LPEFI® Installation Manual

2011 Chevrolet G van Trucks with 6.0 Liter Engine

Models: 3500, 4500 (159”WB)

274562 Revision B

April 6th, 2013

Bi-Phase Technologies, LLC

Eagan, Minnesota, U.S.A.

Bi-Phase Technologies, LLC

REVISION HISTORY

REV	DESCRIPTION	DATE	EWO	D.F.T.G
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Introduction

This instruction booklet shows how to convert a gasoline vehicle to run on clean burning propane utilizing our *LPEFI® (Liquid Propane Electronic Fuel Injection)* system.

The system is vehicle specific and installing a system on any vehicle that the kit was not designed for will void the warranty and may also violate emission laws.

Anyone who installs or repairs the *LPEFI®* system must be trained and certified. This must also include training in the safe handling and characteristics of propane. Bi-Phase Technologies provides such training upon request. Some states may require a license to work on propane vehicles. Consult your state or local authorities or your state propane gas association. Bi-Phase Technologies, LLC is not responsible for your oversight to comply with federal, state or local laws regulating the installation or repair of propane gas systems.

The *LPEFI®* system is a sequential multi-port fuel injection system that injects propane in a liquid state to the engine. It works much the same way as a modern sequential multi-port gasoline fuel injection system and can be diagnosed with the same diagnostic scanners used for gasoline vehicles.

The *LPEFI®* system is covered by U.S. and International patents. The *LPEFI®* system is also certified to the United States E.P.A. standards.

The information in this manual is believed to be accurate as of its date of publication, but it is subject to change. Up-to-date information and changes, if any, can be requested from Bi-Phase Technologies.

In the event of any safety-related changes Bi-Phase Technologies will notify all customers who returned the warranty registration card for the affected vehicles.

For more information contact:
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952-886-6450
Tech. Support line
(888) 465-0571

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Table of Contents

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Notes

Propane Safety

This is a safety alert symbol. It is used through out this manual to alert you to potential hazards. Whenever you see this symbol, you should read and obey the safety warnings that follow. Failure to obey these warnings could result in serious personal injury or property damage.

Please read the Specific Warnings below before proceeding with the installation or repair of any propane system

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WARNING: Always unplug the LPEFI Liquid Propane Control Module (LPCM) and disconnect the battery before you work on any part of the LPEFI system.

The LPEFI tank contains an electronic control box. The LPEFI system could go into a purge mode which pumps liquid propane through the hoses and injectors. To prevent a sudden release of cold liquid propane, disconnect the power from the LPCM before you loosen any hose fittings. Failure to do this could cause personal injury and fire hazard.

WARNING: Never loosen fittings or vent any propane. Escaping liquid propane can cause frostbite and severe freeze burns. If liquid propane touches your skin, it causes a sudden burn similar to frostbite. Wear insulated PVC rubber gloves resistant to propane. Wear goggles for protection against accidental release of pressurized products and thermal protective clothing when handling refrigerated liquids.

Propane is stored as a liquid. When you release liquid propane, it tries to evaporate as quickly as it can, by absorbing heat from its surroundings. Everything it touches gets chilled to –44 degrees F (-42 deg. C). If liquid propane sprays on your fingers, it will freeze them-right down to the bone. Anyone who works with liquid propane must wear insulated PVC rubber gloves.

DANGER: Do not remove any valves, bulkheads or fittings from a propane tank unless the tank has been properly drained (evacuated) completely. The pressure inside a propane tank can push a loosened bulkhead or valve out with enough force to cause injury. Release of propane in an uncontrolled situation will create a flammable/explosive mixture of air and propane, which could cause serious injury, death and property damage.

Propane is stored under pressure. When you remove a valve or bulkhead from the tank, all of the pressure is released at once, in a violent rush. Always drain the tank before you work on it. Failure to do this will result in damage to the tank or valves and can result in severe injury or death. You should drain the tank using a flare stack in an approved safe manner. Your propane supplier can help you with this.

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DANGER: Do not vent or release propane indoors or near sewers, pits or low lying areas. Propane can accumulate in low spots, creating a fire hazard. Propane can also displace oxygen, creating a suffocation hazard.

Propane is heavier than air. It can fill low, sheltered areas with flammable vapors. If these vapors are ignited, they can create a fire or explosion, causing severe property damage, injury or death. Never release propane near sewers, pits or indoors.

WARNING: Keep all sources of ignition away from propane vehicles while the fuel system is being serviced. Even if the tank and fuel lines are empty, there may still be flammable vapors near the vehicle.

Do not allow smoking, sparks, flames, running vehicles, or other sources of ignition near the vented propane. Failure to do this could result in fire or explosion, causing severe property damage, injury or death.

WARNING: Do not disconnect any propane hoses unless they have been properly drained completely.

Propane in the hoses is kept under pressure, even when the engine is off. When you disconnect a hose, the internal pressure is released all at once. Always properly drain the fuel lines before you disconnect them. Failure to do this can result in damage to the hose fitting and possible injury.

WARNING: NO SMOKING OR OPEN FLAMES IN OR AROUND PROPANE VEHICLES DURING FUELING OR SERVICING.

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Facts about Propane & Propane Powered Vehicles

Propane gas is the most widely used alternative fuel, with nearly 4 million vehicles worldwide running on propane. More than 350,000 vehicles run on propane in the U.S., according to the U.S. Department of Energy's Alternative Fuels Data Center.

Propane powered vehicles offer the best combination of durability, performance and driving range.

The first propane powered vehicle ran in 1913.

Bi-Phase Technologies' *LPEFI®* (Liquid Propane Electronic Fuel Injection) system has surpassed other technologies today by introducing liquid fuel injection. This technology improves power, efficiency and operating characteristics. For more information call for our General Information and Training Manual.

Safety comes first is a motto you should always live by. Without knowledge of a product it is hard to follow this motto. In our manuals we try to stress the need for knowledge and provide warning signs to alert you.

It is your responsibility to know the law. NFPA, National Fire Protection Association, has manuals to help you understand safe handling of many products. We recommend that you obtain and read their NFPA #58, Standard for the Storage and Handling of Liquefied Petroleum Gases.
To further enhance the industry's safety and service, a number of training programs and efforts have been implemented throughout the country. The National Propane Gas Association has developed a Certified Employee Training Program (CETP), which provides service personnel with a complete technical training curriculum. We encourage you to contact your state propane gas association or the National Propane Gas

Association for more information on how you can benefit from such programs. Visit www.propanesafety.com for more information.

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Approximate Properties of LP Gases

(Commercial Propane)

Specific gravity of liquid (water = 1) at 60 degrees F.	0.504
Initial boiling point at 14.7 psia, degrees F.	- 44.0
Weight in lbs per gallon of liquid at 60 degrees F	4.24
Specific heat of liquid, BTU/lb. at 60 degrees F.	0.630
Cubic ft. of vapor per gallon at 60 degrees F.	36.38
Cubic ft. of vapor per pound at 60 degrees F.	8.66
Specific gravity of vapor (air = 1) at 60 degrees F.	1.50
Ignition temperature in air, degrees F.	920 to 1120
Maximum flame temperature in air, degrees F.	3,595
Limits of flammability in air	
Percent of vapor in air/gas mixture	
a) Lower	2.15
b) Upper	9.60

Heating values		
	a) BTU per cubic foot	2,488
	b) BTU per pound	21,548
	c) BTU per gallon	91,500
Chemical formula		C_3H_8
Vapor pressure in psig		
	a) 70 degrees F	127
	b) 100 degrees F	196
	c) 105 degrees F	210

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Pre-Installation Inspection

(Recommended)

If the installation is being performed on a used vehicle please fill out the Pre-Installation inspection form "A.2.13" found at the end of this manual. If forms are needed please contact Bi-Phase Technologies @ 888-465-0571

- Visually inspect the vehicle
  Is the malfunction indicator lamp illuminated?
  Does the engine start and run smooth?
  Are there any fluid leaks?

