LPEFI® Installation Manual

For

2012 Chevrolet G van Trucks with 6.0 Liter Engine

Models: 4500

Mono-Rail System

274561 Revision A

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Bi-Phase Technologies, LLC

Eagan, Minnesota, U.S.A.

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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.

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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 <u>Specific Warnings</u> 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) or disconnect the battery before you work on any part of the LPEFI system.**

The LPEFI tank contains an electronic control box. Any time the driver door is opened, the LPEFI system could go into a purge mode, pumping 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 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.

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 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.

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.

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)

Recommend the following inspection on new vehicles:

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

****Note**Tanks are shipped with min 17psi tank pressure; verify tanks are holding pressure by opening the spitter valve. If pressure exist continue, if not contact Bi-Phase Technologies.**

- Install a diagnostic scan tool and verify there are no DTCs (Diagnostic Trouble Codes) stored in the computer memory

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.*

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.

Note*: When disconnecting or connecting injector connectors be careful and 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 break this plastic tab and locking piece*.

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

2. Disconnect the engine wiring harness electrical connectors from the fuel injectors, 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.

3. Place drain pan under driver side of bell housing to catch any gasoline spilled while disconnecting the fuel lines

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

4. Using a 3/8" QD tool, disconnect the supply fuel line from the steel line attached to the driver side frame rail

5. Remove four (6 mm) mounting studs and nuts holding the gasoline fuel rails to the intake manifold



6. Remove the line from EVAP purge valve and install a vacuum cap supplied in the kit. (Between intake manifold and throttle body)

7. Remove the gasoline fuel rails, EVAP canister, and Gas Tank. Make sure to 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. Remove the cup at the end of the fill hose that mounts to the body as it will be re-used. This part is identified with ha red arrow below

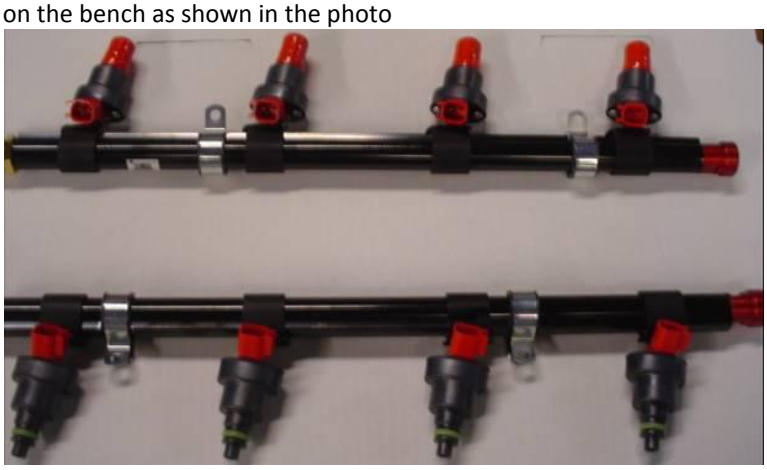

8. Remove the fuel tank pressure sensor from the tank and leave it plugged into the OEM harness. The other connector will plug into the *LPEFI®* harness

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

LPEFI® fuel rail installation

1. Remove the new fuel rails from the conversion kit

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



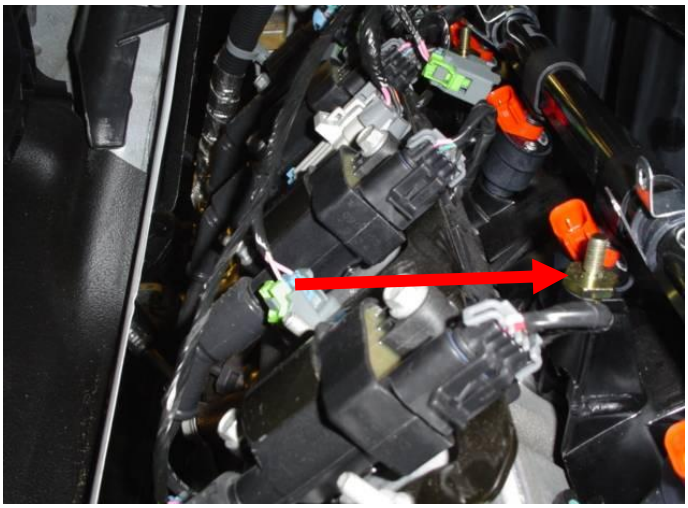
3. The top fuel rail in the photo is the passenger side rail

4. The bushings and hold down clamps are not mounted on the rails and will need to be installed prior to installation on the engine

5. 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.*

6. Before installing fuel rails, install the 4 studs provided in the kit into the manifold. Use the stock mounting holes from the gasoline fuel rails. Apply **one** small drop of *red* "Loctite" to the threads that go into the manifold. torque of 12 NM (106 in-lb)



7. Carefully install each rail making sure the rails are fully seated into the intake manifold. This will be leak checked later, but be sure each o ring gets seated properly into the manifold

8. Use the supplied M5 flange head nylok nut to secure rails onto the manifold. Leave the protective cap on the end of the rail until hose installation

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

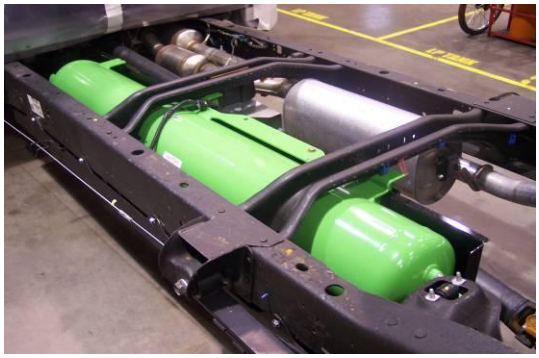
- Ensure that the CPA retainer is pulled out 1 click
- Connect the electrical connectors to their corresponding injectors
- Push the CPA retainer in 1 click
- Ensure that the connector is secured

Tank Installation

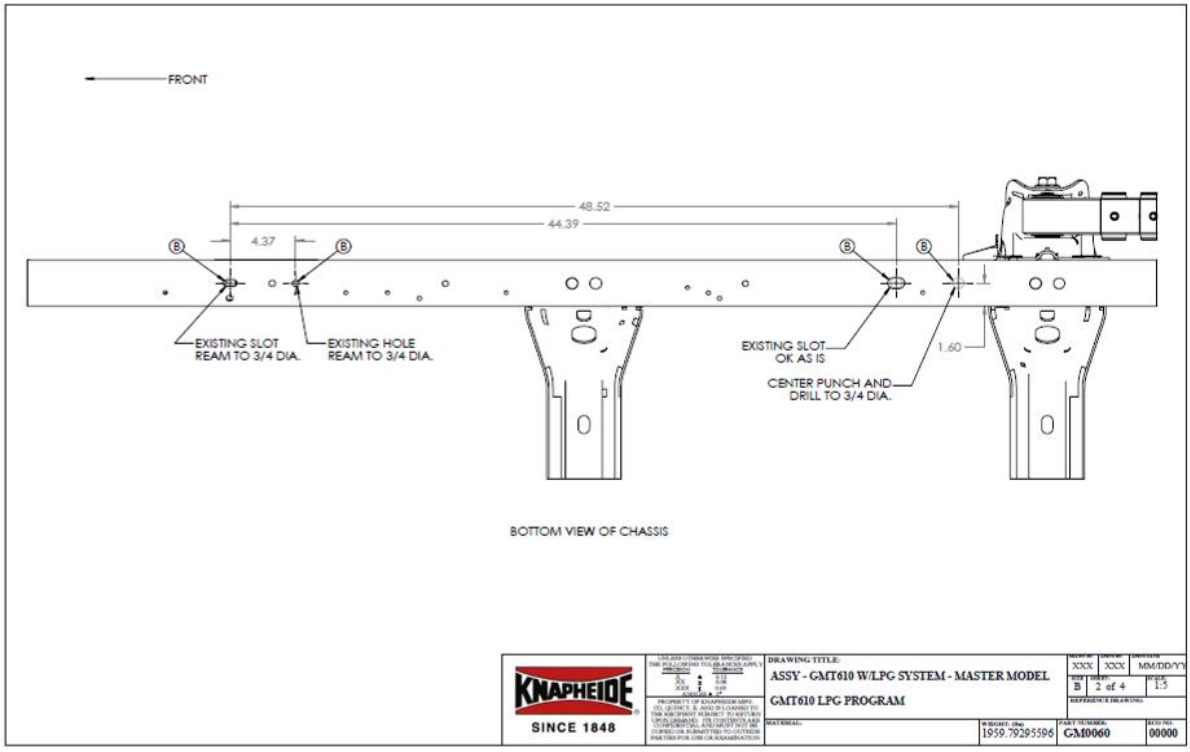
Primary tank is installed on the inside of the driver's side frame rail where the gasoline tank is located. The secondary tank is installed between the frame rails behind the rear axle

****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**

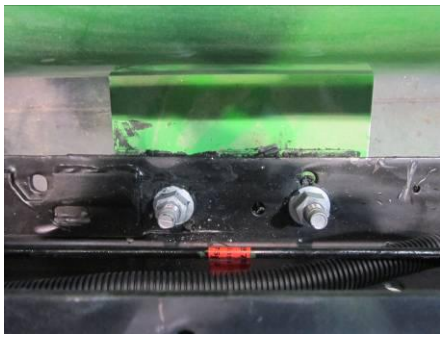
Primary Tank Installation



1. Use supplied template #2 below to drill mounting holes. The template is referencing the driver's side frame frail from the bottom view. (Larger schematic attached to instructions)



2. Raise the tank into place and install M16 GM coated flange bolts. Use supplied GM torque prevailing flange nuts to secure tank. Use supplied mounting bracket to bolt tank to the two existing cross members. Torque all hardware to 177 +/- 25 ft-lbs.



