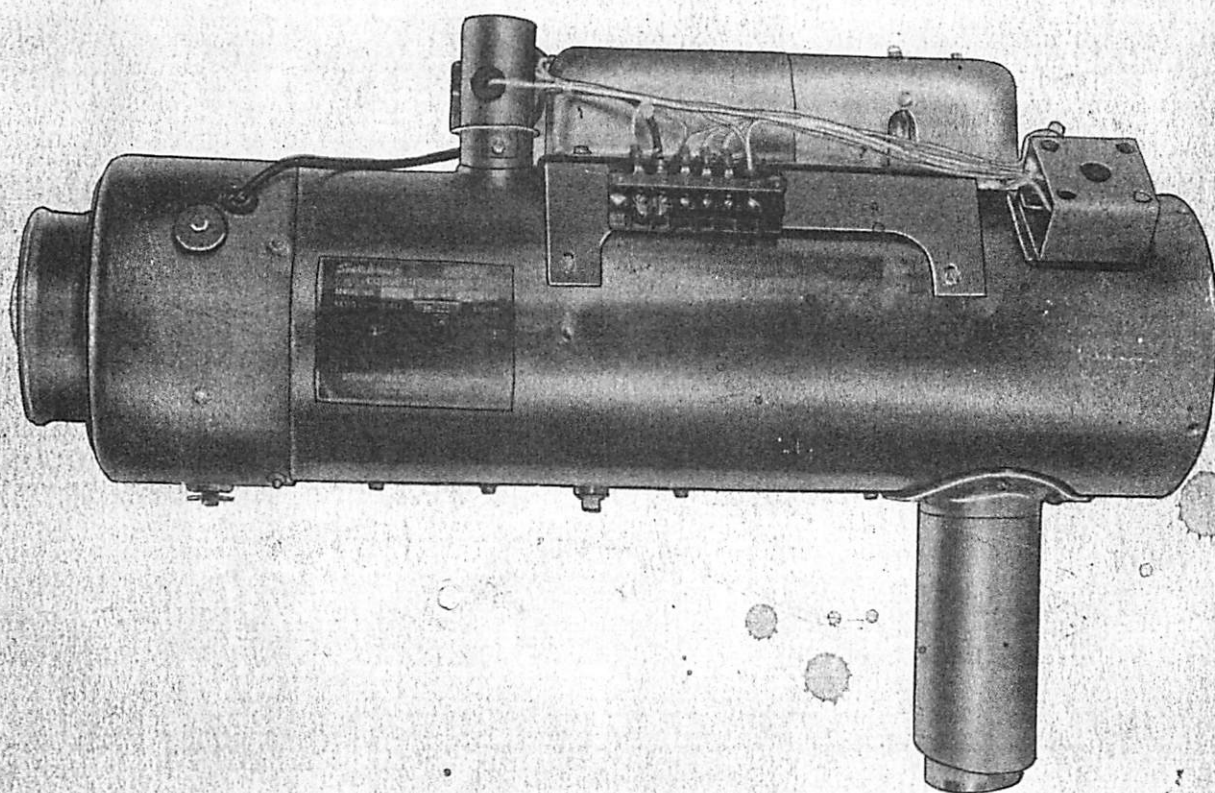


South Wind **SERVICE MANUAL**

AIRCRAFT HEATERS

8240-E

8259-HL1, -HL2, -L



P.M. 35710

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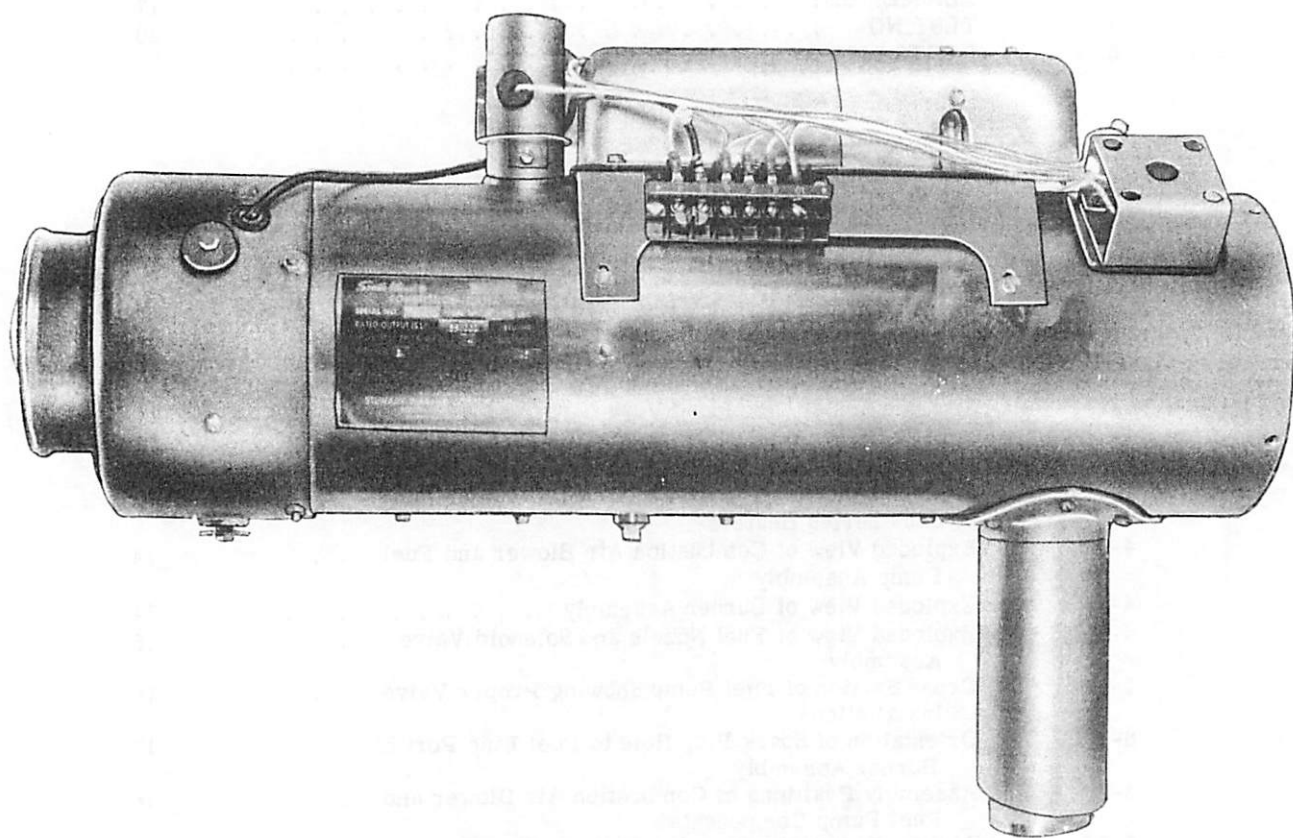


