



INSTRUCTION BULLETIN

No. 340740
Machine: 8410 LPG
Published: 12-2004
Rev. 02

NOTE: DO NOT DISCARD the Parts List from the Instruction Bulletin. Place the Parts List in the appropriate place in the machine manual for future reference. Retaining the Parts List will make it easier to reorder individual parts and will save the cost of ordering an entire kit.

NOTE: Numbers in parenthesis () are reference numbers for parts listed in Bill of Materials.

Installation instructions for **kit number 9000826**

SYNOPSIS / PROBLEM:

This kit contains parts needed to install/replace the LPG injector, ECU controller, coolant orifice, and filter on 8410 LPG model sweepers with serial numbers between 013228 and 013999 (with Zeems fuel systems). Please follow step-by-step instructions.

SPECIAL TOOLS / CONSIDERATIONS: NONE

(Estimated time to complete: 2 1/2 hours)

PREPARATION:

1. Move the machine outdoors or to a well ventilated area.

FOR SAFETY. Keep flames and sparks away from fuel system service area. Keep area well ventilated.

2. Park the machine on a clean level surface, turn off the machine, and set the parking brake.

FOR SAFETY: Before leaving or servicing machine, stop on level surface, turn off the machine, and set the parking brake.

3. Open and lock engine compartment doors.
4. Disconnect the LPG injector harness connector from the injector assembly. Refer to Fig. 1.

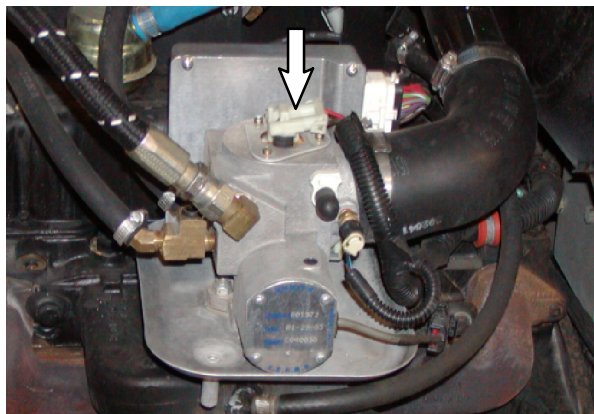


FIG. 1

5. Remove the retaining plate, injector assembly, and o-rings from the throttle housing. Refer to Fig. 2.

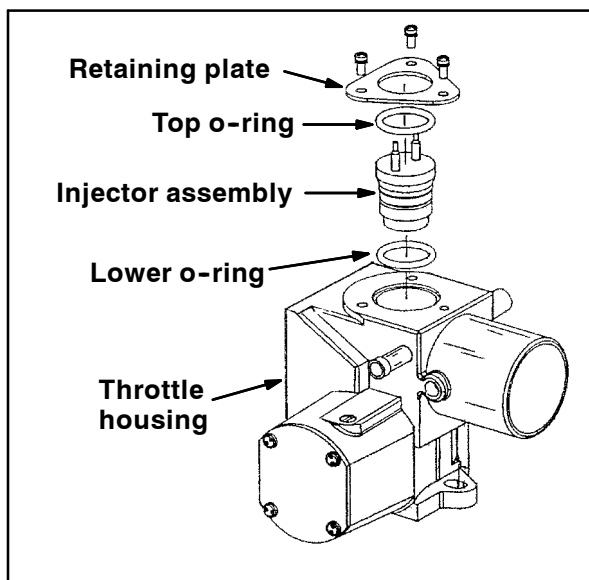


FIG. 2

6. Place a clean shop towel over the opening of the throttle housing and turn the ignition switch on, but do not start the machine. LP fuel will spray from the opening for approximately 4 seconds. **Do not** allow dirt or debris to fall into the throttle housing.
7. Remove the shop towel from the opening of the throttle housing and observe for excess oil.

8. Repeat Steps 6 and 7 several times if there is excess oil in the system. If there is still excess oil in the system after repeating Steps 6 and 7, proceed to Step 13 to drain excess oil from the vaporizer regulator and secondary regulator.
9. Use carburetor or brake cleaner to clean excess oil from the throttle housing. **Do not** use these cleaners on the o-rings since they could cause the o-rings to swell.
10. Seat the lower smaller o-ring back inside the throttle housing. Refer to Fig. 2.
11. Insert the injector assembly and the top o-ring back into the throttle housing. Refer to Fig. 2.
12. Reinstall the retaining plate onto the throttle housing. Refer to Fig. 2.

NOTE: Complete Steps 13 through 19 only if the plugs must be removed from the bottom of the vaporizer regulator and the secondary regulator to drain excess oil. Refer to Fig. 8.