Frame Rail Top view

Cross Member

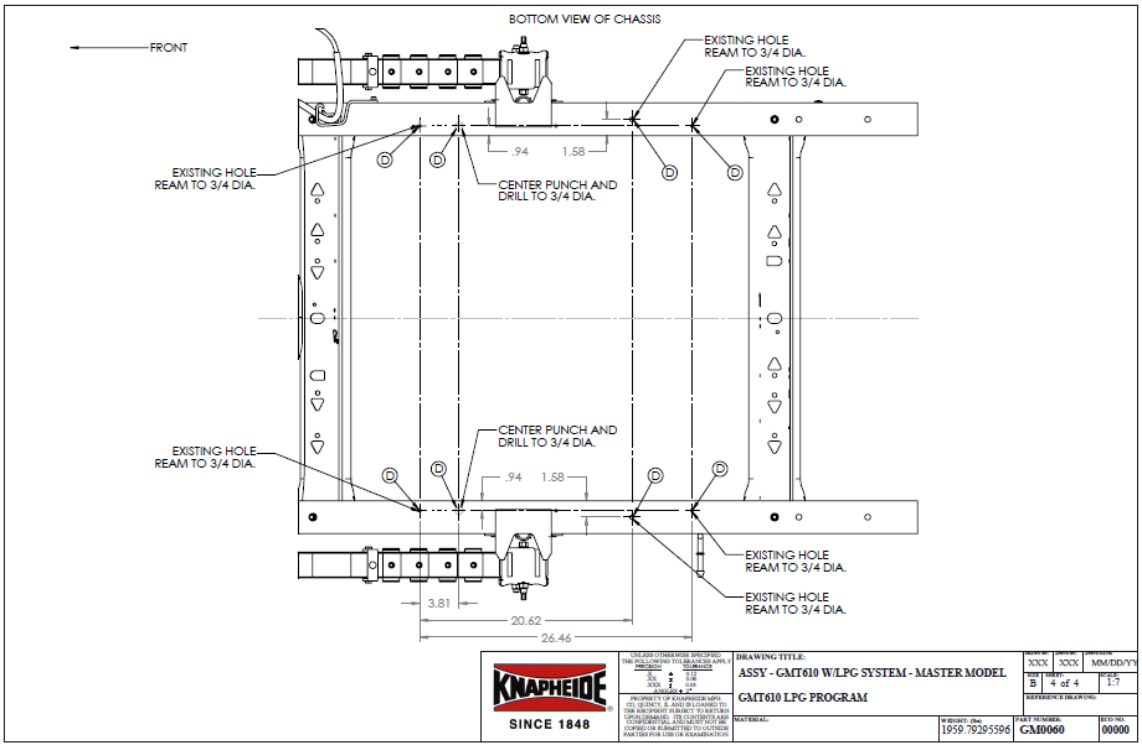
IMPORTANT: ***Install all hardware before tightening any tank mounting bolts***

3. Torque the two bolts into the cross members to 177 +/- 25 ft-lbs ft-lbs

Secondary Tank Installation

1. The Rear tank is secured with the 8 supplied M16 Flange bolts and torque prevailing flange nuts

1. Use the template #4 below to drill the required mounting holes for the rear tank. (Larger Schematic attached in instructions)



2. Torque all hardware to 177 +/- 25 ft-lbs

3. Install the supplied brass “T” and adapter into the 80% stop fill valve on the secondary tank if necessary. Orient the fitting as shown in the picture. Make sure the 80% stop fill does not move when tightening fittings. Use thread sealant on the fittings when installing these items

WARNING: ***Stop fill valve elbows are never tightened at the tank manufacturer. The valve is tight but the elbow must be tightened and clocked to the proper position. Do not allow the valve itself to move while tightening the elbow.***

Primary and Secondary tank fuel gauges

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

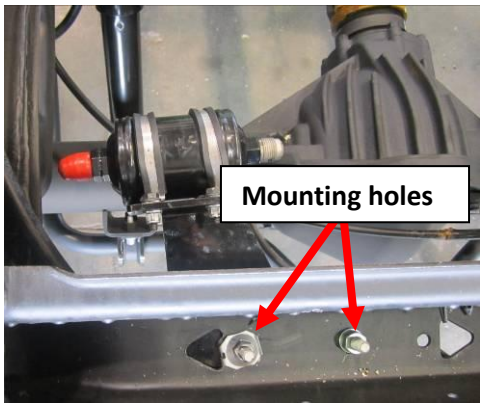
***Note**: Use the 240 - 40 ohm resistance fuel level gauge sending unit supplied in the kit*

2. When installing a fuel level gauge sending unit always reset the sender to zero using a small magnet; after 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 Filter& Fill Hoses installation

1. Install the fill filter bracket shown below onto the cross member located just above the pumpkin. Use the provided M8 flange head bolts and nuts to mount the bracket

2. Use 2 #39 stainless steel "P" clamps and M6 hardware to secure the filter as shown below



3. Using the supplied vinyl edging apply on each of the cross members along the frame rail where the hoses will route. There should be 2 cross members where 4 pieces of edging will be applied

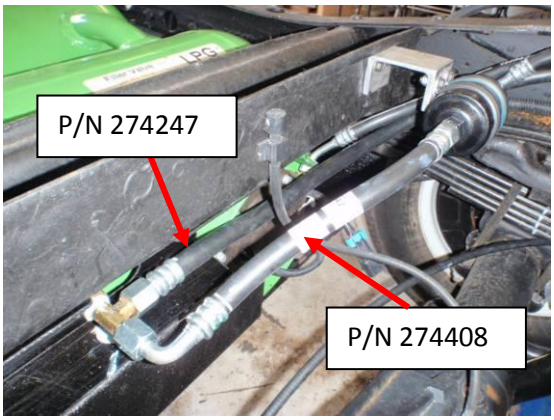
4. Connect fill hose P/N 274408 from the black fill filter to the brass “T” on the secondary tank. This hose is about 12.5” in length. See pictures on next page for reference

5. Connect fill hose P/N 274355 from the brass “T” to the mid-ship tank. Hose will route in front of the secondary LPDM, into the frame, through 2 frame cross members, and attach to the 80% stop fill located in the center portion of the mid ship tank. Use any vinyl edging where hose may contact frame rail edges to prevent chaffing. See pictures on next page for reference

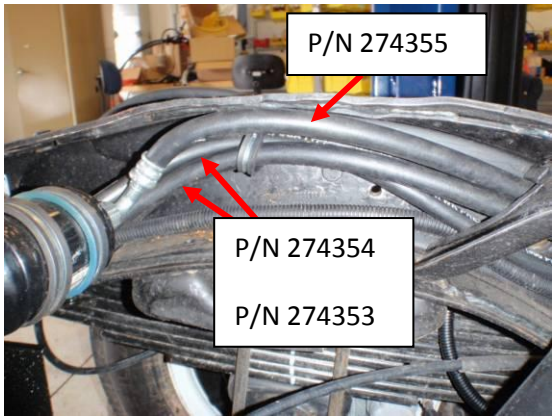
6. Route transfer hose (P/N 274353) from secondary LPDM to primary tank 80% stop/fill valve located on the end of the primary fuel tank. This hose is the only -6 hose in the kit (1 size smaller) See pictures on next page for reference

7. Route Fill hose P/N 274354 from the stock GM fill cup to the Black fill filter. This hose will be secured with 2 “P” clamps, and also pass through 2 cross members. See pictures on the next page for reference

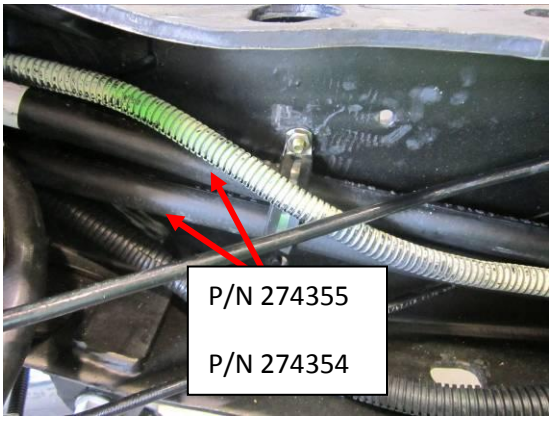
8. After all hoses are routed properly install the “P” clamps in the proper positions and secure with the provided M6 flange head bolts and nuts



