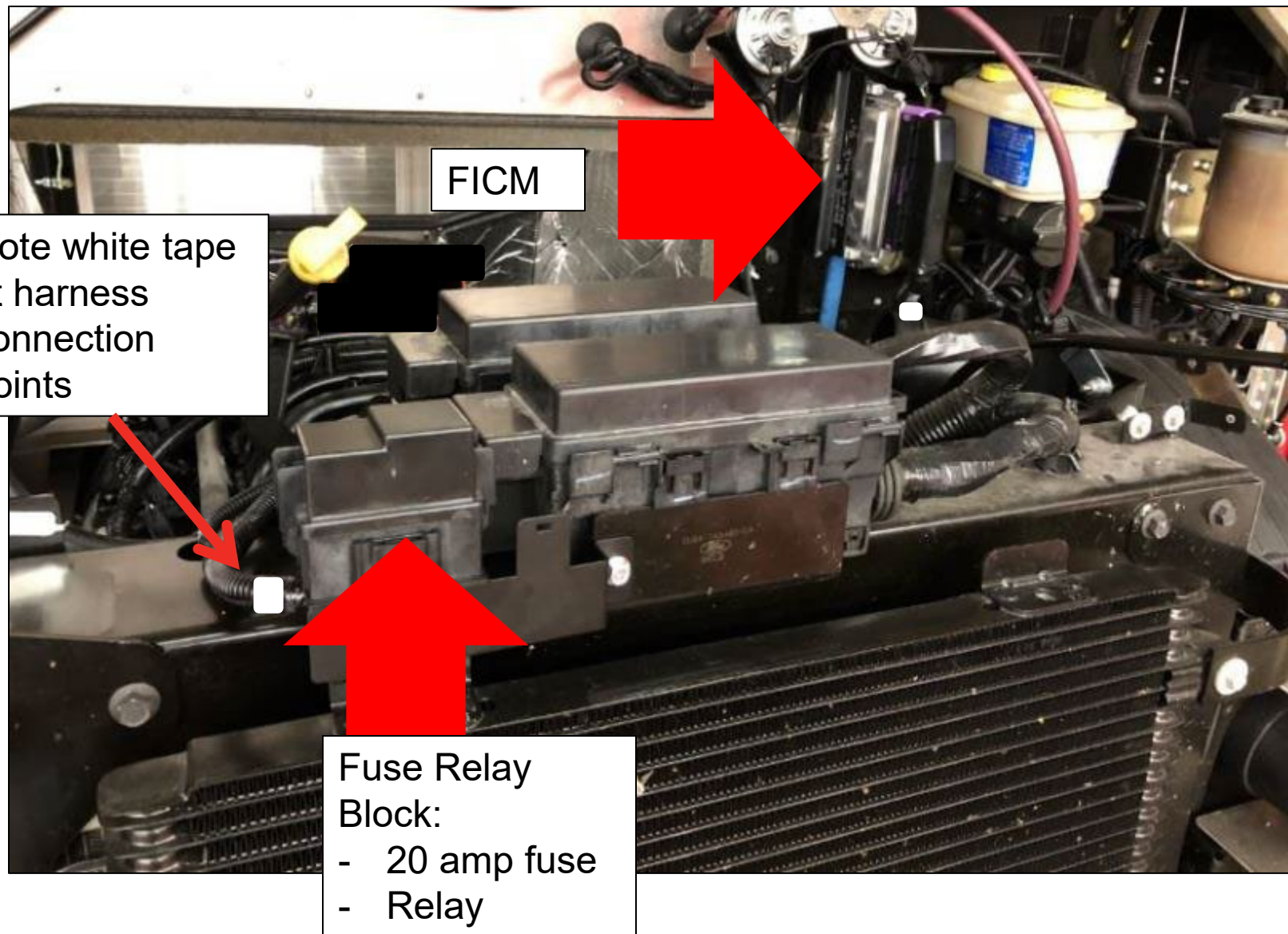
Ford Powertrain Control Module (PCM)