13. Seat the lower smaller o-ring back inside the throttle housing. Refer to Fig. 2.
14. Insert the injector assembly and the top o-ring back into the throttle housing. Refer to Fig. 2.
15. Reinstall the retaining plate onto the throttle housing. Refer to Fig. 2.
16. Connect the LPG injector harness connector to the injector assembly. Refer to Fig. 1.
17. Run the engine until it is at operating temperature.
18. Remove the drain plugs from the bottom of the vaporizer regulator and secondary regulator, and allow the vaporizer regulator and secondary regulator to drain. Refer to Fig. 8.
19. Reinstall the drain plugs into the vaporizer regulator and the secondary regulator when they are through draining. Refer to Fig. 8.
20. Move the machine to the repair area, park the machine on a clean level surface, and set the parking brake.

FOR SAFETY: Before leaving or servicing machine, stop on level surface and set the parking brake.

21. Open and lock engine compartment doors.
22. Close the fuel tank service valve.
23. Run the engine until it stops from lack of fuel.
24. Remove key from ignition.

FOR SAFETY: Before leaving or servicing machine turn off machine and remove key.

FOR SAFETY: When servicing machine, allow engine to cool. Keep flames and sparks away from fuel system service area. Keep area well ventilated.

25. Disconnect battery cables from the machine.



WARNING: Always disconnect the battery cables from the machine before working on electrical components.

26. Completely drain the coolant system.
27. Remove the scrubber fan vacuum hose from the machine and disconnect the squeegee recovery hose from the recovery tank.
28. Remove the air intake hose from the machine. Refer to Fig. 3.

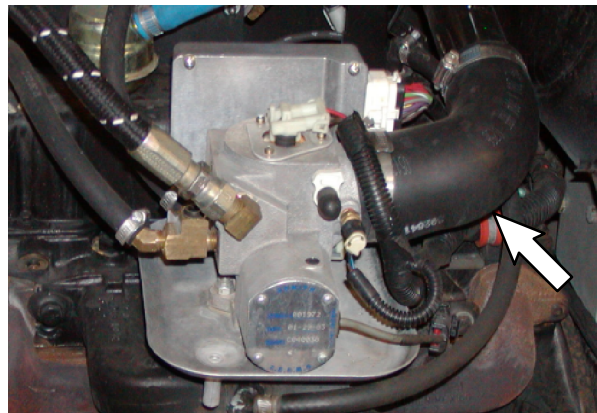


FIG. 3

INSTALLATION:

1. Disconnect the end of the heater hose (A) and the end of the hose from the engine thermostat (J) from the LPG throttle housing assembly (B). Refer to Fig. 8.
2. Remove and discard the high pressure LP hose (C), the fitting attached to the regulator (D), and the three fittings attached to the LPG throttle housing assembly (E). Refer to Fig. 8.
3. Disconnect the LPG injector harness connector from the LPG injector. Refer to Fig. 4.

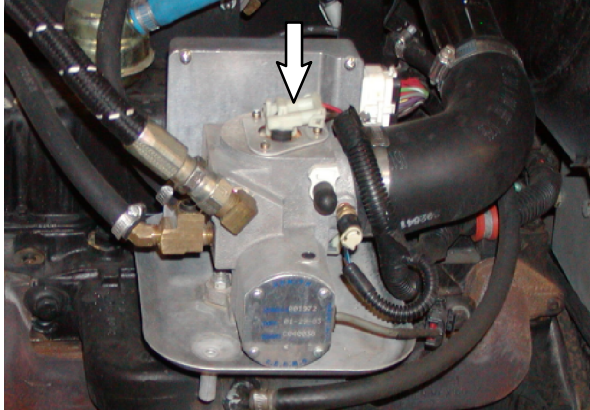


FIG. 4

4. Remove the injector retaining plate (F) from the LPG throttle housing assembly. Refer to Fig. 9.
5. Remove the old LPG fuel injector (G) from the LPG throttle housing assembly (B). Be sure to remove both o-rings from inside the LPG throttle housing assembly when removing the injector. Refer to Fig. 9.
6. Install the new LPG fuel injector (12) into the LPG throttle housing assembly (B). Be sure the o-rings are seated inside the LPG throttle housing assembly. Refer to Fig. 9.
7. Reinstall the injector retaining plate (F) onto the LPG throttle housing assembly (B). Be sure the injector retaining plate is not bent before reinstalling it onto the LPG throttle housing assembly. Flip retaining plate over if it is bent. Refer to Fig. 9.
8. Connect the LPG injector harness connector to the new LPG fuel injector (12). Refer to Fig. 4.
9. Carefully disconnect both connectors from the ECU controller (H). Refer to Fig. 9.
10. Remove the ECU controller (H) from the LPG throttle housing assembly (B). Refer to Fig. 9.

