



7CMZ21-RV LP Conversion Kit 278479

This kit allows 7CMZ21-RV generators to be converted from gasoline to straight LP fuel. Observe the following safety precautions when installing the LP conversion kit.

⚠ WARNING

UNIT STARTS WITHOUT NOTICE! To prevent accidental starting on units with a remote start/stop switch, always disconnect battery (remove negative lead first and reconnect it last) to disable generator set before working on any equipment connected to the generator.

⚠ WARNING

DANGEROUS FUELS! Use extreme caution when handling, storing, and using fuels—all fuels are highly explosive in a vapor state. Store fuel 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 to prevent spilled fuel from igniting on contact with hot parts or from ignition spark. Keep fuel lines and connections tight and in good condition—don't replace flexible fuel lines with rigid lines. Flexible sections are used to avoid breakage due to vibration. Should any fuel leakage, fuel accumulation, or electrical sparks be noted, **DO NOT OPERATE GENERATOR SET.** Have systems repaired by qualified technicians before resuming operation. Additional precautions should be taken when using the following fuels:

Propane (LP)—Adequate ventilation is mandatory. Propane is heavier than air; install gas detectors low in room. Inspect detectors often.

⚠ WARNING

DANGEROUS GAS LEAKS! When the entire system is completed, it must be checked for leakage using a soap-water solution. Do not use soap solutions that contain ammonia or chlorine, for soap will not bubble for an accurate leakage test.

⚠ WARNING

PRESSURIZATION! After all LP-Gas connections have been completed, the entire system must be test pressurized to 6-8 ounces (10-14 inches water column).

Before Installing Kit:

1. Disconnect battery (negative lead first) to disable generator set.
2. Remove generator side cover, air cleaner, air duct, gaskets, and mounting hardware. Retain these parts for later use (except air duct gasket at carburetor).
3. Remove the fuel pump lead, fuel pump, and mounting brackets. Cap fuel line and disconnect fuel line at fuel tank. Cap fuel tank connection. Drain all fuel from fuel line between fuel tank and generator set. Cap and secure both ends of fuel line to prevent contamination.

⚠ WARNING

FIRE HAZARD! Spilled fuel may ignite on contact with hot engine parts. Wipe up all spilled fuel after bleeding system.

4. Disconnect the governor link. Leave link attached to the governor arm. Remove the breather line from the carburetor air intake (retain hose clamp). Remove choke leads and anti-diesel solenoid leads from intake manifold and ignition coil. Replace nut and lockwasher on ignition coil.
5. Remove carburetor (including air cleaner adapter), fuel line, gasket, and carburetor mounting studs. Remove the air cleaner adapter from carburetor (save mounting screws for reinstallation of adapter after modification).
6. When the gasoline carburetor is removed, the breather hose is disconnected from the engine manifold. Seal manifold breather hole by installing pipe plug (X-75-23). (Apply a UL approved pipe sealant to pipe plug before installing.)

INSTALLATION

NOTE

Use a UL approved pipe sealing compound suitable for use with LP gas at all threaded connections to prevent dangerous fuel leaks.

1. The air cleaner adapter must be modified for use with LP fuel. To reuse the air cleaner adapter, the adapter bowl vent breather hole must be plugged to prevent unfiltered air from entering the engine. Apply Loctite 242 or similar compound to set screw (X-60-48) and install in breather hole. See Figure 1.

