



***8.1L LPG MEDIUM DUTY
OWNER'S MANUAL
SUPPLEMENT***

XXXXXX

IMPCO® MD Owner's Manual Supplement

- Section 1** **Features and Controls**
This section explains how to start and operate your vehicle.
- Section 2** **Problems on the Road**
This section tells you what to do if you have a problem on the road.
- Section 3** **Service Care**
Here the manual tells you how to keep your vehicle running properly.
- Section 4** **Maintenance Schedule**
This section tells you when to perform vehicle maintenance.
- Section 5** **Customer Assistance Information**
This section tells you how to contact IMPCO® for technical assistance.
- Section 6** **Index**
Here's an alphabetical listing of every subject in this manual.

GENERAL MOTORS, GM, and the GM emblem are registered trademarks of General Motors Corporation and are used herein with the permission of General Motors Corporation.

This manual includes the latest information at the time it was printed. We reserve the right to make changes in the product after that time without further notice

Please keep this manual in your vehicle, so it will be there if you ever need it when you're on the road. If you sell the vehicle, please leave this manual in it so the new owner can use it.

Litho in U.S.A.
IM-21632 A First Edition

©Copyright IMPCO Technologies, Inc. 1998
All Rights Reserved

Introduction

Your vehicle is designed to operate on Liquefied Petroleum Gas (LPG), also known as propane. There are abundant reserves of propane in the United States and Canada. When propane is burned in your engine, it produces low emissions. This means less smog, less air pollution and cleaner air. This makes propane a promising motor fuel for the future.

How to Use this Supplement

This supplement contains information specific to the propane fuel system on your vehicle. It doesn't explain everything you need to know about your vehicle. **You must use this supplement along with your GM owner's manual.** Only then will you be able to properly operate and maintain your vehicle.

Please read this supplement from beginning to end when you first receive your new vehicle. If you do this, it will help you learn about the special features and controls. In this supplement, you'll find that words and pictures work together to make things easy to understand.

Index

A good place to look for what you need is the Index in the back of this supplement. It's an alphabetical list of all that's in the supplement, and the page number where you'll find it.

Propane Cautions

CAUTION:

Propane is extremely flammable. If something ignites it, you could be badly burned. Keep sparks, flames and smoking materials away from propane. Do not smoke if you are near propane or refueling your vehicle.

CAUTION:

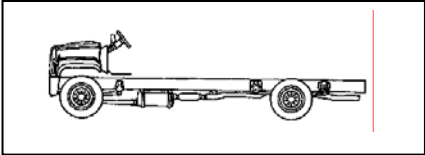
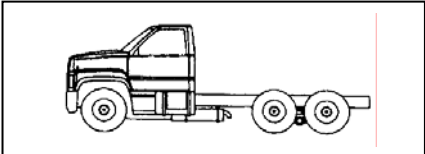
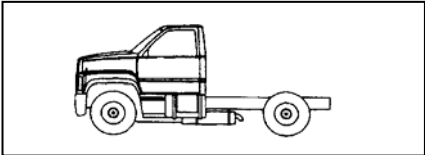
The propane fuel system is under high pressure. The system operates at pressures up to 312 psi (2151 kPa). Sudden escape of propane can cause very bad injuries. Never disconnect a fuel line or remove a fuel system component. Service and repair of this system should only be performed by a trained propane service technician with the proper knowledge and tools.

CAUTION:

If you get liquid propane on your skin or in your eyes, you could be injured. Liquid propane causes severe cold burns and frostbite. Never let liquid propane contact your skin or eyes. When filling your propane fuel tank, always wear gloves approved for handling propane and appropriate eye protection.

Model Reference

This supplement contains information that covers C-Series conventional cab models and B7 Chassis models as shown. Most models are unfinished from the factory.



Section 1 Features and Controls

This section explains how to start and operate your vehicle.

- 1-2 Starting Your Propane Engine
- 1-3 Cold Weather Operation
- 1-3 Restarting the Propane Engine While Moving (Automatic Transmission)
- 1-4 Reduced Engine Power Light
- 1-4 Malfunction Indicator Lamp

Starting Your Propane Engine

Automatic Transmission

Set the parking brake and move your shift lever to NEUTRAL (N) or PARK (P) if so equipped. Your engine won't start in any other position -- that's a safety feature.

Manual Transmission

Set the parking brake, shift your gear selector to NEUTRAL (N) and hold the clutch pedal to the floor while starting the engine.

Starting Your Engine

1. Without pushing the accelerator pedal, turn your ignition key to *START*. When the engine starts, let go of the key. The idle speed will go down as your engine gets warm.

NOTICE:

Holding your key in *START* for longer than 15 seconds at a time will cause your battery to be drained much sooner. And the excessive heat can damage your starter sooner.