- Install a diagnostic scan tool and verify there are no DTCs (Diagnostic Trouble Codes) stored in the computer memory.
- Record the short and long term fuel trims on the vehicle

Note: *Proceed with the LPEFI® system installation if all conditions are acceptable. If any problems are discovered it is not recommended to install the LPEFI® system until the problems are repaired. After the installation is complete refer to the Post-Installation Inspection found in this manual.*

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LPEFI® System Installation

Note: *The kit contains all the components needed for conversion, decals, owner information card, and a warranty registration card. The warranty registration card, along with the Post-Installation Inspection form, must be filled in and returned to Bi-Phase Technologies for warranty to be valid. Label placement is described later in this installation manual.*

Removing the gasoline system

WARNING: Disconnect the battery before you work on any part of the LPEFI® system.

Remove gasoline fuel rails, fuel line, tank & evaporative emission system (if the vehicle is equipped with the EVAP components)

CAUTION: Gasoline under pressure. Gasoline is flammable & toxic. Use extreme caution and eliminate all sources of ignition while handling. Wear gloves & goggles.

1. Disconnect battery
2. Remove the seats, the bottom of the dash and dog house.

3. Disconnect the engine wiring harness electrical connectors from the fuel injectors and perform the following

    - Mark the connectors to their corresponding injectors to ensure correct reassembly
    - Pull the CPA retainer on the connector up 1 click
    - Push the tab on the connector in
    - Disconnect the fuel injector electrical connector

***Note**: When disconnecting or connecting injector connectors use extreme caution. Pull locking tab up to disconnect and push in on connector (squeeze) to disconnect. After reconnecting push locking tab down to lock connector. Be careful not to damage this plastic tab and locking piece.*

4. Place drain pan under the vehicle in the appropriate locations to catch any gasoline spilled while disconnecting the fuel lines

    ***Note**: Gasoline residue will drain out of the lines and rails when you disconnect*

5. Using a 3/8" QD tool, disconnect the fuel lines from the frame rails

6. Remove four (6 mm) mounting bolts holding the gasoline fuel rails to the intake manifold



7. Remove the EVAP purge valve and install a vacuum cap supplied in the kit (P/N 274398) (Between intake manifold and throttle body)

8. Remove the gasoline fuel rails, EVAP canister, and Gas Tank. Save the 2 bolts holding the EVAP bracket onto the cross member as they will be reused. When disconnecting fuel lines use drain pan to catch any spilt fuel

9. Remove the gasoline fill cup housing at the end of the fill hose that mounts to the body as it will be re-used.

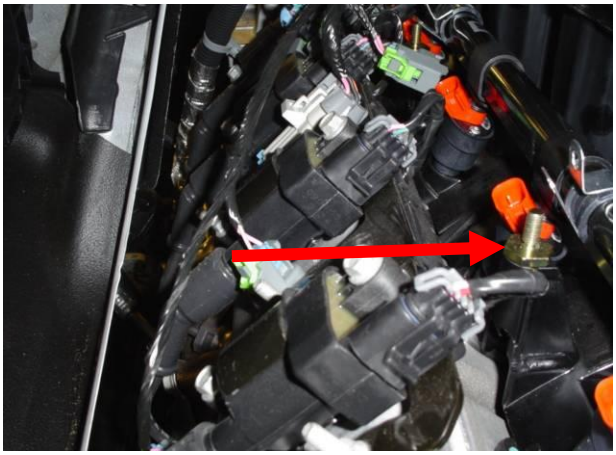
10. Remove the fuel tank pressure sensor from the tank and leave it plugged into the OEM harness. The other connector will plug into the *LPEFI®* harness

11. Drain all gasoline from the fuel tank and lines. Recycle all unused components according to local state and federal regulations

LPEFI® Conversion Kit Installation

Fuel Rail Installation

1. Install the 4 fuel rail mounting studs provided in the kit into the manifold (P/N 274164). Use the stock mounting holes from the gasoline fuel rails
2. Apply **one** small drop of *red* "Loctite" provided in the kit to the threads that go into the manifold. Torque of 12 NM (106 in-lb)



3. Remove the new fuel rails from the conversion kit

4. Place both rails on the bench as shown in the photo

5. The bushings and hold down clamps are not mounted on the rails and will need to be installed prior to installation on the engine
    i. Install bushings onto the fuel rails by opening the bushing. Bushing is designed to crack to allow fitment over the fuel rail. Bushing locations are machined into the rail.
    ii. Install the stainless “p” clamps onto the bushings with the clamp facing outward

6. Lubricate the lower o-rings (green) on each injector and place each rail on the engine with the QD hose inlet connectors facing toward the rear of the engine. O-ring lube or Vaseline works best for installation

Note: *The injector electrical connectors should be facing outward to allow clearance between injector & intake plenum. The electrical connector could interfere with the installation of the rail or the installation of the rail could damage the injector if not pre-positioned outward*

7. Carefully install each rail making sure the rails are fully seated into the intake manifold. Be sure each o ring gets seated properly into the manifold by inspecting each injector with a flashlight

8. Use the supplied M6 flange head nylok nut to secure rails onto the manifold. Leave the protective cap on the end of the rail until hose installation. Torque all hardware to 12NM (106 in-lb)

9. Connect the engine wiring harness electrical connectors (8) to the fuel injectors, perform the following:

- Ensure that the CPA retainer is pulled out 1 click
- Connect the electrical connectors to their corresponding injectors
- Push the CPA retainer in 1 click
- Ensure that the connector is secured

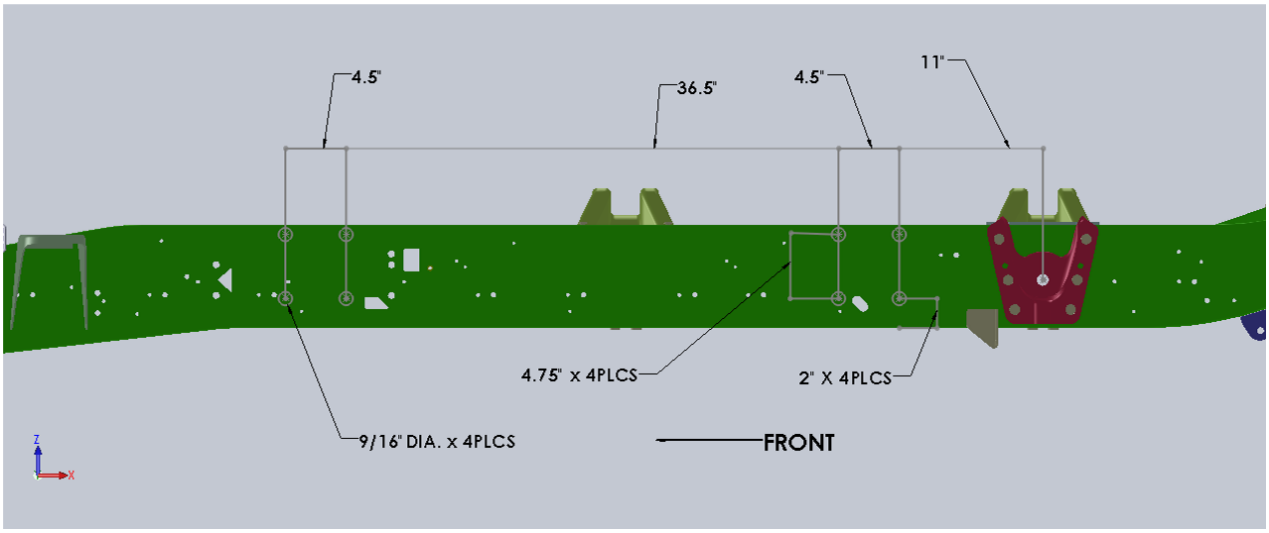

Tank Installation

Primary tank is installed on the outside of the port side frame rail.

