KOHLER POWER SYSTEMS

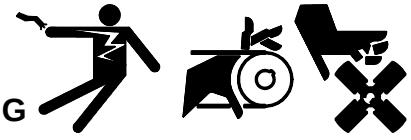
TT-924
INSTRUCTIONS
3/93

LP Vapor Conversion Kit PA-227820 for 7CCKM and 7CCKMR RV/Mobile (Non-extended-Shaft) Generator Sets

This kit is intended to convert a gasoline-fueled unit to an LP Vapor-fueled unit. Installation involves removal of the fuel system components, intake manifold and wiring harness. This kit is not to be used on extended-shaft units. Use this kit only on the following specs:

PA-140249
PA-140250
PA-140251
PA-140252
PA-140255
PA-140259
PA-140260

⚠ WARNING



Accidental starting.
Can cause severe injury or death.
Disconnect battery cables before working on generator set (negative lead first and reconnect it last).

Accidental starting can cause severe injury or death. Disconnect battery cables (remove negative lead first and reconnect it last) to disable generator set before working on any equipment connected to generator. The generator set can be started by remote start/stop switch unless this precaution is followed.

⚠ WARNING

Fire.
Can cause severe injury or death.

Do not smoke or permit flame or spark to occur near fuel or fuel system.

A flash fire can cause severe injury or death. Do not smoke or permit flame or spark to occur near carburetor, fuel line, fuel filter, fuel pump, or other potential sources of spilled fuel or fuel vapors. When removing fuel line or carburetor, use a proper container to catch all fuel.

⚠ WARNING

Hazardous voltage.

Moving rotor.

Can cause severe injury or death.

Do not operate generator set without all guards and electrical enclosures in place.

Hazardous voltage can cause severe injury or death. Short circuits can cause bodily injury and/or equipment damage**.** Do not contact electrical connections with tools or jewelry while adjustments are made. Remove wristwatch, rings, and jewelry that can cause short circuits.

⚠ WARNING

Explosive fuel vapors.
Can cause severe injury or death.

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

Explosive fuel vapors can cause severe injury or death. All fuels are highly explosive in a vapor state. Use extreme care when handling, storing, and using fuels. 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 since spilled fuel may ignite on contact with hot parts or from ignition spark. Do not smoke or permit flame or spark to occur near potential sources of spilled fuel or fuel vapors. 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. Additional precautions must be taken when using the following fuels:

Gasoline – Store gasoline only in approved red containers clearly marked GASOLINE. Do not store gasoline in any occupied building.

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

Explosive fuel vapors can cause severe injury or death. Spilled fuel can cause an explosion. Use a container to catch fuel when draining fuel system. Wipe up all spilled fuel after draining system.

Explosive fuel vapors can cause severe injury or death. Fuel leakage can cause an explosion. Check LP Vapor gas fuel system for leakage using a soap–water solution with fuel system test pressurized to 6–8 ounces per square inch (10–14 inches water column). Do not use test solutions that contain ammonia or chlorine, since the soap will not bubble for an accurate leakage test.

(LP Vapor Gas Models only.)

Parts Listing

Description	Qty.	Part No.
Carburetor Assembly	1	A-227617
Actuator Mounting Bracket	1	227637
Reducer Bushing 1/4 x 1/2	1	X-202-12
Reducer Bushing 3/8 x 1/2	1	X-202-28
Lock Washer #8	3	X-22-7
Pipe Nipple 1/4 x 7/8	1	X-220-5
Plain Washer .219 x .500 x .049	1	X-25-36
Union Connector 1/2	2	X-296-10
Screw 10-24 x 2-1/4	1	X-50-42
Screw 8-32 x 5/8	3	X-51-9
Hose Connector	1	X-582-14
45° Flared Elbow	1	X-6289-2
Self Tapping Screw 1/4-20 x .500	2	X-67-115
Pipe Plug	1	X-75-23
Engine Wiring Harness	1	227424
Flexible Fuel Line	1	227457
Carburetor Sleeve	1	227618
Wiring Harness	1	227619
Gas Valve Mounting Bracket	1	227632
Intake Manifold	1	227634
Adapter Gasket	1	227635
Fuel Line	1	227636
45° Street Elbow	1	227642
Gas Valve	1	227648
Gas Regulator	1	227649
Air Cleaner Base	1	278855
Breather Hose	1	278967
Closure Plate	1	278982
Carburetor Gasket	1	278869
Manifold Gasket	2	278988
Screw 8-32 x 0.750	2	X-67-132
Cable Tie	2	X-468-3
Decal	1	227841
Retaining Wire	1	238247

NOTE

The installation of this kit requires reusing some of the unit's existing hardware. When disassembling components, save all hardware unless stated otherwise.

NOTE

This kit is not intended for extended-shaft generator sets.

Installation

1. If removing the generator set from a coach, move the controller master switch to the STOP position. Disconnect the battery of the generator set, negative lead first. Disconnect the fuel lines, load leads, electrical leads and exhaust system. Remove the generator set from the coach according to the procedure supplied by the coach manufacturer.

NOTE

Refer to Figure 1 for generator component identification.