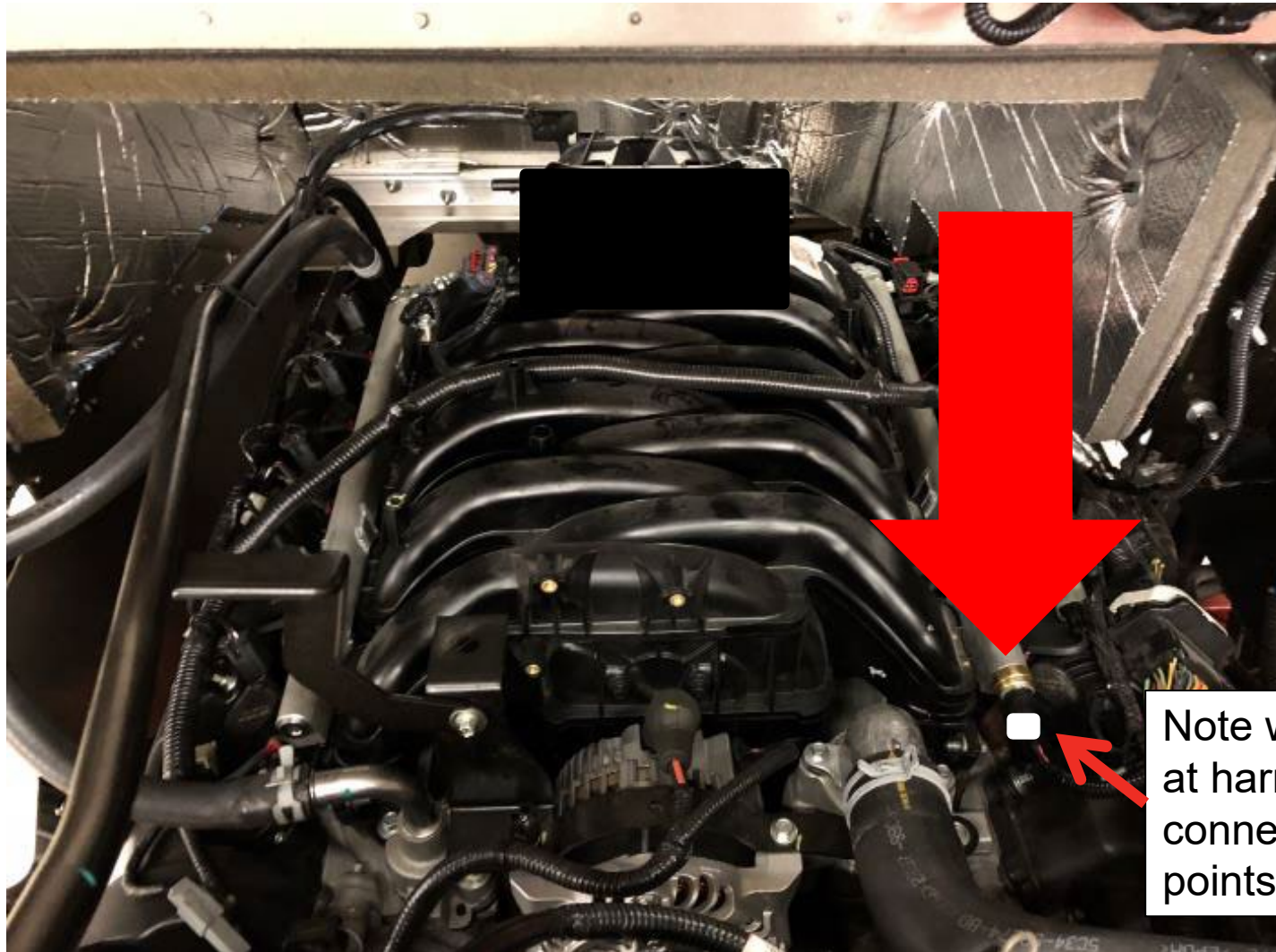
Do not reprogram label on firewall



Landi Renzo Fuel Injection Control Module (FICM) & Fuse Relay Block



Fuel rail pressure / temperature sensor



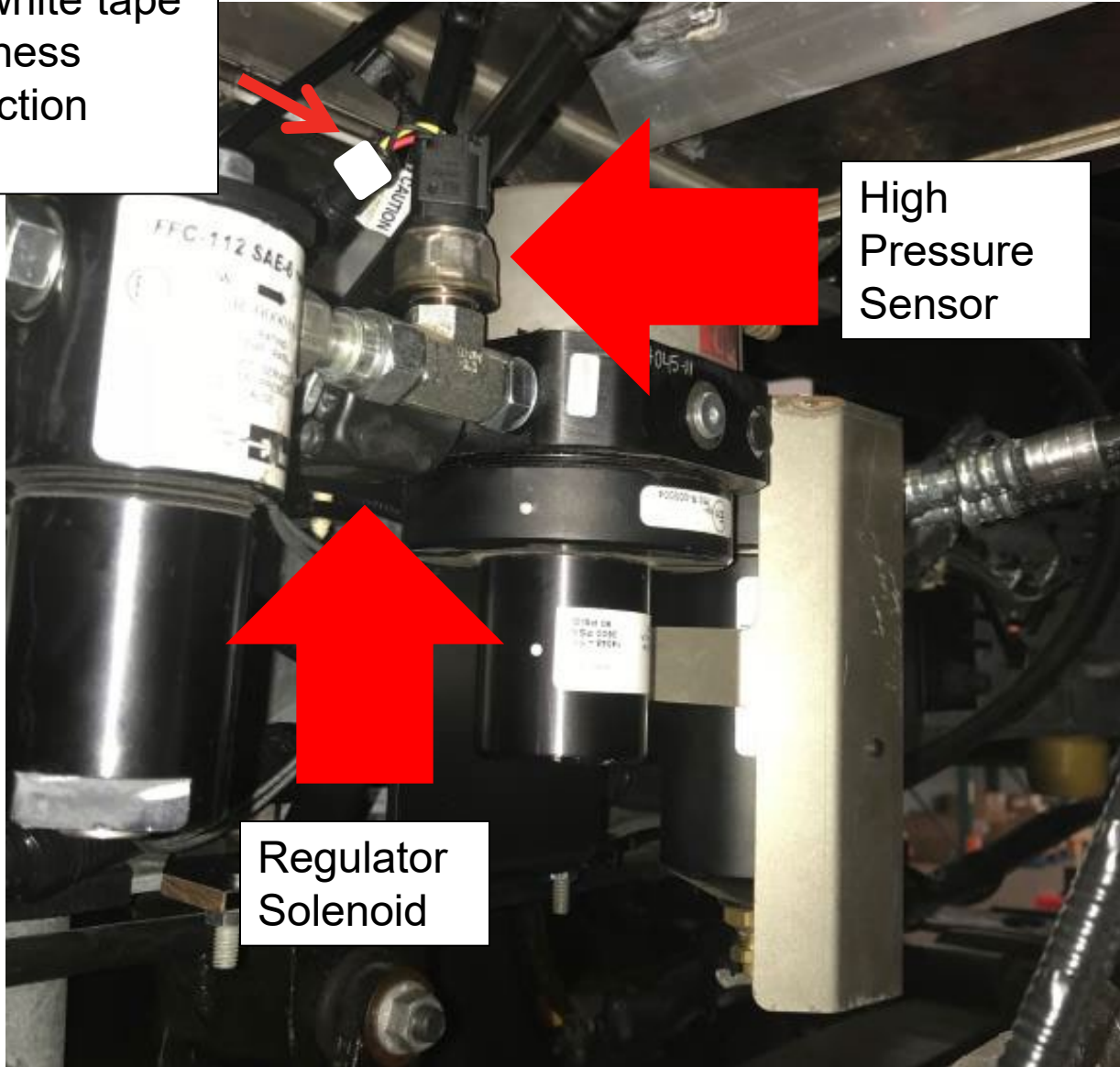
Note white tape
at harness
connection
points

Regulator Solenoid & High Pressure Sensor (@ Regulator Assembly)

Note white tape
at harness
connection
points

High
Pressure
Sensor

Regulator
Solenoid



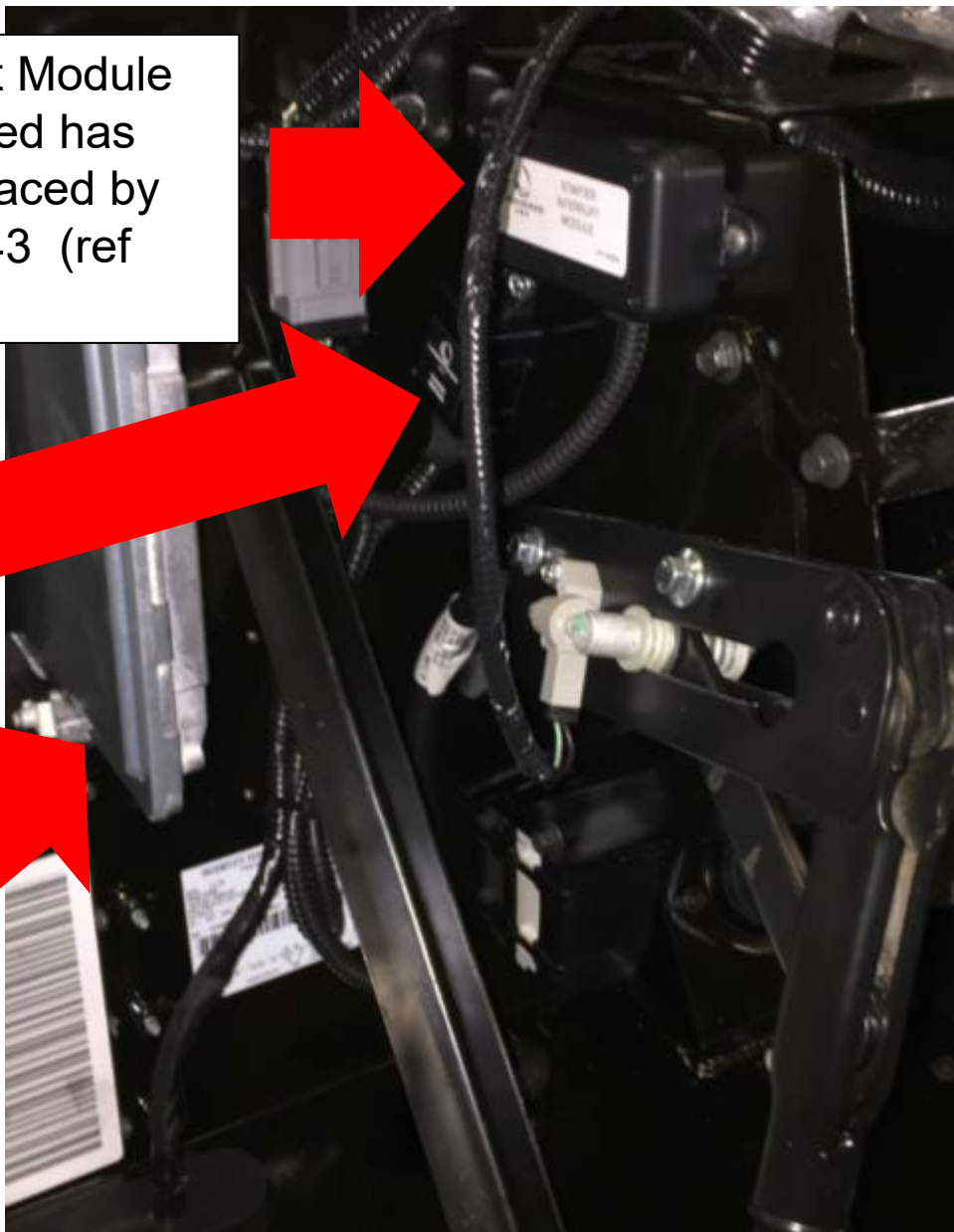
Fuel Gauge Emulator & Starter Interrupt Module

Starter Interrupt Module originally installed has since been replaced by relay kit 4827543 (ref CAB D22-01)