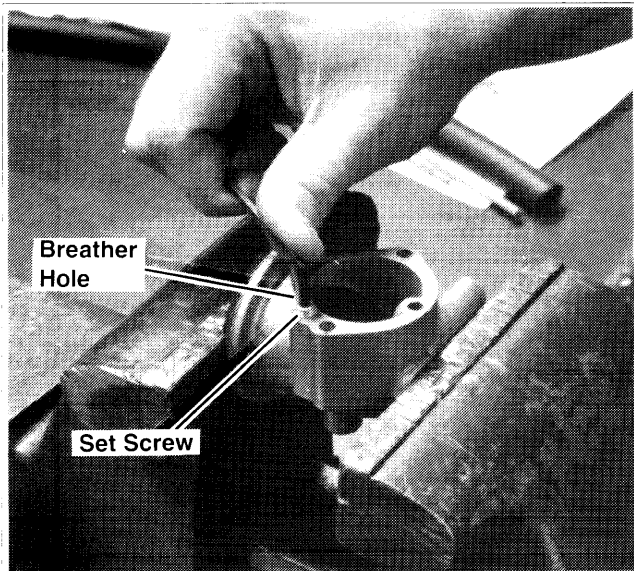


Figure 1. Plugging Adapter Breather Hole

2. The air cleaner adapter must be further modified by removing adapter boss. Use a hacksaw or similar tool to cut off the portion of the adapter boss shown in Figure 2. (Boss already removed in Figure 2.)

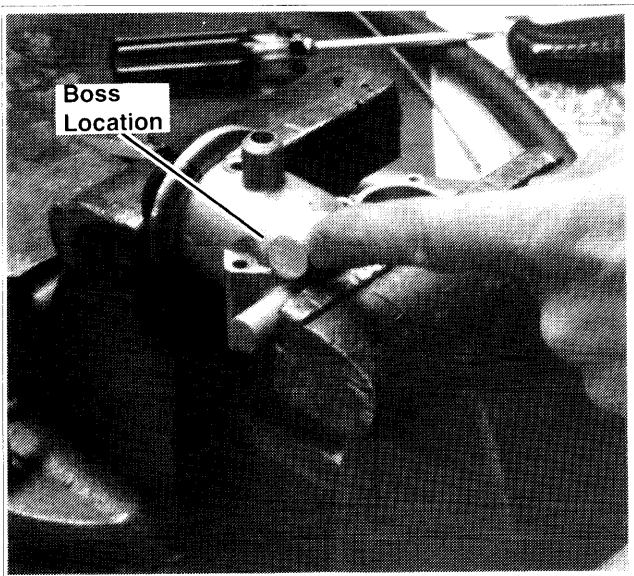


Figure 2. Adapter Boss Removal

3. Attach the carburetor adapter (277881) and gasket (271030) to the intake manifold. The gasket must be positioned between adapter and manifold. Secure adapter with screws (X-55-5).
4. Apply pipe joint sealant to connector (X-391-15), nipple (X-220-5), and elbow (X-215-9) and assemble as shown in Figure 3. Apply UL approved pipe joint sealant to elbow assembly and install in LP carburetor (A-277878). Elbow assembly should be positioned as shown in Figure 3.

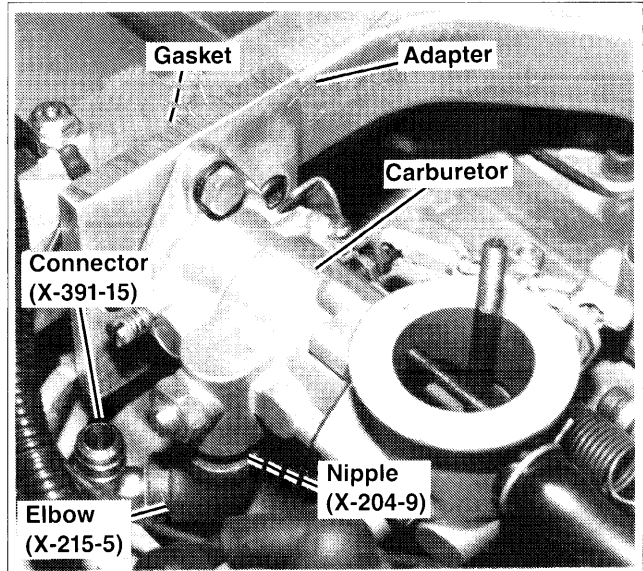


Figure 3. LP Carburetor Installation

5. Assemble the carburetor and modified air cleaner adapter using gasket (277069) and retained mounting screws. Attach hose (X-6037-2) to carburetor elbow with clamp (X-426-3). Attach the assembly with gasket (271030) to adapter with screws (X-125-30) and lock-washers (X-22-5).

NOTE

The carburetor flange may have to be modified slightly to achieve a tight fit on carburetor adapter. Use a file or similar tool to remove flange material where carburetor flange contacts adapter mounting screws.