2. Remove the screws securing the hood to the generator. Remove the hood to expose the engine end of the generator.
3. Remove the air intake pipe (227553), with the closure plate attached, by removing two screws.
4. Remove one screw (X-67-115) from the air intake pipe which is secured to the intake manifold.
5. Disconnect the hose clamp connecting the black heat-duct tube (227549) to the back of the air cleaner.
6. Cut cable tie (X-468-4) to remove the hold-down plate (227582).
7. Remove the black heat-duct tube and air intake pipe with closure plate. (Discard the heat-duct tube and the air intake pipe.)
8. Remove the pleated hose between the carburetor and air cleaner by disconnecting the hose clamp located at the carburetor. (Keep the hose clamp in place which secures the pleated hose to the air cleaner.)
9. Remove the air cleaner cover by unsnapping four side clips.
10. Remove the screw (X-67-115 which is located behind the front spark plug) on the clip securing the breather hose. Remove the clip.
11. Remove the copper breather line from the engine breather housing assembly.
12. Remove the air cleaner cover, with the pleated hose attached, and the copper tube with the black insulation sleeve (227578) around it.
13. Remove the air cleaner element and pre-filter foam.
14. Remove the air cleaner base by removing three screws. Two screws (X-67-115) are mounted in front, and one screw (X-6217-4) is mounted in back. Leave the captive nut in place. (Discard the air cleaner base.)
15. Disconnect the fuel line from the right side of the gasoline carburetor.
16. Remove the screw (X-67-115) and clip which holds the spark plug lead to the intake manifold.
17. Remove the screw (X-67-115) to disconnect the support bracket from the stator adapter.
18. Disconnect the 6-pin connector (J9/P9) from the actuator assembly.
19. Disconnect the single lead (N) and double lead (70) from the choke.
20. Remove the two screws from the ignition module.
21. Remove the lead (AD) from the carburetor antidiesel solenoid.
22. Remove the lead (70) from the PTC (Positive Temperature Coefficient) assembly.
23. Remove the four socket-head screws (X-55-27) and four washers (X-25-33) from the intake manifold flanges which secure the air intake manifold to the engine. Remove the two pipe plugs (X-75-18) from the intake manifold and save. Discard the intake manifold.
24. Remove the spark plug boot covering the front (No. 1) spark plug.
25. Remove the carburetor, choke, actuator assembly, and bracket. (Remove and save the stepper motor and the mounting hardware from the actuator assembly. Remove and save the two studs (X-352-90) and two nuts (X-76-2) from the carburetor and intake manifold, and remove and save one screw (X-465-18) and one nut (X-76-2)

from the actuator assembly; discard the remaining components.)

26. Remove the four screws (X-794-2) securing the controller cover to the controller. (This is done to offer better access to the fuel system components.)

27. Remove the two screws securing the fuel pump to the controller mounting bracket.

28. Disconnect the fuel line to the fuel pump.

29. Disconnect the 2-pin (J5/P5) connector (containing the red-positive and black-negative leads).

30. Remove and discard the fuel line, fuel filter and fuel pump.

31. Remove the carburetor drip pan by removing the screw mounted into the controller. Replace the screw in the hole, discard the drip pan.

32. Remove the engine wiring harness. Reference the proper wiring diagram and Steps 33-55.

33. Disconnect the 20-pin connector (J4/P4) from the controller.

34. Remove the screw (X-67-52) and cable tie (X-468-5) which secure the leads to the generator adapter.

35. Disconnect the lead (71) from the starter solenoid.

36. Disconnect the two leads (MP) from the magnetic pickup.

37. Disconnect the positive lead (P) from the starter solenoid.

38. Disconnect the battery positive lead from the starter solenoid.

39. Remove the voltage regulator guard by removing three screws (X-67-113 qty. 2, and X-794-2 qty. 1).

40. Disconnect the 6-pin connector (J10/P10) from the voltage regulator.

41. Remove one screw (containing the plastic clip) from the bottom left of the voltage regulator.

42. Clip the cable tie securing the leads to the end bracket fin.

43. Disconnect the 4-pin connector (J8/P8) containing leads 33, 44, B1, and B2.

44. Remove the four screws (X-794-2) securing the circuit breaker cover to the circuit breaker box.

45. Disconnect the white lead (55) from the fuse located inside the circuit breaker box. Disconnect the short jumper lead (55).

46. To gain space to feed the terminal end of lead 55 through the back of the breaker box, remove the lead (2) from the circuit breaker and feed it through the back of the breaker box.

47. Remove the brush holder cover by removing four screws (X-67-113).

48. Raise the brushes in the holder by pushing leads upward in the slots. Retain brushes by inserting the retaining wire (238247).

49. Remove the two screws holding the brush holder bracket to the generator end bracket.

50. Disconnect the leads (FN and FP) from the brush holder and feed leads through the brush holder cover.

51. Free the harness from the back of the controller.

52. Remove the lead (13) from the low-oil-pressure switch.

53. Remove the leads (70 and N) from the ignition module.

54. Remove the two leads (70) from the top of the ignition coil. (Replace the star washer and nut into the ignition coil.)

55. Remove the lead (N) from the bottom of the ignition coil. (Replace the star washer and nut into ignition coil.)

56. Mount the Actuator Mounting Bracket (227637) to the intake manifold (227634) using two screws (X-67-115). Attach the stepper motor to the actuator mounting bracket using existing hardware to secure.

57. Remove the two studs (X-352-90) and nuts (X-76-2) from the old carburetor/intake manifold assembly.

58. Install the two studs (X-352-90) into the flange of the intake manifold.

59. Install the gasket (278869) onto the studs.

60. Install the PTC assembly onto the gasket.

61. Mount the carburetor assembly (A-227617) onto the studs and secure with nuts (X-76-2).

62. Position the throttle pin as shown in Figure 2. Slide sleeve onto the pin extending from the carburetor.

63. Mount the existing screw (X-465-18) and nut (X-76-2) on the actuator bracket to serve as a stopper for the stepper motor. Adjust the stop screw for the stepper motor so that the carburetor throttle valve is in the full-open position.

