

SERVICE BULLETIN

Original Issue Date: 3/01

Model: **30-100 kW (GM Engines) with Barber-Colman Governor**

Market: **Industrial Generator Sets**

Subject: **Natural Gas to LP Gas Vapor Conversion**

Introduction

This bulletin provides instructions for converting the General Motors engine-powered generator sets from natural gas to LP gas vapor on models with Barber-Colman governors. Figure 1 lists specification numbers for generator sets with Barber-Colman governors.

Models	Spec No.
30 kW	GM13685-GA1, 4, 7, 10
35 kW	GM13685-GA2, 5, 8, 11
45 kW	GM13685-GA3, 6, 9, 12
50 kW	GM13686-GA1, 3, 5, 7
60 kW	GM13686-GA2, 4, 6, 8
80 kW	GM13934-GA1, 2, 3, 4
100 kW	GM13934-GA5, 6, 7, 8

Figure 1 Specification Numbers

The Figure 2 and Figure 3 illustrations show the 50/60 kW models; the 30-45 kW and 80/100 kW models are similar.

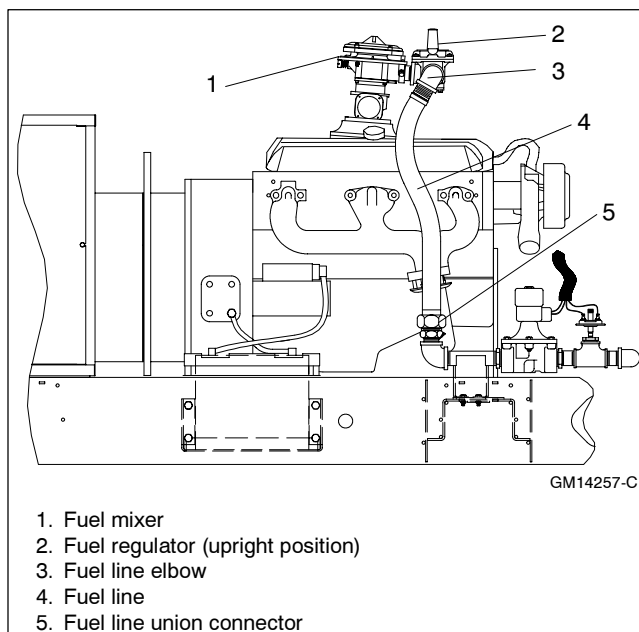


Figure 2 Natural Gas Fuel System Configuration

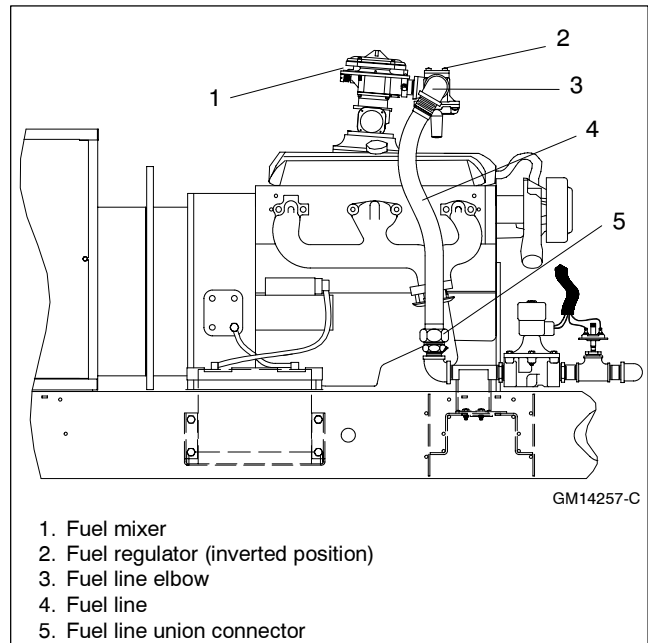


Figure 3 LP Gas Vapor Fuel System Configuration

Save the original fuel mixer diaphragm (50-100 kW), fuel regulator spring, and adjustment screw for possible future conversion back to natural gas.

Note: When converting the 50-100 kW models, order kit **GM17010-KP1**, which contains the LP fuel mixer diaphragm.

30-45 kW Models (4.3 L GM Engine). Use the following procedure except for step 2, Convert the fuel mixer for LP gas vapor. The 30-45 kW generator set (General Motors 4.3 L engine) does not require a fuel diaphragm conversion; therefore, no kit is necessary. Refer to the respective spec sheet for generator set ratings based on fuel selection.

50/60 kW Models (5.7 L GM Engine). Use the following procedure. Refer to the respective spec sheet for generator set ratings based on fuel selection.

