
INSTALLATION INSTRUCTIONS

Original Issue Date: 2/99
 Model: 20RZ
 Market: Industrial
 Subject: Fuel Vaporizer Kit ES-37770

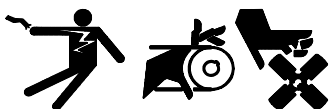
Use the following instructions to convert a LP vapor fuel system to a LP liquid withdrawal fuel system.

Installation of the Fuel Vaporizer kit must comply with these installation instructions. Failure to install the fuel vaporizer per these installation instructions may result in poor generator set performance and affect the generator set warranty.

With the LP liquid withdrawal fuel system, LP fuel in liquid form is directed under pressure from the tank to a vaporizer. The vaporizer converts the fuel from a liquid to a gaseous state and then the LP vapor is drawn off to the carburetor. The system also includes a fuel valve which shuts off the fuel flow when the engine is stopped.

Observe the following safety precautions while installing the kit.

⚠ WARNING

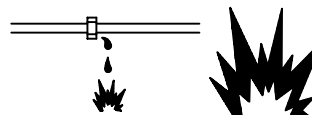


Accidental starting.
Can cause severe injury or death.

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



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.

LP liquid withdrawal fuel leaks. Explosive fuel vapors can cause severe injury or death. Fuel leakage can cause an explosion. Check the LP liquid withdrawal gas fuel system for leakage by using a soap and water solution with the fuel system test pressurized to at least 90 psi (621 kPa). 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.

Installation

1. Place the generator set master switch in the OFF position.
2. Disconnect the power to the battery charger, if equipped.
3. Disconnect the generator set engine starting battery(ies), negative (-) lead first.

4. Turn off the fuel supply to the generator set.
5. With the engine and radiator cool, drain the coolant into a suitable container. Dispose of all waste materials, (engine oil, fuel, coolant, etc.) in an environmentally safe manner. Contact local authority for procedures.

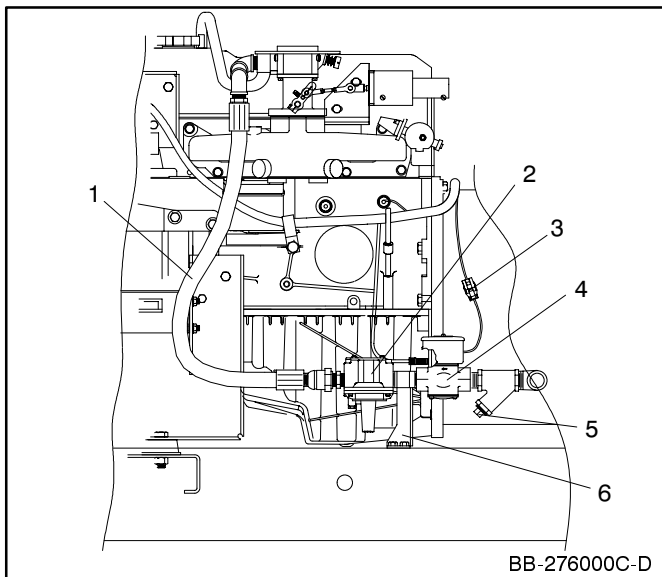
NOTE

Drain valve is located on radiator bottom and/or on side of engine crankcase.

NOTE

Apply pipe sealant to male threads of all components before installation.

6. Disconnect the fuel supply line connected to the gas valve assembly.
7. Disconnect the gas valve two-pin connector. See Figure 1.
8. Disconnect and remove the flexible fuel line between the pressure regulator and the carburetor. The fuel line will not be reused. See Figure 1.
9. Remove the pipe plug from the gas strainer. See Figure 1. Save the pipe plug for installation later.
10. Remove the hardware securing the fuel valve bracket to the generator set skid.