Figure 1-1. Typical Aircraft Heater of the 8240 and 8259 Series

SECTION 1

INTRODUCTION

1-1. GENERAL

The 8240 and 8259 Series aircraft heaters (figure 1-1) are very similar in design, except that the ventilating air blower of the 8259 heater is more powerful and the fuel rate is higher, providing a higher BTU output. All models consist of a complete heating system incorporating the ventilating air blower, combustion air blower, solid state ignition system, fuel pump, and safety controls.

1-2. SPECIFICATIONS

Specifications for the heaters are given in Table 1-1.

1-3. MODELS COVERED

The following models are covered in this publication:

8240-E
8259-HL1
8259-HL2
8259-L

1-4. OVERALL DESCRIPTION

a. The 8240 and 8259 Series heaters consist of four main subassemblies as follows:

- (1) The heat exchanger and burner assembly, which includes the ignition system, combustion air-fuel safety switch, duct limit switch, and overheat switch.
- (2) The ventilating air blower assembly, which mounts on the end of the heater by means of bayonet slots which engage studs on the heater case.

(3) The combustion air blower and fuel pump assembly.

(4) The thermostat or duct temperature control switch.

b. The above components are described separately in the following paragraphs.

1-5. HEAT EXCHANGER AND BURNER ASSEMBLY

The heat exchanger and burner assembly consists of a metal case (figure 1-1) which encloses an all-welded stainless steel heat exchanger (figure 1-2) which has a removable burner assembly in one end. The ignition system, lockout overheat switch, and duct limit switch are mounted on the outside of the heater case. The airflow switch assembly is attached to the combustion air inlet of the burner which extends through an opening in the heater case.

1-6. HEAT EXCHANGER

The heat exchanger (figure 1-2) is a cylindrical stainless steel assembly with a pair of inner wraps which provide a passage for fresh, ventilating air. One end of the heat exchanger is constructed in the form of a combustion chamber housing which acts as a sump and provides a mounting for the burner assembly. The spark plug screws into a threaded bushing at the top of the combustion chamber housing. A threaded drain fitting is provided at the bottom. The heat exchanger also contains another internal drain which permits fuel in the central chamber to drain out through the exhaust. These drains prevent unburned fuel from collecting in the heater in the event of an ignition failure.

TABLE 1-1. SPECIFICATIONS

	8240 SERIES	8259 SERIES
Heat Output (BTU/HR at S. L.)	35,000	45,000
Fuel	aviation gasoline	aviation gasoline
Fuel Consumption (LB/MIN)	0.055 to 0.065	0.065 to 0.075
Power Supply	24 volts dc	24 volts dc
Current Requirements	4.25 amps max.	14 amps max.
Duct Limit Switch Setting	215° ± 10°F	215° ± 10°F
Lockout Overheat Switch Outlet Air Temperature Setting	350°F	350°F
Fuel Pressure	20 to 25 psi	20 to 25 psi
Combustion Air Blower Speed	2800 rpm (min.)	2800 rpm (min.)
Ventilating Air Blower Speed	5600 rpm (min.)	6000 rpm (min.)
Thermostat Temperature Range	70° to 190°F	70° to 180°F
Exhaust Temperature	1,200°F max.	1,200°F max.

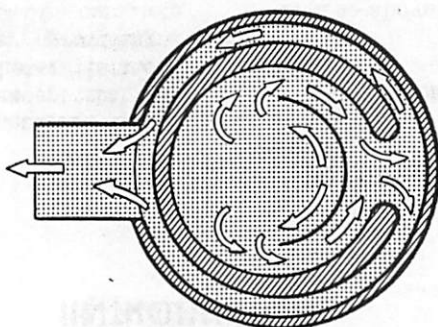
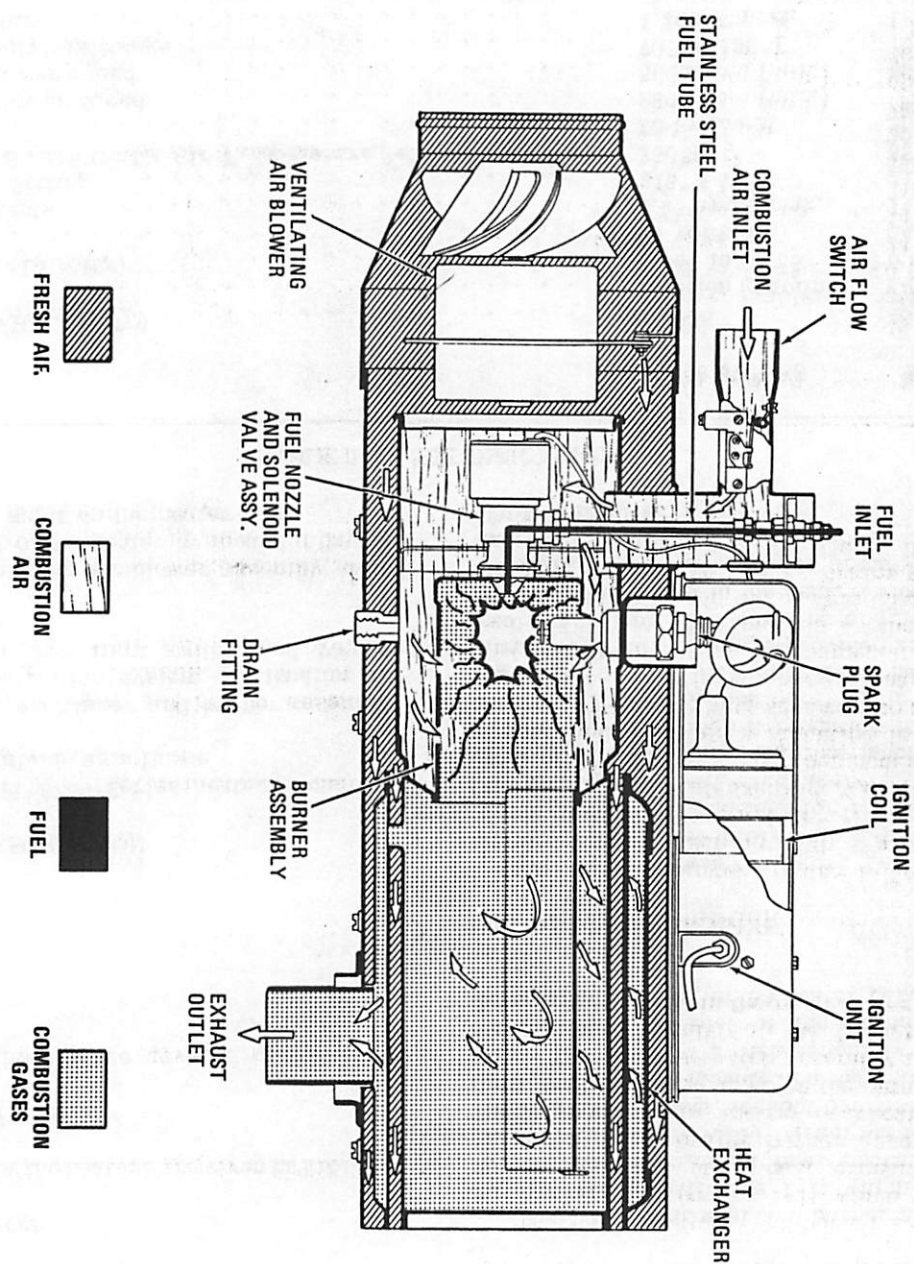