Fuel Gauge Emulator

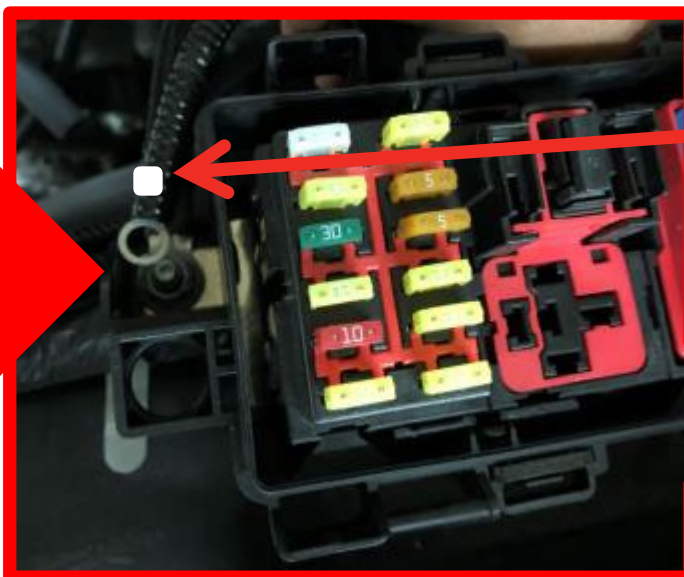
PCM

Emergency Brake in cab



FICM Harness Power Connection

FICM
harness
power

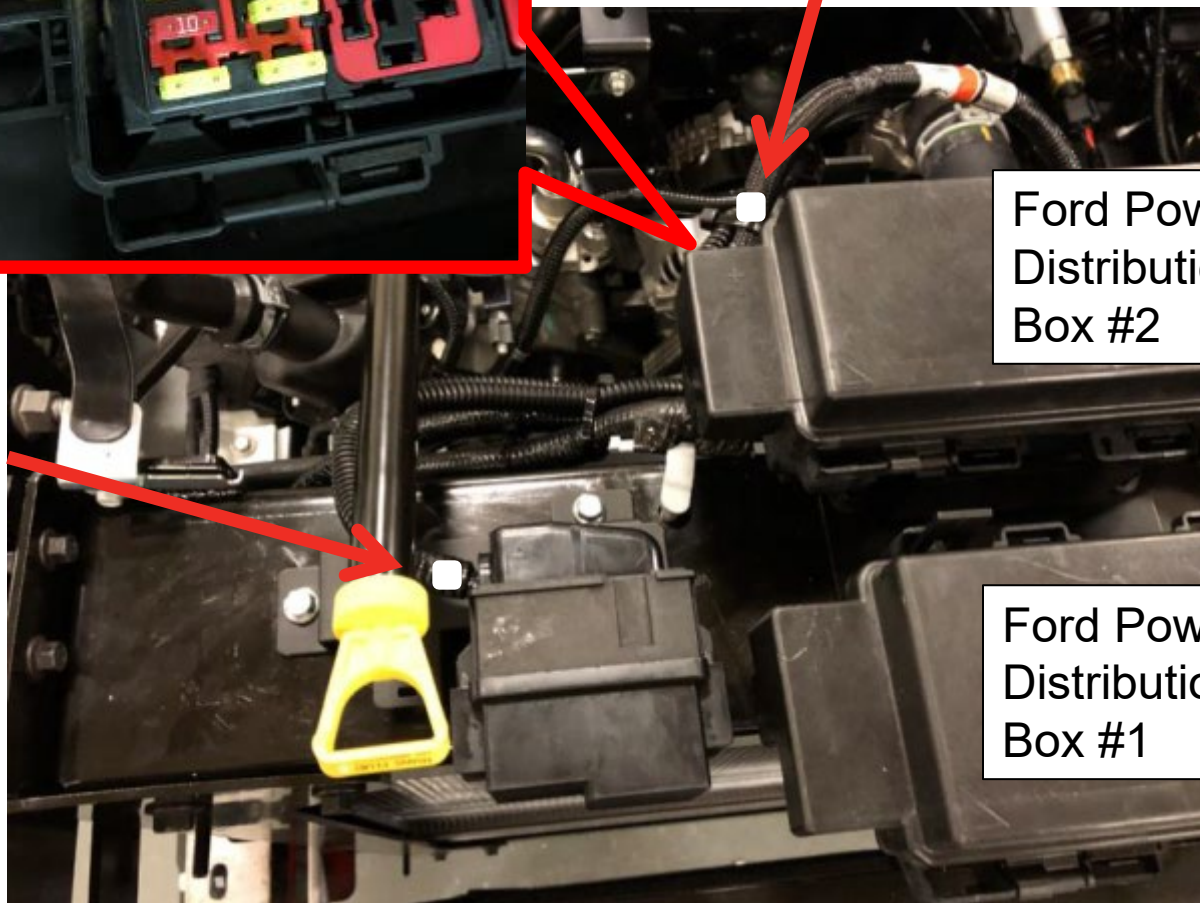


Note white tape
at harness
connection
points

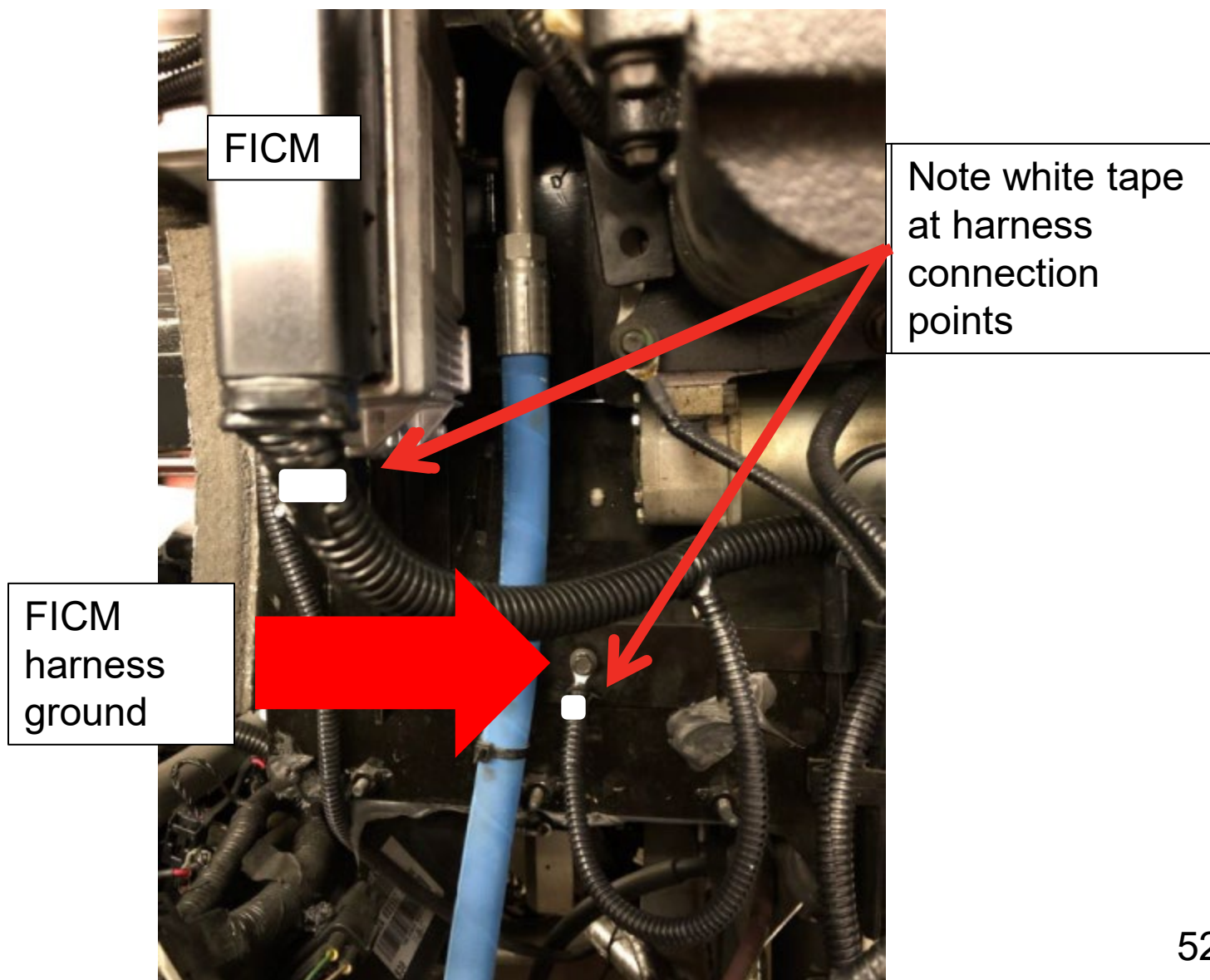
Ford Power