****Note** Tanks are shipped with min 17psi tank pressure; verify tanks have a minimum of 17 psi. If pressure is ok continue with next step, if not contact Bi-Phase Technologies. Tanks are purged with inert gas**

Primary Tank Installation

1. Use supplied template #1 to drill 8 mounting holes for the supplied “J” brackets. The template is referencing the driver’s side frame frail from the side view. Template also found at the end of this manual



2. Raise the “J” brackets into place and mount using the supplied ½” Grade 8 bolts, belleville washers, and nyloc-nuts. Ensure to orient the Bellville washers correctly to ensure proper function. Torque all hardware to 80 +/- 5 ft-lbs and torque mark with a paint pen

IMPORTANT: ***Install all hardware before tightening any tank mounting bolts***

3. Raise the fuel tank into the “J” brackets as shown

4. Position the tank so the rear portion of the tank has minimum 1.5” of clearance from leaf spring shackle

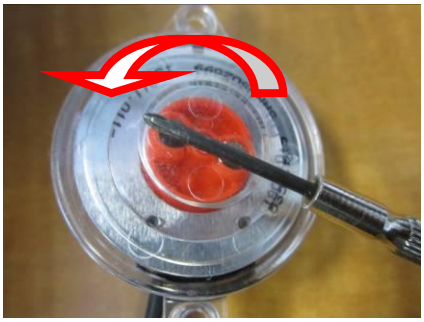
5. Place a level on the rear tab and orient the tank so it is properly leveled

6. Position the tank band clamps into place and tighten using the supplied locking hardware. Torque hardware to 75 ft-lbs

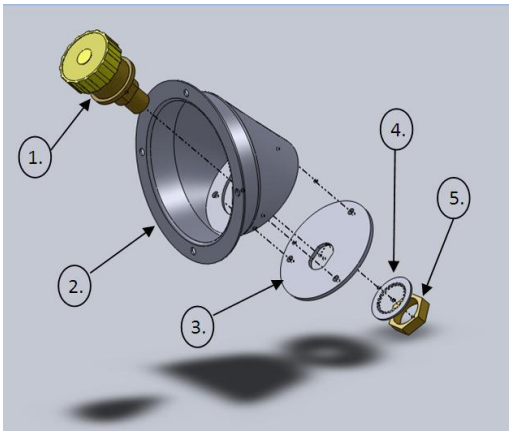
Primary fuel gauge

1. Install fuel level sending unit on the primary tank using supplied hardware.

2. When installing a fuel level gauge sending unit always reset the sender to zero using a small magnet. After the gauge is installed on the tank, the sending unit's needle should register zero or empty unless there is fuel in the tank. In the case there is already fuel in the tank orient the gauge so the magnets match the level of the fuel in the tank



Fill Cup Assembly



1. Fill Valve

2. Stock GM housing

3. Fill Valve Mounting Bracket

4. Lock-Washer

5. Nut

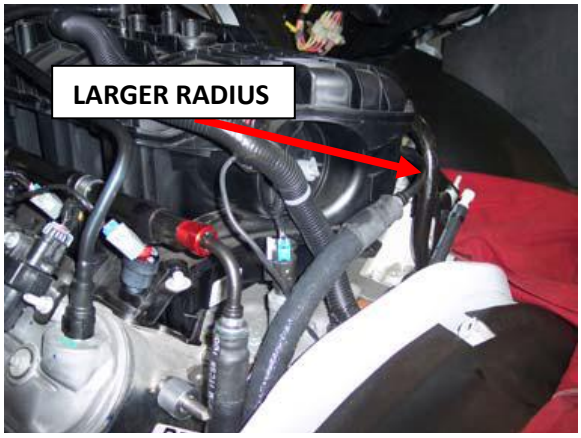
1. Using supplied M5 hardware to assemble the fill cup as shown. Note: correct orientation of item 3 to be positioned so the fill valve cutout is in the lowest position possible to allow easy connection when filling

Fill Filter& Fill Hoses installation

1. Locate the two fill hoses, fill filter, and (2) #39 “P” clamps
2. Install the fill hoses and filter assembly as shown below. Please note fill hose installations may vary based on body application. Note flow direction on filter before installation
3. Torque all fittings to 44-48 ft-lbs. Torque mark all connections

Verify the hoses are routed in a way that there is no interference with chassis components that could cause chaffing. Use vinyl edging in any cases where hoses may come in contact with the frame

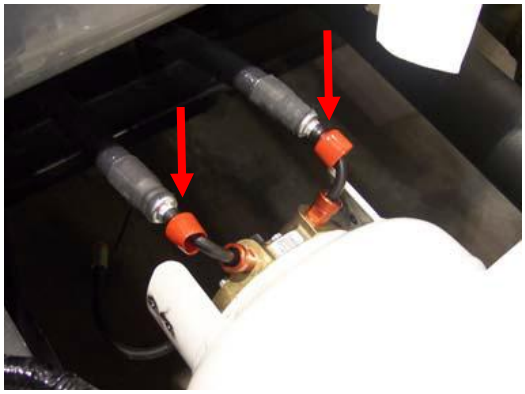
Primary Hose installation



NOTICE: *Take extreme care to center the white nylon line into the rail end fitting and slowly push the line all the way in (turn the hose from side to side or twist it as you are pushing it in) or kinking of the nylon line may occur. Once the white inner line is completely in, push the entire fitting into the rail until it clicks and locks. Inner line seals around an o-ring inside the fitting. Do not allow any dirt or contaminants inside the line during installation*

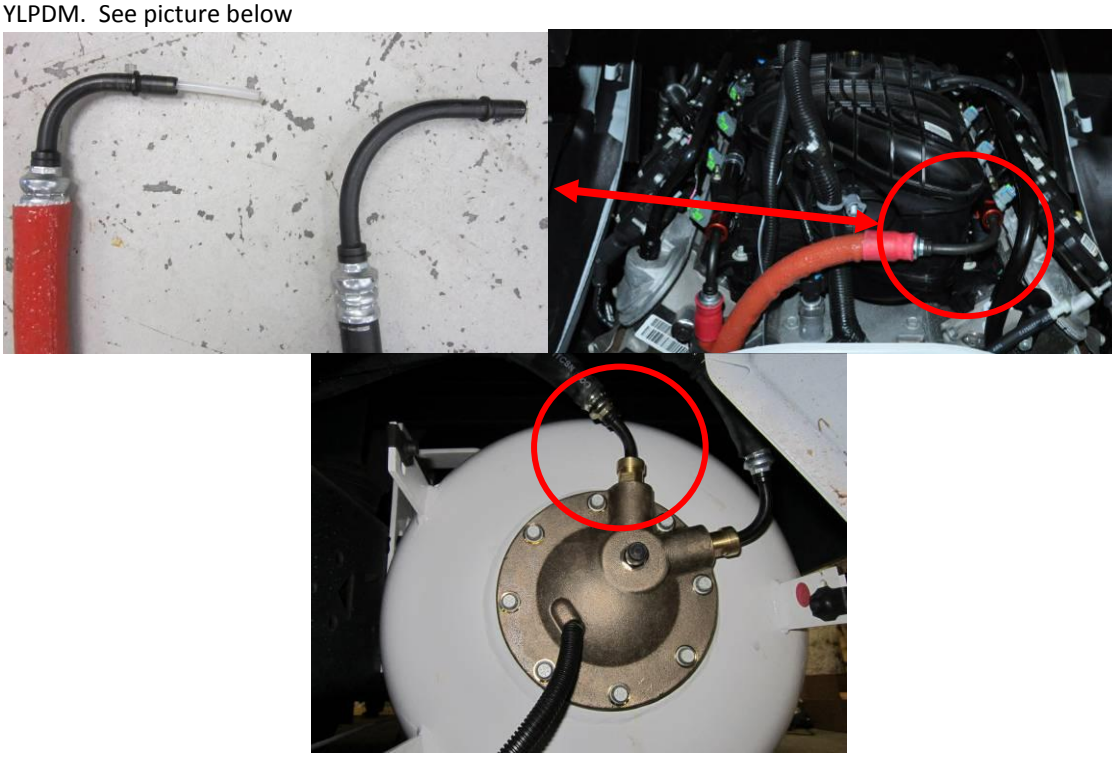
1. Route the two primary fuel hoses under the cab