2. If the engine doesn't start in three seconds, hold your key in *START* and crank the engine for 12 more seconds, unless it starts sooner. When the engine starts, let go of the key.
3. If your engine still won't start, check for the following conditions:
 - The propane fuel tank is empty.
 - The manual shut-off valve is closed. See "Propane Manual Shut-off Valve" in the Index.
 - The propane fuel system fuse is bad. See "Fuses" in the Index.

If none of these conditions exists, your vehicle may require service.

Propane Engine Warm-Up

When you've started your engine, let it run for 20 or 30 seconds to warm-up before you put a load on the engine.

Drive at moderate speeds for the first few miles, especially in cold weather. Running a cold engine at high speed can damage it.

Cold Weather Operation

In cold weather, stalling and hard starting may occur. If the engine coolant temperature is below freezing (32°F (0°C)), the REDUCED ENGINE POWER light will come on. Refer to "Reduced Engine Power Light" in this Section.

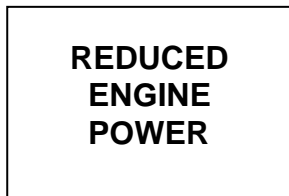
For better cold weather starting and warm-up, you can do the following:

- Move the vehicle to a warm garage area.
- Use an engine coolant heater. Refer to "Engine Coolant Heater" in the Index of your GM owner's manual.

Restarting the Propane Engine While Moving (Automatic Transmission)

If you have to restart the engine while the vehicle is moving, you'll have to shift the automatic transmission to NEUTRAL (N). This safety feature prevents starting the engine when the transmission is in a drive gear.

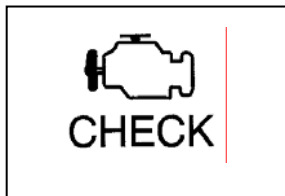
Reduced Engine Power Light



If the engine coolant temperature is below freezing (32°F (0°C)), the REDUCED ENGINE POWER light will come on. In this mode, the engine speed will not go above idle, even if you push the accelerator pedal. The light will stay on and the engine will operate in this mode until the engine coolant temperature reaches 32°F (0°C). You can then drive your vehicle as normal.

If the engine coolant temperature is above freezing (32°F (0°C)) and the engine switches to or continues to operate in the reduced power mode, your vehicle may require service.

Malfunction Indicator Lamp (Check Engine Light)



Your vehicle is equipped with a computer that monitors the operation of the propane fuel system. If the computer detects a fuel system problem, the CHECK ENGINE light will come on. Your vehicle may require service. See “Malfunction Indicator Lamp” in the Index of your GM owner’s manual.

Section 2 Problems on the Road

This section tells you what to do if you have a problem on the road.

2-2 Propane Manual Shut-off Valve

2-2 In Case of a Propane Leak

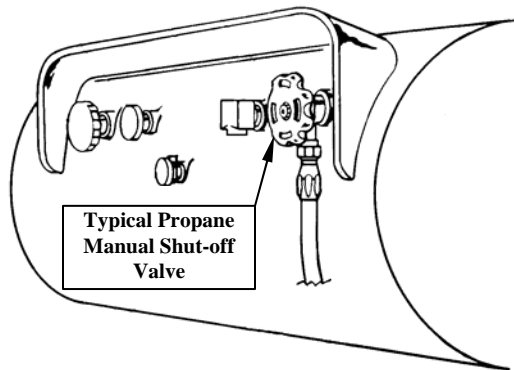
2-3 Jump Starting

2-3 Towing Your Vehicle

Propane Manual Shut-off Valve

The propane manual shut-off valve is located on the fuel tank. To close the valve, turn the handle clockwise. To open the valve, slowly turn the handle counterclockwise. Always operate your vehicle with the manual shut-off valve fully open.

Your vehicle may have a variety of different propane fuel tanks. The tank and the manual shut-off valve can be mounted in many different locations. Here's a typical propane manual shut-off valve.



The manual shut-off valve has an internal valve. Under certain conditions, this excess flow valve will close and stop fuel flow. This can happen if the fuel lines are empty and the manual shut-off valve is opened too quickly. To reset the excess flow valve, close the manual shut-off valve and then slowly open it.

In Case of a Propane Leak

It's normal to smell a slight propane odor right after you turn-off your vehicle. However, if you smell a persistent propane odor or hear a hissing sound, the propane fuel system on your vehicle might have a leak. Turn the manual shut-off valve on the propane fuel tank clockwise to close the valve. See "Propane Manual Shut-off Valve" in this section. Have the vehicle towed to an authorized propane service facility.

Jump Starting



CAUTION:

If the propane fuel system has a leak, a spark from jumper cables could ignite the propane. You or someone else could be badly burned. Do not jump start your vehicle if you smell propane or hear a hissing sound.