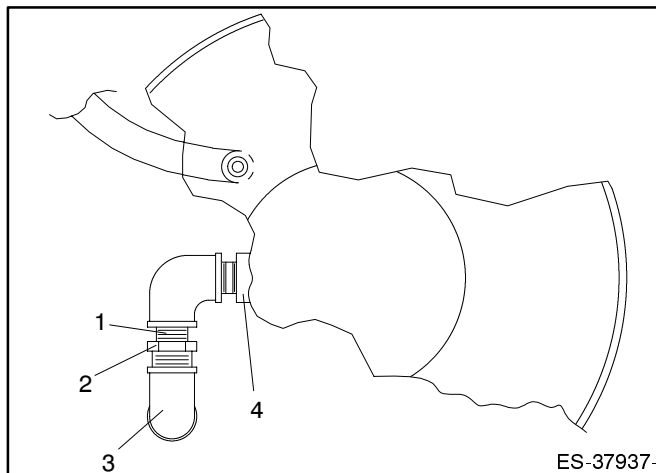


1. Flexible fuel line
2. Pressure regulator
3. Gas valve two-pin connector
4. Gas valve assembly
5. Pipe plug (remove and reuse)
6. Fuel valve bracket

Figure 1. LP Vapor Fuel System

11. Remove the air cleaner assembly from the carburetor.

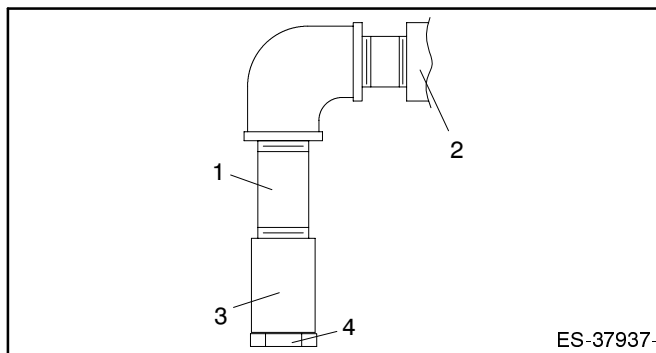
12. Remove the existing 45° elbow, reducer bushing, and pipe nipple from the carburetor inlet. See Figure 2. The hardware will not be reused.



1. Pipe nipple
2. Reducer bushing
3. 45° elbow
4. Carburetor inlet

Figure 2. Carburetor—Top View

13. Apply pipe sealant to the threads of the pipe nipple (X-209-3) and install in the existing 45° elbow. See Figure 3.
14. Apply pipe sealant to the exposed threads of the pipe nipple installed in step 13 and install the pipe coupling (X-216-20). See Figure 3.
15. Apply pipe sealant to the threads of reducer bushing (X-202-46) and install in pipe coupling. See Figure 3.

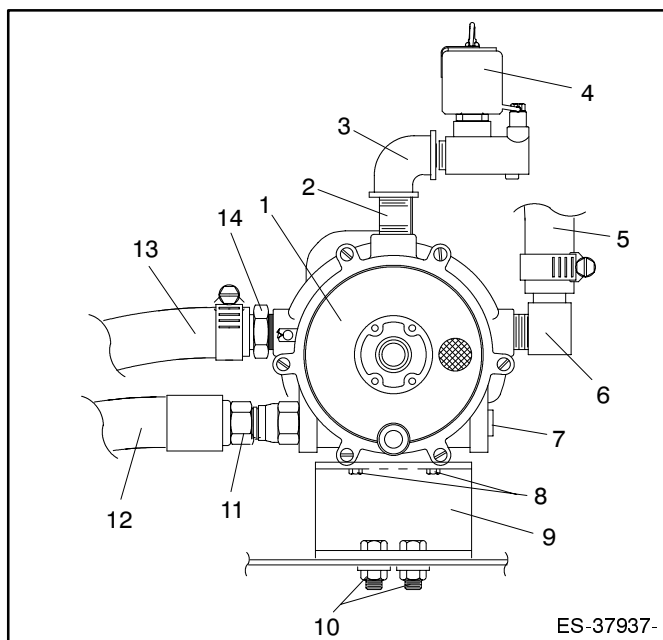


1. Pipe nipple (X-209-3)
2. Carburetor inlet
3. Pipe coupling (X-216-20)
4. Reducer bushing (X-202-46)

Figure 3. Carburetor Inlet Connections

16. Secure gas convertor (226576) to gas convertor bracket (256888) using 1/4-20 x 0.625 in. screws (X-465-2) and plain washers (X-25-40). See Figure 4
17. Secure gas convertor bracket to generator set skid using screws 5/16-18 x 0.750 in. (X-125-3), washers (X-25-85), and 5/16-18 spirallock nuts (X-6210-7). See Figure 4.