2. Install the 2 plastic QD caps over the fuel lines as shown near the YLPDM location

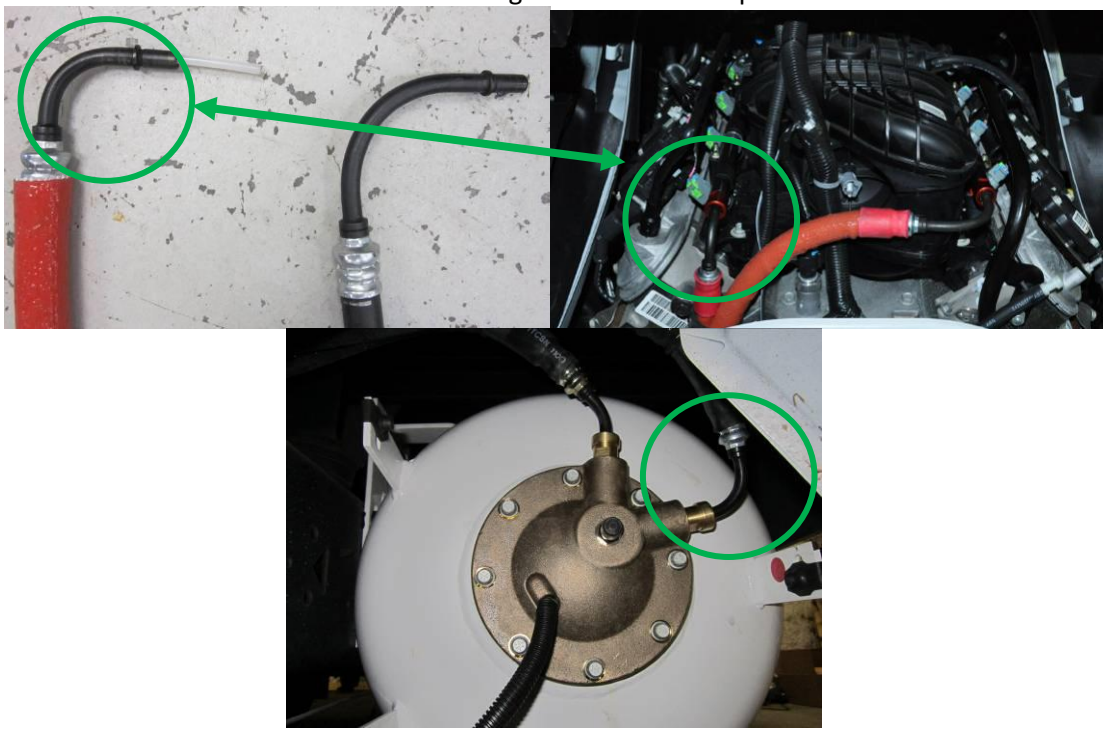


3. Passenger side hose installation. Make sure to identify the correct hose for each side before installing. The larger hose end goes to the passenger side fuel rail, while the smaller hose end connects to the

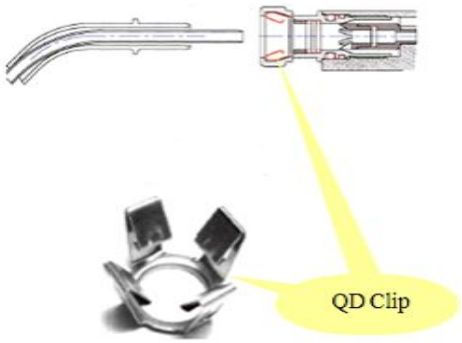
YLPDM. See picture below



4. The drivers side hose has the same fittings on each end so it can be installed either way. This hose has the smaller radiused hose fitting on each end. See pictures below



5. Carefully install the fuel lines on the YLPDM first. Lubricate the white nylon inner line with o ring lube



6. Make sure the hoses correlate to the respecting side. (Passenger side fuel rail connects to passenger fitting on YLPD

7. Gently apply even force when inserting fuel lines and listen for the fittings to “click” into place

Note: verify the hose is routed in a way that there is no interference with chassis components that could cause chaffing

WARNING: ***Improperly attached fuel lines could cause the release of propane causing personal injury.***

8. Using a bright light look at the QD fittings and verify the four locking tabs are secured on the hose fittings

9. Gently pull on the on the hose ends to verify the fitting will not disconnect

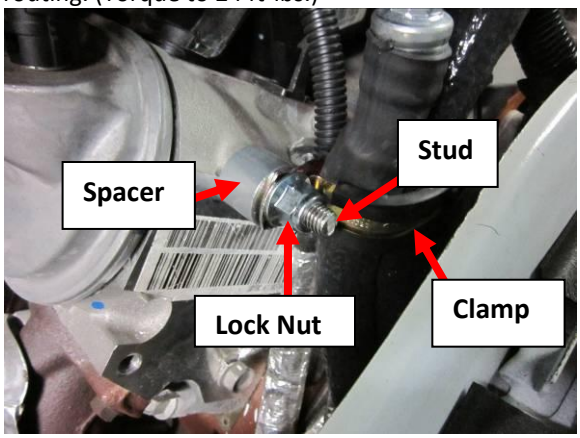
10. Slide plastic caps over the QD fittings after hose installation as shown

IMPORTANT: **After hearing the click of the line quick connecting, visually look and verify the 4 sides of the QD clip are over the locking ring**

11. Very carefully insert the primary lines into the fuel rails. Use the same process used in hooking the lines to the YLPDM. Use extreme care when inserting the lines

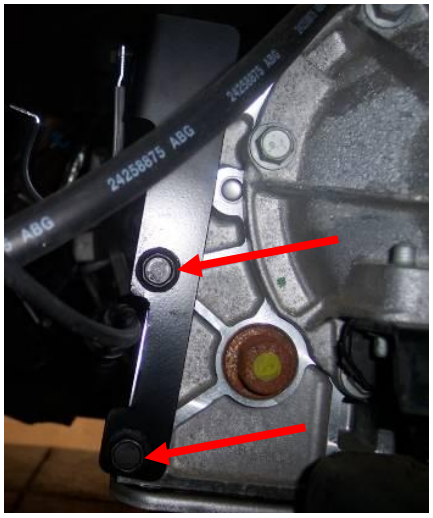
Primary Hose Retainment

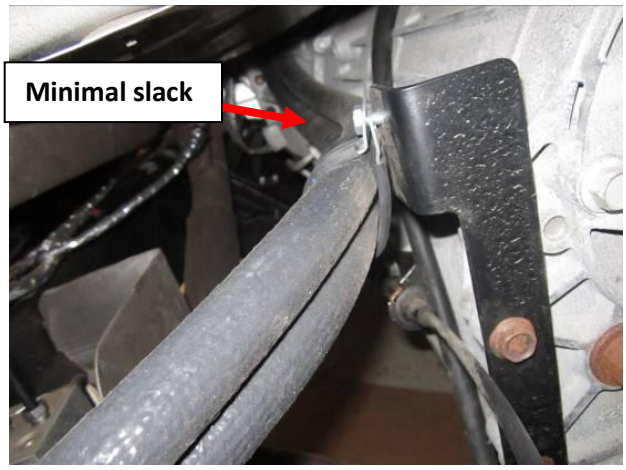
1. The primary hoses are secured using 3 P clamps. Use the supplied #24 P clamp to secure to the driver's side engine head. See detailed picture below. Clamp is secured with a M10 70mm stud, ½ inch aluminum spacer, and M10 lock nut. Use (2) M10x1.5 nuts to install the stud. Note pictures to ensure proper routing. (Torque to 24 ft-lbs.)