6. Reconnect breather line and governor link. Adjust linkage, if necessary, to obtain a 1/16 in. (1.6 mm) gap between throttle lever and carburetor body when lever is in relaxed position. See Figure 4.

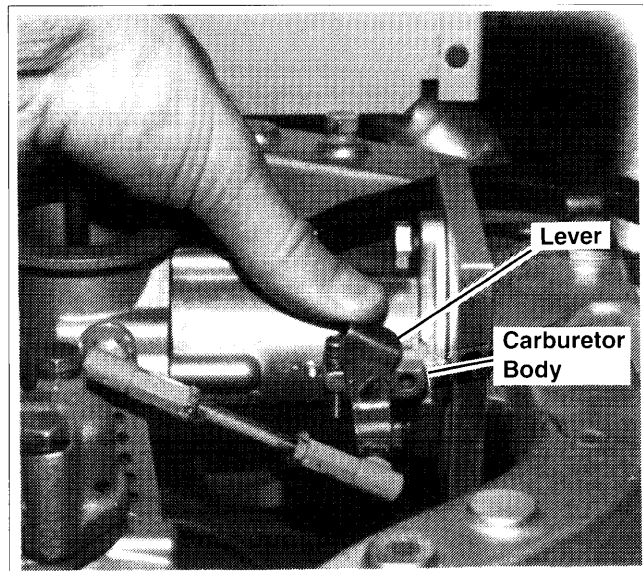


Figure 4. Carburetor Linkage Adjustment

- Using pipe joint compound at threaded connections, install 3/8 and 3/4 NPT hose connectors (X-582-4 and X-582-10) in gas regulator (B-230695). Attach hose (X-6037-2) to 3/4 in. hose connector and secure with clamp (X-426-3).
- Attach gas regulator (with connectors and hose) to mounting bracket (241880) with screws (X-465-8), lock washers (X-22-11) and nuts (X-81-1).
- The gas regulator must be attached to the mounting skid on the back side of the generator. To attach regulator, drill two 9/32 in. (7.1 mm) holes through bottom of skid in positions illustrated in Figure 5.

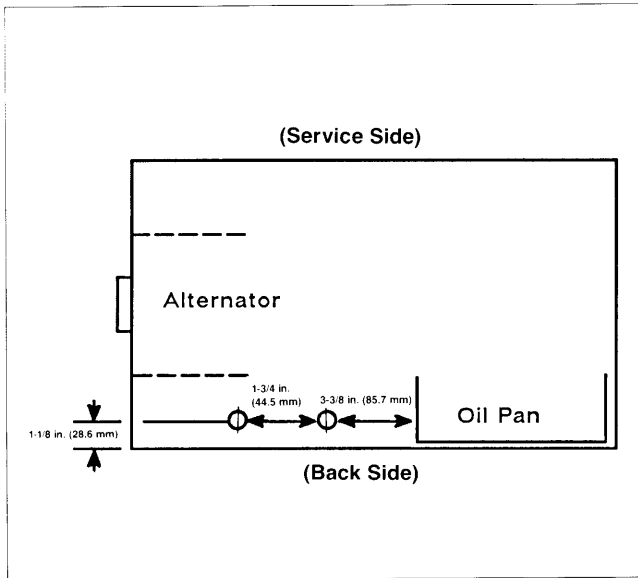


Figure 5. Gas Regulator Mounting Holes (Top View)

- Attach regulator assembly to skid with screws (X-465-16) and lock washers (X-22-11). (Screws thread into bottom of regulator.)
- Route carburetor hose over top of intake manifold to regulator. Trim hose to length (approximately 20 in./50.8 cm). Leave adequate slack in hose to avoid wear from abrasion. Secure hose to regulator 3/8 in. hose connector with clamp (X-426-3). See Figure 6.