80/100 kW Models (8.1 L GM Engine). Use the following procedure except for step 5, Change the engine ignition timing. The 80/100 kW generator set (General Motors 8.1 L engine) does not require an

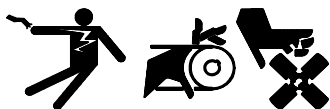
engine ignition timing adjustment. Refer to the respective specification sheet for generator set ratings based on fuel selection and derate the specification sheet LP fuel ratings by 2%.

Note: No ratings derate is necessary for the 80/100 kW models with LP fuel when ignition module part no. GM19765 is installed. Order the ignition module for LP fuel through the Service Parts Dept.

Safety Precautions

Observe the following safety precautions while installing the kit.

WARNING



Accidental starting.
Can cause severe injury or death.

Disconnect the battery cables before working on the generator set. Remove the negative (-) lead first when disconnecting the battery. Reconnect the negative (-) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or connected equipment, disable the generator set as follows: (1) Move the generator set master switch to the OFF position. (2) Disconnect the power to the battery charger. (3) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent starting of the generator set by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer.

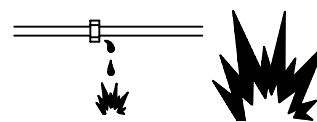
WARNING



Fire.
Can cause severe injury or death.

Do not smoke or permit flames or sparks near fuels or the fuel system.

WARNING



Explosive fuel vapors.
Can cause severe injury or death.

Use extreme care when handling, storing, and using fuels.

The fuel system. Explosive fuel vapors can cause severe injury or death. Vaporized fuels are highly explosive. Use extreme care when handling and storing fuels. Store fuels in a well-ventilated area away from spark-producing equipment and out of the reach of children. Never add fuel to the tank while the engine is running because spilled fuel may ignite on contact with hot parts or from sparks. Do not smoke or permit flames or sparks to occur near sources of spilled fuel or fuel vapors. Keep the fuel lines and connections tight and in good condition. Do not replace flexible fuel lines with rigid lines. Use flexible sections to avoid fuel line breakage caused by vibration. Do not operate the generator set in the presence of fuel leaks, fuel accumulation, or sparks. Repair fuel systems before resuming generator set operation.

Explosive fuel vapors can cause severe injury or death. Take additional precautions when using the following fuels:

Propane (LP)—Adequate ventilation is mandatory. Because propane is heavier than air, install propane gas detectors low in a room. Inspect the detectors per the manufacturer's instructions.

Natural Gas—Adequate ventilation is mandatory. Because natural gas rises, install natural gas detectors high in a room. Inspect the detectors per the manufacturer's instructions.

Gas fuel leaks. Explosive fuel vapors can cause severe injury or death. Fuel leakage can cause an explosion. Check the LP vapor gas or natural gas fuel system for leakage by using a soap and water solution with the fuel system test pressurized to 6-8 ounces per square inch (10-14 inches water column). Do not use a soap solution containing either ammonia or chlorine because both prevent bubble formation. A successful test depends on the ability of the solution to bubble.

Fuel Conversion Procedure

1. Remove the generator set from service.

- 1.1 Place the generator set master switch in the OFF position.
- 1.2 Disconnect the power to the battery charger, if equipped.
- 1.3 Disconnect the generator set engine starting battery(ies), negative (-) lead first.
- 1.4 Close all fuel supply valves.

2. Convert the fuel mixer for LP gas vapor (50-100 kW models only).

- 2.1 Remove the five fuel mixer cover plate screws. See Figure 4. Be aware that there is a spring under the fuel mixer diaphragm, that may cause the cover plate and mixer diaphragm to pop up when the screws are loosened and removed.
- 2.2 Remove the fuel mixer cover plate and natural gas fuel diaphragm. See Figure 5. Save the natural gas fuel diaphragm for possible future conversion back to natural gas.
- 2.3 Clean the fuel mixer, cover plate, and spring with a clean rag.