2. Next install the transmission bracket using the supplied M10x25 flange bolts into existing mounting holes located on the rear portion of the transmission housing. Picture below is taken from the rear driver's side portion of the transmission looking forward. (Torque to 24 lb-ft)

3. Secure hoses with a #24 P clamp to the transmission bracket using the supplied M6 hardware. Be sure to note that there is minimal hose slack between the engine and transmission bracket





4. Install the new EVAP bracket into the existing mounting holes from the stock EVAP bracket. Use existing hardware to secure. Use a #39 P clamp and route hoses through the clamp. Attach to the top of the EVAP bracket. Use M6 hardware to install

5. After all hoses are secure zip tie hoses together every 8 inches

6. Hoses will cross over the top of the driver's side frame rail just behind the cab. Hoses are secured with a #24 P clamp and ¼" mounting hardware

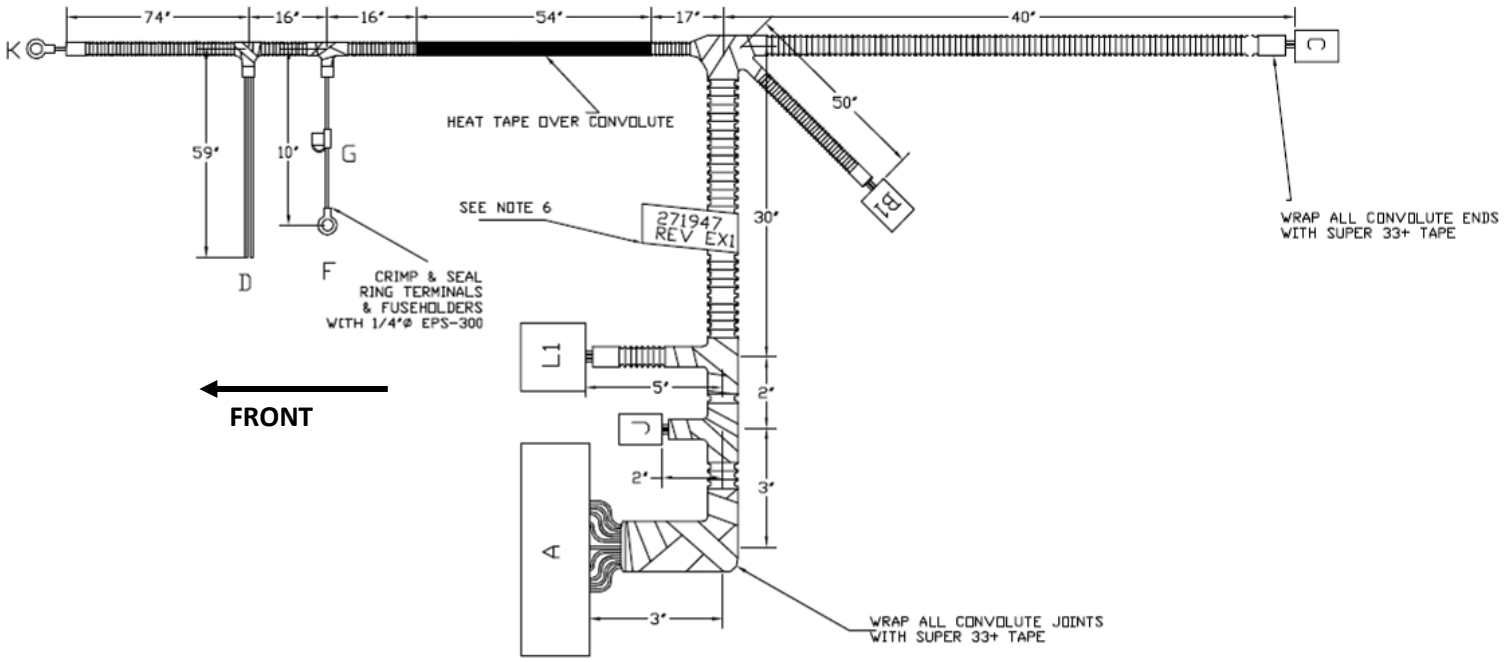
Main wire harness

WARNING: Do not make the final electrical connections until the LPEFI system is completely sealed. Applying power could cause the valves in the tank to open, releasing fuel into the hoses.

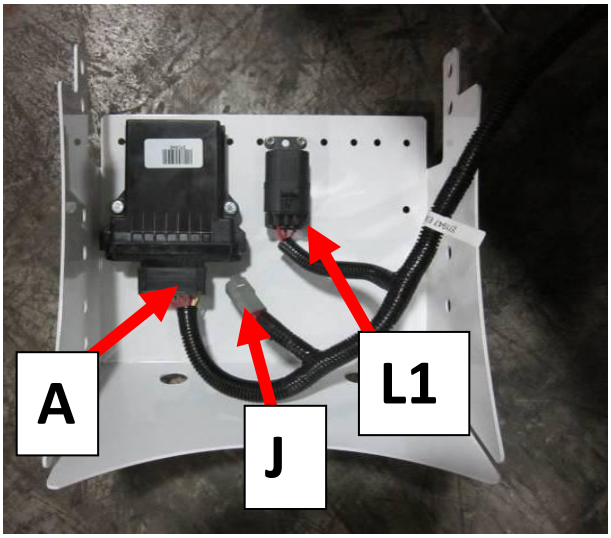
Note: Before securing any of the harness makes sure it is routed to meet the length requirement to make each connection. When you are prepared to secure the harness, tie wrap it every 8 inches.

Main LPEFI® harness

1. Lay out the main harness and place loosely on the truck. Using the schematic verify harness connections will fit properly



A – (Cinch connector)	To LPCM (Electronics Bracket)
B1 – (2 pin Delphi connector)	To Primary Fuel Tank Gauge (Primary Tank Mid-ship)
C – (4 pin Delphi connector)	To GM Fuel Pump Delphi Connector (Inside Port Frame Rail)
D – (Grey Bare Wire)	To Wait To Start Lamp (Inside Cabin)
F – (Orange Ring Connector)	To Fuse Distribution Block (Under Hood, port side)
J – (Deutsch 4 pin Connector)	To YLPDM
K – (Black Ring Connector)	To Ground G105 (Under Hood, Inside Starboard Quarter Panel)
L1 – (Relay Connector)	To Primary Pump Relay (Electronics Bracket)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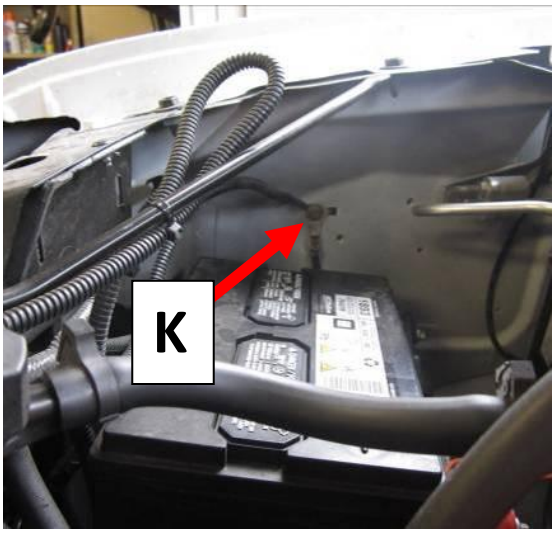
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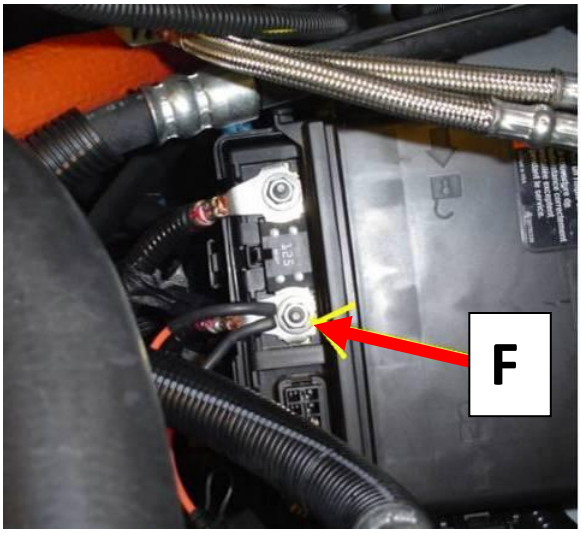
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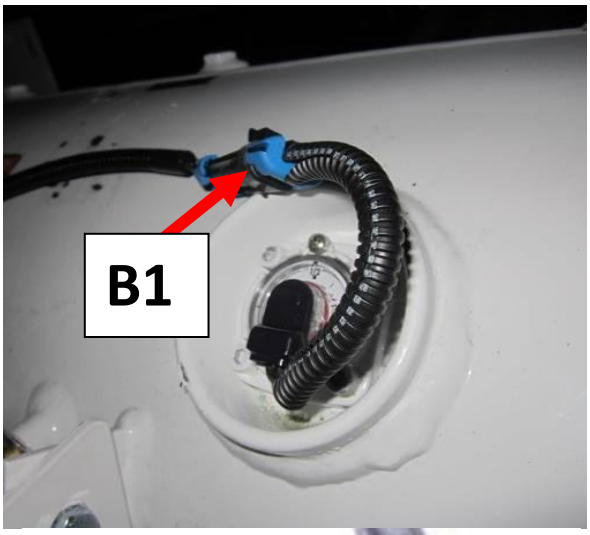
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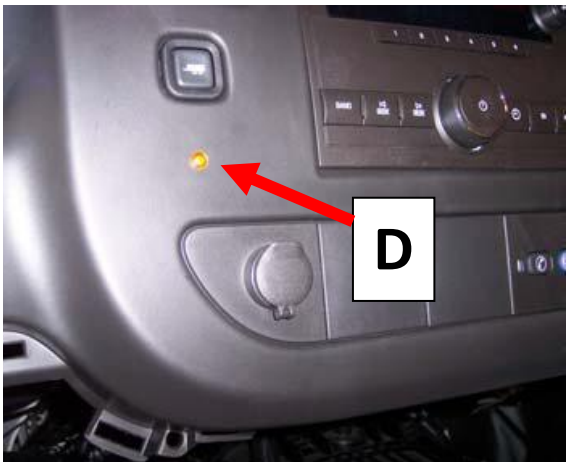
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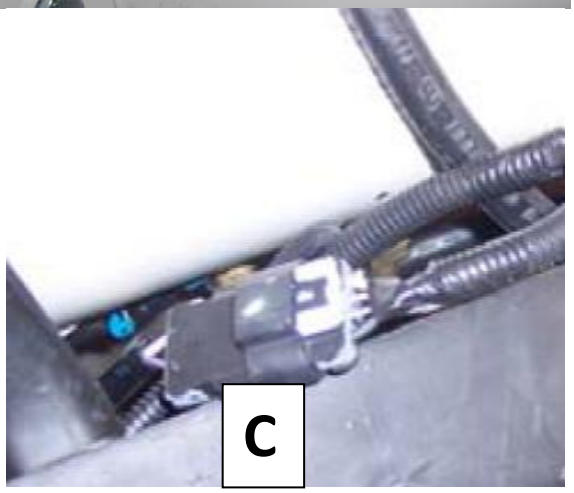