NOTE

Use pipe sealant on all pipe connections.

64. Under the carburetor, add pipe nipple (X-220-5).

65. Install the reducer bushing (X-202-12) onto the pipe nipple.

66. Install the gas regulator (227649) to the reducer bushing. Be sure the flow arrow (on the regulator casting) is pointing up toward the carburetor. Position the gas regulator at the 7 o'clock position. See Figure 2.

67. Install the connector (X-296-10) into the bottom hole of the gas regulator.

68. Mount the intake manifold and gaskets (278988) to the engine using existing hardware (X-55-27 socket-head screws and X-25-33 washers).

69. Mount the closure plate (278982) at the position shown in Figure 2. Use existing hardware to secure.

70. Remount the ignition module to the intake manifold using thermal compound and two screws (X-67-132).

71. Replace the two pipe plugs (X-75-18, removed from the old intake manifold) into the new intake manifold. Be sure to use pipe sealant on all pipe connections.

72. Remount the spark plug lead to the intake manifold using the existing screw (X-67-115) and clip to secure.

73. Mount the gas valve (227648) to the gas valve mounting bracket (227632) using screw (X-50-42) and washer (X-25-36) to secure. Be sure that the gas valve is installed in the proper position. The fuel inlet should be positioned toward the bottom and the fuel outlet should be positioned toward the top.

74. Install the reducer bushing (X-202-28) into the fuel outlet (top) of the gas valve.

75. Install the 45° flared elbow (X-6289-2) into the reducer bushing.

76. Install the 45° street elbow (227642) into the gas valve's fuel inlet (bottom).

77. Install the connector (X-296-10) into the 45° street elbow.

78. Install the flexible fuel line (227457) onto the connector on the gas valve.

79. Install the fuel line (227636) to the 45° flared elbow positioned at the top of the gas valve.

80. Mount the gas valve bracket to the controller mounting bracket using two existing screws (X-67-115).

NOTE

If encountering difficulty mounting the gas valve, slowly tighten some of the fuel pipe connections. Be sure not to overtighten.

81. Mount the adapter gasket (227635) and carburetor sleeve (227618) to the carburetor using three screws (X-51-9) and lock washers (X-22-7).

82. Install the breather hose (278967) to the engine breather housing assembly.

83. Install the hose connector (X-582-14) into the pleated hose attached to the air cleaner.

84. Reinstall the clip over the breather hose and magnetic pickup leads and install into the bracket mounted behind the spark plug using an existing screw (X-67-115).

85. Install engine wiring harness (227424). Refer to Steps 86-106.

86. Feed 4- and 6-pin connectors (containing leads 33, 44, FN, FP, 55, B1, B2) and leads 70 and CP, through the hole behind the gas valve. Route the leads behind the controller and pull out at the generator end of the unit.

87. Route the lead (55) into the circuit breaker box through the hole in the back of the breaker box.

88. Install the small jumper lead (55) onto lead 55 and connect to the back of the fuse.

89. Feed the circuit breaker lead (2) back into the breaker box and reconnect it to the circuit breaker. (Lead 2 was removed to gain some space in the hole.)

90. Reinstall the circuit breaker cover to the circuit breaker box using four existing screws.

91. Connect the 20-pin connector (J4/P4) to the connector located at the left side of the controller.

92. Connect the 2-pin connector end of the wiring harness (227619) to the 2-pin connector (J20/P20) on the engine wiring harness (containing leads AD and N). Connect the terminal ends of the wiring harness to the gas valve.

93. Feed leads FP and FN through the hole in the brush holder cover. Connect the black brush lead and lead FP to the brush holder (back screw position). Connect the black brush lead and lead FN to the brush holder (front screw position). Connect using existing screws and washers. Refer to the wiring diagram.

94. Mount the brush holder bracket to the end bracket using existing screws. Remove the retaining wire from the brush holder. Be sure that the brushes are centered on the slip rings. Improper brush position will cause premature wear.

95. Remount the brush holder cover to end bracket using four existing screws (X-67-113).

96. Plug the 6-pin connectors (J10/P10) together at the voltage regulator.

97. Plug the 6-pin connector end of the harness to the 6-pin connector (J9/P9) at the actuator assembly (containing leads M1, M2, M3, and M4).

98. Feed part of engine wiring harness underneath the intake manifold.

99. Connect the two leads (70) and the one lead (N) to the top position of the ignition coil. (Use existing hardware to secure.)

100. Connect the (N) lead to the bottom of the ignition coil. (Use existing hardware to secure.)

101. Connect the (N) lead to the “C” position on the ignition module. Connect the (70) lead to the “B” position on the ignition module.

102. Connect the lead (13) to the low-oil pressure switch.

103. Connect the lead (70) to the PTC assembly.

104. Connect the two leads (MP) of the engine wiring harness to the two leads coming from the magnetic pickup (white & black leads).

105. Connect the (CP and P) leads, and the positive battery lead to the positive side of the starter solenoid. Connect the (71) lead to the small terminal on the starter solenoid.

106. The 4-pin connector of the engine wiring harness, (located at the back end of the generator) plugs into the 4-pin connector (J8/P8) of the stator wiring harness containing lead 33, 44, B1, and B2.