Distribution
Box #2

Note white tape
at harness
connection
points

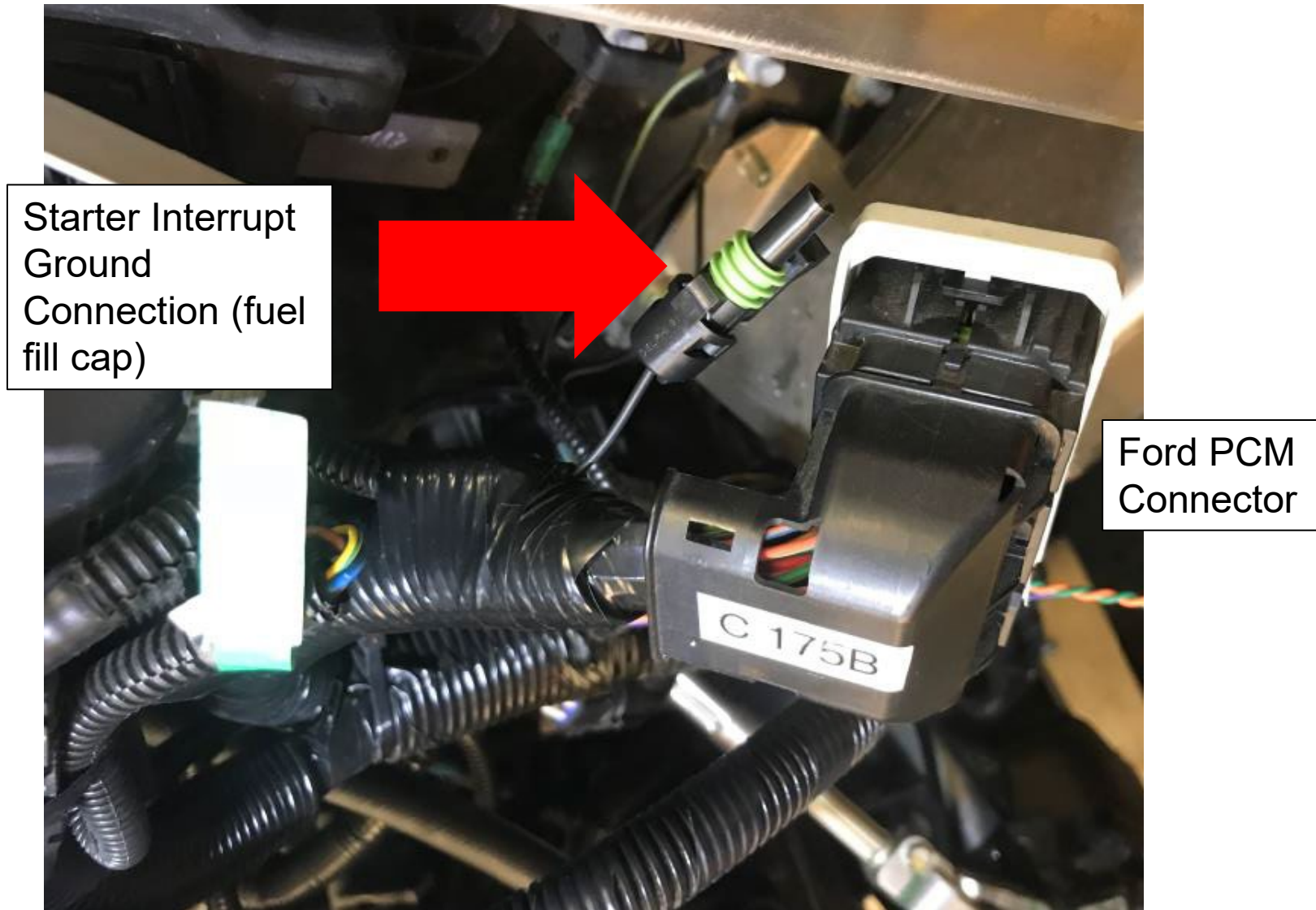
Ford Power
Distribution
Box #1



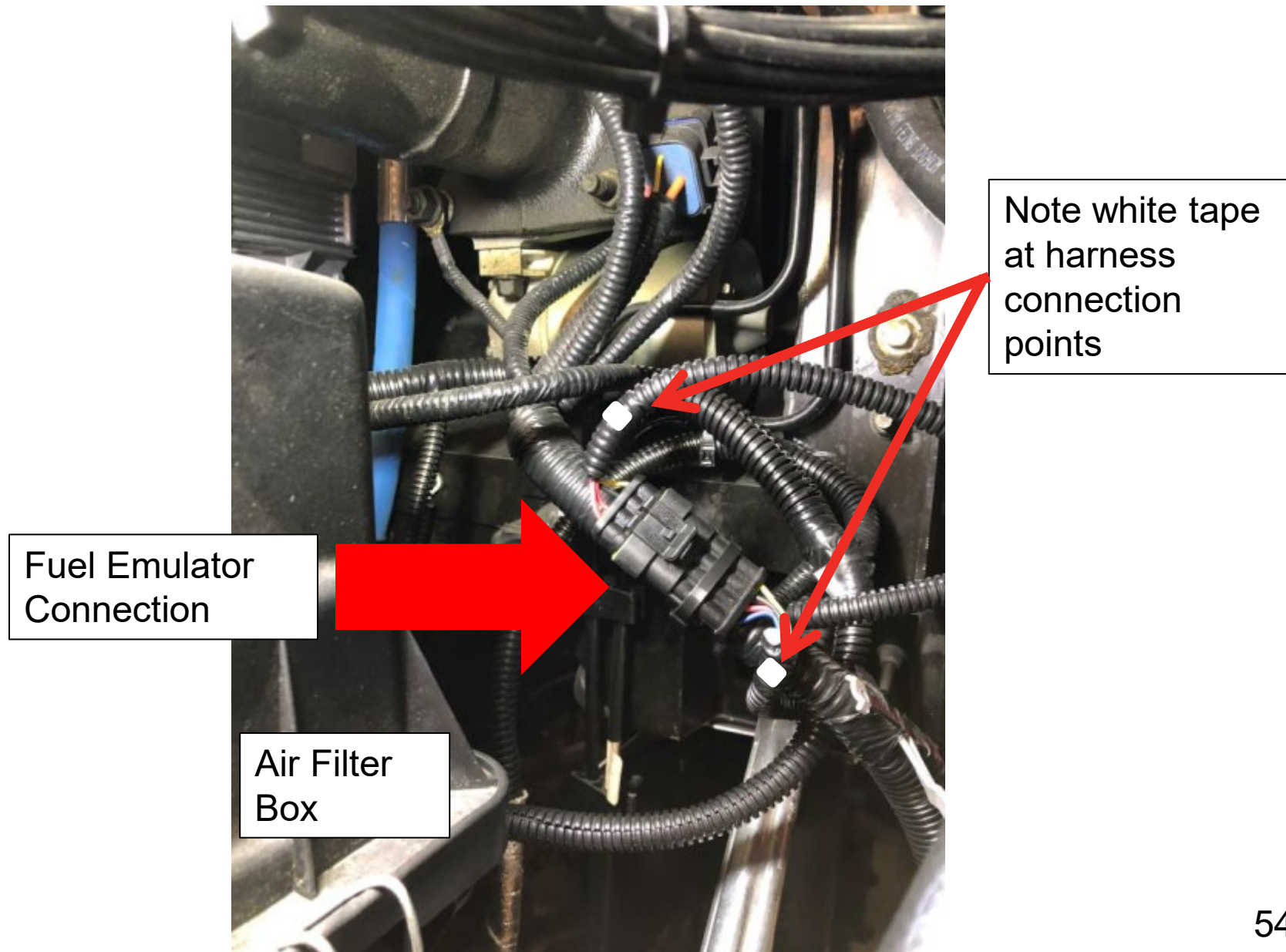
FICM Harness Ground Connection



Starter Interrupt Ground Connection



Fuel Emulator Connection (4 pin)