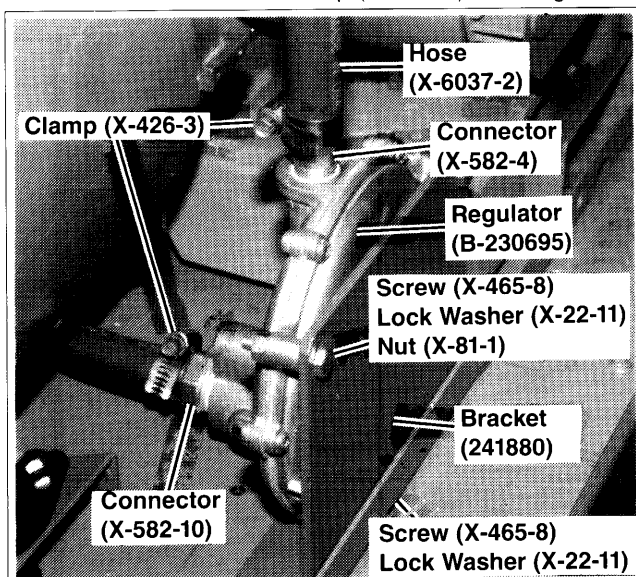


Figure 6. Regulator Installation

- Drill two 9/32 in. (7.1 mm) holes in skid to mount fuel valve assembly. Holes should be drilled in positions illustrated in Figure 7.

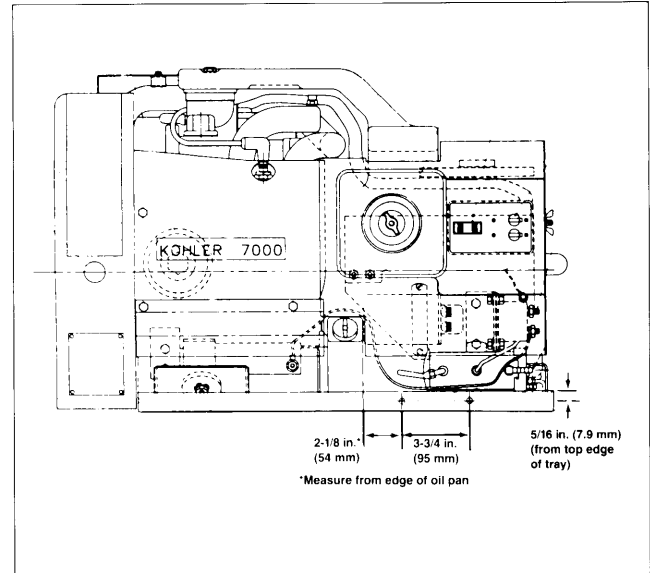


Figure 7. Fuel Valve Mounting Hole Position

- Assemble fuel valve components as shown in Figure 8. Use pipe sealing compound at all threaded connections to prevent gas leaks.

NOTE

Connect coach fuel inlet fitting to fuel valve before securing fuel valve to skid.

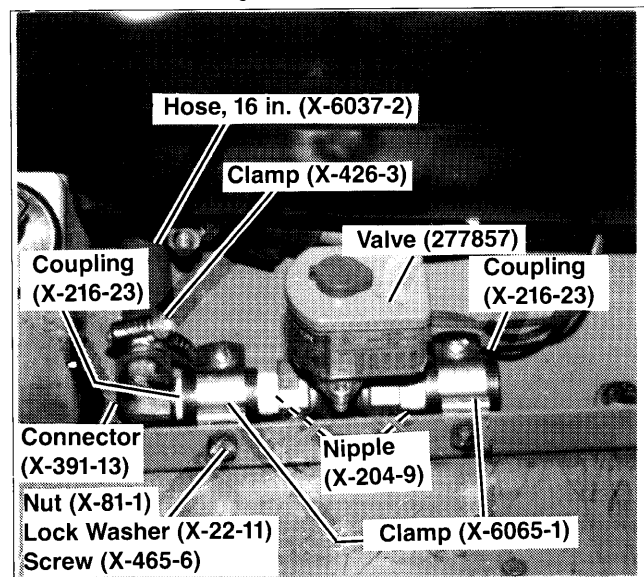


Figure 8. Fuel Valve Components

- Route hose from regulator beneath alternator to fuel valve. Cut hose to length (approximately 16-3/4 in. / 42.5 cm) leaving adequate slack to avoid wear and stress from vibration. Connect hose to valve with clamp (X-426-3).
- Place heat shrink tubing (X-6079-2) over piggyback terminal of 18 in. (45.7 cm) lead (LWT2-1818-9757). Use a heat gun to shrink tubing until snug on piggyback terminal. Remove controller cover. Remove lead T2 from Start/Stop switch. Connect piggyback terminal to vacated spade on Start/Stop switch. Route

other end of lead through port on back side of controller. Reattach lead T2 to piggyback terminal now on Start/Stop switch. Replace controller cover.