Figure 1-2. Flow System of Typical Heater

1-7. BURNER ASSEMBLY

a. The burner assembly consists of the mixer assembly, or "flame basket", with a support plate which holds the fuel nozzle holder and solenoid assembly to the mixer. The support plate contains a pattern of holes which are part of the combustion air metering system. The burner assembly mounts to a flange inside the combustion chamber housing which constitutes one end of the heat exchanger assembly.

b. The fuel nozzle and solenoid valve assembly is just what its name implies. The fuel atomizing nozzle is screwed into a base which has a solenoid valve assembly built on the other end. In this manner the volume of fuel between the solenoid valve seat and the nozzle is held to an absolute minimum. By building the unit in this fashion, dripping or drooling of fuel from the nozzle is virtually eliminated.

c. The fuel nozzle and solenoid valve assembly is mounted on a support which also serves as the mounting for the mixer assembly. This assembly, in turn, mounts on the combustion air chamber in such a way that the entire burner assembly may be removed from the heat exchanger as a single unit.

1-8. AIRFLOW SWITCH

a. The airflow switch assembly (figure 1-2) is a safety device designed to prevent ignition of the heater at any time that combustion air flow is not sufficient for proper burning. It is attached to the combustion air inlet of the burner assembly by means of two clamps.

b. This switch assembly is constructed in the form of a metal housing or elbow which conducts the combustion air into the burner housing. The fuel line of the burner is terminated in a bulkhead fitting at the top of the housing and a microswitch is mounted on its side. Inside the housing, a vane operates on a shaft which has a cam on its end above the microswitch. The air vane is normally closed, but when combustion air flow through the elbow is sufficient, the vane rises and closes the microswitch by action of the cam. The microswitch is connected into the electrical circuit so that the solenoid valve cannot open nor the spark plug fire until the air vane is actuated by the blower.

1-9. IGNITION SYSTEM

a. The ignition coil is mounted inside a metal case which also houses the ignition unit on the top of the heater, near the spark plug which projects through the heater case. Another housing covers the spark plug and ignition cable to insure suppression of radio noise.

b. Current to the ignition coil is supplied by a solid state ignition unit which has no moving parts. The solid state unit is a capacitor discharge device which has the inherent capability of firing a spark plug under highly adverse conditions.

1-10. VENTILATING AIR BLOWER ASSEMBLY

The ventilating air blower assembly is a removable unit which mounts on the end of the heater housing.

Its purpose is to provide a flow of ventilating air across the heat exchanger. The blower motor is mounted in the housing on rubber vibration-absorbing grommets. The 8240 Series heaters have flat, mixed flow blower wheels while the 8259 Series heaters use conical impeller-type blower wheels. The blower assemblies are mounted with the blower wheel toward the inlet end. The blower of the 8259 Series is larger and more powerful than the blower used on the 8240 heater.

1-11. COMBUSTION AIR BLOWER AND FUEL PUMP

a. Combustion air for the heater is obtained from a separate blower that can be mounted in any convenient place near the heater. The blower outlet is connected to the combustion air inlet of the heater by a duct (not supplied with the heater). This blower is similar for all heater models, the principal difference being in the mounting angle of the fuel pump on the blower motor. The fuel pump is shrouded on all models except the 8259-L.

b. In addition to providing combustion air, the blower assembly also supplies a source of fuel pressure for the heater. A small diaphragm-type fuel pump is mounted on the end of the blower motor and is driven by the motor shaft through a rubber coupling. By using the motor-driven fuel pump, a supply of fuel at the proper pressure is always available when the heater is in operation and an auxiliary electric fuel pump or booster pump is not required unless there is a suction lift at the inlet to the diaphragm pump. The pump contains its own pressure regulating device and is not adjustable.