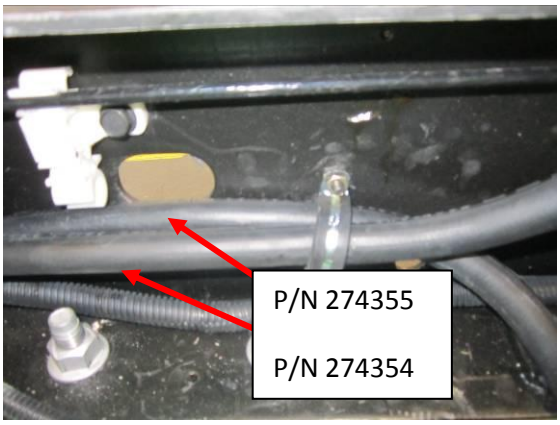
Rear tank/Axel view



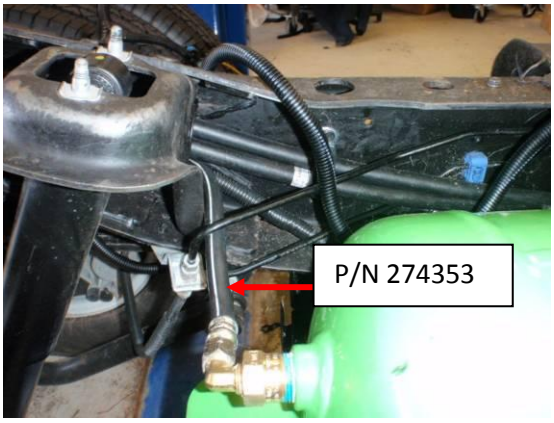
Frame rail Just above Axel

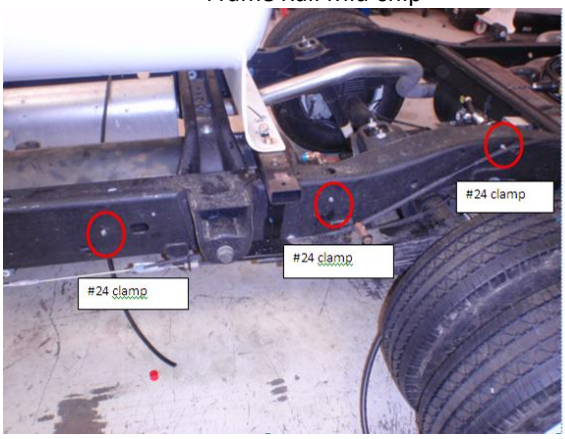


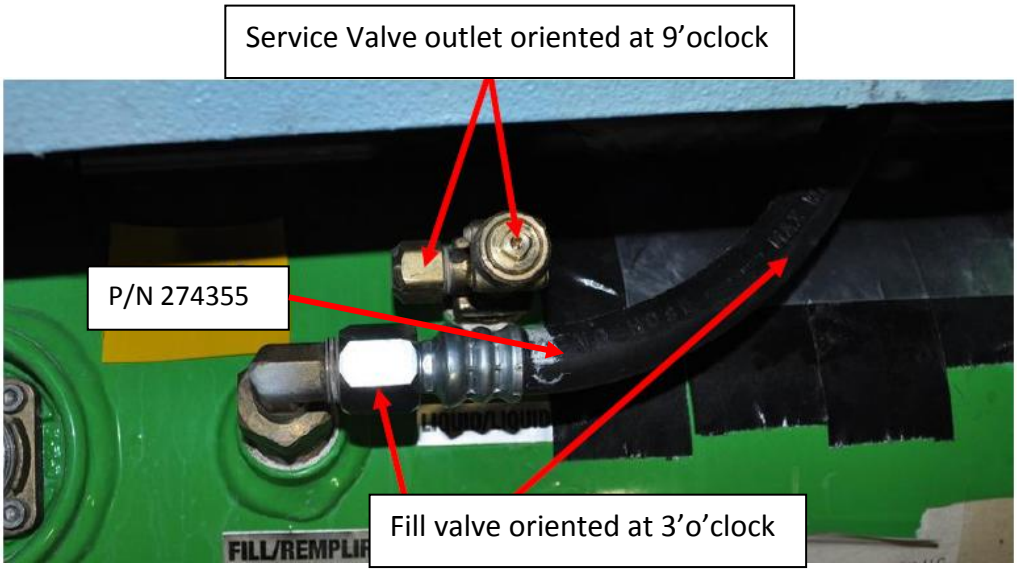
Frame Rail in front of Axel



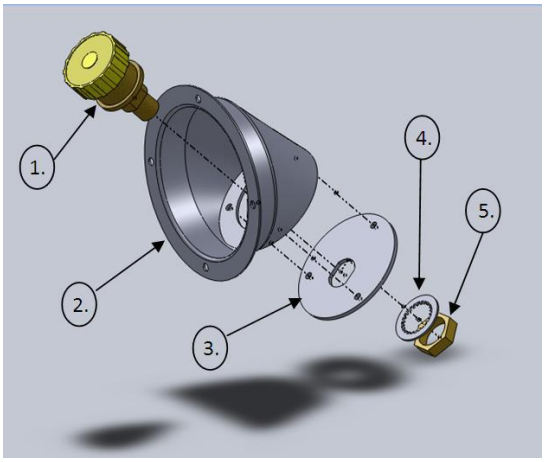
Frame Rail Mid-ship







Fill Cup Assembly



1. Fill Valve

2. Stock GM housing

3. Fill Valve Mounting Bracket

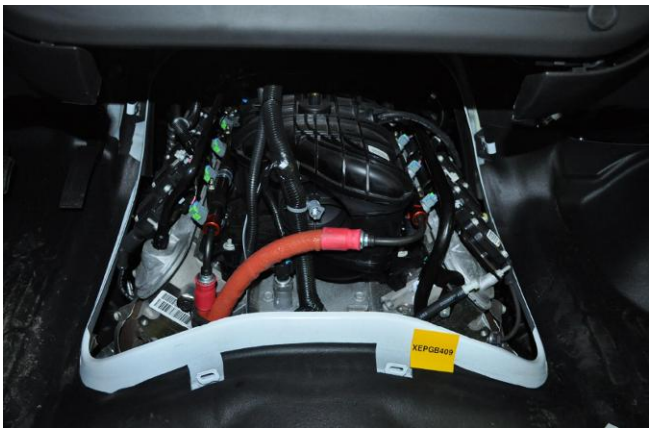
4. Lock-Washer

5. Nut

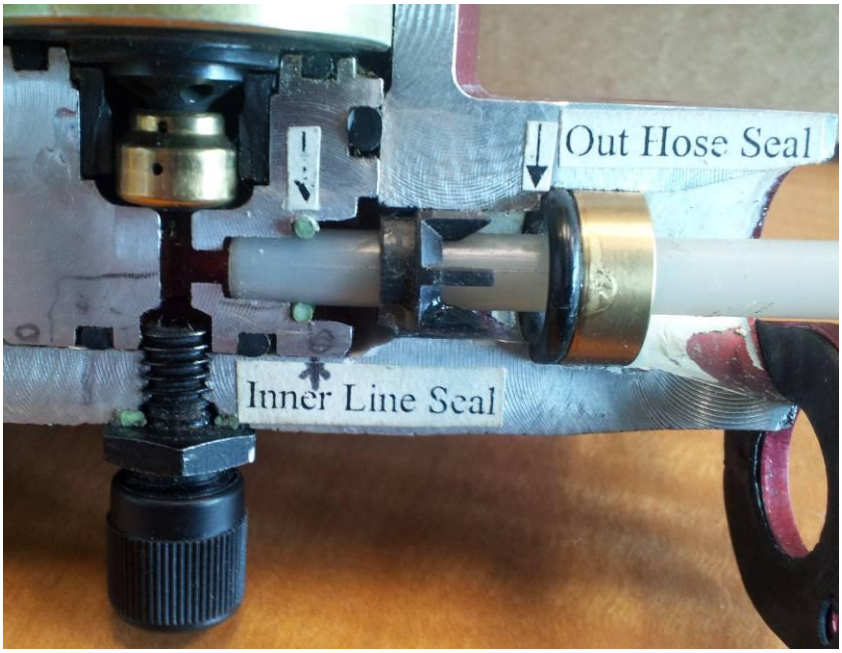
1. Using supplied M5 hardware to assemble the fill cup as shown.

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



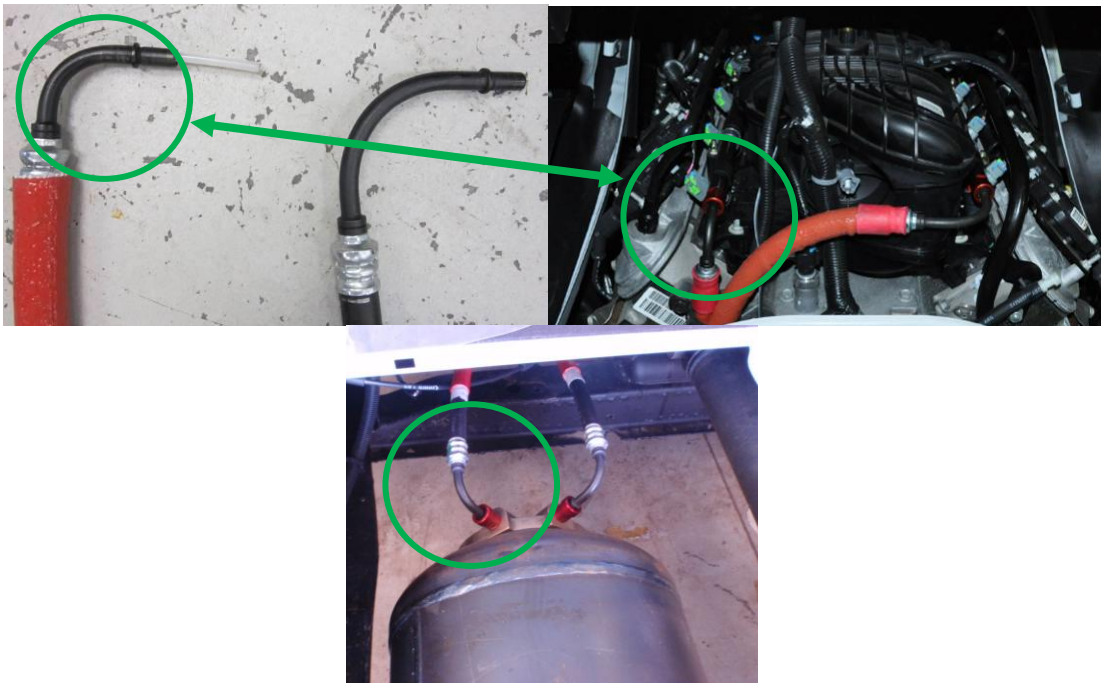
NOTICE: *Take extreme care to center the white nylon line into the rail end fitting and slowly push the line all the way in (turn the hose from side to side or twist it as you are pushing it in) or kinking of the nylon line may occur. Once the white inner line is completely in, push the entire fitting 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*