C

2. Start routing the harness at the front of the tank or just behind the cab back. Route harness over the frame rail

3. Route connector C down the inside of the driver's side frame rail back to the OEM fuel pump connector making sure to follow the OEM harness

4. Route the orange power wire up to the fuse distribution block making sure to follow the OEM harness

5. Remove the driver's side kick panel and floor mat to access the wire harness grommet that passes through the firewall

6. Route the grey and black wires through the main wiring harness grommet into the firewall. Connect grey wire to the "wait to start lamp" positive lead (red), and black to the ground lead. Solder and shrink-wrap all connections. Light is installed underneath the tow/haul switch next to the steering wheel

7. Route the ground ring terminal to the ground location G103 located near the battery on the inside of the passenger front quarter panel. Follow the OEM harness

8. Make all connections and double check to ensure proper routing

9. After all connections are made secure the harness every 8 inches with supplied zip ties. Double check to make sure there are no areas of unprotected or pinched wires

10. Leave the Electronics plate off of the tank to perform final inspections before mounting

WARNING: Do not make the final electrical connections until the LPEFI system is completely sealed. Applying power could cause the valves in the tank to open, releasing fuel into the hoses.

Install labels on the truck/registration

1. Install one "*LPEFI®*" transparent label on each side of the cab

2. Install the EPA emissions label under the hood

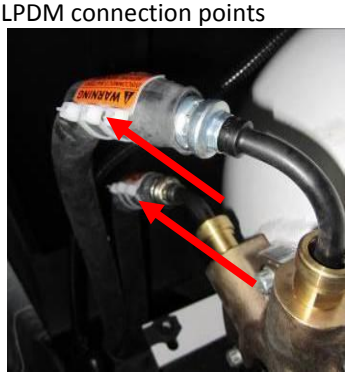
3. If the truck does not have a box or body installed yet, put the propane diamond in the glove box for placement later

4. After the body is installed on the truck, install the black "PROPANE" diamond on the back panel of the truck in the lower starboard side

5. Install the orange WARNING label on the center of the dog house

6. Install the Wait to Start label just below the wait to start light inside the cab

7. Install fuel line warning labels onto the end of each primary hose. Two located near the fuel rails, and 2 located near the LPDM connection points

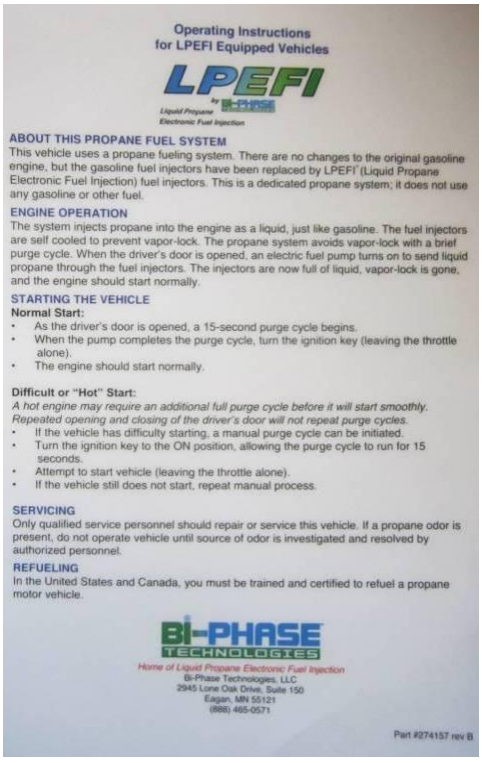


8. Install the HD5 Propane only label near the fill location and on the inside driver's door jam

9. Place a warning label on each of the fill hose locations as shown below

10. Fill out vehicle warranty registration card and return to Bi-Phase Technologies along with the Post-Installation Inspection

11. Place laminated owners information cab card in the glove box or door pocket with the OEM's owner's manual & other GM information



Operating Instructions
for LPEFI Equipped Vehicles

LPEFI
by Bi-PHASE
Liquid Propane Electronic Fuel Injection

ABOUT THIS PROPANE FUEL SYSTEM

This vehicle uses a propane fueling system. There are no changes to the original gasoline engine, but the gasoline fuel injectors have been replaced by LPEFI (Liquid Propane Electronic Fuel Injection) fuel injectors. This is a dedicated propane system; it does not use any gasoline or other fuel.

ENGINE OPERATION

The system injects propane into the engine as a liquid, just like gasoline. The fuel injectors are self cooled to prevent vapor-lock. The propane system avoids vapor-lock with a brief purge cycle. When the driver's door is opened, an electric fuel pump turns on to send liquid propane through the fuel injectors. The injectors are now full of liquid, vapor-lock is gone, and the engine should start normally.

STARTING THE VEHICLE

Normal Start:

- As the driver's door is opened, a 15-second purge cycle begins.
- When the pump completes the purge cycle, turn the ignition key (leaving the throttle alone).
- The engine should start normally.

Difficult or "Hot" Start:

A hot engine may require an additional full purge cycle before it will start smoothly. Repeated opening and closing of the driver's door will not repeat purge cycles.

- If the vehicle has difficulty starting, a manual purge cycle can be initiated.
- Turn the ignition key to the ON position, allowing the purge cycle to run for 15 seconds.
- Attempt to start vehicle (leaving the throttle alone).
- If the vehicle still does not start, repeat manual process.

SERVICING

Only qualified service personnel should repair or service this vehicle. If a propane odor is present, do not operate vehicle until source of odor is investigated and resolved by authorized personnel.

REFUELING

In the United States and Canada, you must be trained and certified to refuel a propane motor vehicle.

BI-PHASE TECHNOLOGIES
Home of Liquid Propane Electronic Fuel Injection
Bi-Phase Technologies, LLC
2945 Lone Oak Drive, Suite 150
Eagan, MN 55121
(888) 465-0571

Part #274157 rev B

FLASHING THE PCM

Please Remove PCM and send to Bi-Phase Technologies to have LPG flash installed at the address below. Please include all information requested.