107. Carefully tuck wires into controller box. Remount the controller cover using existing screws (X-794-3 qty. 4).

108. Use the cable tie (X-468-3) and existing screw to gather together the fuel valve leads. Mount to the controller mounting bracket.

109. If the unit is equipped with a battery charging option, connect lead (70) to the battery charging board and lead (CP) to the battery charging circuit breaker. Refer to the wiring diagram. If the unit does not have the battery charging option, tape leads 70 and CP at the terminal end and wire tie to the engine harness.

110. Use the cable tie (X-468-3) and existing screw (X-67-118) to tie wires at the generator back end. Mount the cable tie to the bottom left of the voltage regulator.

111. Replace the voltage regulator guard to the end bracket and to the controller using existing hardware (X-67-113 qty. 2, and X-794-3 qty. 1).

112. Mount the air cleaner base (278855) to the controller top using existing hardware.

113. Place the pre-filter foam and the paper element inside the air cleaner.

114. Attach the air cleaner cover (with pleated hose attached) by simply snapping in place the 2 clips.

115. Remove the winter/summer decal from the front of the air cleaner.

116. Connect the breather hose to the plastic hose connector in the pleated hose.

117. Attach the pleated hose to the carburetor using the existing hose clamp.

118. Regap the spark plug. Gasoline models have a 0.025 in. (0.64 mm) spark plug gap, LP Vapor models will have an 0.018 in. (0.46 mm) spark plug gap.

119. Place the decal (227841) on controller cover.

120. Replace the generator hood.

121. Reconnect the battery, negative lead last. Connect the fuel lines, load leads, remote leads, and exhaust system.

NOTE

Since this generator set has been converted from a gasoline-fueled unit to an LP vapor-fueled unit, retain this instruction sheet for service parts ordering information. When placing a service parts order, include the generator specification number (found on the generator nameplate) and relay the information that the generator was converted from a gasoline- to an LP vapor-fueled unit.

Specification - LP Vapor Gas

The LP gas system consists of a shut-off valve, a secondary regulator, and a carburetor that adjusts the mixture of fuel and air for proper combustion.

The gas and supply pressure should not exceed six ounces. To check inlet pressure, remove the plug on the fuel inlet of the gas regulator. Insert an ounce pressure gauge or manometer. Adjust the pressure to 4-6 ounces or 7-11 inches water column, inlet pressure is adjusted on the primary regulator (pressure greater than 10 ounces will not allow the electric fuel valve to open).

NOTE

If a removable fuel container is used as a fuel source, fuel leakage during a container change must be prevented by the use of a quick close coupling on the fuel line or a check valve installed in the fuel line.

NOTE

A hydrostatic relief valve is also required between the container shutoff valve and the automatic shutoff valve on the generator set.

LP Carburetor Adjustments

Main Fuel Mixture

For preliminary setting turn the MAIN FUEL valve in a clockwise direction until it bottoms lightly (do not force), then back out 1 turn. With the engine thoroughly warmed up and running at rated rpm under full load, turn MAIN FUEL valve in until the engine slows down (lean setting) then turn valve out until the engine regains full speed (about 1/8 turn). When properly adjusted, the engine will operate with steady governor action. improper adjustment (rich setting) causes improper operation of the vaporizer and excess fuel consumption.

Idle Fuel Mixture

The idle system functions only at part and no load conditions. For this reason, the idle setting has only a momentary effect. To adjust, stop the engine and then turn the IDLE FUEL screw all the way in (clockwise) then back out 1/4 turn. Adjust for proper no load operation.