16. Attach shutdown relay (259391) to bottom of controller housing using controller cover mounting screw. Tighten relay mounting screw securely to insure good relay ground connection.
17. Attach eyelet terminal (X-283-9) to one fuel valve lead and attach to fuel pump mounting bracket. Prior to attaching lead, cut lead to length to remove excess slack.
18. Cut remaining fuel valve lead at length adequate to reach shutdown relay. Attach push-on terminal (X-431-25) to fuel valve lead. Connect lead to shutdown relay terminal 87A. See Figure 9.

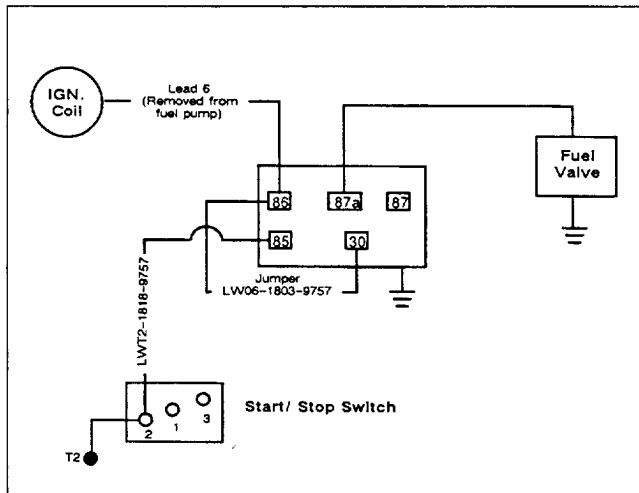


Figure 9. Shutdown Relay Wiring

19. Connect 3 in. (7.62 cm) lead (LW06-1803-9757) between terminals 86 and 30 on shutdown relay. Place heat shrink tubing (X-6079-2) over piggyback terminal and snug with heat gun before installation.
20. Attach lead 6 (removed from fuel pump in step 3 in pre-installation instructions) to piggyback terminal on pin 86 of shutdown relay.
21. Attach other end of lead connected to controller Start/Stop switch to shutdown relay terminal 85.

Adjustments

1. Readjust spark plug gap to .018 in. (0.457 mm).
2. **To adjust carburetor:** Turn the carburetor fine adjustment screw in until it bottoms slightly. This screw will remain closed and no further adjustment is necessary. Turn the main fuel adjustment screw in until it bottoms slightly. From this position, turn the screw out 2-1/4 turns. Minor adjustments may be necessary to achieve full power.
3. **Governor Adjustments:** With the constant speed type governor, the throttle shaft is fixed at a definite length to establish a specific load speed of 1800 rpm. Any variation in speed causes frequency changes in generator output. For this reason, only slight readjustment of speed is possible. To increase speed, loosen the inside speed adjusting lock nut and tighten the

outside nut (Figure 10) to draw the eyebolt closer to the bracket; to decrease speed, loosen the outside locking nut and tighten the inside nut. After speed is correctly set (63 Hz no-load), tighten the nut that was loosened (to lock the eyebolt at the new setting).