ATTN: PCM FLASH REQUIRED

Bi-Phase Technologies

2945 Lone Oak Drive Suite 150

Eagan MN 55121

Information required:

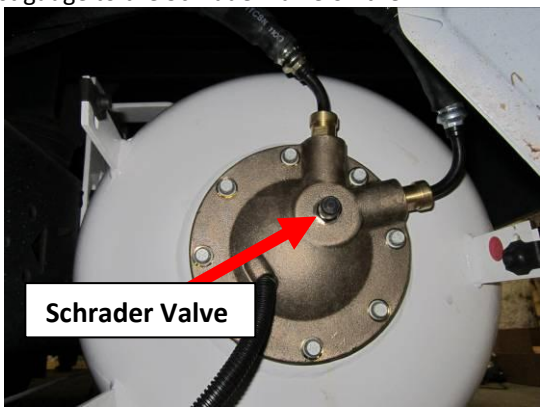
- **Vehicle Year**
- **Vehicle Make**
- **Vehicle Model**
- **Vehicle VIN**
- **Return Shipping Address**
- **Contact Information**

Testing the Installation

1. Visually inspect the tank, the hoses, the wiring and the engine compartment. Is everything assembled properly?

2. Fill the tank with 20 to 30 gallons of propane. It is recommended that you purge the tank with propane vapor and check all the fittings on the tank for leaks before filling the tank completely. Use an approved leak detection fluid or an electronic leak detector to verify there are no leaks. If any leaks are found stop and repair the leaks. The battery should not be connected at this time. (If the tank was filled before installation it should have been checked for leaks at that time.)

3. Connect a fuel pressure test gauge to the Schrader valve on the LPDM



4. Fuel pressure should be 0 psi

5. Locate the “3 switch box” and verify all switches are in the off position. Connect the “3 switch box” to the vehicle battery, then the LPDM

6. Slowly cycle the supply switch for about 30 seconds waiting 5 seconds between cycles. This will allow fuel pressure to equalize between the fuel tank and the fuel lines. (Check all primary hose connection points for leaks) If leaks are found stop and repair. See general Bi-Phase Diagnostic Manual for repairing propane leaks

7. Once fuel pressure is equalized and no leaks are found leave the supply valve in the open position and observe the pressure on the gauge set. This is the tank pressure

8. With the supply valve open turn on the pump switch. Observe the pressure on the gauge set. This is the pump boost pressure

9. With the supply valve open and pump running press and hold the return valve momentary switch. Observe the pressure on the gauge set. This is the purge reduction pressure

10. Release the return valve momentary switch

11. With all connections and procedures checked and vehicle is in a safe location, start the vehicle

12. Verify engine is running smoothly. Turn off engine and remove key

13. Disconnect the 3 switch box and pressure gauge set

14. Check all fuel system for any leaks. If leaks are found stop and repair. See general Bi-Phase Diagnostic Manual for repairing propane leaks

15. If no leaks are found make final electrical connections at the LPCM bracket and attach assembly to the tank. When attaching LPCM plate assemble the plate so that it mounts as high as possible on the tank

16. Secure all wires from the wire harness with tie-wraps

17. With vehicle secure place the key in the “key on engine off” position. A purge should be initiated. If a wait to start lamp is installed observe the lamp to confirm a purge cycle. Purge cycle should last about 15 seconds