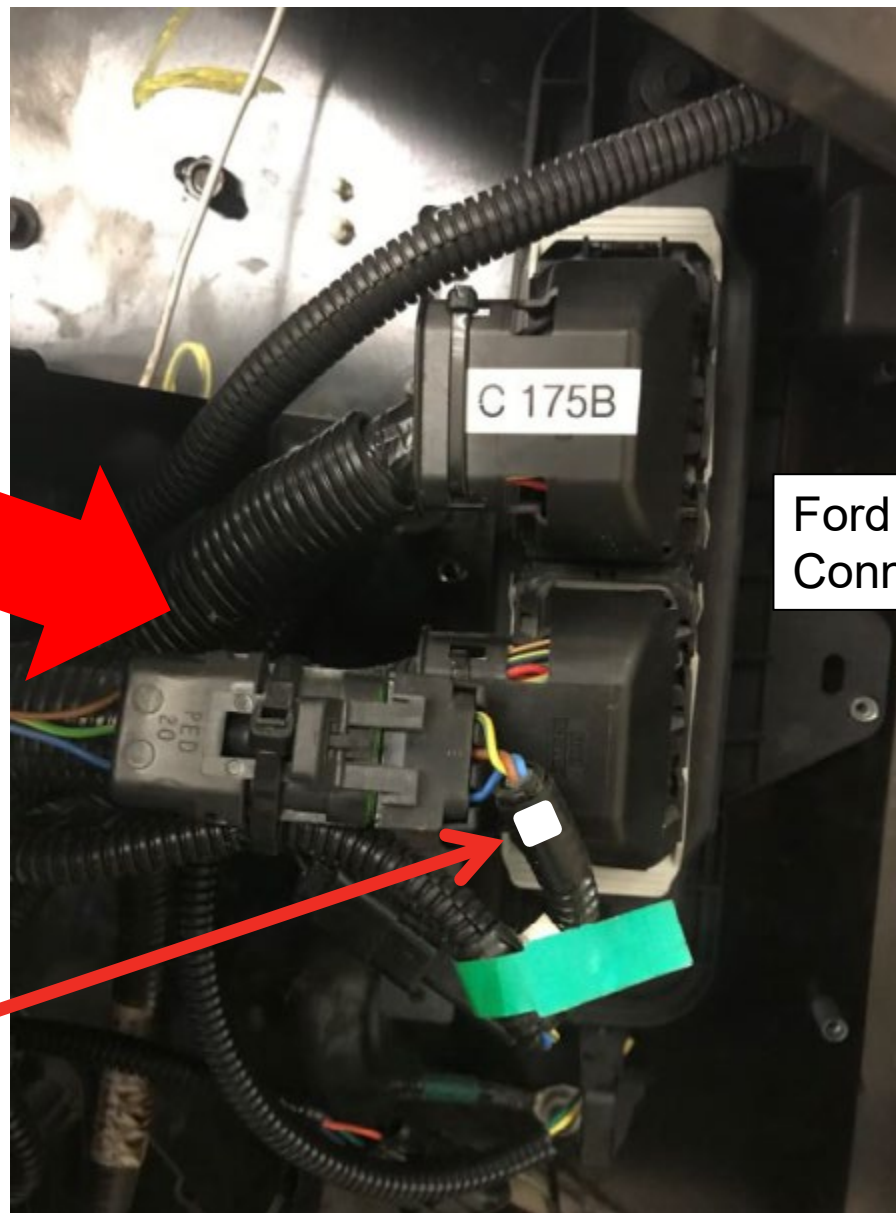


Ford PCM to Landi Renzo FICM Connection (3 pin)