Before jump starting your vehicle, check for a propane leak. If you smell a persistent propane odor or hear a hissing sound, the propane fuel system on your vehicle might have a leak. Do not try to jump start your vehicle. Turn the manual shut-off valve on the propane fuel tank clockwise to close the valve. See “Propane Manual Shut-off Valve” in this section. Have the vehicle towed to an authorized propane service facility.

See “Jump Starting” in the Index of your GM owner’s manual for step by step jump starting instructions.

Towing Your Vehicle



CAUTION:

Towing your vehicle with improperly positioned tow straps, hooks or chains can damage the propane fuel system and cause a leak. You or someone else could be injured. Do not use the propane fuel system components and/or fuel lines as towing attachment points.

To prevent damage to the propane fuel system, use only the attachment points shown in the GM owner’s manual. See “Towing Your Vehicle” in the Index of your GM owner’s manual for towing instructions.

Section 3 Service Care

Here the manual tells you how to keep your vehicle running properly.

- 3-2 Doing Your Own Service Work
- 3-2 Fuel (Propane Engine)
- 3-2 Filling Your Propane Fuel Tank
- 3-4 Fuel Filling Problems
- 3-4 Fuses and Circuit Breakers
- 3-4 Capacities and Specifications

Doing Your Own Service Work



CAUTION:

Never try to do your own service work on the propane fuel system. The propane fuel system operates under high pressure. You could be injured and your vehicle damaged if you try to do service work. Service and repair of the system should only be performed by a trained propane service technician with the proper knowledge and tools.

Fuel (Propane Engine)

It is recommended that you use only HD5 grade propane. This fuel will provide improved driveability and emission control system performance compared to other grades of propane.

Filling Your Propane Fuel Tank



CAUTION:

Propane is extremely flammable. It burns and can cause very bad injuries. If an ignition source is present, a fire can occur. Keep sparks, flames and smoking materials away from propane. Do not smoke if you are near propane or refueling your vehicle.



CAUTION:

Propane is stored in the fuel tank under high pressure. Never fill a leaking or damaged tank. You could be injured. Take your vehicle to a trained propane service technician for inspection and repair.



CAUTION:

If you get liquid propane on your skin or in your eyes, you could be injured. Liquid propane causes severe cold burns and frostbite. Never let liquid propane contact your skin or eyes. When filling your propane fuel tank, always wear gloves approved for handling propane and appropriate eye protection.

Your vehicle may have a variety of different propane fuel tanks. Unless you are experienced with filling a propane fuel tank, consult a qualified propane station operator.

Here is a typical fuel filling procedure.

1. Turn off the engine and set the parking brake.
2. Remove the fill valve cap by turning it counterclockwise.
3. Inspect the fill valve O-ring. Make sure the O-ring is seated in the groove and is not damaged or missing.



CAUTION:

Never connect the fill nozzle to the valve if the O-ring is missing or damaged. You could be hurt. Replace the O-ring before connecting the fill nozzle.

4. Connect the propane fill nozzle to the fill valve.
5. Rotate the fill nozzle handle clockwise until it locks onto the valve.
6. Close the fill nozzle vent valve.
7. Open the 80% valve.
8. Turn on the propane dispenser to begin refueling.
9. When liquid appears from the 80% valve, close the valve and the fill nozzle. Turn off the propane dispenser.
10. Open the fill nozzle vent valve.
11. Rotate the fill nozzle handle counterclockwise to unlock it.
12. Disconnect the fill nozzle.
13. Return the fill nozzle to the dispenser.
14. Install the fill valve cap by turning it clockwise.

Fuel Filling Problems

Under certain conditions, you may notice it takes longer to fill your propane fuel tank on a hot day. This is caused by an increase in the pressure inside the tank. This is normal and does not indicate a problem with the tank.

Be sure your vehicle is on a flat and level surface when filling your propane fuel tank. Otherwise, you may not be able to completely fill the tank. Or, you may overfill the tank, creating a hazardous condition.

Fuses and Circuit Breakers

The propane fuel system wiring in your vehicle is protected from short circuits by a 3 amp fuse. On the C-Series, this fuse is located underhood just outside the maxi-fuse block. On the B7 Chassis, the fuse is located underhood near the Powertrain Control Module (PCM).

If this fuse is bad, your vehicle will not start. Be sure to replace this fuse with a fuse of the same rating. Do not use a fuse of higher amperage.

Capacities and Specifications

Cooling System Capacity

Model	Quarts (Liters)
7.4L	25.5 (24.1)
with automatic transmission	23.5 (22.2)

Above capacities (volumes) are approximate and do not include heaters or lines added by school bus body builders.

Normal Maintenance Replacement Parts

Service Replacement Part and Filter Recommendations

Propane Fuel Filter	F4-20804-001
---------------------	--------------

Section 4 Maintenance Schedule

This section tells you when to perform vehicle maintenance.