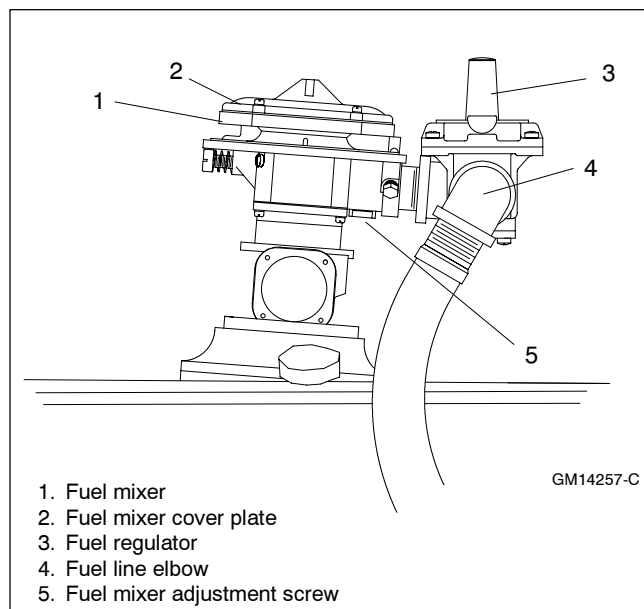


Figure 4 Fuel Mixer

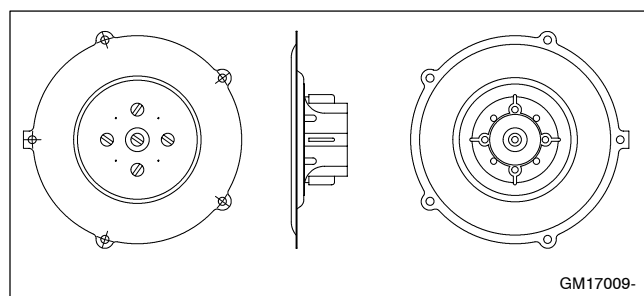


Figure 5 Fuel Diaphragm

- 2.4 Center the spring in the mixer opening and install the LP fuel diaphragm (GM17009) from kit GM17010-KP1.
- 2.5 Replace the fuel mixer cover plate and screws.

3. Convert the fuel regulator for LP gas vapor.

- 3.1 Remove the fuel regulator cover plug. See Figure 6.
- 3.2 Remove the fuel regulator adjustment screw and spring. Save the fuel regulator adjustment screw and spring for possible future conversion back to natural gas.
- 3.3 Replace the fuel regulator cover plug.
- 3.4 Disconnect the fuel line at the union connector. See Figure 2.

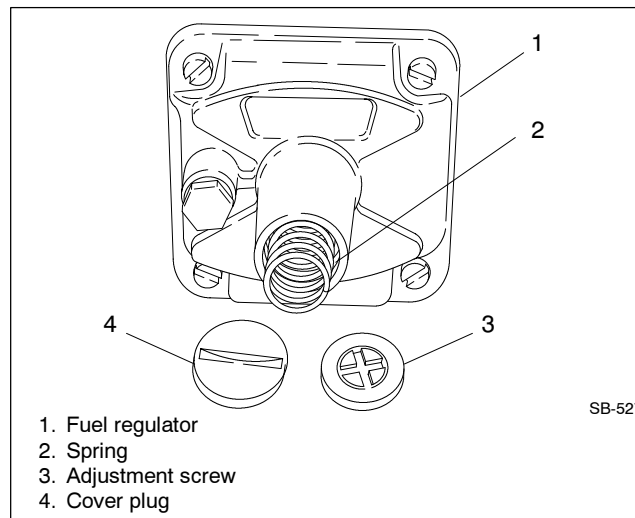


Figure 6 Fuel Regulator Components

- 3.5 Change the fuel regulator position.
 - 3.5.1 See Figure 7, View A for natural gas configuration.
 - 3.5.2 Rotate the *fuel regulator and fuel line* 180° clockwise. See Figure 7, View B.
 - 3.5.3 Rotate the *fuel line elbow* an additional 180° clockwise. See Figure 7, View C.
 - 3.6 Reconnect the fuel line at the union connector.
- ## 4. Restore the generator set to service.
- 4.1 Check that the generator set master switch is in the OFF position.
 - 4.2 Reconnect the generator set engine starting battery, negative (-) lead last.
 - 4.3 Reconnect power to the battery charger, if equipped.
 - 4.4 Open the LP gas supply valve.