1-12. OVERHEAT SWITCH AND DUCT LIMIT SWITCH

a. Two temperature limiting switches are mounted on the heater case to protect the heater and associated components from overheating. These include the duct limit switch and lockout overheat switch (see figure 1-3).

b. The duct limit switch (or cycling switch) is a bimetal blade which is normally closed but will open when air temperature reaches 215°F to deenergize the fuel solenoid valves which cut off the fuel supply to the heater. When the temperature drops, this switch will close and reenergize the fuel solenoid valve to permit the heater to restart. This cycling will continue until the heater is turned off. This switch does not control the ignition system, the combustion blower and fuel pump, nor the ventilating air blower.

c. The lockout overheat switch is of the snap-action type with an external reset button. If the air temperature exceeds 350°F, this switch will snap open and shut off ignition, fuel, and the combustion air blower. The heater will then remain off until the overheat switch has been manually reset. When this switch operates, it is a strong indication that something is wrong with the heating system and service is required.

1-13, PRINCIPLES OF OPERATION

a. When the heater is turned on, the following sequence of events takes place (see figure 1-3):

(1) The ventilating air blower is energized through terminal 5 of the terminal strip.

(2) The combustion air blower is energized through terminal 4, the overheat switch, and terminal 6.

(3) As the combustion air blower gains speed, air velocity closes the airflow switch. Closing of

the switch energizes the ignition system through terminal 10. Closing of the airflow switch also energizes the fuel solenoid valve through the duct limit switch and the temperature control connected across terminals 7 and 8.

(4) If the thermostat contacts are closed, the electrical circuit to the fuel solenoid valve will open the valve. Since the combustion air blower and fuel pump assembly are running, fuel will spray into the mixer and combustion air will be blown through the openings in the can to form a highly combustible mixture.

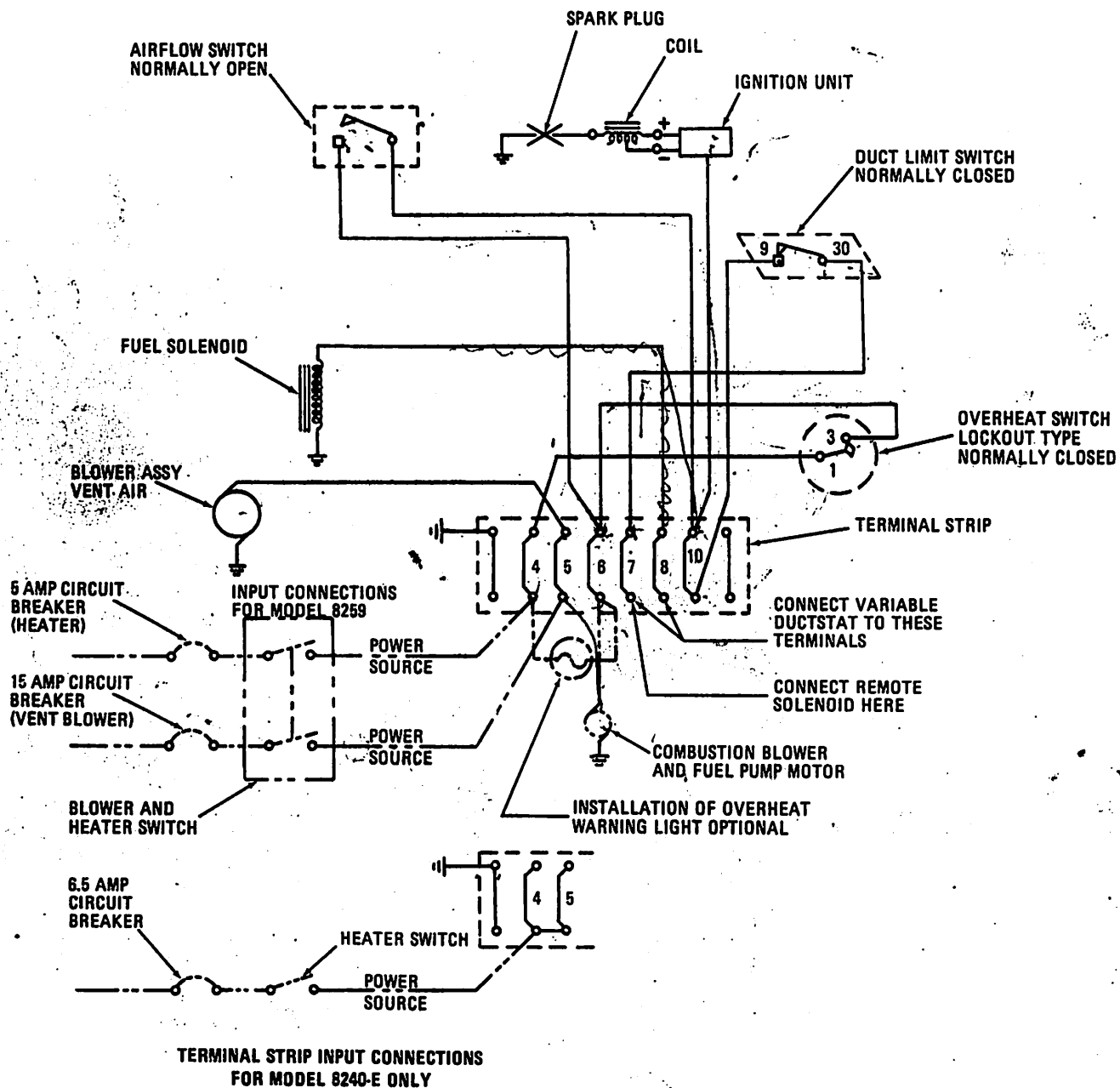


Figure 1-3. Heater Electrical Schematic Diagram

PRINCIPLES OF OPERATION

When the heater is turned on, the following sequence of events takes place (See Figure 2 or 3 according to heater model):

- a. The ventilating air blower is energized through terminal 5 of the terminal strip.
- b. The combustion air blower is energized through terminal 4, the overheat switch, and terminal 6.
- c. As the combustion air blower gains speed, air velocity closes the airvane switch. Closing of the switch energizes the ignition coil through the filter, breaker points and 10-ohm resistor on the 8240-A, 8259-A and 8259-DL, or through terminal 10 and the solid state ignition unit on heaters so equipped. Closing of the airvane switch also permits the fuel solenoid valve to be energized through the duct limit switch and the duct limit switch and the temperature control connected across terminals 7 and 8.
- d. If the thermostat is calling for heat (contact closed), the fuel solenoid will open. Since the combustion air blower and fuel pump assembly is running, fuel will spray into the mixer and combustion air will be blown the openings in the can to form a highly combustible mixture.
- e. With the breaker points or solid state ignition unit interrupting the primary current of the ignition coil, a hot spark appears at the electrodes of the spark plug. Ignition is instantaneous and an intense flame is established within the mixer assembly.
- f. The hot gases of combustion are dispersed by the baffle on the mixer and then rise to the top of the heat exchanger where they are forced to turn and complete a second pass on the two sides. At the bottom of the heat exchanger, the gases are collected and pass out through the exhaust outlet.