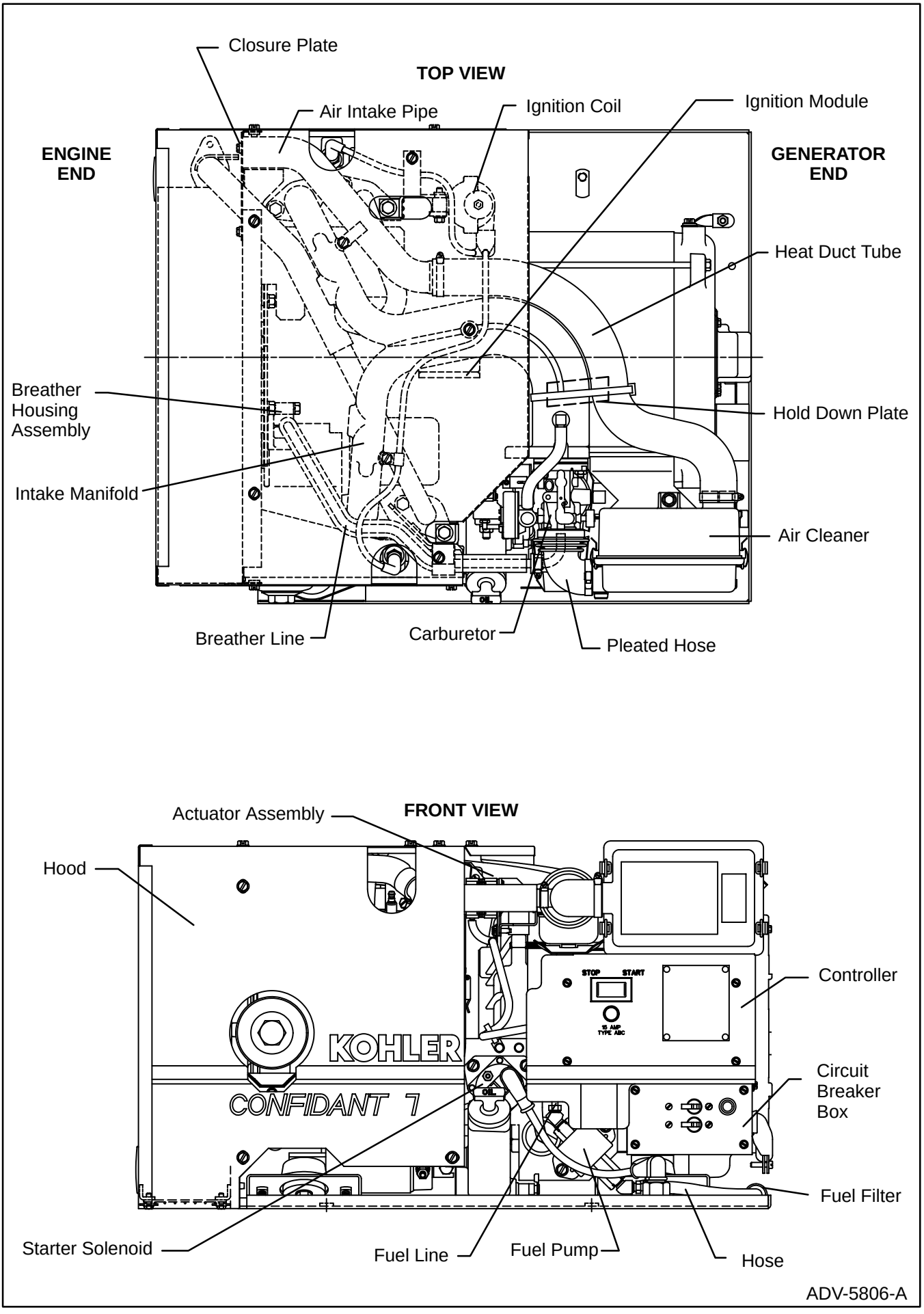


Figure 1. 7kW Gasoline Fueled RV Generator Set.

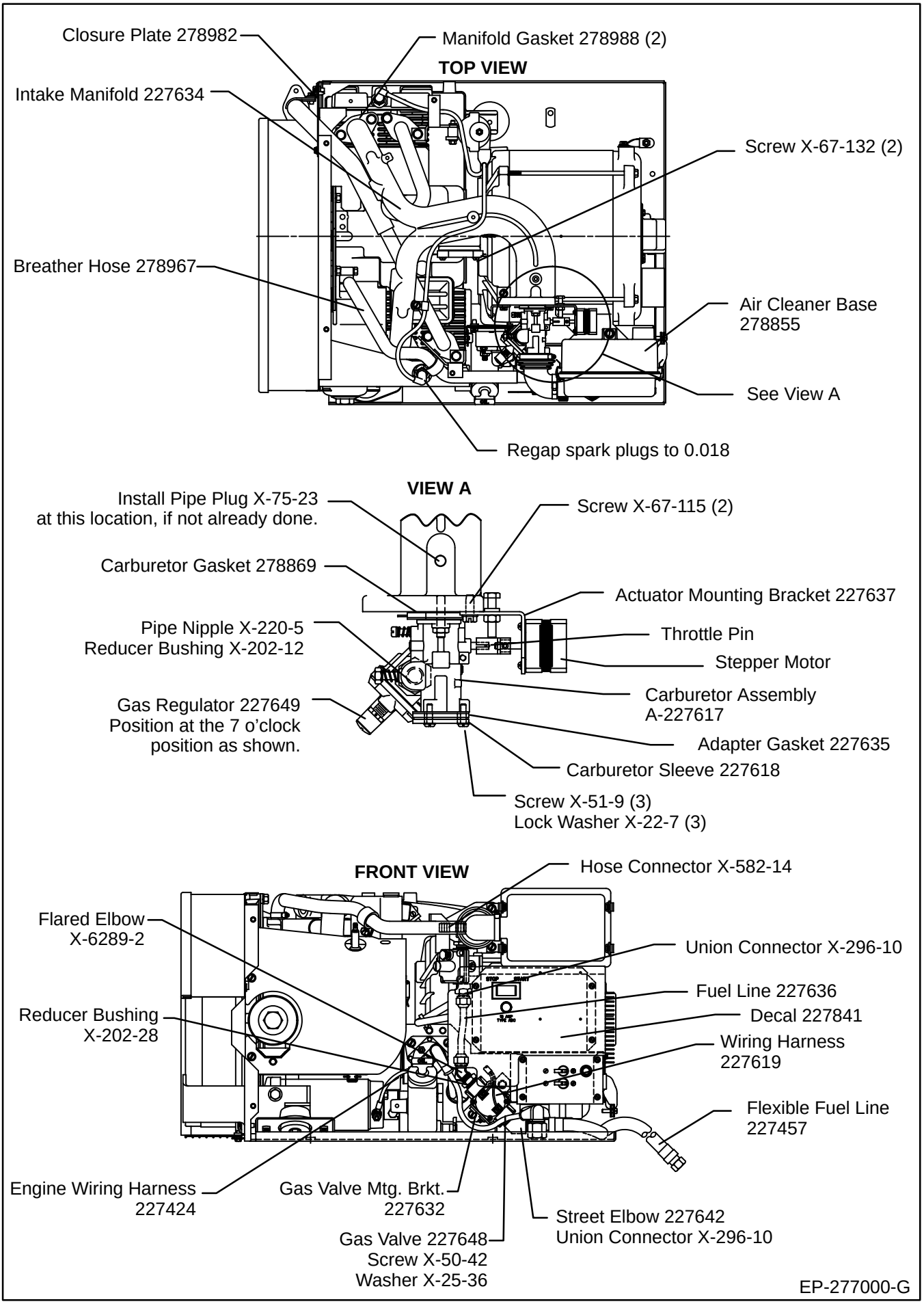


Figure 2. 7kW LP Vapor Fueled RV Generator Set.