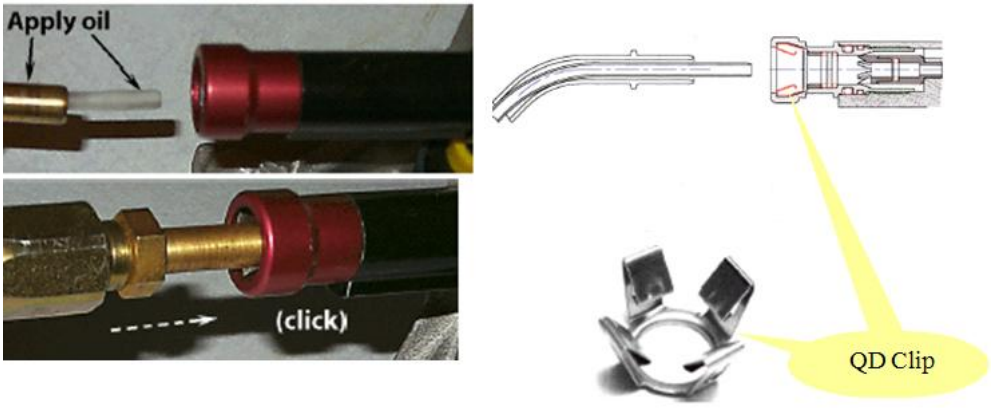
1. Route the two primary fuel hoses under the cab

2. Make sure to identify the correct hose for each side before installing. The passenger side hose (P/N 2743339) has two different style fittings on the hose end. One hose fitting has a larger radius than the other. See pictures below. The larger hose end goes to the passenger side fuel rail, while the smaller hose end connects to the YLPDM. See picture below

3. The drivers side hose (P/N) 274340) 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. The driver's side primary hose is shorter than the passenger side. See pictures below



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



5. Insert the passenger side hose (P/N 274339 into the YLPDM fitting closest to the drive-shaft. This hose is 66.5" and has two different hose ends on each end

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

7. Insert P/N 274340 into the YLPDM fitting closest to the driver's side frame rail. Use extreme care when inserting the primary lines

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

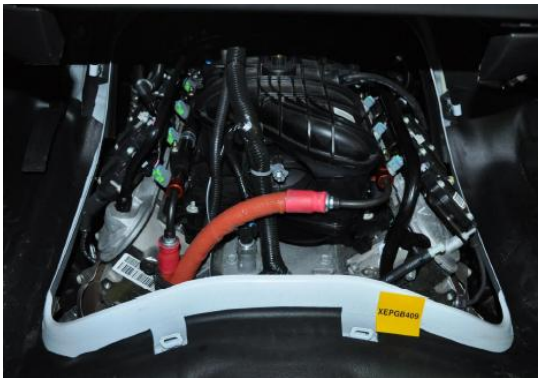
WARNING: ***Improperly attached fuel lines could cause the release of propane causing personal injury.***

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

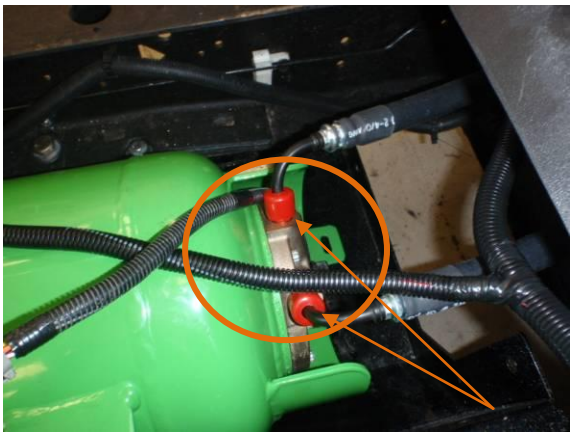
9. Gently pull on the on the hose ends to verify the fitting will not disconnect

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**

10. 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



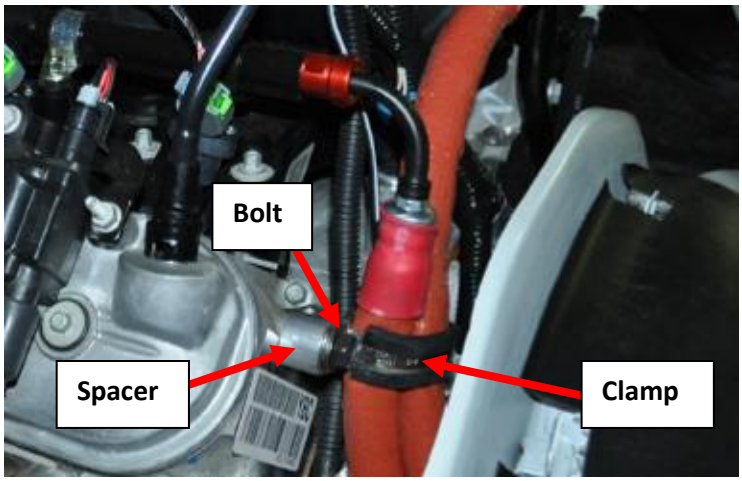
11. Install WARNING label on the primary hose near the fuel rails



12. Slide the red dust caps over the fitting until completely enclosed

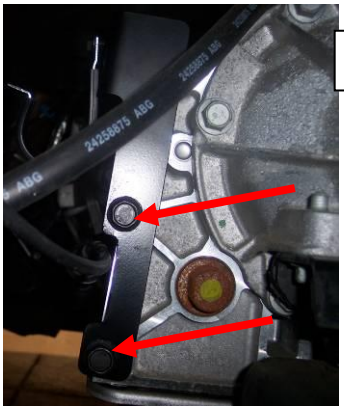
Primary Hose Retainment

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 M10x40mm flange head bolt and ½ inch aluminum spacer. Note picture above to ensure proper routing



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

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

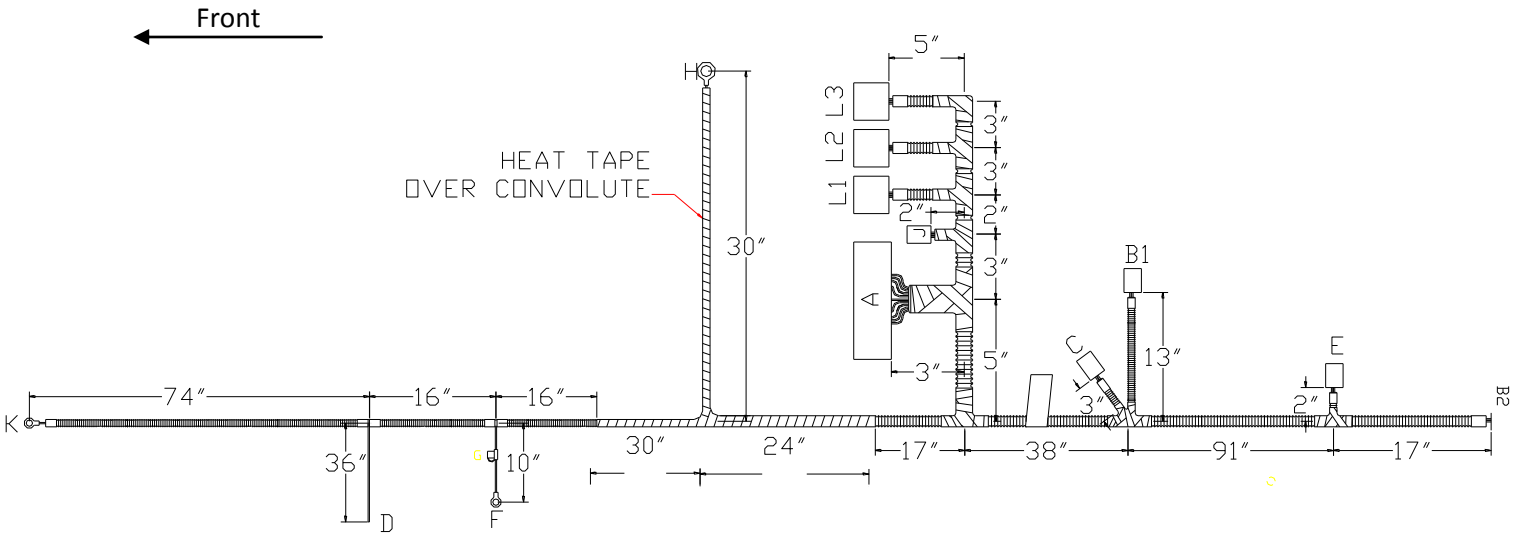
WARNING: Do not make the final electrical connections until the LPEFI system is completely sealed. Applying power could cause the valves in the tank to open, releasing fuel into the hoses.