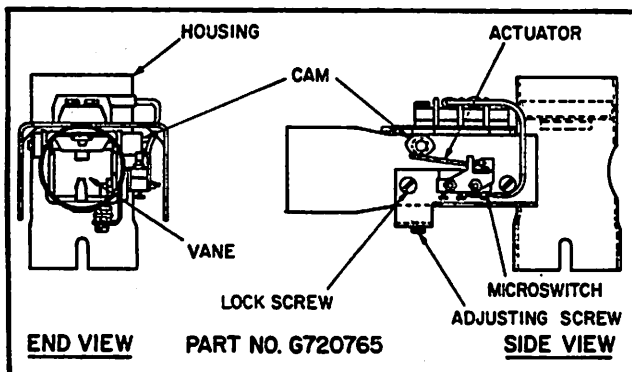


Figure 4 - Airflow Switch Assembly.

- g. The scrubbing action of the hot gases, as they pass through the channels, causes their heat to be transferred through the walls of the heat exchanger to the ventilating air

which is being blown over its outer surface and through the inner slot. The heated air is then conducted to the interior of the airplane.

- h. As the air passes through the duct, it flows around the bimetal helix of the ductstat. When the helix becomes warm, it tends to unwind, due to its bimetal construction, and the cam on the end of the shaft revolves, causing the microswitch to transfer and de-energize the fuel solenoid. Fuel flow stops and flame is extinguished, but the combustion air blower still runs and spark continues at the electrodes of the spark plug. As residual heat in the heat exchanger is carried away by the ventilating air stream, the temperature drops and the ductstat contacts close. The fuel solenoid then opens. Fuel enters the burner and the heater re-ignites. This cycle of operation will continue indefinitely, controlled by the ductstat action, as long as fuel, electric current, and air are available to the heater system and the control switch is turned on.
- i. When the control switch is turned off, the entire system is de-energized and the blowers, fuel supply, and spark are shut off at once.

SAFETY FEATURES

The heater is equipped with several safety devices to prevent the possibility of damage to equipment or a hazardous operating condition. These include provision for all types recommended by C.A.A., including the pilot's instrument panel warning light for an overheat condition. This light, if used, should be connected as shown in the applicable wiring diagram.

Safety features include the following:

- a. Burner drain and an additional drain in the heat exchanger. These eliminate the possibility of accumulating any quantity of unburned fuel in the event of ignition failure.
- b. The airflow switch, which prevents starting of the heater with an inadequate combustion air supply and also shuts off the heater if combustion air should fail during operation.
- c. The duct limit switch. In the event of a short-circuited thermostat, or stoppage of ventilating air flow so that the thermostat is not able to sense air temperature, the temperature within the heater will rise to 220°, at which point the duct limit switch or cycling switch will open and shut off the fuel supply. The heater will then continue to cycle at a safe temperature until thermostat control is again restored by increasing the ventilating air rate or by a change in the thermostat adjustment.

d. Lockout overheat switch. This switch will function only if the duct limit switch fails and permits the temperature to rise to 350° F. If this should occur, the overheat switch will snap open and shut off all components except the ventilating air blower. The warning lamp will light and the heater will remain off until the overheat switch is reset by pushing the button.

III. MAINTENANCE

GENERAL

These heaters are specially designed to simplify service procedures. All heater controls are mounted in accessible positions outside the heater case and the ventilating air blower is attached by means of bayonet slots to simplify removal and replacement.

All maintenance in the aircraft should be confined to replacement of complete subassemblies as outlined below. Attempts to repair the blower assemblies, fuel pump, or breaker points without complete tools and test equipment are likely to result in equipment failure or inadequate operation. The following major subassemblies are designed to permit unit replacement and may safely be installed without further testing if the subassembly was tested in the shop prior to installation:

- a. Combustion air blower and fuel pump assembly.
- b. Ventilating air blower, complete with breaker points (if used).
- c. Airflow switch assembly.
- d. Spark plug.
- e. Ignition coil.
- f. Ductstat.
- g. Fuel pump assembly.

It is not advisable to replace the duct limit switch without a test of the entire heater assembly since the switch must be calibrated after being installed (See Section V). Replacement of the nozzle as a unit is not recommended, since the trouble attributed to the nozzle may be caused by a leaking solenoid.

It should also be remembered that cleaning of the burner assembly will not bring about a permanent improvement in heater performance unless the cause of fouling is known and has been corrected.

If the heater cannot be repaired by replacement of the components listed above, the entire unit should be removed from the airplane and returned to the shop for repair and testing.

Instruction for disassembly, repair and replacement of these parts appears in Section IV of the handbook.

PERIODIC SERVICE AND INSPECTION

The fuel filter should be cleaned at regular intervals to prevent the collection of water and

formation of ice during cold weather. When the fuel filter is cleaned, all fuel connections should be checked for leaks, with fuel pressure applied.

PREFLIGHT

Before each flight, the air duct inlets, exhaust outlet, and heater drain outlet should be checked for clogging, ice, carbon or other obstructions.

250 HOURS OF HEATER OPERATION

After 250 hours of heater operation, remove the ventilating air blower and check breaker point gap on models so equipped. This should be within limits of 0.023 to 0.027. Also, inspect the cam for signs of wear. If a groove or step is worn into the cam, install a new cam and recheck breaker point gap. At the 250 hour period, also remove and inspect the spark plug. If the plug shows signs of fouling or erosion, return the entire heater to the shop for repair and testing, since the nozzle is probably at fault. If the plug is in good condition it should be cleaned and replaced.

Repeat the 250 hour inspection at 250 hour intervals up to 1,000 hours, at which time the heater should be overhauled.

