

2015-2016
Ford F-150 5.0L
CNG Conversion System Owner's Guide Supplement

M-TECH
Solutions Inc.

**CNG
Conversion
System**

**Owner's Guide
Supplement**



**2015-2016 Ford F-150
5.0L**

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This Owner's Guide Supplement should be considered a permanent part of the vehicle and should remain with the vehicle when it is sold.

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Required Maintenance Schedule & Log

CNG Coalescent Filter must be replaced every 10,000 miles. Warranty may be voided if not replaced every 10,000 miles.

1.	_____	_____	_____	_____
	Date	Mileage	Service Center Name	Technician Signature
2.	_____	_____	_____	_____
	Date	Mileage	Service Center Name	Technician Signature
3.	_____	_____	_____	_____
	Date	Mileage	Service Center Name	Technician Signature
4.	_____	_____	_____	_____
	Date	Mileage	Service Center Name	Technician Signature
5.	_____	_____	_____	_____
	Date	Mileage	Service Center Name	Technician Signature
6.	_____	_____	_____	_____
	Date	Mileage	Service Center Name	Technician Signature
7.	_____	_____	_____	_____
	Date	Mileage	Service Center Name	Technician Signature
8.	_____	_____	_____	_____
	Date	Mileage	Service Center Name	Technician Signature
9.	_____	_____	_____	_____
	Date	Mileage	Service Center Name	Technician Signature
10.	_____	_____	_____	_____
	Date	Mileage	Service Center Name	Technician Signature
11.	_____	_____	_____	_____
	Date	Mileage	Service Center Name	Technician Signature
12.	_____	_____	_____	_____
	Date	Mileage	Service Center Name	Technician Signature

CNG Fuse Location & Diagram

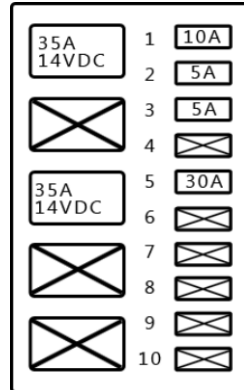
The fuses for your CNG alternative fuel conversion system are not located in the same area as the original equipment fuses. The CNG alternative fuel conversion system fuses are located in engine compartment next to Engine Control Unit.

Fuse List:

- 1. 10A - AFCM-ECU
- 2. 5A - Memory Power & OBD II
- 3. 5A – Ignition & Accessory Power
- 4. Empty
- 5. 30A - Ignition & Solenoid
- 6-10 Empty

Relay List:

- 1-2. 35A - AFCM-ECU
- 3-4. Empty
- 5-6. 35A - Ignition & Solenoid
- 7-10. Empty



When you find it necessary to replace a fuse, be sure to replace it with only a fuse of the same rating.

Technical Specifications

CNG Tank Manufacturer - Lincoln Composites

CNG Tank Capacity – Can range from 12.2 to 30.2 GGE Manufactured Rated. Results may vary. The CNG tank will always have CNG remaining even after the system shuts off, because the engine requires a minimum working pressure of approximately 350 psi. Due to this requirement you will not be able to fill CNG tank with manufacturer rating. If ambient temperature goes up or down, pressure also correspondingly goes up or down. To prevent under fills, tanks can be slowly filled to allow heat to dissipate.

CNG Tank Pressure - 3,600 psi at 70°F

CNG Tank Inspection Requirements: Visual inspection every 3 years or every 36,000 miles, which ever occurs first. Immediate inspection is required in the event of a crash. *See page 17 in the event of crash.*

OWNERS IDENTIFICATION

Original Owner

Name: _____

Address: _____

V.I.N.: _____

Conversion Date: _____

Warranty Number: _____

Dealer/Installer Name: _____

Dealer Number: _____

Address: _____

Owners _____ Signature: _____

Dealers Signature: _____

Second Owner

Name: _____

Address: _____

Date Purchased: _____

Introduction

This booklet supplements your Owner's Guide. It describes the operation of your converted alternative fuel vehicle and how it differs from a standard gasoline powered vehicle. Your new alternative fuel vehicle operates and performs like a conventional gasoline only powered vehicle. However, there are a few differences you should be aware of that are covered in this supplement. In addition to reading the original equipment Owners' Guide it is very important that you read this guide and familiarize yourself and anyone else operating this vehicle with the material covered in this supplement.