18. Apply pipe sealant to hose connector (X-391-2) and install in gas convertor water outlet. See Figure 4.
19. Apply pipe sealant to threads of 1/4 x 1 1/2 in. pipe nipple (X-220-6) and install in gas convertor fuel inlet.
20. Apply pipe sealant to threads of 1/4 in. pipe elbow (X-215-5) and install on pipe nipple installed in step 19.
21. Apply pipe sealant to the threads of the fuel solenoid (256976) and install in pipe elbow installed in step 20. Position fuel solenoid as shown in Figure 4.
22. Apply pipe sealant to the threads of hose connector (X-582-2) and install in gas convertor water inlet. See Figure 4.
23. Apply pipe sealant to the threads of the half union connector (X-296-13) and install in the gas convertor left side vapor outlet.
24. Apply pipe sealant to the threads of the 1/2 in. pipe plug removed in step 9 from the gas strainer and install in the gas convertor right side vapor outlet.

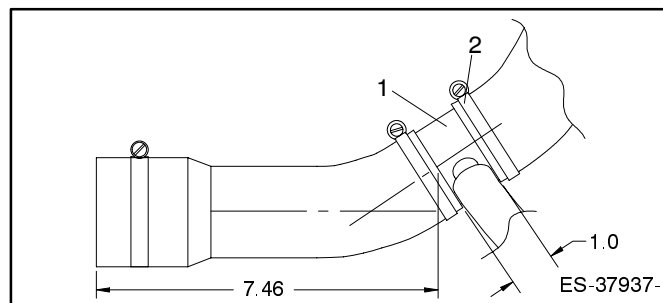


1. Gas convertor (226576)
2. Pipe nipple (X-220-6)
3. Pipe elbow (X-215-5)
4. Fuel solenoid (256976)
5. Hose (X-312-53) and hose clamp (X-426-3)
6. Hose connector (X-391-2)
7. Pipe plug (X-75-28)
8. Screws (X-465-2) and washers (X-25-40)
9. Gas convertor bracket (256888)
10. Screws (X-125-3), washers (X-25-85), and nuts (X-6210-7)
11. Half union connector (X-296-13)
12. Flex fuel line (226378)
13. Hose (X-312-15) and hose clamp (X-426-3)
14. Hose connector (X-582-2)

Figure 4. Gas Convertor Assembly

25. Disconnect and remove the lower radiator hose from the engine and radiator.

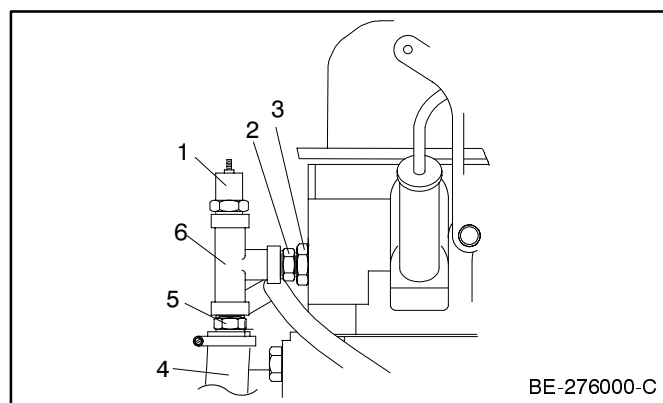
26. Cut a 1 in. (25.4 mm) section out of the lower radiator hose. See Figure 5 for location.
27. Secure hose connector (276222) in lower radiator hose with hose clamps (X-426-4). Position hose connector as shown in Figure 5.
28. Reinstall the lower radiator hose to the engine and radiator. Secure hose with hose clamps.