ANNUAL CHECK OF FUEL PUMP

The fuel pump of any installation should be checked annually, at the beginning of each heating season, since it may be affected by gumming of fuel during a prolonged shut-down period. The pressure of the fuel pump can be checked without removing it from the combustion blower motor, or, for that matter, without removing the combustion blower from its place of installation.

To check pressure:

- a. Disconnect the fuel line from the outlet side of the heater fuel pump and install a pressure gage with tee fitting in the fuel pump outlet. Reconnect fuel line.
- b. Apply power to the heater system.
- c. Turn the heater switch to ON position. The blowers should start and the heater should ignite. Allow time for air to bleed out of the fuel line. With the heater burning, the fuel pressure gage should indicate 18 to 24 psig.
- d. Shut off the heater and disconnect the fuel solenoid lead from terminal No. 8 of the heater terminal strip, then turn the heater switch ON. This will start the blowers, but prevent flow of fuel.
- e. With the fuel pump operating and the solenoid valve closed, pressure reading on the gage must not exceed 27 psig.
- f. If fuel pressure fails to meet the requirements for either test, remove the fuel pump for

SECTION 3

TROUBLE SHOOTING

3-1. GENERAL

This heater must have five supplies fed to it for operation. The required supplies are the following:

a. Fuel. The fuel pump on the combustion air blower supplies fuel to the heater under the proper pressure.

b. Combustion air. On the ground, the combustion air blower will furnish the proper amount of air for combustion. In flight, particularly at altitude, the blower is apt to be marginal and for this reason it is recommended that the static pressure in the combustion air pickup be somewhat above the static pressure in the exhaust. This is a function of the installation design and must be considered at the time the heater is designed into the aircraft.

c. Source of ignition. The ignition system on the heater fulfills this requirement. It is designed to operate all of the time that the heater is turned on, whether the heater is burning or not.

d. Ventilating air. This keeps the heater cool and also heats the cabin. On the ground the ventilating air blower will supply as little as half the air required for the heater to operate at full output. In flight, when this blower is either supplemented or supplanted by ram air, there will probably be far more than the minimum requirement flowing through the heater.

e. Power source. A source of power is required for the control circuit, and to drive the accessories listed above. The power source is usually one of the first things to check when trouble shooting a heater that is not functioning properly. Most of the trouble shooting on this heater can be done with only a test light.

3-2. PRELIMINARY TROUBLE SHOOTING CHECKS

a. Determine if both motors are running as the first step of trouble shooting. If neither one runs, the trouble is probably in the wiring up to the heater. If the ventilating air blower operates but the combustion blower does not, check the overheat switch - it may be tripped. If the overheat switch is not tripped, check with a test light to find the open circuit in the wiring to the combustion blower motor. If there is no open circuit and the blower does not run, the blower motor itself may be defective.

b. If both blowers run but the heater does not ignite, the next step is to check the ignition system. First check with a test light to see if there is power being supplied at terminal No. 10. If there is no power and the combustion air blower is running, the trouble may be in the airflow switch.

c. If there is power at terminal 10, the next step is to check the spark plug. Remove the ignition cover, pull the high tension lead from the spark plug, and

check to see if the ignition system is supplying high voltage to this point. If voltage is adequate, remove the spark plug and check. If there is no evidence of spark to the plug, substitute a new coil first, then a new ignition unit if the new coil does not correct the fault.

d. If the ignition system checks out satisfactorily, the next step is to check the fuel system. For ease in checking, loosen the fuel fitting on the heater to see if there is fuel under pressure at that point. If so, check with a test light to see if there is power at terminal No. 8 on the terminal strip. If power is indicated, the trouble may be in the fuel solenoid, or the fuel nozzle, and the heater will have to be disassembled to correct the problem. If this terminal is dead, check terminal No. 7. Power at this point but not at No. 8 would indicate the trouble was in the thermostat, or the thermostat wiring. If there is no indication of power at No. 7 check back, with the test light, through the duct limit switch to the airflow switch, using the wiring diagram (figure 1-3) as a guide. Power at the airflow switch, but not at terminal 7, indicates a defective duct limit switch. Replace the airflow switch if there is power at terminal 6, but none at terminal 10.

NOTE

The combustion air blower must be running when performing these tests.

e. Trouble shooting a heater which burns but does not have sufficient output is the most difficult type of trouble shooting. It requires the use of a thermometer which can be put into the ventilating air duct at a point about 12 to 18 inches downstream from the heater, preferably around a bend in the hot air ducting. With the heater in operation and the thermostat set to the maximum heat position, the thermometer should read about 180° to 190°F. If the thermometer does not register this, the test light should be used to determine if the thermostat or the duct limit switch is properly cycling the heater fuel supply on and off. If the thermostat is cycling, but at a lower temperature, it should be recalibrated. If the duct limit switch cycles but the thermostat does not, the setting of the duct limit switch should be raised until the thermostat just cycles.

WARNING

The duct limit switch must not be set above 225° since the residual heat in the heat exchanger, at the time the heater is shut down, can trip the manual reset overheat switch if the heater is permitted to operate at a higher temperature level. This is particularly true when the heater is shut down with the aircraft on the ground, as there is no ram air available to cool the heater after shutdown. It will be noted that this heater does not have an automatic 'purge' or cooling period after shutdown.

f. Test for low heat output when neither the duct limit switch nor the thermostat is cycling the fuel on and off. This step requires the use of a pressure gage tapped into the fuel line between the fuel pump and the heater. The fuel pressure at this point should be at least 18 psig, and in most installations it should be 20 to 24 psig. If the fuel pressure is less than is required, the fuel pump, or the fuel system up to the pump, may be defective. Many times the apparent fuel pump problems can be traced to a very small air leak into the system on the suction side of the pump. A hot spot in the fuel line up to the pump can cause vapor bubbles in the line. Since the fuel pump is small, it will not pump air, or vapor, and still maintain sufficient fuel for the heater. Also, bubbles in the line require time to go through the nozzle and stop the flow of fuel during that time. In some installations, a powerful fuel solenoid valve in the fuel line up to the pump has been found to generate enough heat to vaporize the fuel in the line and cause what appears to be a defective fuel pump.

g. If the fuel pressure to the heater is adequate and the heater still does not cycle on the thermostat, the trouble may be in the fuel nozzle in the heater. In this case the heater should be removed from the installation, disassembled, and the fuel nozzle replaced.