Some of the information in this supplement replaces certain instructions in the original equipment Owner's Guide. Please read this supplement carefully in its entirety to understand the operation and unique features of your alternative fuel vehicle.

Warnings

You will find important safety information in this supplement and in the Owner's Guide. This information reminds and alerts you to be particularly careful in potential hazard areas that can cause damage to your vehicle or possible injury to yourself, your passengers or others. Please read all warnings carefully.

Taking Care of the Unexpected

CNG Fuel System Leak Emergency Procedure

If you smell natural gas other than when refueling, or if you hear a hissing sound, follow these directions:

1. Park your vehicle in a well-ventilated area and apply the parking brake. Keep heat, sparks and flames away. Open all windows and the trunk lid for ventilation.
2. Turn the ignition switch to the lock position or OFF.
3. DO NOT drive the vehicle. Your vehicle should be towed to an authorized service facility for inspection immediately. The complete alternative fuel system must be inspected and tested before the vehicle can be operated again.

Service and maintenance to the alternative fuel system must be conducted at an authorized dealership by qualified technicians. Failure to do so may result in personal injury or damage to the alternative fuel system.

In The Event of a Crash

If possible pullover to a safe location and follow steps 2-3.

Gasoline Fuel System for Dedicated Only Version

As a dedicated Natural Gas Vehicle, the converted engine now runs solely on compressed natural gas. Manufacturer's recommendation is ½ tank of gasoline in OEM fuel tank and never allowing it to go below ¼ tank of gasoline. Fuel stabilizer must be added every 12 months. This will help avoid detrimental deposits in the gasoline circuit due to fuel deterioration. A label has been applied to the fuel fill door of the vehicle warning against filling the vehicle with gasoline.

The CNG Cylinder

The CNG fuel tank meets the specifications and safety standards for ANSI/CSA NGV2, NFPA 52, CAN/CSA B51, TC 301.2, METI-KHK, DOT-NHTSA, US DOT FMVSS 304, ISO 11439 and ECE R110. The CNG fuel tank is required to be visually inspected every 3 years or every 36,000 miles, whichever ever occurs first, after its production date.

Service and maintenance to the alternative fuel system must be conducted at an authorized dealership by qualified technicians. Failure to do so may result in personal injury or damage to alternative fuel system.

Have a qualified and certified cylinder technician inspect the tank for damage or leaks. If tank passes inspection, they will put a sticker on the tank that will show the next required inspection date or mileage.

If your vehicle is involved in a collision, then your CNG tank must be inspected for damage. Failure to do so may result in personal injury or damage to the alternative fuel system and the vehicle.

Most CNG fuel tanks have a lifetime of 20 years. After manufacturer expiration date the tank is required to be replaced and destroyed. The expiration date of the CNG fuel tank is on a label the manufacturer attached to the fuel tank. If removing or replacing the CNG tank from your vehicle you must contact an authorized dealership by qualified technicians to remove the tank. Failure to do so may result in personal injury or damage to alternative fuel system. Cylinders are high pressure and need to be vented properly before removal or replacement. Do not reuse the old CNG tanks; certified CNG tank inspectors can dispose of CNG tanks properly. Contact your authorized dealer.

SAMPLES BELOW:



Types of System

Unlike the conventional gasoline model, your vehicle with CNG conversion system operates on Compressed Natural Gas (CNG).

There are two types of CNG Conversion systems:

- **Dedicated** – vehicle operates solely on natural gas.
- **Bi-fuel** – vehicle operates on gasoline or natural gas.

If you are unsure as to which system you have, contact your dealer.

Your new alternative fuel conversion system is a result of years of research and technical experience. M-TECH uses the newest electronics to provide excellent drivability, emissions control and fuel economy.