11. Attach the new ECU controller (11) to the LPG throttle housing assembly (B). Refer to Fig. 9.

NOTE: Refer to the schematic in Fig. 10 for additional wiring information.

12. Carefully loosen, (or if necessary, remove) the red locking cover from the white connector to dislodge the connection. Refer to Fig. 5.

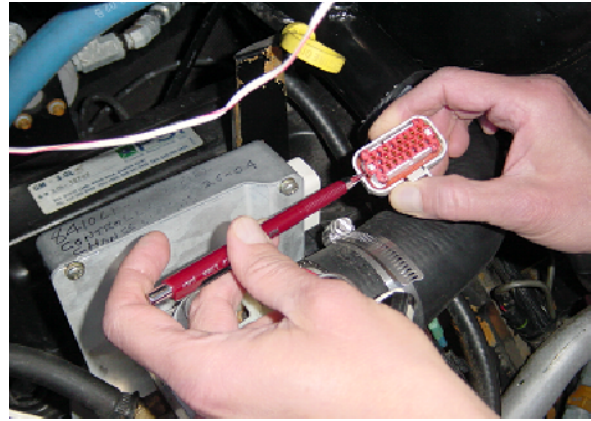


FIG. 5

13. If necessary, cut electrical tape from the end of the harness near the connector to make access to the wires easier.

NOTE: Refer to numbers stamped on the side of the connector for pin locations.

14. Cut the brown wire in **pin #3** approximately 2" from the connector.
15. Strip a small portion of insulation from the end of the brown wire still in **pin #3**. Refer to Fig. 6.



FIG. 6

16. Measure and mark a point between 1 1/2" and 2" from the connector end of the wire in **pin #2**.
17. Strip between 1/4" to 1/2" of insulation from the marked area of the wire in **pin #2**.

18. Twist the wire (or use a pin extracting tool) to remove it from **pin #2**.
19. Slide the heat shrink onto the wire removed from **pin #2**.
20. Solder the loose end of the brown wire in **pin #3** to the wire from **pin #2**. Solder wires at an angle so heat shrink can be positioned over the solder joint for the best possible seal. Refer to Fig. 7.

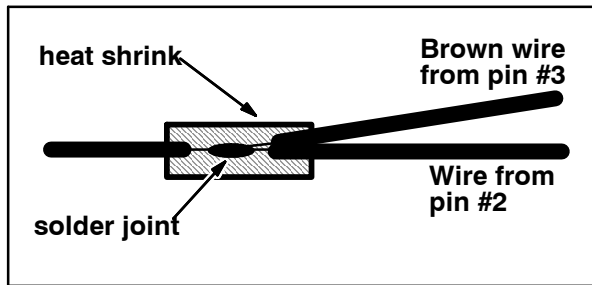


FIG. 7

21. Heat shrink the heat shrink over the solder joint and the exposed portions of both the brown wire in **pin #3** and the wire from **pin #2**. Refer to Fig. 7.
22. Reinstall the wire removed from **pin #2** back into **pin #2**. Ensure the wire is locked into place in the connector.
23. Ensure all wires are locked securely in the connector.
24. Push (or reinstall) the red locking cover into the connector.
25. Tape the unused end of the brown wire from the harness against the harness. This wire is not used.
26. Ensure the red seal is properly positioned inside the white connector.
27. Connect both connectors to the new ECU controller (11).
28. Reattach the air intake hose to the machine. Refer to Fig. 3.