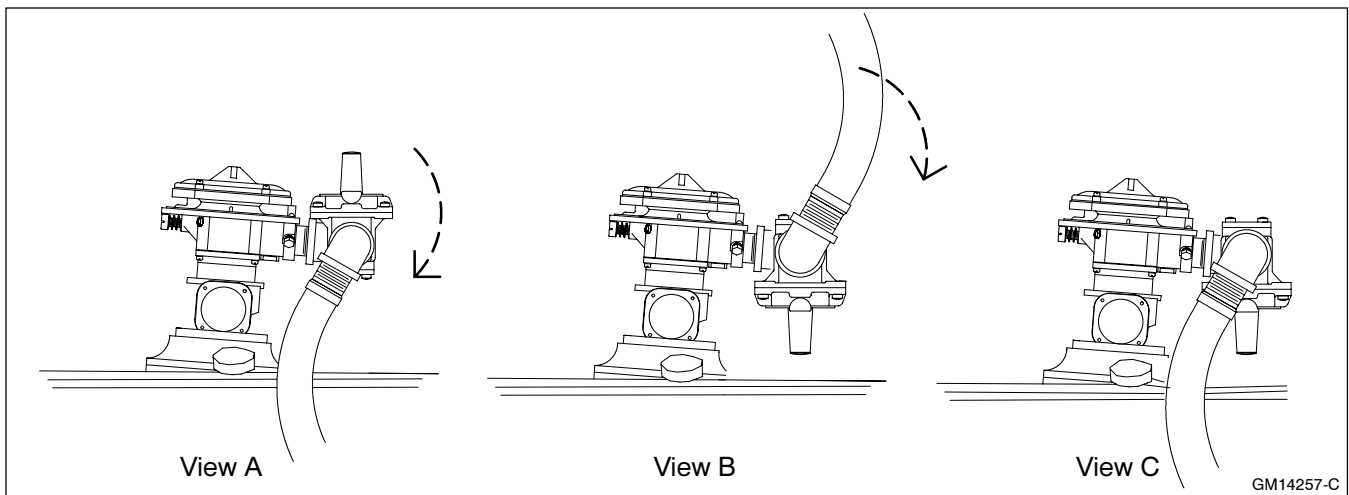


Figure 7 Fuel Regulator and Fuel Line Rotation Views for Natural Gas to LP Gas Vapor Conversion

5. Change the engine ignition timing (30-60 kW models only).

- 5.1 Loosen the distributor hold-down clamp screw.
- 5.2 Remove dirt and grease from the crankshaft pulley groove and engine timing plate mark using a clean rag. Highlight the timing marks with chalk.
- 5.3 Connect an ignition timing light to the engine. Follow the ignition timing light manufacturer's instructions.

Typically the ignition timing light connects to the starting battery for power and the inductive pickup goes on the no. 1 spark plug wire. The no. 1 spark plug is in the front left side of the engine. See Figure 8.

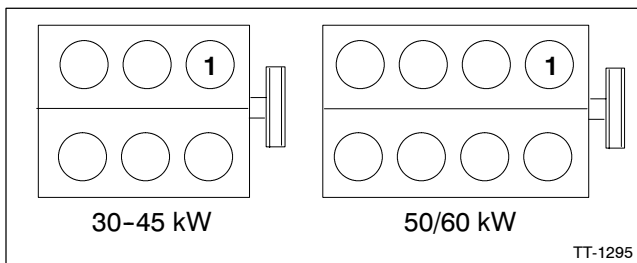


Figure 8 Engine No. 1 Cylinder/Spark Plug

- 5.4 Set the ignition timing light adjustment to **28° BTDC** (before top dead center) **for LP gas vapor**.
- 5.5 Place the generator set master switch in the RUN position to start the generator set.
- 5.6 Point the ignition timing light at the engine timing plate mark and slowly turn the distributor clockwise or counterclockwise until the crankshaft pulley groove aligns with the engine timing plate mark.

- 5.7 Place the generator set master switch in the OFF position to stop the generator set.
- 5.8 Tighten the distributor hold-down clamp to 25 Nm (18 ft. lb.) being careful not to alter the distributor position.
- 5.9 Disconnect the ignition timing light from the engine.

6. Adjust the carburetor (fuel mixer).

- 6.1 Place the generator set master switch in the RUN position to start the generator set. Run the generator set at approximately half load.
- 6.2 See Figure 4 for location of the fuel mixture adjustment screw and adjust the fuel mixture screw (Figure 9) until the engine runs smoothly.
- 6.3 Apply varying loads and readjust the carburetor as necessary to achieve smooth engine performance at all load levels.
- 6.4 Place the generator set master switch in the OFF position to stop the generator set.

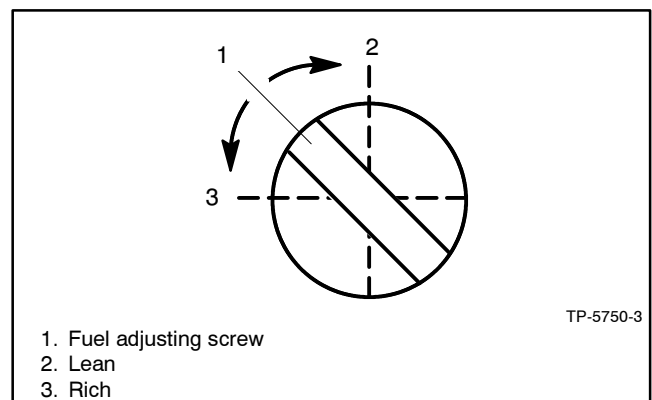


Figure 9 Fuel Mixture Adjustment, Typical