Compressed Natural Gas (CNG)

Compressed natural gas is a mixture of hydrocarbon gases with approximately 96% methane and is highly flammable, odorless and colorless. Natural gas is a highly pressurized version of the same clean burning natural gas used in many homes. Compressed natural gas is abundant in the United States, which allows natural gas to be used as a very cost-effective alternative fuel. Natural gas is a clean burning fuel, which makes it highly suitable to meet the most stringent automotive emission requirements. Natural gas is cheap, clean, and domestically produced.

The compressed natural gas used in your vehicle is stored under high pressure (maximum of 3,600 psi) at 70°F (21°C). The compressed natural gas system in your vehicle, including the tank, hoses and other components have been designed to hold gas at this pressure. All components on your alternative fuel system have been tested for safety. You should never smell gas or hear a hissing sound unless you are refueling. If you smell gas or hear a hissing sound at any other time you need to shut down the CNG system and follow the instructions on page 17.

A bi-fuel system will start up on Fuel source last used. If the vehicle runs out of CNG it will automatically switch to gasoline mode until refueled with CNG. Once refueled with CNG it will switch automatically back to CNG mode. The CNG mode is the default as long as there is CNG in the tank, unless manually turned off. The dedicated system starts on CNG and does not have a gasoline mode.

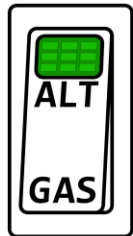
Fuel Source Selector Switch (Bi-fuel Models Only)

This switch serves as a:

- **Fuel Source Selector**

This switch is a selector switch (bi-fuel model only). By lightly depressing this switch during vehicle operation the fuel that the vehicle is operating on may be changed. This change can be made at any time the driver wishes. The switch flipped down to the "GAS" position indicates the vehicle is operating on gasoline. The switch flipped to the "ALT" position will illuminate the green light, which indicates the vehicle is operating on compressed natural gas. After starting the vehicle it may take up to 90 sec for the light on the switch to become active. This does not effect the ability to switch between fuel sources.

Natural Gas Mode



Gasoline Mode



Maintenance

Engine Oil - Follow manufacturers recommendation for engine oil change intervals as listed in the original equipment Owner's Guide.

Engine Coolant - Follow manufacturers recommendation for engine coolant service intervals as listed in the original equipment Owner's Guide. Your vehicle has 2 additional coolant hoses that are connected to the CNG high-pressure regulator. These hoses run the entire length of the vehicle from the engine compartment to the high-pressure regulator in the rear of the vehicle. Visually inspect these hoses, their mounts and covering annually.

CNG Filter

Your CNG vehicle has a CNG Coalescent filter mounted next to CNG tank in bed of truck. The natural gas travels through a short high-pressure fuel line and enters a (10 micron) coalescent filter, which removes aerosol compressor oil, oil droplets and other contaminants from the natural gas to help protect your engine and alternative fuel system components. Some CNG stations are not maintained properly and can transport compressor oil in the gas stream. This usually happens on older stations, but can happen on new station as well. If your dealer determines there is oil in your filter then contact the CNG station owner and make them aware of the problem. Having oil or other contaminants in your CNG tank can void warranties and deteriorate the inside of the tank. Please be sure to have your filter inspected on a regular basis.

This filter needs to be replaced and drained on a regular basis. This filter must be changed every 10,000 miles. This requires special tools and is under high pressure, so please do not try to service yourself. You may injury yourself or cause damage to alternative fuel system. Please contact your authorized dealer for maintenance on the filter.

Service and maintenance to the alternative fuel system must be conducted at an authorized dealership by qualified technicians. Failure to do so may result in personal injury or damage to alternative fuel system.

Starting the Engine

Your CNG vehicle will start like any conventional gasoline vehicle. By following the procedure outlined below you will be assured of consistent engine starts.