Ford PCM to
Landi Renzo
FICM
Connection

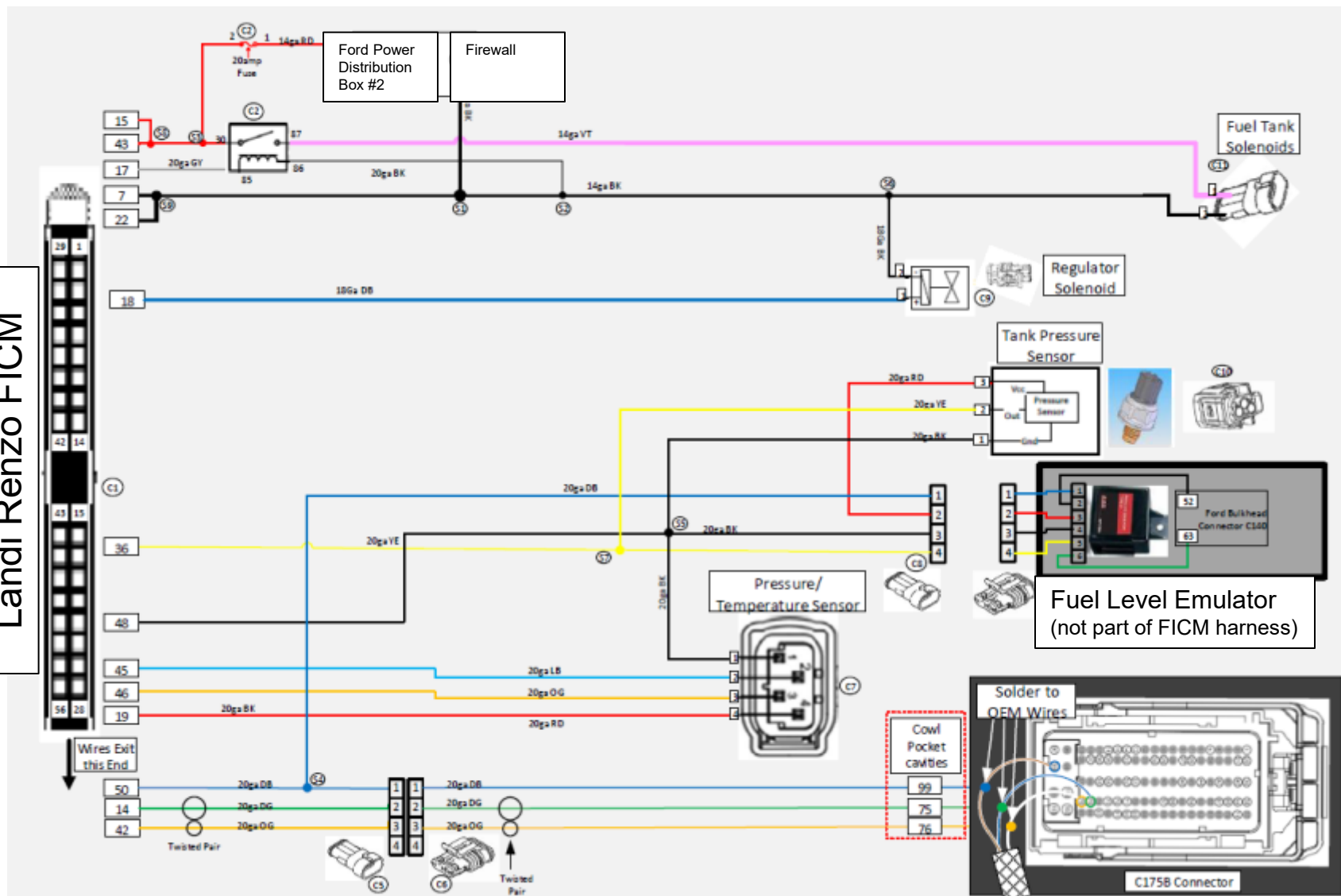
Ford PCM
Connector

Note white tape
at harness
connection
points



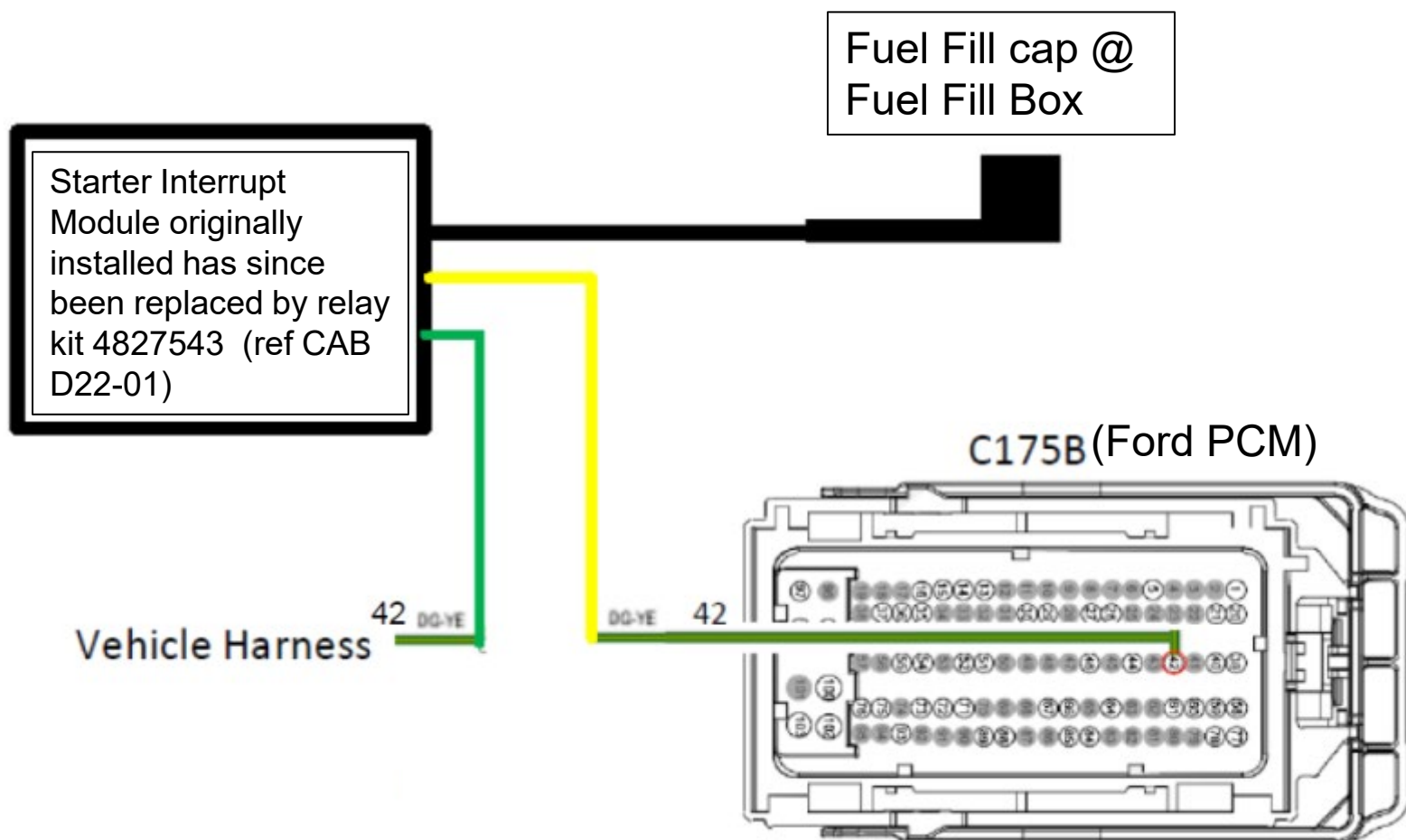
FICM & Fuel Emulator Wiring Diagram

Landi Renzo FICM



Ford PCM

Starter Interrupt Wiring Diagram





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Landi Repair Assistance



2 options:

1. Online form (Repair Assistance) - www.landiusa.com
2. Call 1-855-526-3400: M-F 11A-8P EST, 10A-7P CST, 9A-6P MDT, 8A-5P PST



[About](#) [Service](#) [Products](#) [Pressroom](#) [Sales](#) [Contact](#) [Q](#)

ALTERNATIVE FUEL VEHICLE SYSTEMS
FOR ECO-READY FLEETS™

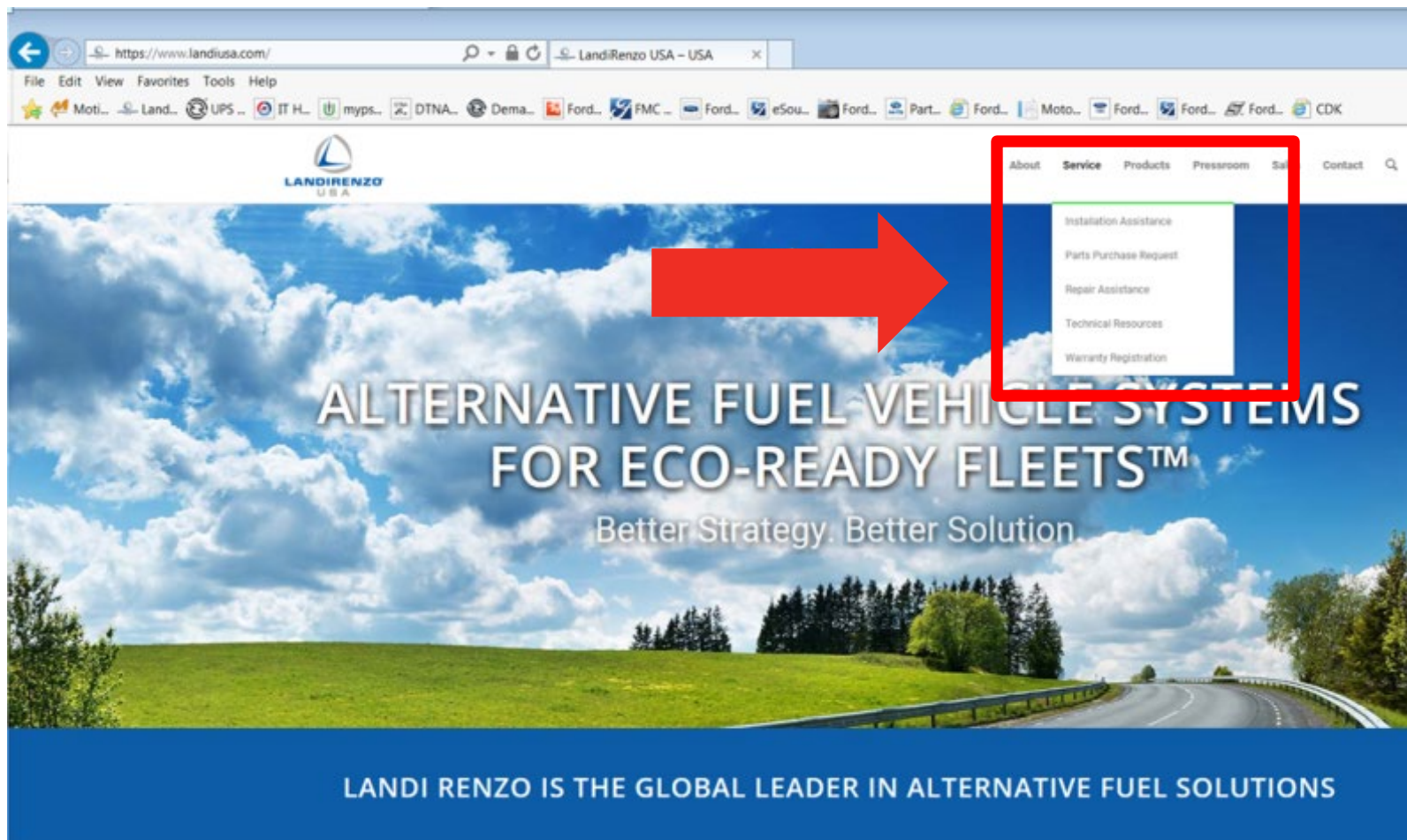
The advertisement features a scenic landscape with a green field, a line of trees, and a blue sky with white clouds. A road curves through the landscape. The text "ALTERNATIVE FUEL VEHICLE SYSTEMS FOR ECO-READY FLEETS™" is overlaid in large, white, bold letters.

Better Strategy. Better Solution.

Online Form Steps (www.landiusa.com)



1. Hover mouse over "Service"
2. Drop down menu appears
3. Click on "Repair Assistance"



Note: You will receive an email confirmation of receipt and the assigned ticket #. Landi Renzo will work the issue and respond accordingly. service@landiusa.com

Online Form Steps (www.landiusa.com)



4. Complete as much of form as possible. Takes 9-10 min (screen 1 of 4)

REPAIR ASSISTANCE

REPAIR ASSISTANCE

Complete the form below and submit to Landi Renzo USA. If there are questions or problems submitting this form, you can contact Landi Renzo USA Service:

Email: service@landiusa.com

Phone: (855) 526-3400

Fax: (310) 539-3041

Landi Renzo will ship replacement parts using standard ground shipment only. If expedited shipping is required by the Service Center, additional costs will apply.