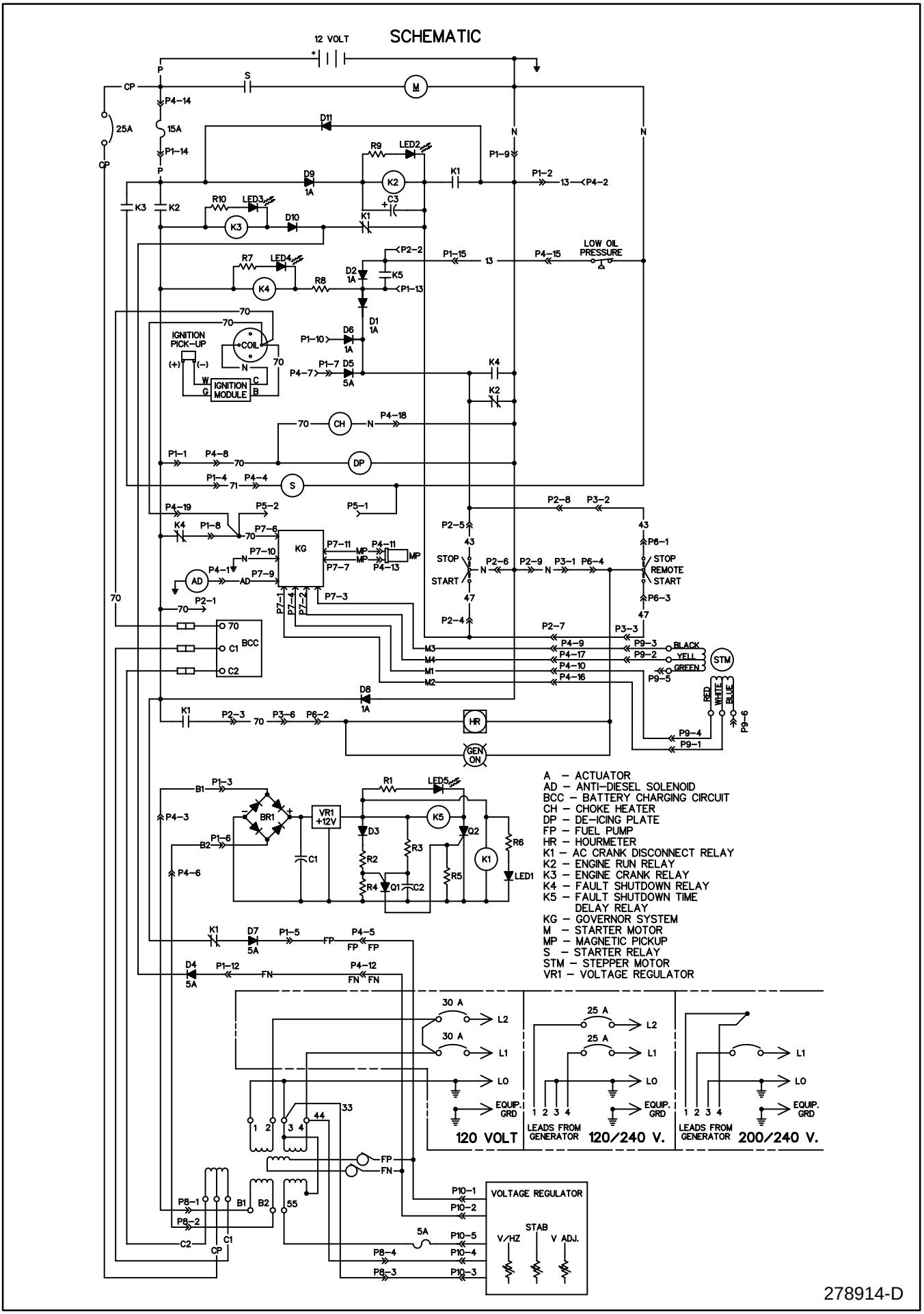


Figure 3. Wiring Diagram - Schematic 7kW RV Gasoline.