4-2 Part A: Scheduled Maintenance Services

4-3 Part B: Owner Checks and Services

4-4 Part C: Maintenance Record

Part A: Scheduled Maintenance Services

Maintenance Schedule

The following maintenance items are specific to the propane fuel system on your vehicle. These items are required *in addition to* the maintenance items listed in your GM owner's manual.

The services shown in this schedule should be performed after 100,000 miles (166 000 km) at the same intervals.

30,000 Miles (50 000 km)

- Inspect intake system for vacuum leaks.
- Replace propane fuel filter (or every 12 months, whichever occurs first). (3)
- Check all vacuum lines and fittings.
- Check all fuel lines and fittings.
- Spark plug service (or every 30 months, whichever occurs first). (3) (28)
- Mixer air valve service. (60)

60,000 Miles (100 000 km)

- Check intake system for vacuum leaks.
- Check converter / check regulator primary and secondary pressures. (61)
- Replace propane fuel filter (or every 12 months, whichever occurs first). (3)
- Check all vacuum lines and fittings.
- Check all fuel lines and fittings.
- Spark plug service (or every 30 months, whichever occurs first). (3) (28)
- Replace ignition wires (or every 60 months, whichever occurs first). (3) (28)
- Mixer air valve service. (60)

90,000 Miles (150 000 km)

- Check intake system for vacuum leaks.
- Replace propane fuel filter (or every 12 months, whichever occurs first). (3)
- Check all vacuum lines and fittings.
- Check all fuel lines and fittings.
- Spark plug service (or every 30 months, whichever occurs first). (3) (28)
- Mixer air valve service. (60)

120,000 Miles (166 000 km)

Check intake system for vacuum leaks.

Check converter / check regulator primary and secondary pressures. (61)

Replace propane fuel filter (or every 12 months, whichever occurs first). (3)

Check all vacuum lines and fittings.

Check all fuel lines and fittings.

Spark plug service (or every 30 months, whichever occurs first). (3) (28)

Replace ignition wires (or every 60 months, whichever occurs first). (3) (28)

Mixer air valve service. (60)

FOOTNOTES

- (3) = An Emission Control Service.
- (28) = Replace spark plugs. Inspect spark plug wires for damage. Check wire boot and boot heat shield fit at spark plugs and distributor. Replace parts as needed.
- (60) = Remove the mixer cover and spring from the mixer. Remove the air valve assembly from the mixer body. Inspect for dirt, oil contamination or damage. Clean or repair as necessary.

- (61) = If primary and secondary pressure are within specification, no further action is necessary. If pressures are out of specification, remove converter cover, spring and diaphragm. Inspect for dirt, oil contamination or damage. Clean or repair as necessary.

Part B: Owner Checks and Services

At Each Fuel Fill

Fill Valve O-Ring

Inspect the fill valve O-ring. Make sure the O-ring is seated in the groove. Replace if missing or damaged.

At Least Twice a Year

Converter Coolant Hoses

Inspect the converter coolant hoses twice a year (for example, spring and fall). Have the hoses replaced if they are cracked, swollen or deteriorated. Inspect all fittings and clamps; replace if necessary.

At Least Once a Year

Propane Fuel System Leak Inspection

Inspect the propane fuel system for leaks once a year using a liquid or an electronic leak detector. If a leak is found, repair or replace the component as required.

Part C: Maintenance Record

After the scheduled services are performed, enter the date, odometer reading and services performed on the maintenance record charts provided here. Any additional information from “Owner’s Checks and Services” can be added on the following record pages.

Section 5 Customer Assistance Information

This section tells you how to contact IMPCO® for technical assistance.

5-2 Parts and Service

5-2 Technical Assistance

Parts and Service

For parts orders and the location of the nearest authorized service center, contact:

IMPCO Technologies, Inc.
17872 Cartwright Road
Irvine, CA 92614
1-888-90-IMPCO

Technical Assistance

For technical assistance, contact:

IMPCO Technologies, Inc.
17872 Cartwright Road
Irvine, CA 92614
1-800-816-8691

Section 6 Index

Capacities and Specifications.....	3-4	Owner Checks and Services.....	4-3
Cold Weather Operation	1-3	Parts and Service	5-2
Doing Your Own Service Work.....	3-2	Propane Manual Shut-off Valve	2-2
Filling Your Propane Fuel Tank	3-2	Reduced Engine Power Light	1-4
Fuel (Propane Engine)	3-2	Restarting the Propane Engine While Moving (Automatic Transmission).....	1-3
Fuel Filling Problems	3-4	Scheduled Maintenance Services	4-2
Fuses and Circuit Breakers.....	3-4	Starting your Propane Engine	1-2
In Case of Propane Leak	2-2	Technical Assistance	5-2
Jump Starting	2-3	Towing Your Vehicle.....	2-3
Maintenance Record	4-4		
Malfunction Indicator Lamp	1-4		