18. Once purge cycle ends and wait to start lamp goes out start the vehicle

19. Connect Scan tool to the vehicle and record any DTC codes found. Resolve any DTC’

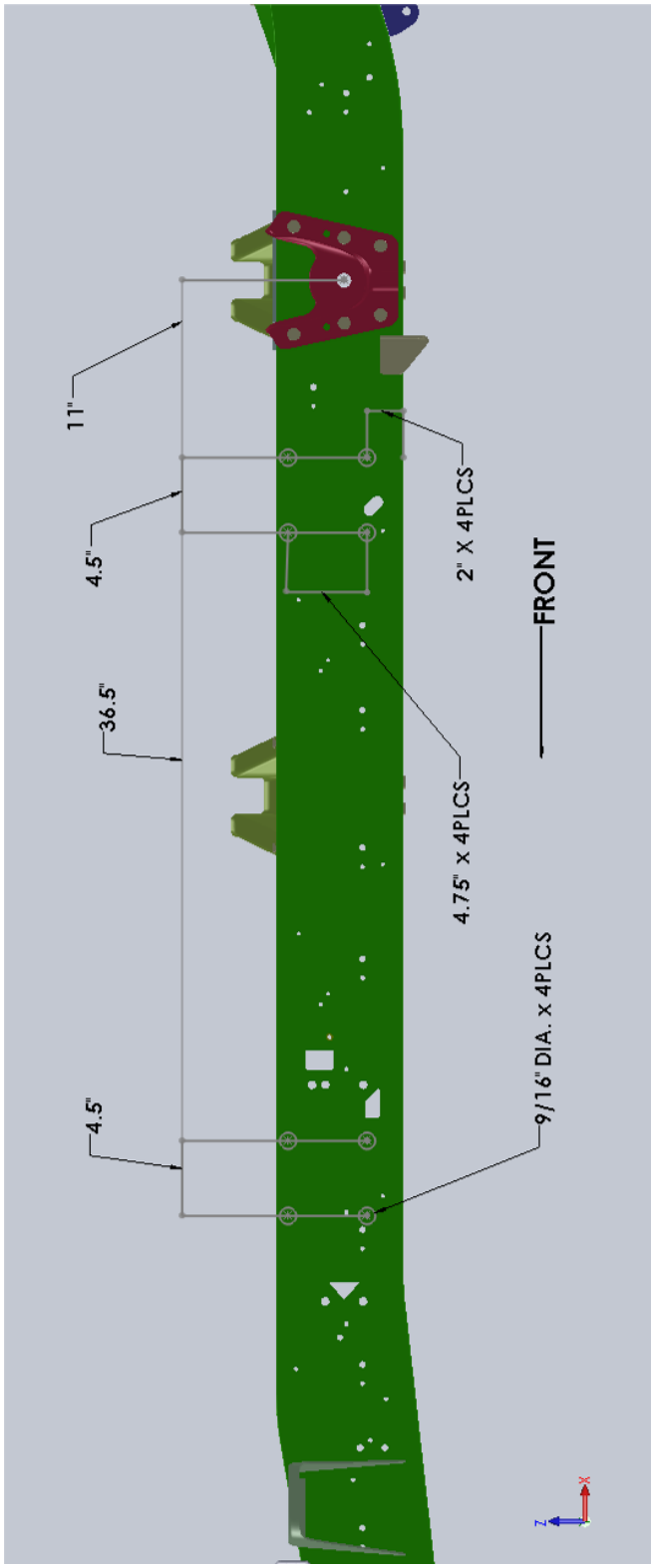
20. Remove all test equipment

21. Vehicle is now ready to be taken on test drive. Please refer to Post Installation Inspection form

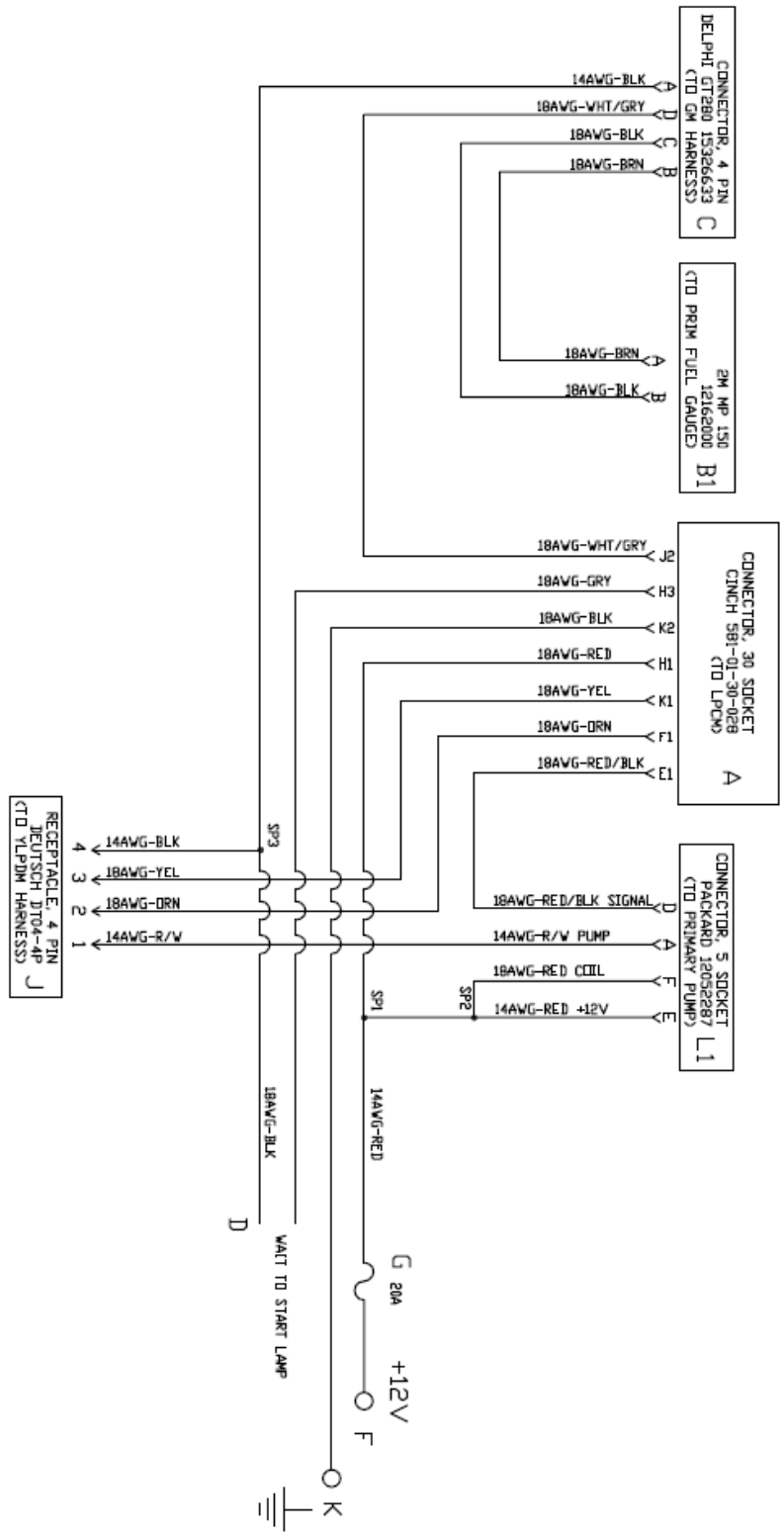
WARNING: The pressure test hose may contain cold liquid propane. Wear insulated rubber gloves and goggles when removing.

If vehicle does not operate properly check all hose connections, wire connections, battery voltage and contact Bi-Phase Technical Hotline at (888) 465-0571

TEMPLATE #1



Wire Harness Schematic (P/N 271947)



Pre-Installation Inspection Form A

Date:_____ **Installation Location**_____

VIN_____ **Engine**_____

Year _____ **Make**_____ **Model**_____ **Wheelbase**_____

Installer company name_____

Vehicle Mileage_____

Any stored DTCs in computer memory? Yes ☐ **No** ☐

List all codes/descriptions:_____

_____

NOTE: If any DTCs are found Bi-Phase does not recommend continuing with the LPEFI installation until all codes are resolved and vehicle is operating properly.

Does vehicle engine idle smoothly? Yes ☐ **No** ☐

Are all vehicle systems functioning properly? Yes ☐ **No** ☐

Vehicle Comments:_____

_____

Scan Tool DataStream

Allow Engine to reach full operating temperature (>190°F) before taking measurements

ECT/Temperature_____ **°F**

Fuel Trims at Idle:

	Bank 1	Bank 2
STFT		
LTFT		

Misfire Graphic

Cylinder #	Counts
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Technician Name:_____ **Signature**_____ **Date**_____

Please Print

This inspection form must be returned to Bi-Phase Technologies. Fax 651-681-4441

Any problems found must be noted in the comment section and if a problem cannot be resolved Bi-Phase Technologies must be contacted at 1-888-465-0571.

Post-Installation Inspection

Installation & test date_____

VIN_____**Installer company name**_____

Year_____**Make**_____**Model**_____**Wheelbase**_____

Tank Mfg._____**Quantity of propane (GAL)**_____

Primary Tank Serial #_____**Secondary Tank Serial #**_____

Fuel Rail Serial Numbers: Driver's Side_____**Passenger Side** _____

Injector Electrical Connectors Seated? **Yes** ☐ **No** ☐

Primary hose(s) installed properly with audible click/visual inspection? **Yes** ☐ **No** ☐

All fill hoses installed, tightened, torque marked, and leak checked? **Yes** ☐ **No** ☐

Loop hose installed properly with audible click/visual inspection? **Yes** ☐ **No** ☐ **N/A** ☐

Wait to start light/purge operating correctly? **Yes** ☐ **No** ☐ **N/A** ☐

Door Purge operating correctly? **Yes** ☐ **No** ☐ **N/A** ☐

Auto Purge operating correctly? **Yes** ☐ **No** ☐ **N/A** ☐

Transfer system operating correctly? **Yes** ☐ **No** ☐ **N/A** ☐

Idle Shutdown operating correctly? **Yes** ☐ **No** ☐ **N/A** ☐

Leak test tank & *LPEFI*® system complete (refer to installation manual for test procedure) **Yes** ☐ **No** ☐

Leaks found & repaired **Yes** ☐ **No** ☐
Where_____

Any stored DTCs in computer memory? **Yes** ☐ **No** ☐
List all codes:_____
If any DTCs found (other than the codes listed in the BPT Installation manual for the specific vehicle), repair all codes and retest

Does vehicle restart easily after purge cycle is complete? **Yes** ☐ **No** ☐

Does vehicle engine idle smoothly? **Yes** ☐ **No** ☐

Check fuel gauge operation, does tank gauge and dash gauge correspond? **Yes** ☐ **No** ☐

Vehicle Comments:_____

Tank Temps & Operating Pressures @ LPDM

Tank temperature (bottom of tank) _____**°F**

Room temperature _____**°F**

Pump Pressures with 3 Switch Box

1. Tank pressure (Supply & Return on) _____ **PSI**
Example: Tank Pressure =100 PSI

2. Pump boost pressure (Supply & Pump on) _____ **PSI**
Note: Pump boost pressure is observed with supply valve and pump in the on position. (Pump acceptable boost is min 35 psi over tank pressure)
Example: 135psi tank/pump – 100psi tank = Pump boost Pressure **35PSI**

3. Purge reduction pressure (Supply, Pump on & Return) _____ **PSI**
Note: Purge Reduction Pressure is observed with supply valve, pump, and return valve all in the on position (Purge reduction range is 1 to 15 psi)
Example: 135psi tank/pump – 125psi tank/pump/return = Purge reduction **10 PSI**
**Note: If specifications are out of range reference Bi-Phase LPEFI Diagnostic Manual*

Scan Tool DataStream

PCM Flash performed? _____

ECT/Temperature_____**°F**

Fuel Trims at Idle:

	Bank 1	Bank 2
STFT	_____	_____
LTFT	_____	_____

Note: Fuel trims range from 0 to -17% and shouldn't differ between bank by more the 10%

**Note: If specifications are out of range reference Bi-Phase LPEFI Diagnostic Manual*

Generic Post A.2.13

POST INSPECTION FORM AND ROAD TEST

Road test: (Always comply with state and federal regulations when test driving the vehicle)

1. **Bring truck to operating temperature >190 Degrees** ☐
2. **Verify smooth idle** ☐
3. **Drive truck to 65mph where limits permit** ☐
4. **Verify smooth operating performance at all speeds** ☐
5. **Stop and record fuel trims after test drive** ☐

Re-Check LPEFI system for leaks? **Yes** ☐ **No** ☐

Any IP Warning lights on? **Yes** ☐ **No** ☐

→ **Repair: Yes** ☐ **Problem Found** _____

_____

Comments _____

_____

Road test completed **Yes** ☐ **No** ☐

Comment below on any performance issues:

_____

_____

_____

Technician Name:

_____

PRINT **SIGNATURE** **DATE**

Place (1) Copy in Cab of Truck

These inspection forms MUST be returned to Bi-Phase Technologies. Fax 651-681-4441

Any problems found must be noted in the comment section and if a problem cannot be resolved Bi-Phase Technologies must be contacted at 1-888-465-0571.

Generic Post A.2.13