3-3. TROUBLE SHOOTING CHART

Trouble Shooting Chart, Table 3-1, is provided as an aid in diagnosing heater failure or improper operation. The chart provides columns entitled "Symptom", "Possible Cause", "Check", and "Reference". The first two columns are self-explanatory. The third column indicates what should be checked to confirm the possible cause. The fourth column indicates the location of additional reference information that can be used for checking. The numbers in parentheses in the "Check" column indicate the terminal on the terminal strip to which the associated component connects.

TABLE 3-1. TROUBLE SHOOTING CHART

SYMPTOM	POSSIBLE CAUSE	CHECK	REFERENCE
Heater does not operate, blowers do not run	Electrical failure	Circuit breakers, wiring to heater	Aircraft wiring schematic
Heater does not operate, ventilating air blower only runs	Lockout overheat switch open	Reset lockout switch	Par. 1-14b(4)
	Defective combustion blower and fuel pump motor	Check motor with separate power source	Par. 7-4
Heater does not operate, both motors run	Ignition failure (raw fuel at drain and/or exhaust pipe)	Power to ignition unit; if none there, back up through airflow safety switch (10) and cycling switch	Fig. 1-3, electrical schematic
		Spark to spark plug	Fig. 1-3, electrical schematic
	Lack of fuel	Spark plug (for fouling)	Par. 5-5
		Coil and solid state ignition unit	Par. 5-10 and 7-6
		Power to heater solenoid coil (8); if none there, check: Thermostat	Fig. 1-3, electrical schematic Fig. 1-3 and Par. 1-13a(4)
		Airflow switch	Fig. 1-4, Par. 5-2, and Par. 7-7
		Cycling switch	Par. 1-12(b) and Par. 7-8
		Fuel pressure between pump and heater	Par. 7-5
		Fuel supply to pump (remote solenoid, filter, manual valves, etc.)	Aircraft fuel to heater schematic
		Fuel nozzle and solenoid assembly (requires heater removal and teardown)	Par. 7-3
Heater operates on ground but not in flight	Weak ignition	Spark plug	Par. 5-5
		Output of ignition unit	Par. 5-10 and Par. 7-6

TABLE 3-1. TROUBLE SHOOTING CHART (CONT)

SYMPTOM	POSSIBLE CAUSE	CHECK	REFERENCE
Heater operates on ground but not in flight (Cont)	Poor fuel atomization in burner	Fuel pressure to heater	Par. 7-5
		Fuel nozzle (requires heater removal and teardown)	Par. 7-3
Heater operates in flight, output is low	Poor thermostat operation	Thermostat setting and freedom of operation	Aircraft operations manual
	Low fuel pressure	Fuel pressure to heater	Par. 7-5
		Fuel nozzle (requires heater removal and teardown)	Par. 7-3

SECTION 4 DISASSEMBLY

4-1. GENERAL

An overhaul of any heater model consists of complete disassembly, cleaning, repair, and testing, as described in Sections 4, 5, and 6, plus final test of the complete heater as directed in Section 7. The information is presented in overhaul sequence, but it should be noted that parts are not necessarily removed in the order shown and, for maintenance, most sub-assemblies can be removed without disturbing other components.

4-2. SPECIAL SERVICE TOOLS

No special tools are required for repair or servicing of these heaters. Test equipment is described in Section 7.

4-3. DISASSEMBLY INSTRUCTIONS

Normally the heater will be disassembled first by major subassemblies, then each subassembly will be disassembled, repaired, and tested as a unit prior to final assembly and testing of the complete heater. For convenience, these operations will be treated under separate headings in the following procedure.

4-4. HEATER DISASSEMBLY (See figure 4-1)

a. Disconnect the lead of the ventilating air blower (1) from the No. 5 terminal of the terminal strip (34). Loosen the four hex nuts (2) on the end of the heater housing. Turn the blower (1) in a counterclockwise direction to free the bayonet slots and pull straight out.

b. On Model 8240-E, remove the three screws (4), and remove the adapter (3) and blower vent screen (5).

c. Disconnect the solenoid valve lead from terminal No. 8 of the terminal strip.

d. Remove the nut (6) and washer (7) from the fuel tube assembly (54). Disconnect the airflow switch

leads from terminals No. 6 and 10 on terminal strip. Remove the switch leads from the switch by removing screws (8) and lock washers (9).

e. Remove the clamps (10) and screws (11), and pull straight up on the airflow switch assembly (12) to remove it.

f. Remove the spark plug housing (13) by removing four screws (14) and remove the ignition cable (16). Remove the spark plug (15) with a deep socket.

g. Remove the nuts (17) from the terminals of the ignition coil (19); disconnect the coil leads. Disconnect the ignition unit lead from terminal No. 10 on the terminal strip (34). Remove the screws and remove the ignition unit (18) from the heater assembly.

h. Remove the ignition coil (19).

i. Disconnect the wire assembly (22) from terminals No. 4 and 6 of the terminal strip. Remove the screws (23) and disconnect the wire assembly from the overheat switch (24). Remove the four screws (25); remove and disassemble the overheat switch (24) from the switch guard (27).

j. Disconnect the duct limit switch leads from terminals No. 7 and 10 of terminal strip (34) and remove the nut (30) to disconnect the wire assembly (29) from the duct limit switch (31). Remove the two screws (32) and remove the duct limit switch.

k. Remove the screws that secure the wire assembly (33) to the terminal strip (34); remove the wire assembly. Remove the two screws (36) that secure the terminal strip (34) to the shelf assembly (43). On heater models 8240-E, 8259-HL1, and 8259-HL2, the marker strip (41) is mounted on top of the terminal strip, secured with drive pins (42). Do not disassemble unless the marker strip or terminal strip is damaged. On model 8259-L, the marker strip (35) is mounted under the terminal strip and will be removed with the terminal strip.