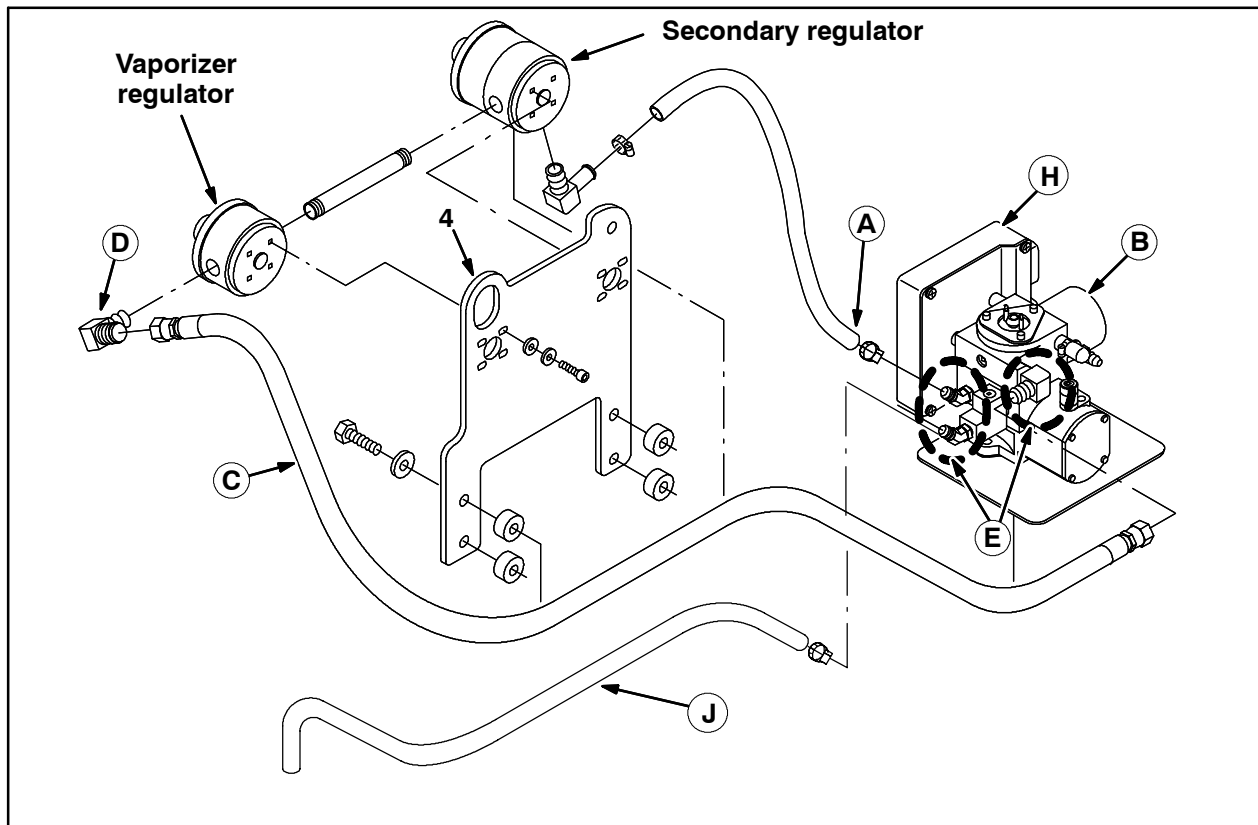


FIG. 8

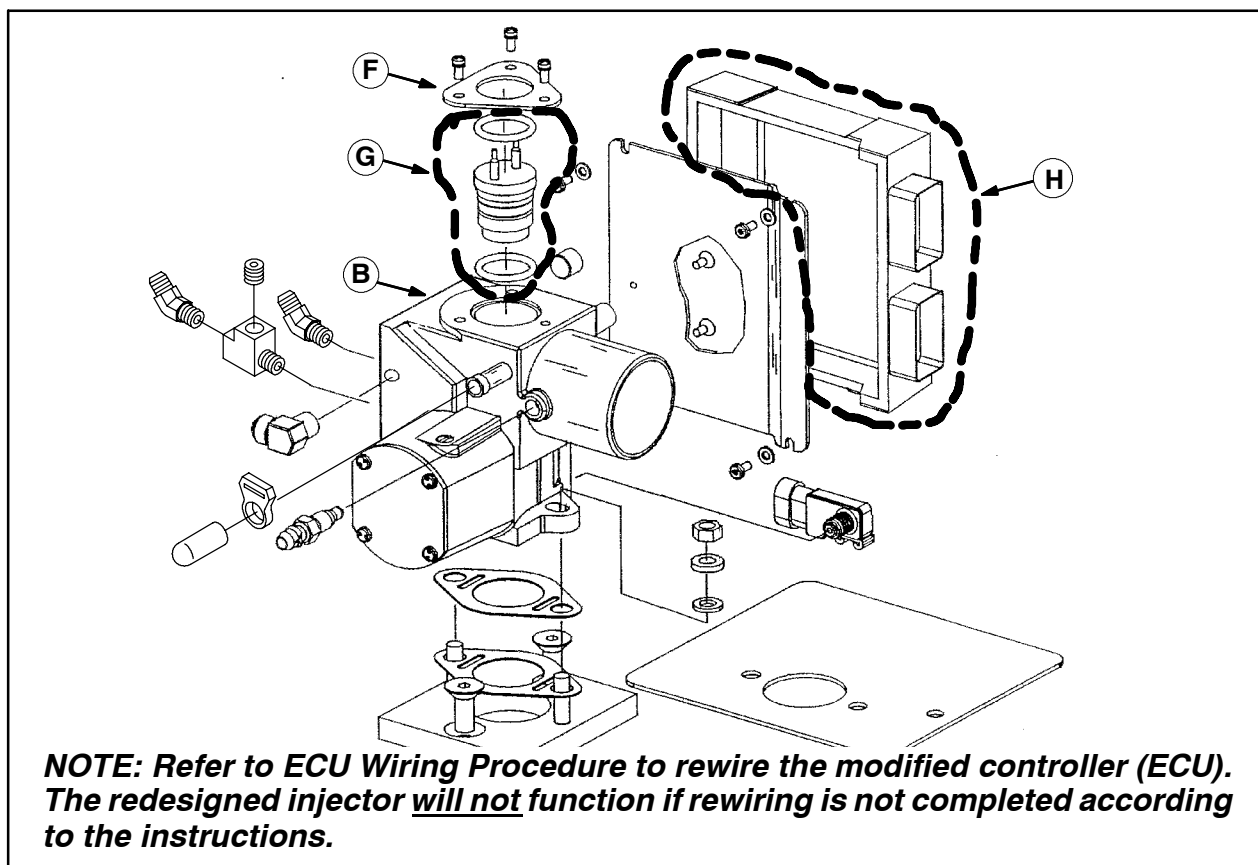


FIG. 9



NOTE: Apply the appropriate sealant to all fittings prior to installation.

29. Thread a straight hydraulic fitting into (7) into the input port of the LPG fuel filter (10). Refer to Fig 11.



FIG. 11

30. Thread a 90° hydraulic fitting (2) into the output port of the LPG fuel filter (10). Refer to Fig 12.



FIG. 12

31. Thread two plug fittings (9) into the LPG throttle housing assembly. Refer to Fig 13.

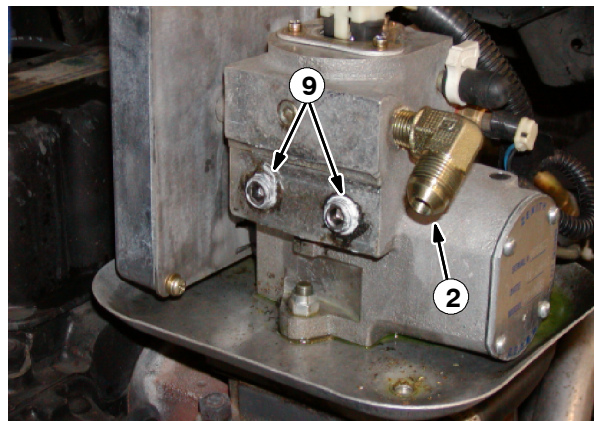


FIG. 13

NOTE: If necessary, adjust the angle of the fittings to make installation of the 8.5" LPG hose (1) and the 10.5" LPG hose (8) easier.