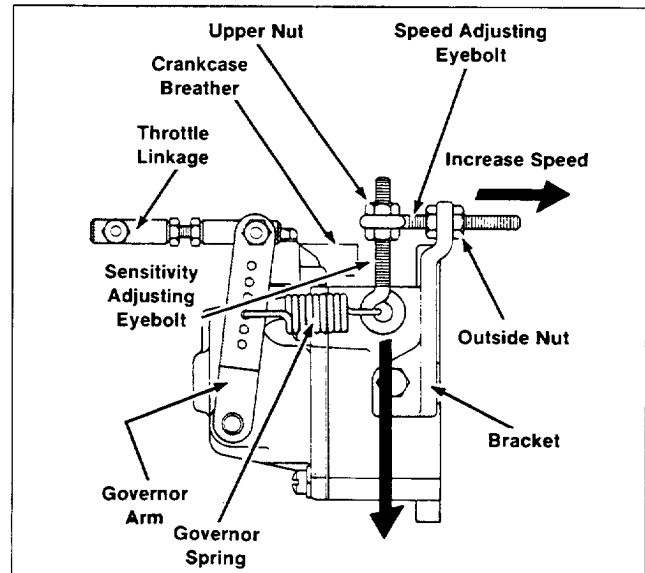


Figure 10. Governor Components and Adjustments

If the governor is too sensitive, speed surging will occur with changes in load. If a big drop in speed occurs when normal load is applied, the governor should be set for greater sensitivity. Sensitivity is changed by repositioning the sensitivity adjusting eyebolt as shown in Figure 10. To make the governor control more sensitive, loosen the upper nut and tighten the lower nut to force the eyebolt downward. Recheck speed after making sensitivity adjustment. Retighten the nut that was loosened to lock the eyebolt at the new setting.

4. **Gas Supply:** The gas and supply pressure should not exceed six ounces. To check inlet pressure, remove plug on fuel inlet of gas regulator. Insert manometer or ounce pressure gauge. Adjust pressure to 4-6 ounces (7-11 in. water column). Inlet pressure is adjusted on primary regulator.

⚠ WARNING

PRESSURIZATION! After all LP-Gas connections have been completed, the entire system must be test pressurized to 6-8 ounces (10-14 inches water column).

⚠ WARNING

DANGEROUS GAS LEAKS! When the entire system is completed, it must be checked for leakage using a soap-water solution. Do not use soap solutions that contain ammonia or chlorine, for soap will not bubble for an accurate leakage test.

5. **Deration:** The kilowatts of the generator set will decrease 3.5% for each 1,000 feet (305 meters) above sea level, 1% for each 10°F (5.5°C) above 60°F (16°C), and 11.1% when converted to LP fuel.
6. Replace air cleaner components and gasket (278176) side cover, and mounting hardware. Reconnect generator set battery, negative lead last.