Main wire harness

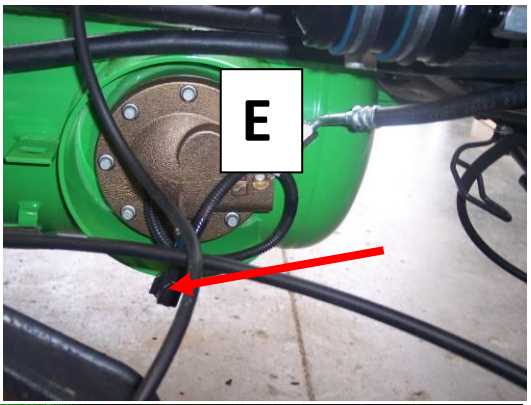
Note: Before securing any of the harness makes sure it is routed to meet the length requirement to make each connection. When you are prepared to secure the harness, tie wrap it every 8 inches.

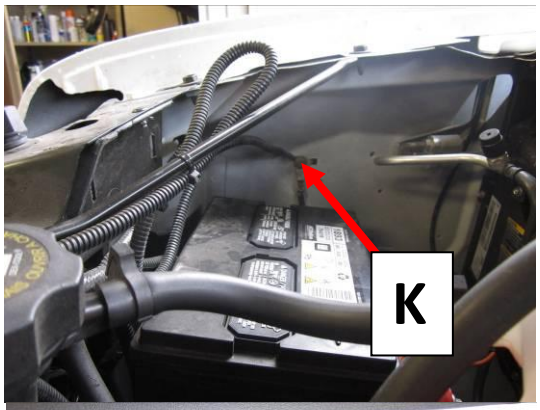
Main LPEFI® harness

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

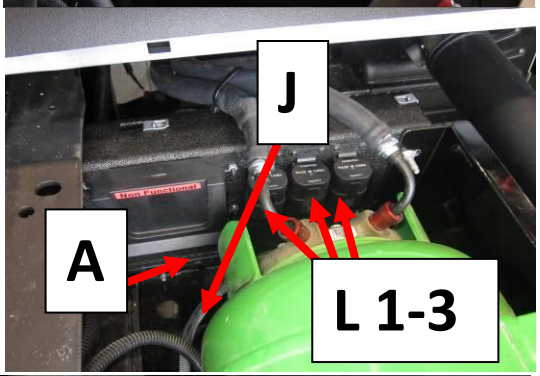


A – (Cinch connector)	To LPCM (Electronics Bracket)
B1 – (2 pin Delphi connector)	To Primary Fuel Tank Gauge (Primary Tank Mid-ship)
B2 – (2 pin Delphi connector)	To Secondary Fuel Tank Gauge (Secondary Tank Front Cylinder)
C – (4 pin Delphi connector)	To GM Fuel Pump Delphi Connector (Inside Frame Rail)
D – (Grey Bare Wire)	To Wait To Start Lamp (Inside Cabin)
E – (2 pin Delphi Connector)	To Secondary LPDM (Secondary Tank Front Cylinder)
F – (Orange Ring Connector)	To Fuse Distribution Block (Under Hood, port side)
H – (Black Ring Connector)	To Ground G103 (Rear portion of Engine Block)
J – (Deutsch 4 pin Connector)	To YLPDM (Primary Tank Bow Section)
K – (Black Ring Connector)	To Ground (Under Hood, Inside Starboard Quarter Panel
L1 – (Relay Connector)	To Primary Pump Relay (Electronics Bracket)
L2 – (Relay Connector)	To Scavenge Pump Relay (Electronics Bracket)
L3 – (Relay Connector)	To Secondary Pump Relay (Electronics Bracket)


E

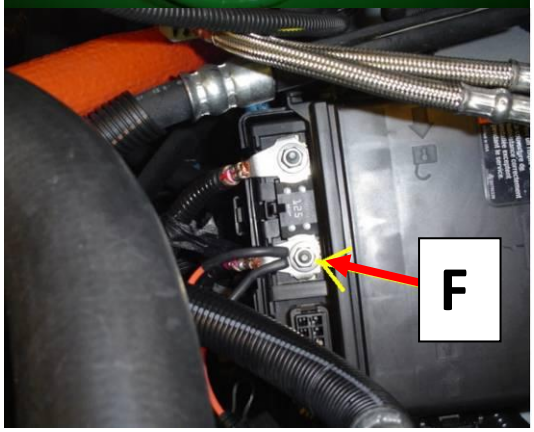

K

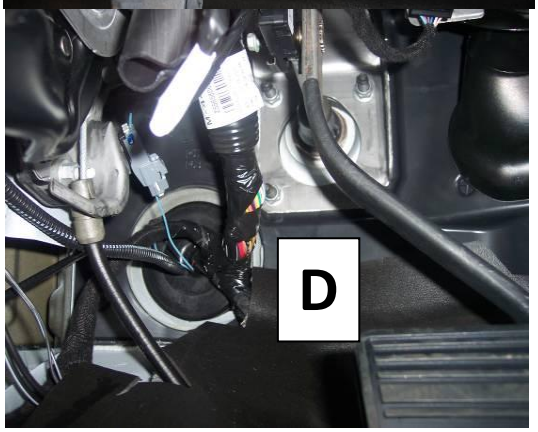

B1


J
A
L 1-3


B2


H


F

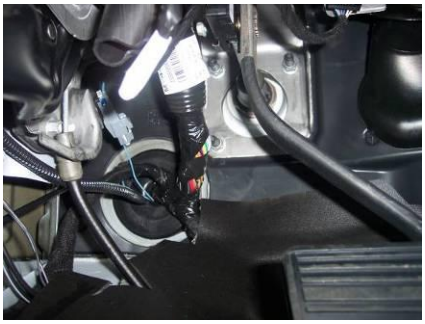

D

2. Start routing the harness at the front of the mid-ship tank or just behind the cab back. Route the Power wire, ground wire, and grey wire along existing GM wiring harness along frame rail up into the under hood compartment. Make sure to follow existing GM wire harness and keep clear of steering components and exhaust

3. Route the ground wire across the radiator fan shroud and to the ground post G105 located on the inside of the passenger quarter panel


4. Route the orange power wire to the fuse distribution block. Be sure to install the harness on the stud closest to the front of the vehicle

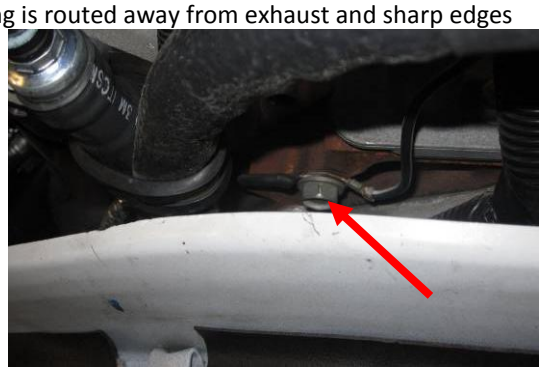
5. Remove the driver's side kick panel and floor mat to access the wire harness grommet that passes through the firewall



6. Route the grey wire through the main wiring harness grommet in the firewall. Connect grey wire to the "wait to start lamp" which is installed underneath the tow/haul switch next to the steering wheel

7. Install ground wire to cab body grounding terminal near the driver's side kick panel

8. Route the second ground strap to the ground location G103 located on the rear portion of the engine block. Make sure all wiring is routed away from exhaust and sharp edges



9. Feed the harness along the driver's side frame rail back to the rear making sure to follow the existing GM wire harness

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

11. 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

LPCM Assembly

1. Use the supplied M5 hardware to attach the LPCM and3 relays to the mounting plate as shown below. Fastener heads should be on the front side of the plate contacting the relays and LPCM box. Washers are placed on between the fastener head and the LPCM. Torque all hardware to 10-12 in-lbs

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

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

Post-Installation Inspection

Installation & test date_____

VIN_____

Make_____Model_____

Installer company name_____

Tank Mfg._____Primary tank serial number_____Secondary tank serial number_____

Fuel Rail Serial Numbers_____ & _____

Quantity of propane _____gallons

Primary hoses engaged into rails with audible click? Yes ☐ ☐No

Primary hoses installed engaged into rails with audible click? Yes ☐ No ☐

Turn key to on position. Does purge cycle initiate? Yes ☐ No☐

Start Vehicle

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 ☐

Transfer System (refer to installation manual for test procedure) Yes ☐ No ☐

Vehicle Comments:_____

Tank Temps & Operating Pressures @ LPDM	*Scan Tool DataStream*
Tank temperature (bottom of tank) _____°F Room temperature _____°F Pump Pressures with 3 Switch Box Tank pressure (Supply & Return Valves on) _____ psi Example: 100 psi Answer 100 psi Pump boost pressure (Supply & Pump on) _____ psi Note: Pump boost is calculated by how much the pressure increases from tank pressure (Pump acceptable boost is min 35 psi) Example: 140 psi (140 psi – 100 psi = 40psi) Answer 40 psi Purge reduction pressure (Supply, Pump on & Return)_____ psi Note: Purge reduction is calculated by how much the pressure decreases from pump boost pressure (Purge reduction range is 1 to 15 psi or tank pressure) Example: 140 psi (140 psi – 125 psi = 15 psi) Answer 15 psi **Note: If specifications are out of range reference page 21 and 29 of the Bi-Phase LPEFI Diagnostic Manual*	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 page 21 and 29 of the Bi-Phase LPEFI Diagnostic Manual*

Technician Name:_____

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.