This email will NOT receive a receipt confirmation or be in the original correspondence loop

VEHICLE OWNER INFORMATION

Company Name *

Contact Name *

Phone Number

Email Address

VEHICLE INFORMATION

17 Digit VIN *

Vehicle Make *

Vehicle Model *

Vehicle Model Year *

Drive System *

Fuel System *

Online Form Steps (www.landiusa.com)



4. Complete as much of form as possible. Takes 9-10 min (screen 2 of 4)

Tank Option *		Cab Configuration *	
<input type="text"/>		<input type="text"/>	
Customer Vehicle Number		Mileage *	
<input type="text"/>		<input type="text"/>	
Other Vehicle Information			
<input type="text"/>			

REPAIR FACILITY INFORMATION			
Repair Facility Name *		Repair Facility Contact Name *	
<input type="text"/>		<input type="text"/>	
Repair Facility Address *			
<input type="text"/>			
Street Address			
<input type="text"/>			
Apt, Suite, Bldg. (optional)			
<input type="text"/>			
City		State/Province	
<input type="text"/>		<input type="text"/>	
Zip/Postal		United States	
<input type="text"/>		<input type="text"/>	
Repair Facility Phone		Repair Facility Email *	
<input type="text"/>		<input type="text"/>	

This email WILL receive a receipt confirmation and be in the original correspondence loop

Online Form Steps (www.landiusa.com)



4. Complete as much of form as possible. Takes 9-10 min (screen 3 of 4)

SUMMARY OF ISSUES
Description of Vehicle Concern *

Diagnostics Performed (Include DTC and Test Results) *

Technicians Questions *

PARTS
Part(s) Required

Serial Number of Defective Part(s)

RO#

Method of Shipment
Select One

Tracking #

All parts replaced under warranty should be returned to:
Landi Renzo USA
c/o Warranty Service
23535 Telo Avenue
Torrance, CA 90505


Online Form Steps (www.landiusa.com)



4. Complete as much of form as possible. Takes 9-10 min (screen 4 of 4)
5. Click in "I'm not a robot box"
6. Click "Submit"
7. Repair facility email entered will receive an email confirmation of receipt and the assigned ticket #. Landi Renzo will get engaged from that point.


ADDITIONAL DOCUMENTATION

File Upload


Drop a file here or click to upload
Maximum upload size: 33.55MB


reCAPTCHA

☐ I'm not a robot


reCAPTCHA
Privacy • Terms

Submit

Landirengo Workshop Manual

- PDF file provided as part of familiarization training
- Available at www.landiusa.com
 - Service
 - Technical Resources (password landirenzousa)
- Includes
 - REPAIR TECHNIQUES
 - LOW PRESSURE SYSTEM PARTS LIST
 - FUEL PRESSURE SPECIFICATIONS
 - MAINTENANCE PROCEDURES
 - Low Psi Fuel Filter Maintenance
 - High Psi Fuel Filter Maintenance
 - DTC CHART (10 DTCS) 
 - SYMPTOM CHART DIAGNOSIS
 - PIN POINT TESTS (PPT)
 - MAIN HARNESS OVERVIEW
 - MAIN HARNESS WIRING DIAGRAM
 - EMULATOR HARNESS OVERVIEW
 - STARTER INTERRUPT INSTALLATION WIRING DIAGRAM

DTC	Description
P0006	Fuel Pressure Regulator Solenoid Supply Voltage Control Circuit Low
P0007	Fuel Pressure Regulator Solenoid Supply Voltage Control Circuit High
P01A5	Alternative Fuel Rail Pressure Sensor Circuit Low
P01A6	Alternative Fuel Rail Pressure Sensor Circuit High
P01B6	Alternative Fuel Rail Temperature Sensor Circuit Low
P01B7	Alternative Fuel Rail Temperature Sensor Circuit High
P01A0	Alternative Fuel Tank Pressure Sensor Circuit Low
P01A1	Alternative Fuel Tank Pressure Sensor Circuit High
P224E	Alternative Fuel Tank Shutoff Valve "A" Control Circuit Low
P224F	Alternative Fuel Tank Shutoff Valve "A" Control Circuit High

Repairing Leaks – Depressurizing

Warning: Before fixing a leak at a connection, depressurize the high and low pressure fuel system completely



- Depressurizing the low and high pressure fuel system with a running engine
 - Close the valves on both cylinders
 - Run the engine at idle
 - The engine will die when the fuel pressure is depleted.
 - Verify that the pressure gauge in the fuel box reads 0 psi
- Depressurizing the low and high pressure fuel system with a non-running engine
 - Close the valves on both cylinders
 - Open the petcock at the bottom of the low pressure fuel filter. About 150 psi of fuel will be removed.
 - Leave the petcock open
 - Turn the ignition key on. About 150 psi of fuel will be removed
 - Repeat the key on, key off process (leaving the key off for at least 5 sec) until no more gas is heard escaping from the low pressure fuel filter and the pressure gauge in the fuel box reads 0 psi.
 - Tighten the petcock on the low pressure filter

Repairing Leaks – Types of fittings*

- O-Ring face seal and compression fittings are utilized
- Once the system has been depressurized, use the proper tools to address the leaking tube connection
 - Snugging a leaking tube fitting, assuming it was assembled properly, may stop a leak
 - If snugging the fitting does not fix the leak
 - Depressurize again
 - Disassemble, clean and reassemble
- If the leak is not fixed at this point, the component and or the tubing should be replaced

* Refer to Landi Renzo Workshop manual for proper methods

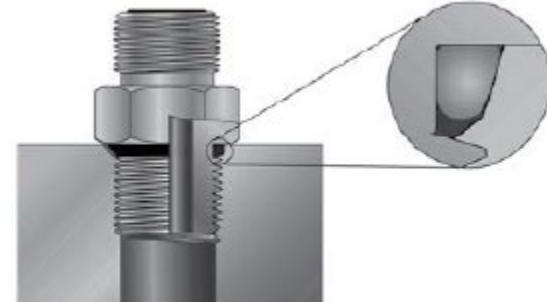


Fig. S7 — Non-Adjustable Port End Assembly

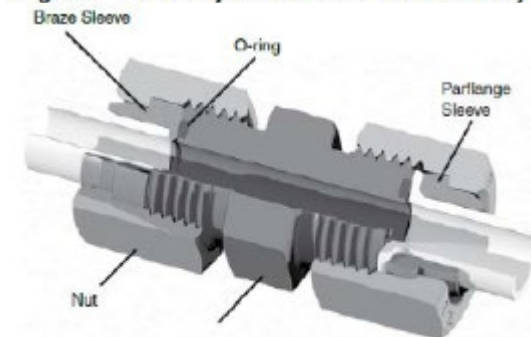


Fig. S15 — Seal-Lok Union cutaway with flanged and brazed assemblies

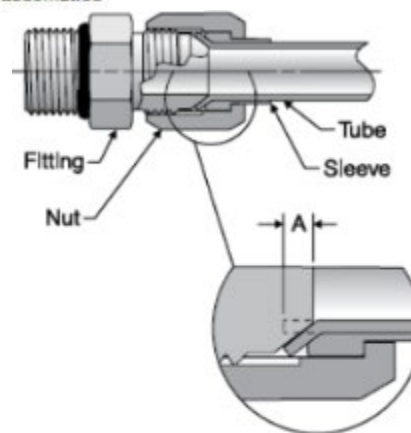
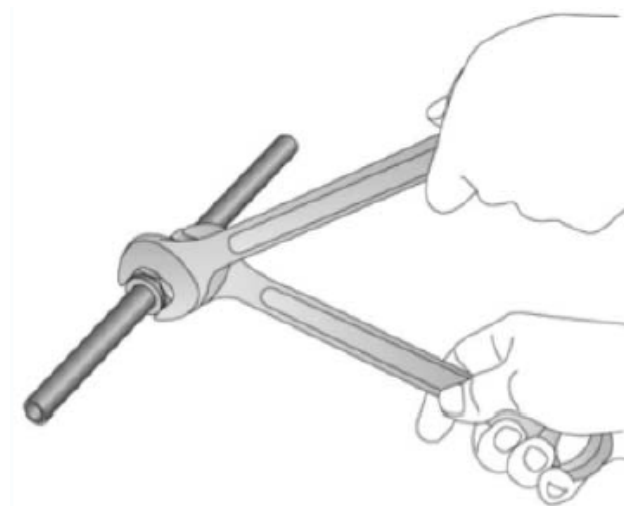


Fig. S26 — Tube length allowance

Repairing Leaks – Line Removal & Installation

- Use a touch of non-synthetic, non-detergent oil to lubricate the O-rings prior to installation
- **CAUTION: DO NOT USE silicone grease or any other type of lubricant**
- Install high pressure fittings, tubing and hoses finger tight to ensure proper fitment before fully tightening components. Be sure to use a opposing wrench to apply equal and opposite force. Refer to the following slide for torque values.
- Ensure O-rings are not damaged during the disassembly and reassembly process. All O-rings can be reused if no damage is visible and connection is leak-free



Repairing Leaks – Torque Values & O-Ring Part Numbers

■ Torque Values

SAE J1926 O-Ring Boss (ORB) Fittings

Used On:

- LP Fuel Lines
- HP Fuel Lines
- PRD Vent Lines

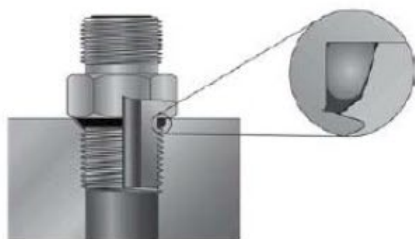


Fig. S7 — Non-Adjustable Port End Assembly

SAE J1453 O-Ring Face Seal Fittings (ORFS)

Used On:

- LP Fuel Lines
- HP Fuel Lines

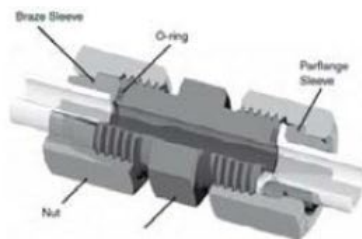


Fig. S15 – Seal-Lok Union cutaway with flanged and brazed assemblies

SAE Straight Thread Port Assembly (SAE J1926)

SAE Dash Size	Thread Size UN/UNF	Assembly Torque (+10% -0)									
		Non-Adjustables				Adjustables				Plugs	
		Seal-Lok (Heavy Duty SAE J1926-2)		Triple-Lok Ferulok Adapters (Light Duty SAE J1926-3)		Seal-Lok (Heavy Duty SAE J1926-2)		Triple-Lok Ferulok Adapters (Light Duty SAE J1926-3)		Hollow Hex	Hex Head
		ft.lbs. (in. lbs)	N-m	ft.lbs. (in. lbs)	N-m	ft.lbs. (in. lbs)	N-m	ft.lbs. (in. lbs)	N-m	HP50N-S (Light Duty SAE J1926-3)	P50N-S (Light Duty SAE J1926-3)
6	9/16-18	(420)	47	(350)	40	(420)	47	(350)	40	(350)	40
8	3/4-16	(720)	81	(620)	70	(720)	81	(620)	70	(620)	70

Notes: Lubricate threads before assembly. Values in chart are for plated steel fittings in steel ports. For stainless steel fittings, use the upper limit of torque range. For brass and aluminum, decrease torque value by 35%.

Table S1 – SAE J1926 Straight Thread Port Assembly Torques

O.D.		SAE Dash Size	Tube Side Thread Size (UN/UNF)	Tube Side Assembly Torque (+10% -0%)			Flats from Wrench Resistance (F.F.W.R.)	
(in.)	(mm)			in.-lb.	ft.-lb.	N-m	Tube Nuts	Swivel & Hose Ends
3/8	8, 10	-6	11/16-16	360	30	40	1/4 to 1/2	1/2 to 3/4

Table S14 – Seal-Lok and UPTC assembly torque and F.F.W.R. For brass, aluminum (and other soft metals) decrease torque value by 35%, however F.F.W.R. is the same.

■ O-Ring Part Numbers

Landi Renzo USA Replacement O-Ring Part Numbers

Connection Type	Dash Size	Landi P/N	Landi Description
SAE J1926 O-Ring Boss (ORB)	-6	1002345	O-Ring, CNG, #6 MORFS, 2-012
	-8	1002346	O-Ring, CNG, #8 MORFS, 2-014
SAE J1453 O-Ring Face Seal (ORFS)	-6	1002347	O-Ring, CNG, #6 MORB, 3-906
	-8	1002348	O-Ring, CNG, #8 MORB, 3-908

- Natural Gas and CNG Background
- Driver Information
- Maintenance Intervals and procedures
- **Landi Renzo CNG Fuel System**
 - Major Components
 - Electronics
 - Repair Assistance
 - **Service Parts**
 - Warranty Coverage & Process
 - Ford Dealer Reference
- Support Resources

CNG Service Parts

- Recommended initial stock parts list below (each center to determine quantity of each at own discretion)
- Parts book provided separately
- The process for new part adds can be performed either:
 1. Through the solution center attention MDC
 2. Place a unit down order through AIS with the info from the parts catalog. At that point MDC will send to the catalog group for profiling and UPS # setup. A PO is then cut to the supplier to create the order.

PART #	DESCRIPTION
1002575	Injector, NGI2 Std., Bosch 8854, Shaved
1002401-B1	Regulator, 70 PSIG, 12V SInd, HPNGV4
1001863	Filter, LP Coalescing, SAE#8
1000042	Filter, CNG, HP, GR-6, 9/16" STB
1003254	Module, Starter Interrupt, F59
1003217	Cap, Dust, Receptacle with Connector
1003054	Cap, Dust, Parker, Defueling Receptacle
1003209	Screw, SS, Pan Head, 10-32x1 1/2" L for Cover
1003146	Bracket, Defueling Cover
1003218	Valve, Tank, PRD, Passenger, OMB ESA 1-1/8" UNF
1003257	Valve, Tank, PRD Driver, OMB ESA 1-1/8" UNF

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 - Ford Dealer Reference
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Landi Renzo Warranty Coverage

3yr / 50,000 mi – Base

5yr / 50,000 mi - Emissions warranty

- CNG Wiring Harness
- Fuel Injection Control Module
- CNG Low Pressure Regulator
- CNG Injector Rails
- CNG Injectors

Landi Renzo Warranty Process



UPS in-house warranty repairs

2 scenarios

1. Defective part determined without engaging Landi via online repair assistance form and part sourced from UPS MDC
 - Submit claim through normal MDC warranty channels and return part(s) to MDC
2. Defective part determined by engaging Landi via online repair assistance form and parts supplied by Landi
 - Submit claim through normal MDC warranty channels and reference Landi ticket # assigned
 - Package defective parts and include a copy of the ticket # . Return label will be provided by Landi Renzo USA.

Dealer Repairs

The Ford dealer identified in the contact matrix for each location has signed a Landi Renzo Service Agreement which includes instructions for the dealer how to file warranty claims to Landi Renzo

- Natural Gas and CNG Background
- Driver information
- Maintenance Intervals and procedures
- **Landi Renzo CNG Fuel System**
 - Major Components
 - Electronics
 - Repair Assistance
 - Service Parts
 - Warranty
 - **Ford Dealer Reference**
- Support Resources

Connecting with Ford IDS Tool

1. Open Ford IDS program.
2. Select “Manual Vehicle Entry”.
3. Select the check mark in bottom right corner or press ENTER to continue.
4. Select “All Other”.
5. Enter vehicle Tear Tag “VBW0”
6. Select the check mark in bottom right corner or press ENTER to continue.
7. Select vehicle Model Year.
8. Select “Yes” to confirm vehicle details.
9. In this screen, the VIN should be a series of “#” signs. Do not enter anything, then select the check mark in bottom right corner or press ENTER to continue.
10. The Ford IDS tool is connected. To read PCM codes:
 - a. Select the Red Tool Box icon at the top of the IDS program
 - b. Select “Self Test” then “All CDMTCs”

Ford PCM Recalibration Process

1. Complete a Repair Assistance Form on the Landi Renzo USA Service website
2. Flash the PCM with the as-built data on gasoline using one of the following methods:
 - * Providing the PCM to a Ford dealership for flashing OR
 - * Using the Ford IDS tool by following Ford GSB 0000150. The engine serial number and transmission ID number will need to be inputted as part of the process.
3. After successfully flashing the PCM with the gasoline calibration, ship it to the address below for the CNG update. Shipping contents should include:
 - * PCM with gasoline calibration
 - * Shipping return label
 - * Printout of the complete Repair Assistance Form received via email

Landi Renzo USA

Attention: Programming

23535 Telo Avenue

Torrance, CA 90505

4. Once the PCM is received by Landi Renzo, it will take approximately 2 business days to program the PCM.

*Ford PCMs not be replaced under Ford warranty, there is a \$239 fee for PCM re-flashing.

- Natural Gas and CNG Background
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Support Resources

fordups.com



Vehicle Activity (30 min)

- Count off by 3's
- Split into 3 groups
- Go to vehicle and complete checklist
- Rotate every 10 min

Rotation 1: Group (checklist)	Rotation 2: Group (checklist)	Rotation 3: Group (checklist)
1 (in cab)	3 (in cab)	2 (in cab)
2 (front of vehicle)	1 (front of vehicle)	3 (front of vehicle)
3 (sides, rear & under vehicle)	2 (sides, rear & under vehicle)	1 (sides, rear & under vehicle)