1. Apply the parking brake.
2. In cold weather turn of all accessories to reduce power drain on the battery.
3. Make sure the shift lever is in park. Press and hold brake pedal down.
4. Without touching the accelerator pedal, turn the ignition switch to the ON position. You may hear a click from the in-tank fuel shutoff valve.
5. Turn the ignition switch to the start position. Do not hold the switch in the start position for more than 15 seconds at a time. If the engine does not start right away, pause for at least 10 seconds and try again.
6. If the engine does not start or starts but stalls right away, repeat step five with the accelerator pedal pressed half way down. If the engine starts, release pressure to the accelerator pedal so the engine does not race.
7. If the engine still does not start, repeat step five with the accelerator pedal pressed all the way down and hold it there while starting. As before, keep the ignition switch in the start position for no more than 15 seconds. Return to step 6 if the engine does not start. If the engine starts lift your foot off of the accelerator pedal so the engine does not race.

*****IMPORTANT-** Dedicated (CNG Only) vehicles require a 3-5 minute warm up period before driving to allow for smooth operation of system.

Fuel Level Gauge

The Gauge provides the driver with the current fuel level in the tank.

Full



Empty



Tool Box

WARNING:

Do not drill into or modify the tool box and skirt. Tool box and skirt should only be serviced or removed by an authorized technician.

On the Bi-fuel models the Fuel fill nozzle is located on the drivers side of the tool box. Do not place heavy objects on top of or against the tool box or skirt.



Precautionary Information

Always use caution when servicing or maintaining any of the alternative fuel system components. Make sure to have adequate ventilation when servicing to prevent build up that may result in combustion.

Service to alternative fuel system must be conducted at an authorized dealership by qualified technicians. Failure to do so may result in injury or damage to alternative fuel system.

In some areas the local authorities require that vehicles that have a CNG conversion system follow certain regulations and guidelines such as: Refueling, underground parking and operation of vehicle under bridges or in tunnels. Contact you local authorities for information in your area.

Breathing hydrocarbon gases like natural gas or air that lacks oxygen can result in headache, dizziness and weakness in the arms and legs. Prolonged breathing of natural gas in confined areas can result in suffocation. In the event of prolonged breathing of natural gas in confined areas, remove victim to fresh air and call your emergency response.

If your alternative fueled vehicle is to be painted, the CNG tanks must be emptied before painting begins. This venting procedure must be done at an authorized dealership by qualified technicians.

Alternative Fuel

Your vehicle has been converted to operate on compressed natural gas (CNG). The natural gas you use to refuel must meet the NFPA-52 and SAE J1616 standards for fuel quality. Do not use liquefied natural gas (LNG) or a CNG that is derived from a process such as flashing (heating LNG). Failure to use the correct type of alternative fuel may cause damage to the engine and damage the alternative fuel conversion system and void your alternative fuel components warranty.

Fuel System Shutoff

The Electronically Controlled Shutoff Valve is located inside the vehicles CNG cylinder. When the ignition switch is locked to acc or the OFF position the valve is closed, shutting off the flow of CNG to the engine. The Electronically Controlled Shutoff Valve allows CNG to flow only when the ignition switch is turned to the ON position. This is similar to how an electric fuel pump works in a gasoline-powered vehicle.

Carrying Cargo

The CNG fuel tanks are located in cargo area in rear of vehicle, enclosed in a cover. When you store items in the cargo area, secure them so they will not shift during travel. Loose items can shift while in travel. Do not carry pointed objects in cargo area because they may damage the CNG fuel system components.

Towing a Trailer

Refer to OEM owners manual.

Jump Starting

Do not jump start you vehicle if you suspect a natural gas leak. If you smell gas or hear a hissing sound, the fuel system may have a leak the needs to be repaired by an authorized technician. If you suspect a leak, have the vehicle towed to an authorized service facility for inspection. If the fuel system is not leaking or damaged, you may jump-start the vehicle. Refer to the manufacturers recommendation as listed in the original equipment Owner's Guide for jump-starting procedure.

Tire Pressure

Inflate and maintain tires to recommended pressure for extra load as listed in the original equipment Owner's Guide. Reason for this is the extra weight of alternative fuel cylinder in rear of vehicle.

Refueling Procedure

Refueling procedure can vary from station to station. The following steps explain the typical refueling process. Always read and follow instructions provided with the fueling equipment being used.