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 at first.
5. If the connections on the electronic purge control assembly have not been made connect at this time.
6. Connect the battery. You may hear a click at the tank.
7. Turn the key to the on position to start the "wait to start lamp". You should hear the solenoid valves click and the pump running inside the tank. If not, check the electrical connections and refer to the troubleshooting section in the general diagnosis manual.
8. Simultaneously with the preceding step you should inspect all hose connections, the LPDM, the fuel rail connections and the injectors for leaks. If any leaks are found you should disconnect the Liquid Propane Control Module, evacuate the lines and repair. See the general diagnosis manual for procedures.
9. When the purge cycle ends, listen for leaking fuel near the hoses and around the entire system. If you do not hear any obvious hissing or smell propane, turn on the ignition key but do not start. This will start the fuel pump, followed by a purge cycle.
10. When you hear the fuel pump stop running notice the fuel pressure on the test gauge. This pressure should be anywhere from 30 psi in cold weather to 180 psi in hot weather.
11. Turn the key off, then on again to start another purge cycle.
12. While the pump is running, observe the fuel pressure. It should be 35 to 55 psi higher than it was in step 10.
13. Turn the key off and check for leaks at every hose fitting on the vehicle. Apply an approved leak detection fluid (similar to soapy water) or use an electronic propane leak detector. The tank, tank valves, fuel injectors and fuel rails have been tested at the factory but you must recheck, and check the hoses and hose fittings.

WARNING: Do not use an open flame to check for leaks. If you smell propane, it's from a leak. The LPEFI system uses sealed fittings and lined hoses, and the there should never be a propane odor from an LPEFI vehicle.

Typical Leak Checking Method

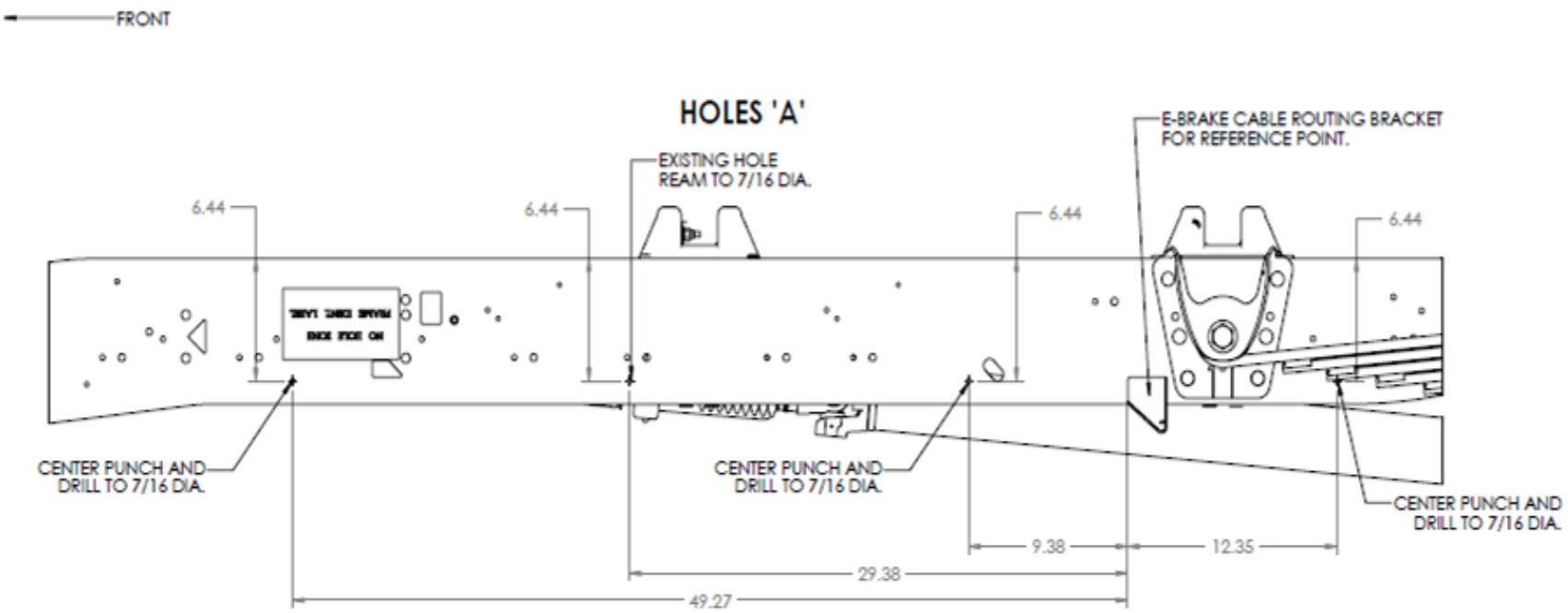
Testing the Installation (cont'd)

14. If there are no leaks, start the engine.
15. Connect a diagnostic scan tool to the vehicle.
16. With the engine running, check the diagnostic trouble codes (DTCs). Correct any problems you find. If the engine is not running smoothly, refer to the general diagnosis manual.
17. If there are no codes and the engine is running smoothly let the vehicle run until it is to full operating temperature (190° F on your Scan tool).
18. Turn the key off and follow the testing procedures described in the Post-Installation Inspection
19. Fill out the Post-Installation Inspection completely.
20. Turn off the engine and disconnect the fuel pressure gauge set. Be sure to reinstall the dust cap on the Schrader valve.

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

21. Drive the vehicle for at least 15 minutes, if possible. Drive under various conditions and a variety of speeds.
22. After the drive notice the long-term fuel trims as noted in the post-inspection. The long-term fuel trims should not be the same as they were before the drive. The long-term fuel trims should not be more than + or – 20%.
23. After driving and inspecting the vehicle turn it off and let it sit with the hood and doors closed for 15 minutes. After 15 minutes return to the vehicle, turn the key to the on position to initiate a purge and start the engine. If the engine starts easily, 3 seconds or so, the vehicle is ready to use.
24. If there are no leaks, no DTCs and the engine runs well (smooth idle, smooth acceleration, good power), the vehicle is ready to use.
25. Testing secondary tank system: Verify secondary tank gauge reads between ½ and ¾. Remove primary tank gauge. Start truck. With a magnet sweep backside of the gauge so primary gauge needle move below ½. Verify secondary pump is running. If secondary pump does run, turn off vehicle and re-attach primary gauge. If secondary pump doesn't run, verify wiring and retest.
26. If you did not fill out the warranty registration card in the Installing Labels Procedure do so now. Also complete the Post-Installation Inspection and return both to Bi-Phase Technologies to establish the warranty start date for your vehicle.

26 If it does not work as described check all wire connections, battery voltage and contact Bi-Phase Technical Hotline at (888) 465-0571.



STREET SIDE VIEW OF CHASSIS

KNAPHEIDE
SINCE 1848

UNLESS OTHERWISE SPECIFIED THE FOLLOWING TOLERANCES APPLY
PRECISION: TOLERANCE
X ± 0.12
XX ± 0.06
XXX ± 0.03
ANGULAR ± 2°

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DRAWING TITLE:
ASSY - GMT610 W/LPG SYSTEM - MASTER MODEL

GMT610 LPG PROGRAM

XXX	XXX	MM/DD/YY
SIZE: B	SHEET: 1 of 4	SCALE: 1:6

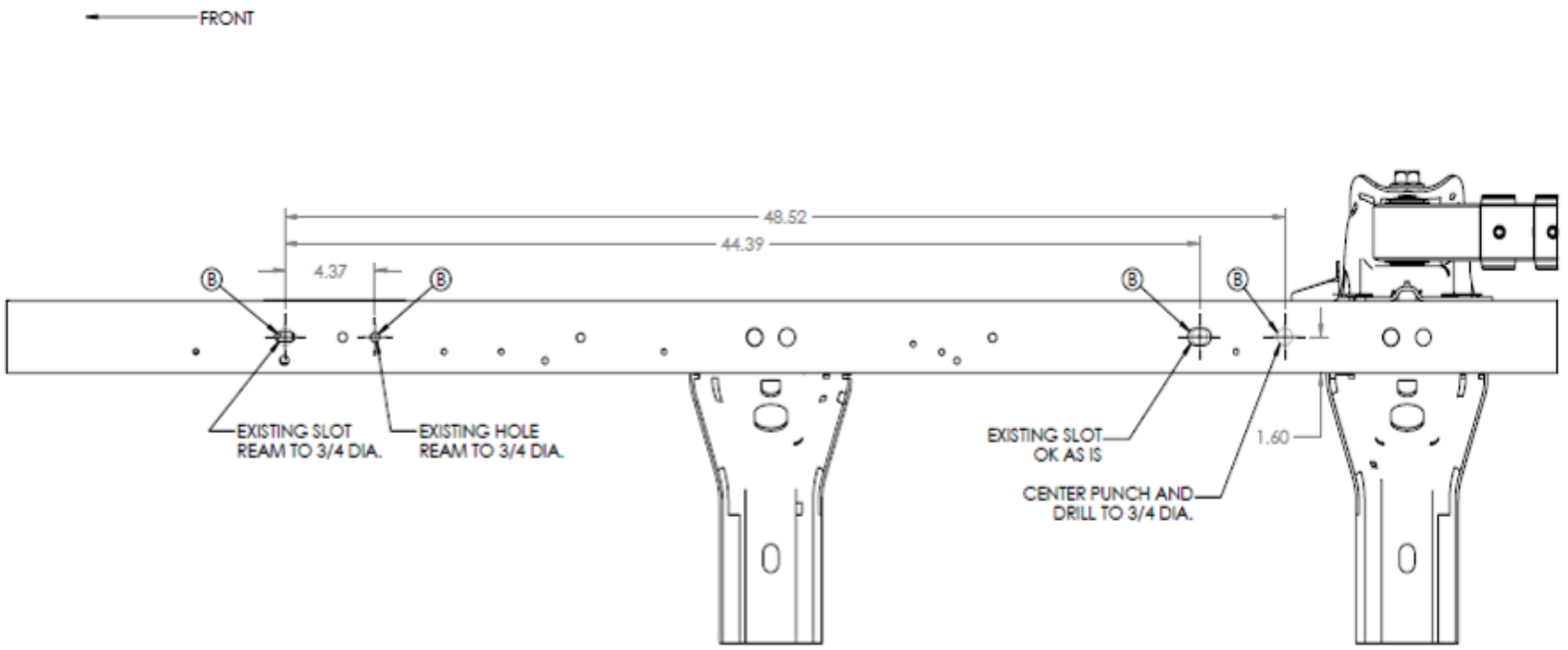
REFERENCE DRAWING:

MATERIAL:

WEIGHT: (lbs) 1959.79295596

PART NUMBER: GM0060

REV NO. 00000



BOTTOM VIEW OF CHASSIS

KNAPHEIDE
SINCE 1848

DRAWING TITLE:
ASSY - GMT610 W/LPG SYSTEM - MASTER MODEL

GMT610 LPG PROGRAM

XXX	XXX	MM/DD/YY
SIZE: B	SHEET: 2 of 4	SCALE: 1:5

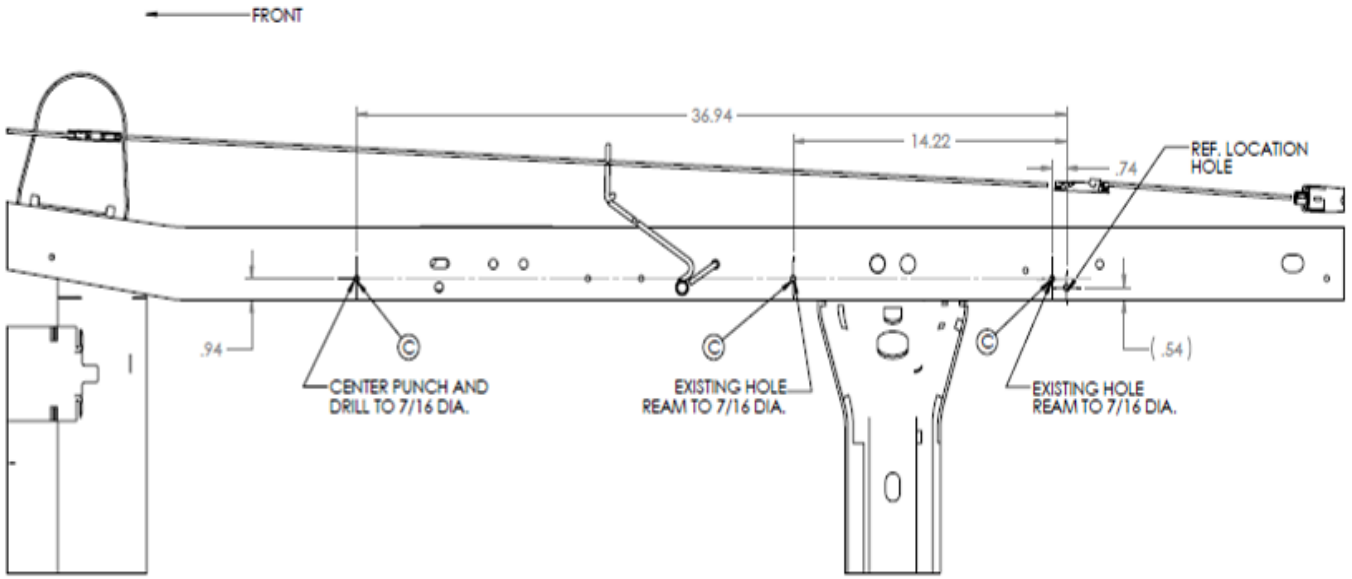
REFERENCE DRAWING:

MATERIAL:

WEIGHT: (lbs) 1959.79295596

PART NUMBER: GM0060

ECO NO. 00000



BOTTOM VIEW OF CHASSIS

KNAPHEIDE
SINCE 1848

UNLESS OTHERWISE SPECIFIED THE FOLLOWING TOLERANCES APPLY

PRECISION	TOLERANCE
X	± .12
.XX	± .06
.XXX	± .03
ANGLES	± 2°

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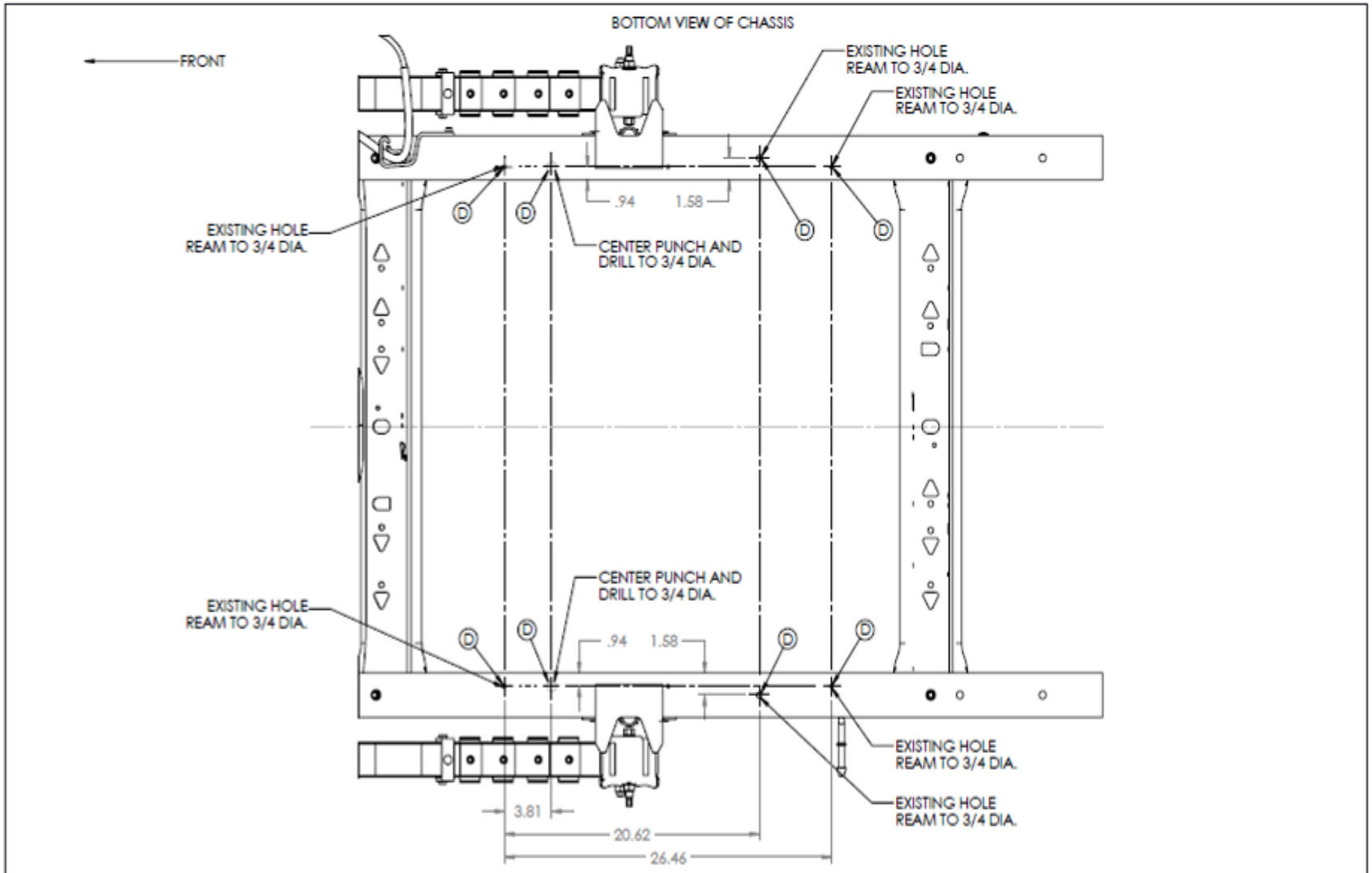
DRAWING TITLE:
ASSY - GMT610 W/LPG SYSTEM - MASTER MODEL
GMT610 LPG PROGRAM

DRAWN BY:	CHECKED:	DATE/REV:
XXX	XXX	MM/DD/YY

SIZE	SHEET:	SCALE:
B	3 of 4	1:5

REFERENCE DRAWING:

MATERIAL:	WEIGHT: (lbs)	PART NUMBER:	ECO NO.
	1959.79295596	GM0060	00000



KNAPHEIDE
SINCE 1848

UNLESS OTHERWISE SPECIFIED THE FOLLOWING TOLERANCES APPLY

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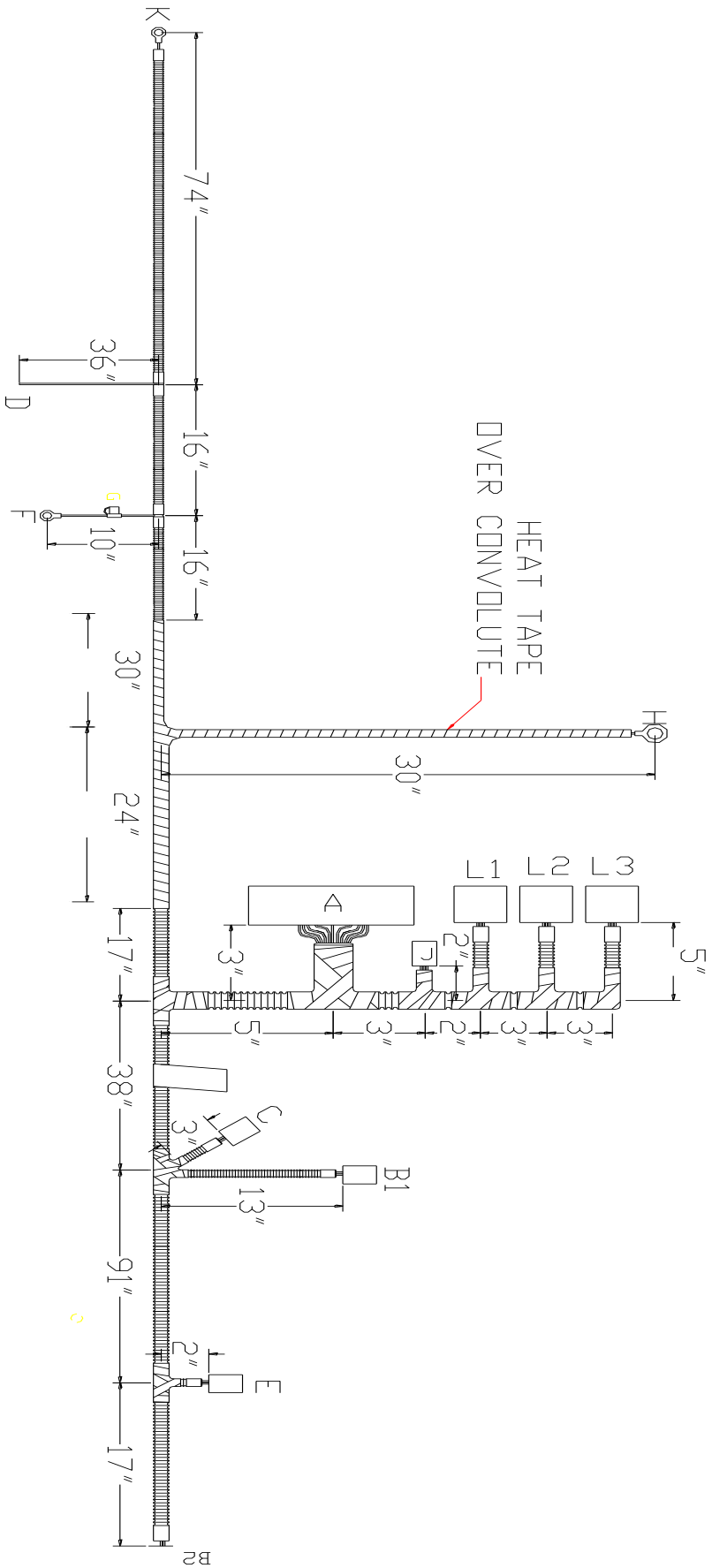
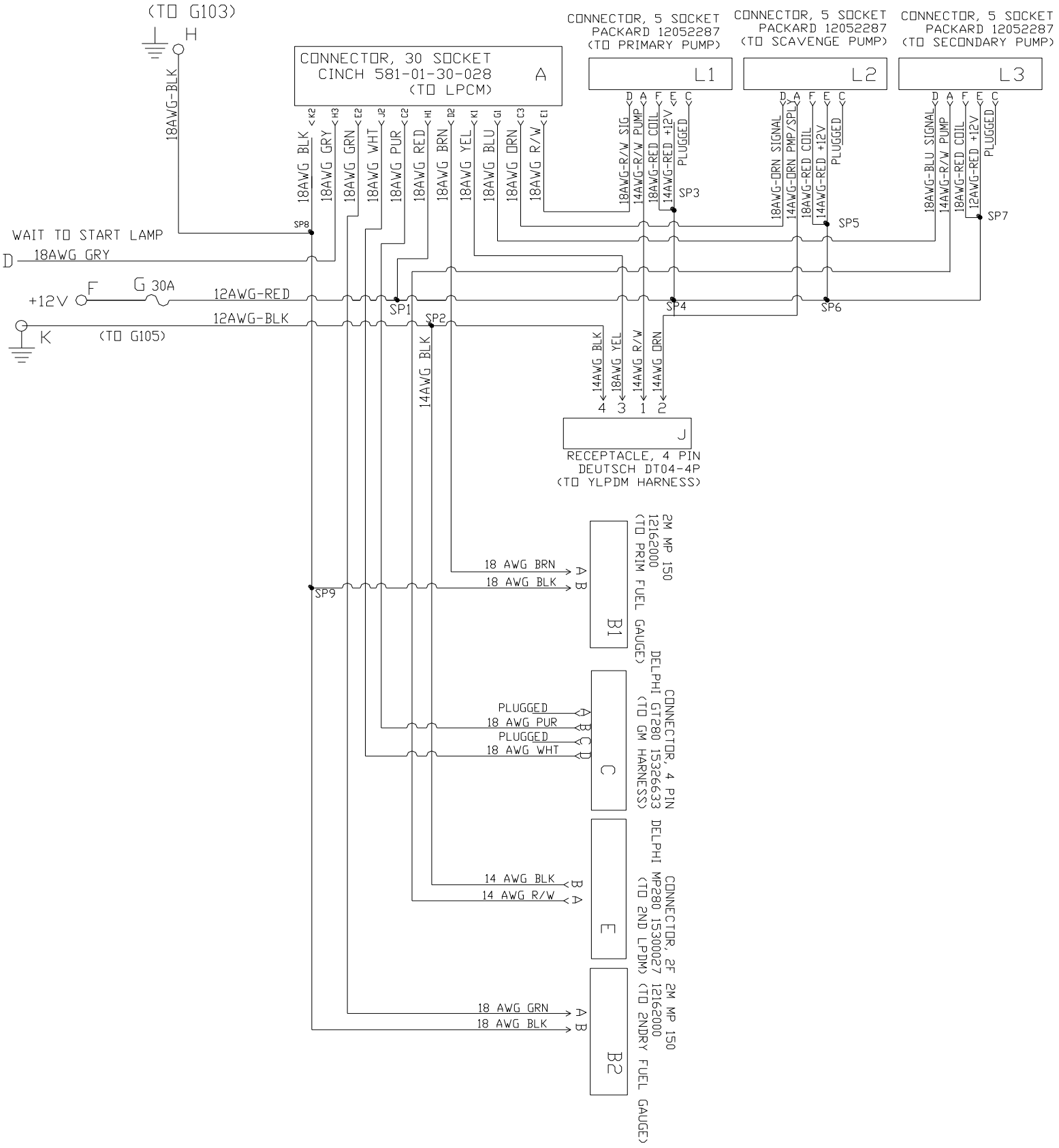
DRAWING TITLE:
ASSY - GMT610 W/LPG SYSTEM - MASTER MODEL
GMT610 LPG PROGRAM

XXX	XXX	MM/DD/YY	
SIZE: B	SHEET: 4 of 4	SCALE: 1:7	
REFERENCE DRAWING:			
MATERIAL:	WEIGHT: (lbs) 1959.79295596	PART NUMBER: GM0060	REV NO. 00000


K
74"
36"
D
16"
F
10"
16"
HEAT TAPE
OVER CONVOLUTE
H
30"
30"
24"
L1
L2
L3
A
3"
2"
5"
5"
3"
2"
3"
3"
17"
38"
C
3"
B1
13"
91"
2"
E
17"
B2


(TO G103)
H
18AWG-BLK
CONNECTOR, 30 SOCKET
CINCH 581-01-30-028
(TO LPCM)
A
CONNECTOR, 5 SOCKET
PACKARD 12052287
(TO PRIMARY PUMP)
L1
CONNECTOR, 5 SOCKET
PACKARD 12052287
(TO SCAVENGE PUMP)
L2
CONNECTOR, 5 SOCKET
PACKARD 12052287
(TO SECONDARY PUMP)
L3
18AWG BLK
18AWG GRY
18AWG GRN
18AWG WHT
18AWG PUR
18AWG RED
18AWG BRN
18AWG YEL
18AWG BLU
18AWG ORN
18AWG R/W
18AWG-R/W SIG
14AWG-R/W PUMP
18AWG-RED COIL
14AWG-RED +12V
PLUGGED
18AWG-ORN SIGNAL
14AWG-ORN PMP/SPL
18AWG-BLU SIGNAL
12AWG-RED +12V
SP3
SP5
SP7
SP8
WAIT TO START LAMP
D
18AWG GRY
F
G 30A
+12V
12AWG-RED
12AWG-BLK
K
(TO G105)
SP1
SP2
SP4
SP6
14AWG BLK
18AWG YEL
14AWG R/W
14AWG ORN
4
3
1
2
J
RECEPTACLE, 4 PIN
DEUTSCH DT04-4P
(TO YLPDM HARNESS)
SP9
18 AWG BRN
18 AWG BLK
A B
B1
2M MP 150
12162000
(TO PRIM FUEL GAUGE)
PLUGGED
18 AWG PUR
PLUGGED
18 AWG WHT
A B C D
C
CONNECTOR, 4 PIN
DELPHI GT280 15326633
(TO GM HARNESS)
14 AWG BLK
14 AWG R/W
B A
E
CONNECTOR, 2F 2M MP 150
DELPHI MP280 15300027 12162000
(TO 2ND LPDM) (TO 2NDRY FUEL GAUGE)
18 AWG GRN
18 AWG BLK
A B
B2