1. Hose connector (276222)
2. Hose clamps (X-426-4)

Figure 5. Lower Radiator Hose

29. Disconnect and remove the low water temperature switch from the pipe tee located on the back of the engine. See Figure 6. Save low water temperature switch for installation later.
30. Disconnect hose clamp securing block heater outlet hose to pipe tee. See Figure 6. Remove hose from pipe tee.
31. Remove block heater outlet hose connector from pipe tee. See Figure 6. Save hose connector for installation later.
32. Remove pipe tee from pipe nipple. Do not remove pipe nipple. Pipe tee will not be reused.

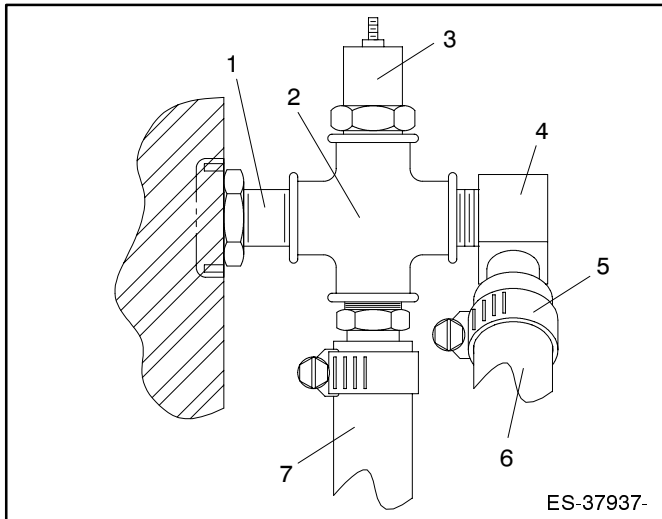


1. Low water temperature switch
2. Pipe nipple
3. Reducer bushing
4. Block heater outlet hose
5. Hose connector
6. Pipe tee

Figure 6. Pipe Tee and Components

33. Apply pipe sealant to the threads of the existing pipe nipple and install pipe cross (X-207-7). Position pipe cross as shown in Figure 7.

34. Apply pipe sealant to the threads of the low water temperature switch removed in step 16 and install in pipe cross. See Figure 7.
35. Apply pipe sealant to the threads of the block heater outlet hose connector removed in step 31 and install in bottom of pipe cross. See Figure 7.
36. Reconnect block heater outlet hose to hose connector. Secure hose to hose connector with hose clamp. Place hose clamp 0.25 in. (6 mm) from end of hose and tighten.
37. Apply pipe sealant to the threads of elbow hose connector (X-391-19) and install in pipe cross. See Figure 7.



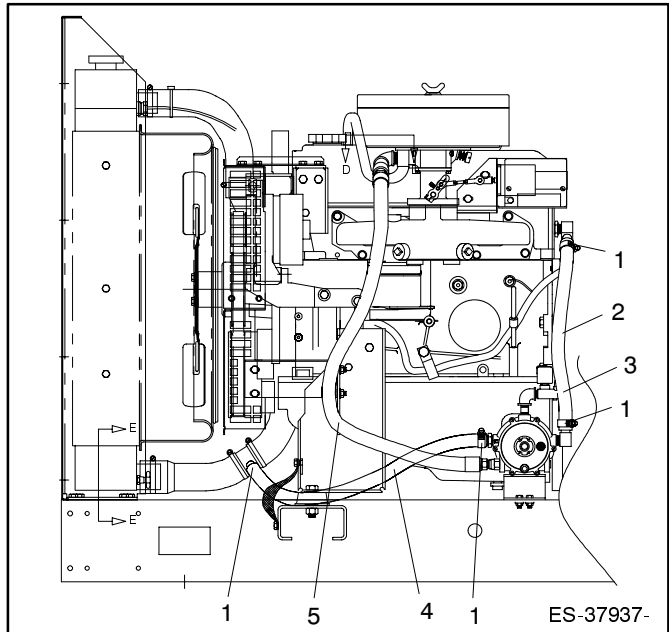
1. Existing pipe nipple
2. Pipe cross (X-207-7)
3. Low water temperature switch
4. Elbow hose connector (X-391-19)
5. Hose clamp (X-426-3)
6. Hose (X-312-53)
7. Block heater outlet hose