32. Thread a 90° hydraulic fitting (2) into the LPG throttle housing assembly. Refer to Fig 13.

33. Thread a 90° hydraulic fitting (2) into the LPG regulator. Refer to Fig 14.

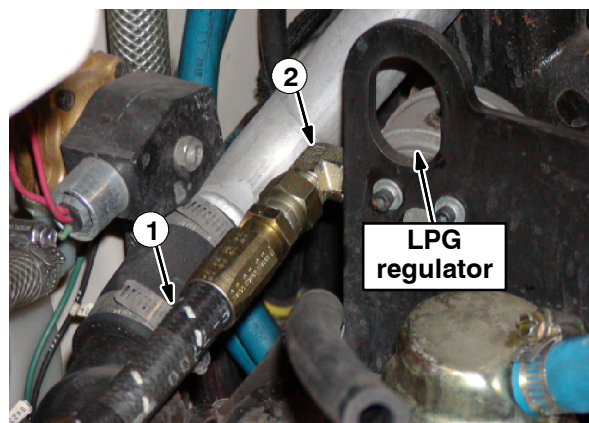


FIG. 14

34. Loosely thread the 8.5" LPG hose (1) into the fitting (2) installed into the LPG regulator in the previous step. Refer to Fig 14.

NOTE: The 8.5" LPG hose (1) is tightened later during adjustment.

35. Use existing hardware to install the LPG filter bracket (6) onto the machine. Refer to Fig. 15.

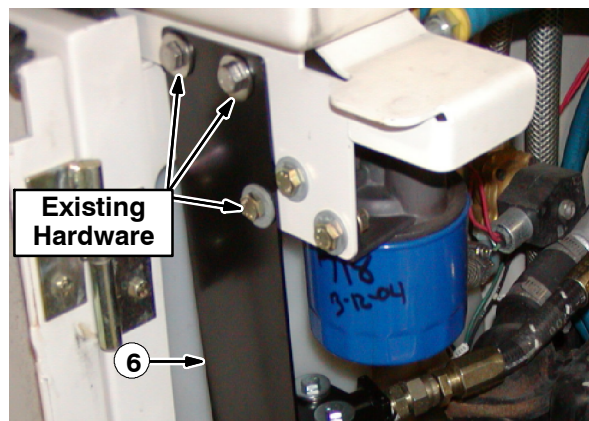


FIG. 15

36. Loosely thread the other end of the 8.5" LPG hose (1) into the straight fitting (7) already installed into the LPG fuel filter (10). Refer to Fig. 16.