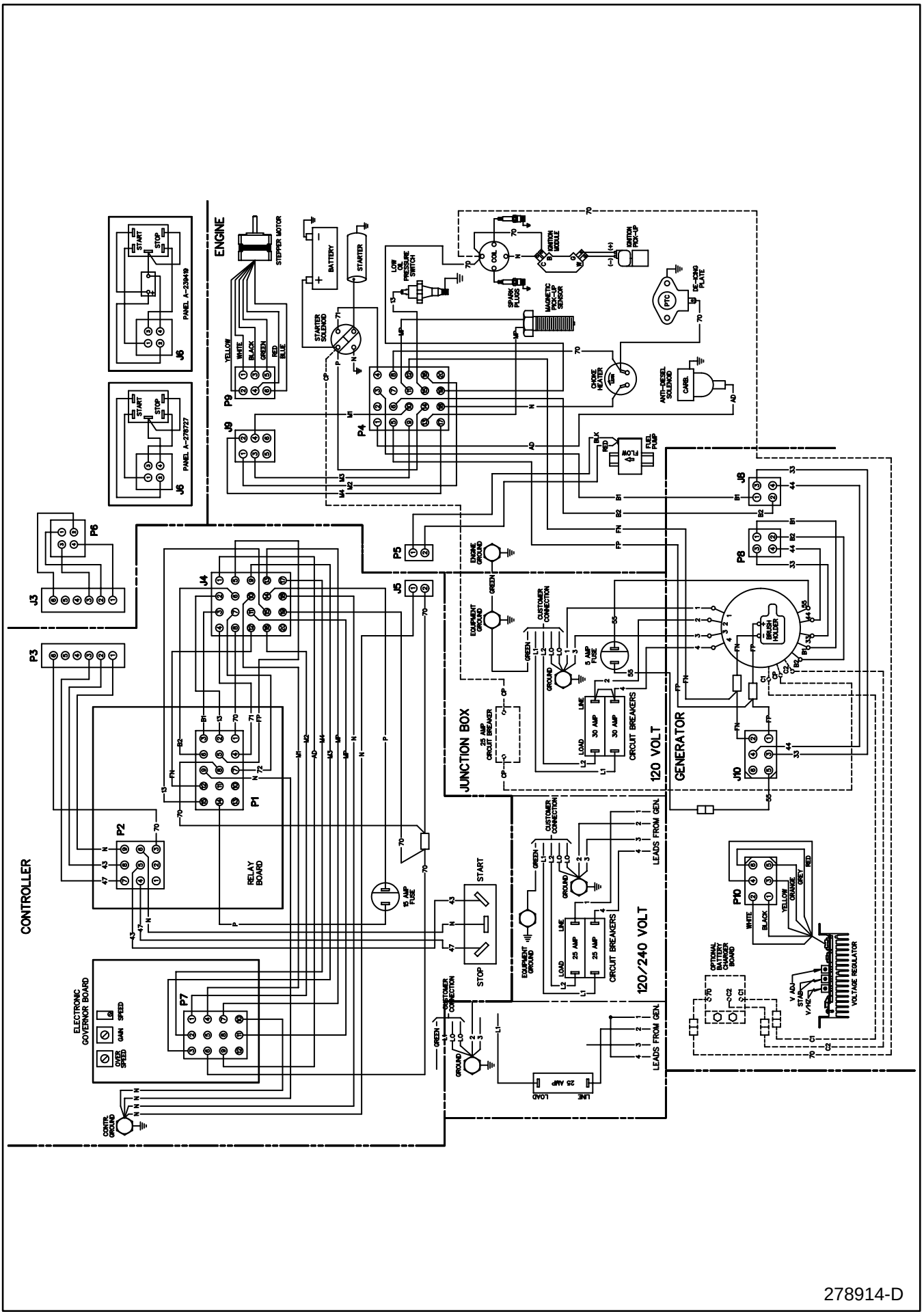


Figure 4. Wiring Diagram - Point-to-Point Wiring 7kW RV Gasoline.