Figure 7. Pipe Cross and Components

38. Secure one end of hose (X-312-53) to elbow hose connector installed in step 37. Secure hose to hose connector with hose clamp (X-426-3). Place hose clamp 0.25 in. (6 mm) from end of hose and tighten.
39. Connect opposite end of hose connected in step 38 to hose connector on right side of gas convertor. See Figure 8. Secure hose to hose connector with hose clamp (X-426-3). Place hose clamp 0.25 in. (6 mm) from end of hose and tighten.
40. Secure one end of hose (X-312-15) to hose connector in the lower radiator hose. Secure hose to hose connector with hose clamp (X-426-3). Place hose clamp 0.25 in. (6 mm) from end of hose and tighten.
41. Connect opposite end of hose connected in step 40 to hose connector on left side of gas convertor. See Figure 8. Secure hose to hose connector with hose

clamp (X-426-3). Place hose clamp 0.25 in. (6 mm) from end of hose and tighten.

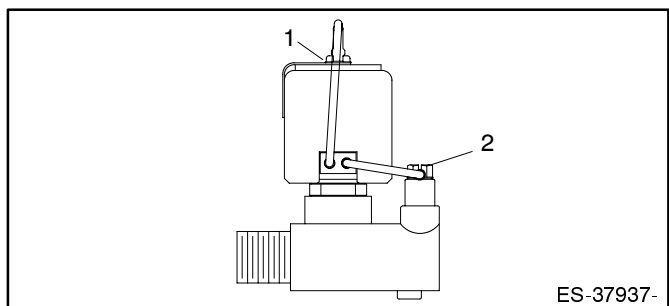
42. Apply pipe sealant to the threads of the half union connector in the left side of the convertor. Secure female end of flexible fuel line to half union connector.
43. Apply pipe sealant to the male threads of the flexible fuel and install in pipe coupling. See Figure 8.



1. Hose clamp (X-426-3)
2. Hose 2.0 ft. (0.6 m) (X-312-53)
3. Fuel inlet
4. Hose 2.6 ft. (0.8 m) (X-312-15)
5. Flexible fuel line (226378)

Figure 8. Fuel Vaporizer Installation

44. Cut the two-pin connector from the harness formerly connected to the gas valve assembly. Crimp customer supplied terminals to the leads.
45. Connect leads disconnected from the gas valve to the fuel solenoid. See Figure 9.



1. Positive connection
2. Negative connection

Figure 9. Fuel Solenoid

46. Connect fuel supply line to the fuel solenoid.
47. Turn on fuel supply to generator set and test connections for leaks. Turn off fuel supply and correct leaks, if required. Turn on fuel supply.

48. Check that the generator master switch is in the OFF position.
49. Reconnect the generator set engine starting battery, negative (-) lead last.
50. Reconnect power to battery charger, if equipped.

LP Liquid Withdrawal Kit

Parts List		
Kit: ES-37770		
Qty.	Description	Part Number
2	Washer, plain OD 0.525	X-25-40
2	Washer, plain OD 0.687	X-25-85
1	Plug, pipe 1/2 in.	X-75-28
2	Screw, h.c. 5/16-18 x 0.750 in.	X-125-3
1	Bushing, reducer 3/8 x 1/2 in.	X-202-46
1	Cross, pipe 1/2 in.	X-207-7
1	Nipple, 1/2 x 2 1/2 in.	X-209-3
1	Elbow, pipe 1/4 in.	X-215-5
1	Coupling, pipe 1/2 in.	X-216-20
1	Nipple, pipe 1/4 x 1 1/2 in.	X-220-6
1	Connector, half union	X-296-13
1	Hose, 5/8 ID x 31 1/2 in.	X-312-15
1	Hose, 5/8 ID x 24 in.	X-312-53
1	Connector, hose	X-391-2
1	Connector, hose elbow	X-391-19
4	Clamp, hose 1.06 max.	X-426-3
2	Clamp, hose 2.25 max.	X-426-4
2	Screw, 1/4-20 x 0.625	X-465-2
1	Connector, hose	X-582-2
2	Nut, spiralock 5/16-18	X-6210-7
1	Line, flexible fuel	226378
1	Converter, gas	226576
1	Bracket, converter	256888
1	Solenoid, fuel	256976
1	Connector, hose	276222