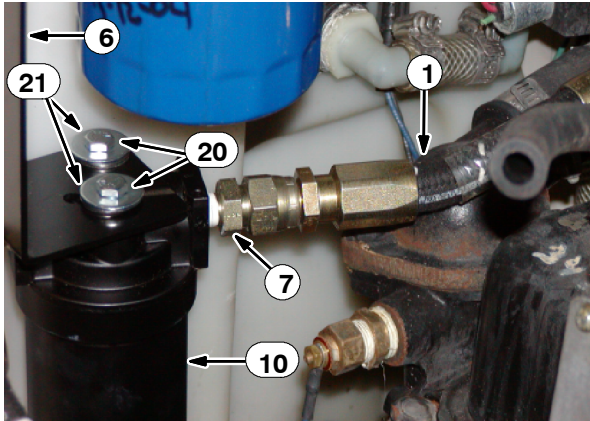


FIG. 16

NOTE: The 8.5" LPG hose (1) is tightened later during adjustment.

37. Use two hex screws (20) and two flat washers (21) to install the LPG fuel filter (10) onto the LPG filter bracket (6). Refer to Fig. 16.

38. Loosely thread one end of the 10.5" LPG hose (8) onto the 90° hydraulic fitting (2) already installed onto the LPG fuel filter (10). Refer to Fig. 17.

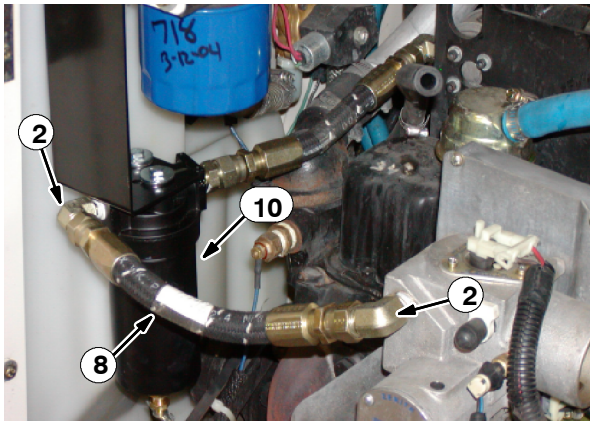


FIG. 17

39. Loosely thread the other end of the 10.5" LPG hose (8) onto the 90° hydraulic fitting (2) already installed on the LPG throttle housing assembly. Refer to Fig. 17.

40. Tighten the 8.5" LPG hose (1) and the 10.5" LPG hose (8) onto the respective fittings.

41. Install the brass straight fitting (14) and the draincock fitting (13) into the plastic tee fitting (16). Refer to Fig. 18.

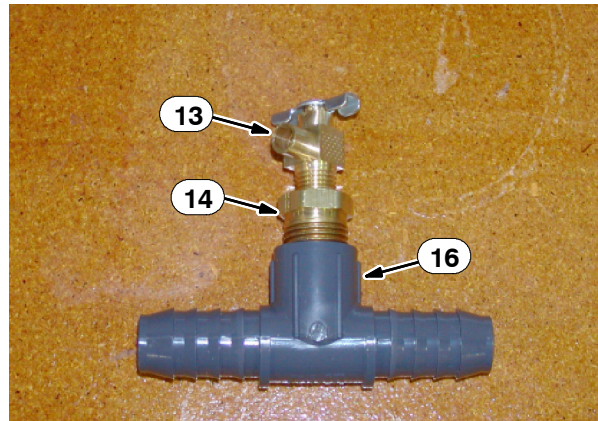


FIG. 18

42. Disconnect the end of the hose (K) connected to the engine water pump and the LPG vaporizer (L) from the LPG vaporizer. Refer to Fig. 19.