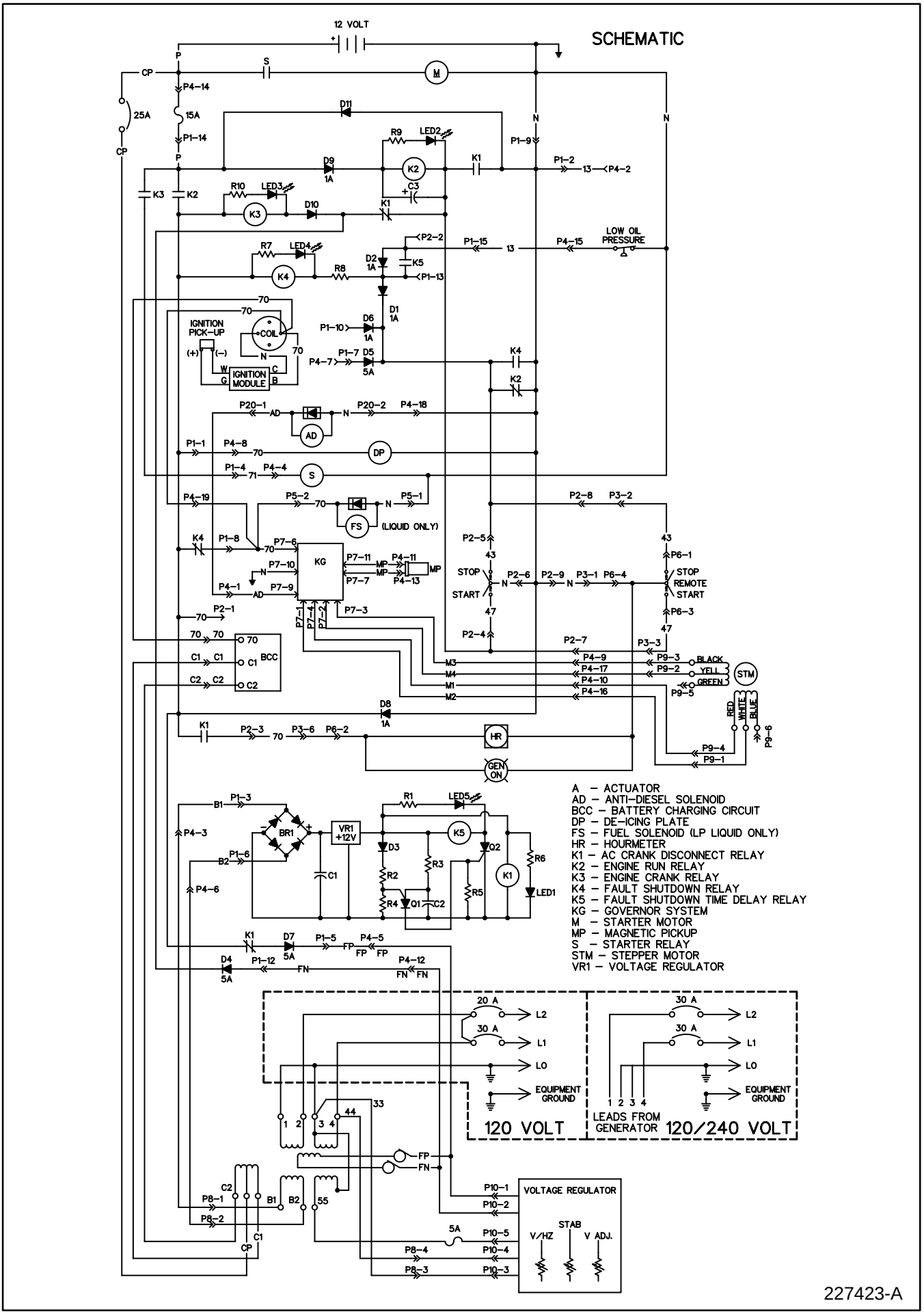


Figure 5. Wiring Diagram - Schematic 7kW RV LP Vapor.

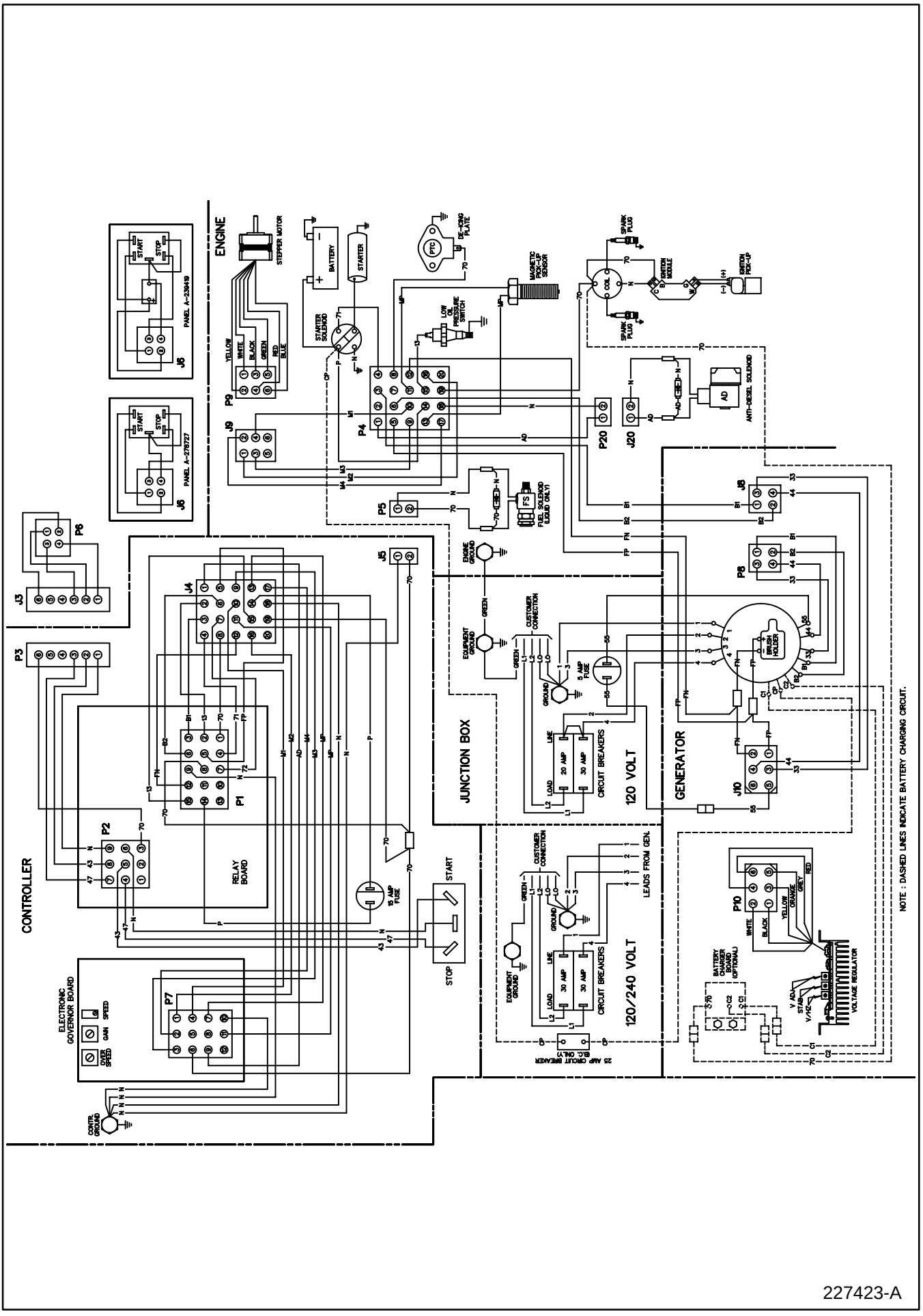


Figure 6. Wiring Diagram - Point-to-Point Wiring 7kW RV LP Vapor.