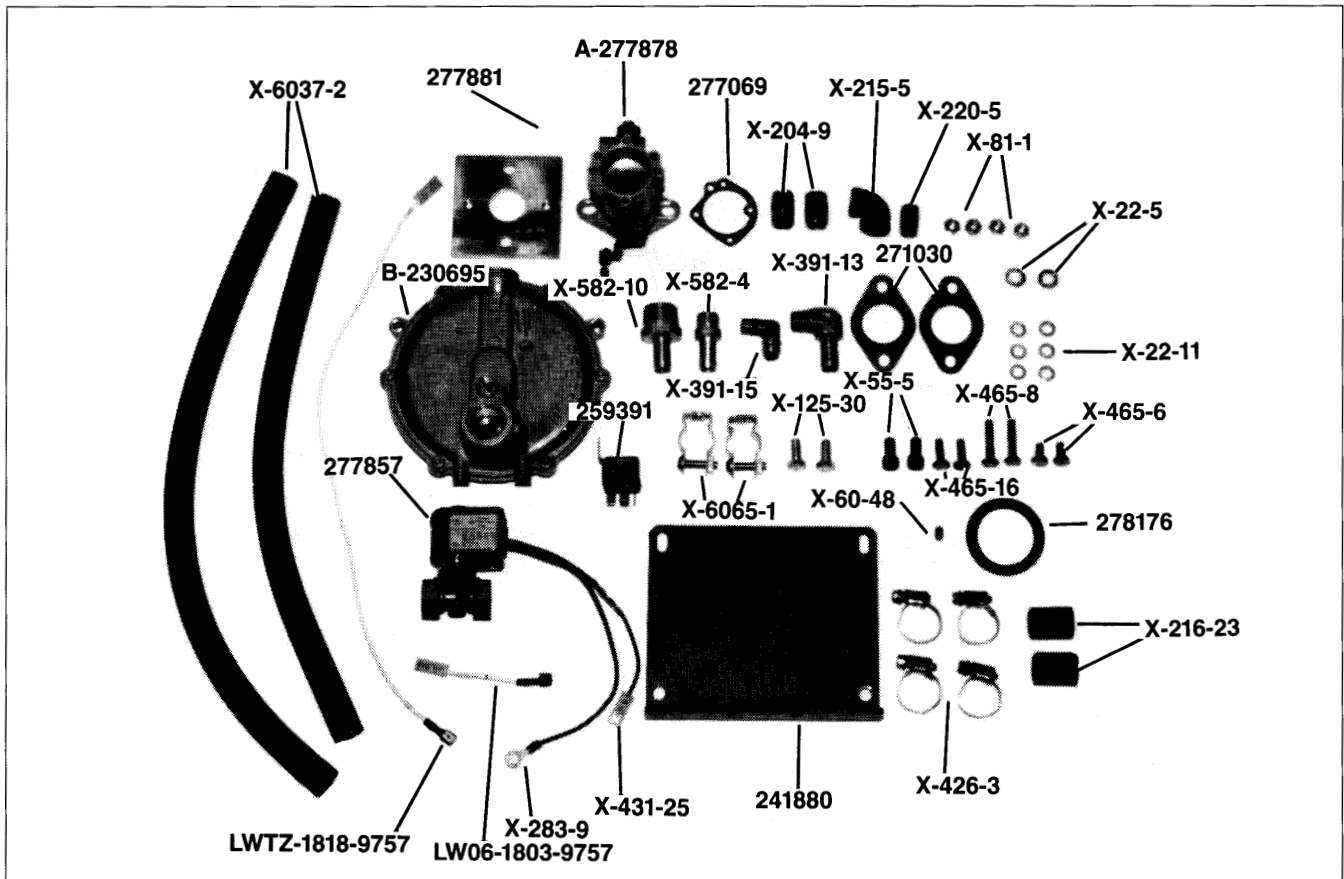


Figure 11. LP Kit Components

PARTS LISTING

| Description | Qty. | Part No. |
|----------------------------------|------|----------|
| Washer, split lock 1/4 | 6 | X-22-11 |
| Washer, split lock 5/16 | 2 | X-22-5 |
| Connector, 90° | 1 | X-391-15 |
| Clamp, hose | 4 | X-426-3 |
| Screw, H.C. 1/4-20 x 1/2 | 2 | X-465-6 |
| Screw, hex 5/16-24 x 5/8 | 2 | X-55-5 |
| Screw, H.C. 5/16-24 x 3/4 | 2 | X-125-30 |
| Screw, set 1/4-20 x 3/8 | 1 | X-60-48 |
| Hose | 2 | X-6037-2 |
| Nipple, 3/8 NPT | 2 | X-204-9 |
| Elbow, 90° 1/4 NPT | 1 | X-215-5 |
| Connector, hose 3/4 NPT x 1/2 | 1 | X-582-10 |
| Bracket, mounting | 1 | 241880 |
| Regulator, gas | 1 | B-230695 |
| Connector, hose 3/8 NPT x 1/2 | 1 | X-582-4 |
| Nipple, 1/4 NPT | 1 | X-220-5 |
| Tubing, shrink | 2 | X-6079-2 |
| Gasket, carburetor | 2 | 271030 |

| Description | Qty. | Part No. |
|--------------------------------------|------|----------------|
| Gasket, air cleaner | 1 | 277069 |
| Adapter, carburetor | 1 | 277881 |
| Gasket, air cleaner | 1 | 278176 |
| Nut, 1/4-20 | 4 | X-81-1 |
| Screw, H.C. 1/4-20 x 3/4 | 2 | X-465-16 |
| Screw, H.C. 1/4-20 x 1-1/4 | 2 | X-465-8 |
| Connector, hose 90° 3/8 NPT x 1/2 | 1 | X-391-13 |
| Coupling, pipe 3/8 NPT | 2 | X-216-23 |
| Valve, gas | 1 | 277857 |
| Clamp, conduit 1/2 in. | 2 | X-6065-1 |
| Relay, shutdown | 1 | 259391 |
| Terminal, push-on | 1 | X-431-25 |
| Terminal, eyelet | 1 | X-283-9 |
| Lead, 3 in. (7.62 cm) | 1 | LW06-1803-9757 |
| Lead, 18 in. (45.7 cm) | 1 | LWT2-1818-9757 |
| Carburetor, LP | 1 | A-277878 |
| Plug, pipe 1/8 NPT | 1 | X-75-23 |