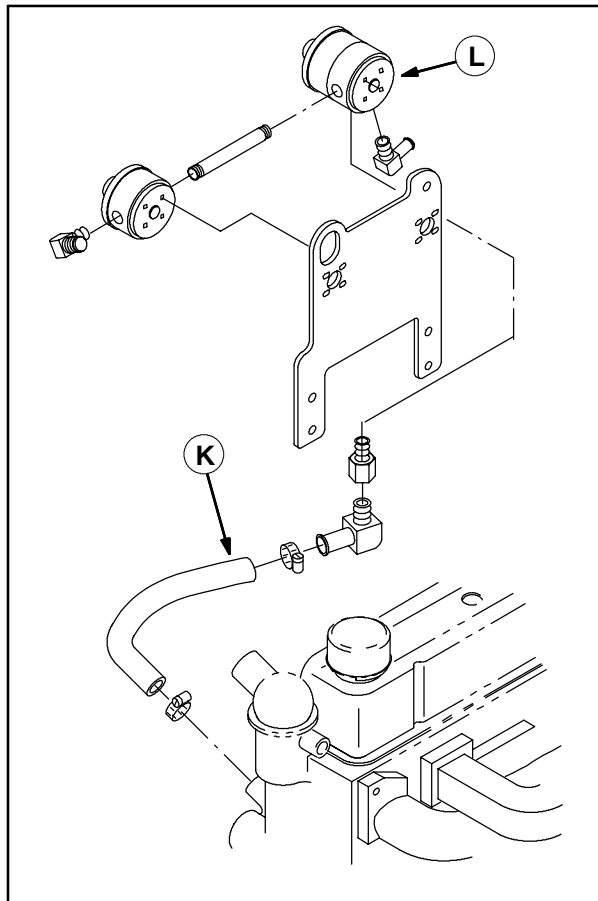


FIG. 19

43. Cut 2.5" from the end of the hose (K) just removed from the LPG vaporizer.

44. Use a hose clamp (17) to connect the 2.5" hose cut in the previous step to the plastic tee fitting (16). Refer to Fig. 20.

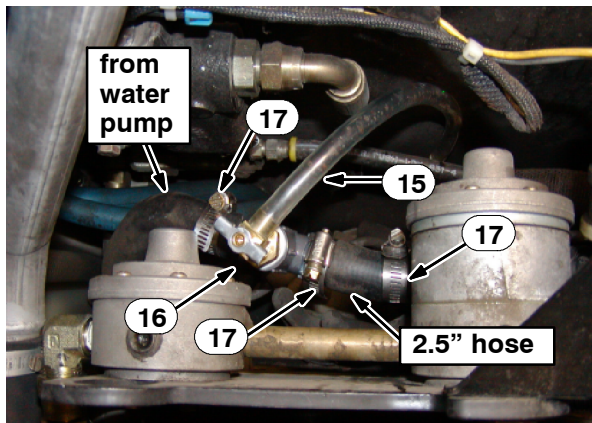


FIG. 20

45. Use another hose clamp (17) to connect the other end of the 2.5" hose to the LPG vaporizer. Refer to Fig. 20.
46. Use another hose clamp (17) to connect the loose end of the hose from the engine water pump to the plastic tee fitting (16). Refer to Fig. 20.
47. Attach the 13" clear PVC hose (15) to the draincock. Be sure to route the loose end of the PVC hose behind the hydraulic hoses. Refer to Fig. 20.
48. Thread the brass straight fitting (3) and the plastic straight fitting (5) into the brass reducer fitting (4). Be sure the gasket and orifice plate inside the reducer fitting inside the reducer when assembling these items. Refer to Fig. 21.

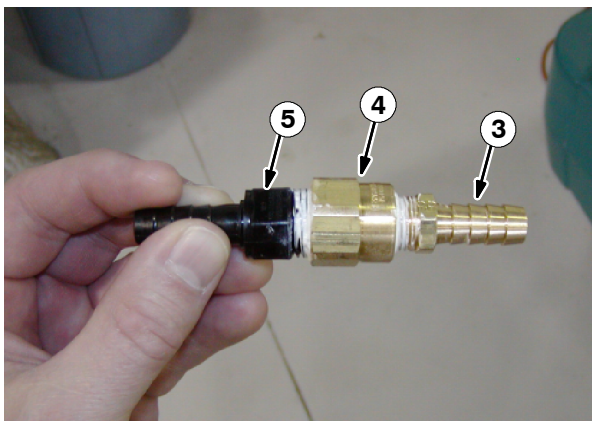


FIG. 21

49. Use a hose clamp (17) to connect the loose end of the hose from the engine thermostat to the the brass straight fitting (3) attached to the brass reducer (4). Refer to Fig. 22.

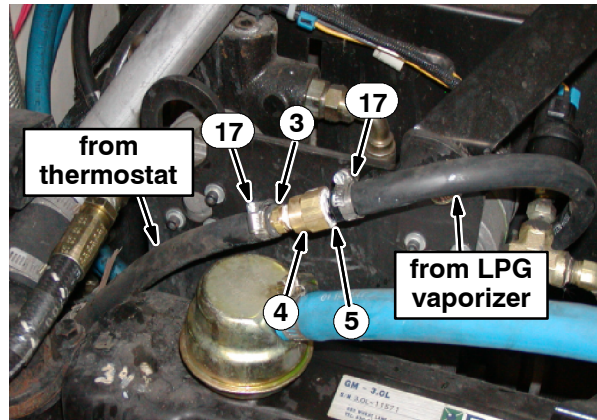


FIG. 22

50. If necessary, cut excess from the loose end of the hose from the LPG vaporizer.
51. Use another hose clamp (17) to connect the loose end of the hose from the LPG vaporizer to the the plastic straight fitting (5) attached to the brass reducer (4). Refer to Fig. 22.
52. Reattach all hoses removed earlier in this procedure.
53. Use cable ties (18) to secure loose hoses that could potentially inhibit machine operation.
54. Install the filter drain label (19) onto the LPG fuel filter (10). Refer to Fig. 23.