1. Park vehicle next to CNG dispenser just like a typical gasoline station.
2. Turn engine off, make sure ignition switch is set to the LOCK position and apply the parking brake.
3. Flip out the refueling receptacle lid located at rear of vehicle by lifting out. Clean any dirt or debris from around the fuel receptacle.



4. Follow the instructions provided on dispenser at the refueling station on how to connect fueling nozzle.
5. Attach CNG fill nozzle to the fuel receptacle and begin dispensing fuel.
6. Once the flow of CNG to the vehicle has stopped, follow the instructions provided on dispenser at the refueling station on how to shut off the flow of CNG to vehicle tanks.
7. Remove CNG nozzle from fuel receptacle.
8. Push lid closed on the fuel receptacle securely.

If you are not sure how to operate the refueling station, ask for assistance.

Any modification to your alternative fuel system will void the alternative fuel conversion system component warranty. Do not replace components that are not approved to be used with your alternative fuel system. Components approved are specifically designed and calibrated for your alternative fuel system. Failure to use approved components may result in personal injury or damage to vehicle.

If the vehicle is involved in an accident or fire that damages any part of the alternative fuel system than the damaged components must be replaced and the complete system must be tested by an authorized dealership by qualified technicians before the vehicle is operated again on the alternative fuel. *See Page 17 in the event of crash.*

Warning

Tampering with or improperly maintaining the high-pressure fuel system can result in fatality or serious injury. Never attempt to modify the fuel system and always have the fuel system maintenance performed at an authorized dealership by qualified technicians. Compressed natural gas is a combustible fuel and is flammable and highly explosive. Failure to read and follow safety procedures can result in fatality or serious injury.

If you suspect or detect a leak, follow the shut down instructions on page 17 and have your vehicle immediately inspected and repaired at an authorized dealership by qualified technicians.

Vehicle Identification and Labeling

Your vehicle has an identifying “CNG” label attached next to the right rear tail light assembly. **Do not remove this label.** This label is necessary for insuring your vehicle. Driving without this label may violate the laws or regulations in some states.



These labels are located in the engine compartment and list alternative fuel system installation information.

This label is a warning label and is attached to fuel filter housing assembly to help ensure proper maintenance of system.



This label is located on the cylinder above the valve and on cylinder cover.



Fuel System Components

The fuel system components include a fuel tank located in the trunk, integrated fuel pressure regulator, in-tank fuel shutoff valve, high-pressure fuel lines, electronically controlled CNG fuel injectors and other equipment. All Fuel system components comply with NFPA-52 safety standards.

Do not replace components that are not approved to be used with your alternative fuel system. Components approved are specifically designed and calibrated for your alternative fuel system. Failure to use approved components may result in personal injury or damage to vehicle.

Refueling Your Vehicle

There are two methods for filling your vehicles CNG tank(s).

- Fast-fill – available at most commercial and private CNG refueling stations. It takes about 3 to 5 minutes to fill up the CNG fuel tank.
- Slow-fill – usually fueled with a Home Refueling Appliance (HRA), such as a Fill unit made by FuelMaker. These devices fill around one gasoline gallon equivalent (GGE) per hour. Always observe all safety recommendations and operating instructions on the refueling equipment.

When refueling you should use a fuel fill nozzle that complies with ANSI/AGA NGV-1-1994 standards. Nozzles are designed according to their maximum fill pressure. P24 for 2400 psi, p30 for 3000 psi and p36 for 3600 psi. This vehicle has a maximum fill pressure of 3600 psi., so you should refuel with a p36 nozzle. Using a p30 (3000 psi) or a p24 (2400 psi) nozzle will only partially fill your fuel tank and can significantly decrease you CNG driving range.

The fast-fill refueling process warms the natural gas, which causes the pressure in the tank to rise and reduces the amount of fuel you can put in your CNG tanks.

To obtain information about the location of compressed natural gas refueling stations in the United States, visit www.ngvamerica.org, www.cngprices.com or use www.afdc.doe.gov for a complete listing of stations and other useful information.