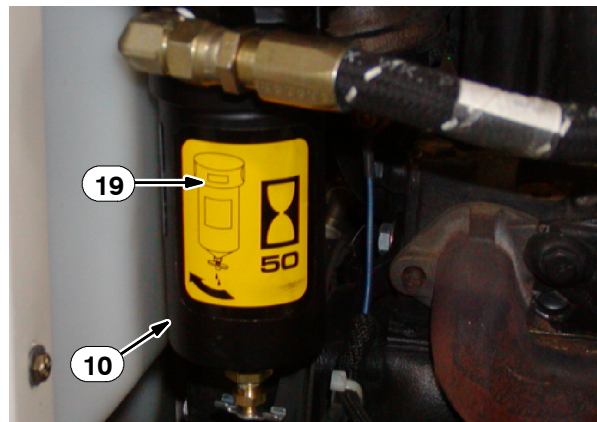


FIG. 23

55. Ensure the draincock (13) is open.
56. Refill the coolant system. Continue filling until coolant begins to exit from the clear PVC hose (15). Shut the draincock (13).

57. Reinstall the scrubber fan vacuum hose and reattach the squeegee recovery hose to the recovery tank.

58. Reconnect battery cables and open the fuel tank service valve.

NOTE: After kit is installed, open the draincock (13), start the engine, bleed the air from the coolant line, and shut off the the engine.

59. Start the machine. Observe newly installed components for leaks or malfunctions.

NOTE: The ECU reprograms itself when the engine is first started after rewiring. Allow approximately 1-2 minutes for the engine to settle down. The machine is then ready for use.

60. Use the drain cock located on the bottom of the LPG fuel filter (10) to drain oil. Draining should be performed at approximately 50-hour intervals. **Turn off** engine **before** draining oil.

NOTE: The 50-hour interval for draining the oil is only an approximate period. The oil may need to be drained at different intervals depending on the amount of oil left in the system after the LP is vaporized.

Bill of Materials for Injector Kit, LPG, Replmt [8410]-(9000826)

Ref.	Tennant Part No.	Description	Qty.
▽	9000826	Injector Kit, LPG, Replmt [8410]	1
▲ 1	1017471	Hose, Lpg, MED08, JF08STR/JF08STR, 8.5"	1
▲ 2	1017272	Fitting, Hyd, E90, JM08/PM04	3
▲ 3	150516	Fitting, Brs, Str, PM04/BM06	1
▲ 4	1017239	Fitting, Brs, Str, PM04/PF04 Reducer	1
▲ 5	1017598	Fitting, Plstc, Str, BM06/M.69-16	1
▲ 6	1017072	Bracket, Filter, Lpg [8410]	1
▲ 7	87833	Fitting, Hyd, Str, PM04/JM08	1
▲ 8	1017475	Hose, Lpg, ME08, JF08STR/JF08STR, 10.5"	1
▲ 9	02247	Fitting, Pipe, Plug, PM04 Soc Head	2
▲▽	1017500	Filter, Fuel, Lpg Coalescent	1
▲▲	372937	Element, Filter, Fuel, LPG [Coalescent]-(Available)*	1
▲ 11	9000823	Controller (ECU), Modified, 8410, 800, 810Lp	1
▲ 12	1017270	Injector, Fuel, Lpg [3.0L GM]	1
▲ 13	51305	Fitting, Draincock, .25NPT 90	1
▲ 14	311828	Fitting, Brs. Str, PM08/PF04	1
▲ 15	392258	Hose, PVC, Clr, 0.38ID 0.56OD 13.00L	1
▲ 16	64740	Fitting, Plstc,Tee, BM12/PF08/BM12	1
▲ 17	11399	Clamp, Hose, Wormdrive, 0.81-1.50D	8
▲ 18	130041	Tie, Cable, Nyl, 11.5L .19W (not shown)	6
▲ 19	1017662	Label, Instr, Filter Drain	1
▲ 20	19317	Screw, Hex, .25-20 X 0.75, 5	2
▲ 21	29570	Washer, Flat, 0.28B 1.00D .06, Stl	2

*Part available upon request.

TENNANT COMPANY
P. O. Box 1452
Minneapolis, MN 55440-1452