- | | |
|-----------------------------|------------------------|
| 1. Ventilating air blower | 18. Ignition unit |
| 2. Nut (4 reqd) | 19. Ignition coil |
| 3. Adapter | 20. Pad |
| 4. Screw (3 reqd) | 21. Wire tie |
| 5. Vent blower screen | 22. Wire assembly |
| 6. Nut | 23. Screw (2 reqd) |
| 7. Washer | 24. Overheat switch |
| 8. Screw | 25. Screw (4 reqd) |
| 9. Washer | 26. Speed nut (4 reqd) |
| 10. Clamp (2 reqd) | 27. Switch guard |
| 11. Screw (2 reqd) | 28. Gasket |
| 12. Airflow switch assembly | 29. Wire assembly |
| 13. Housing | 30. Nut (2 reqd) |
| 14. Screw (5 reqd) | 31. Duct limit switch |
| 15. Spark plug | 32. Screw (2 reqd) |
| 16. Ignition cable | 33. Wire assembly |
| 17. Assembled washer nut | 34. Terminal strip |
| | 35. Marker strip |

- | | |
|---|----------------------------|
| 36. Screw (2 reqd) | 51. Cover clamp (4 reqd) |
| 37. Jumper | 52. Hook bolt (4 reqd) |
| 38. Screw (12 reqd) | 53. O-ring |
| 39. External tooth lock washer (2 reqd) | 54. Fuel tube assembly |
| 40. Internal tooth lock washer (2 reqd) | 55. Nut |
| 41. Marker strip | 56. O-ring |
| 42. Drive pin | 57. Burner assembly |
| 43. Shelf assembly | 58. Screw (3 reqd) |
| 44. Screw (4 reqd) | 59. Screw |
| 45. Gasket shielding | 60. Screw (5 reqd) |
| 46. Exhaust shroud | 61. Heat exchanger |
| 47. Screw (6 reqd) | 62. Nameplate |
| 48. Gasket | 63. Heater case |
| 49. Burner cover | *64. Ductstat |
| 50. Nut (4 reqd) | *65. Fuel solenoid valve |
| | *66. Combustion air blower |

Legend for Figure 4-1.

*Remotely mounted parts

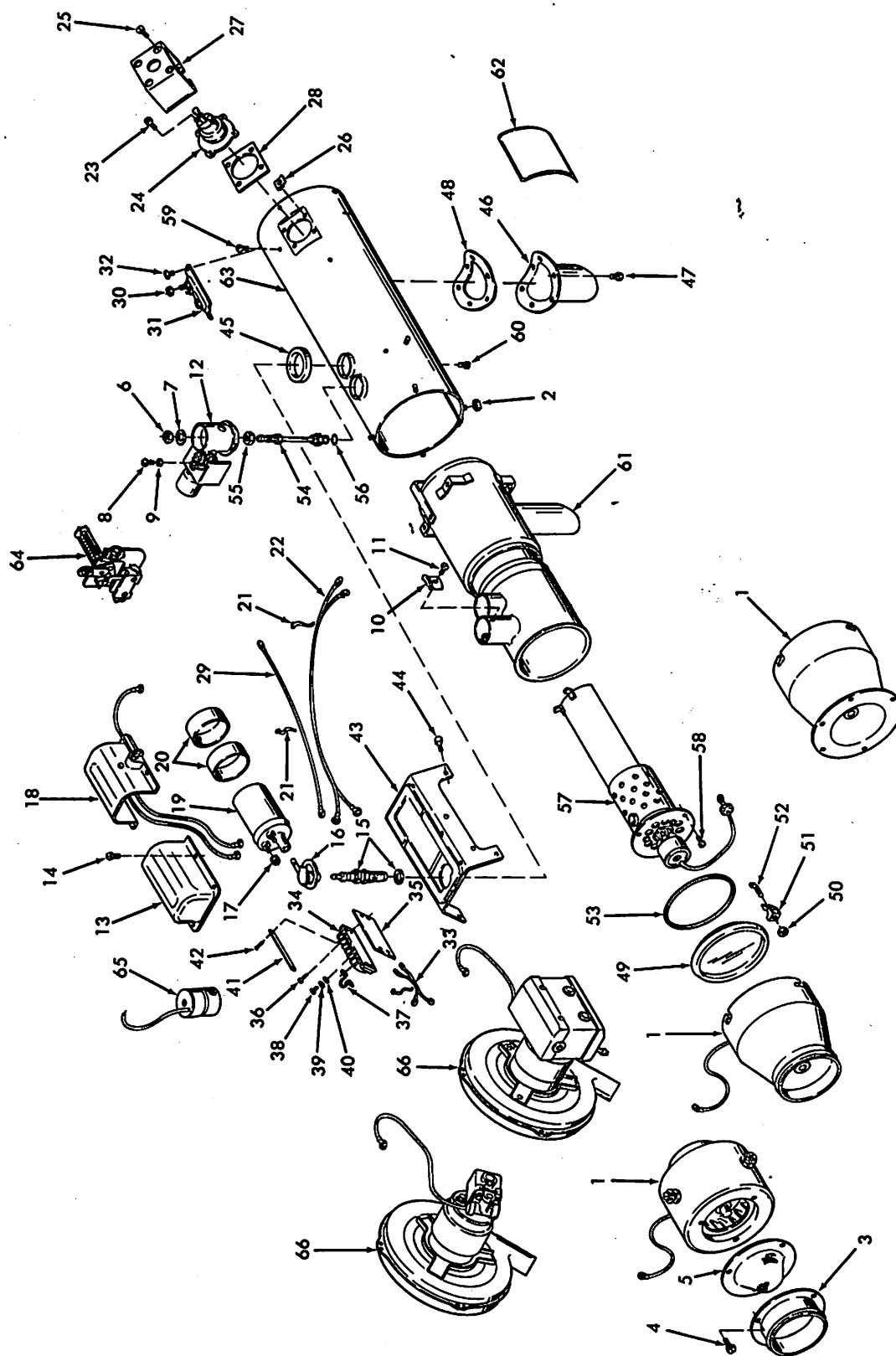


Figure 4-1. Aircraft Heater, Exploded View

l. Remove the shelf assembly (43) by removing the four screws (44) that secure it to the heater case. Remove the gasket shielding (45).

m. Remove the six screws (47) that secure the exhaust shroud (46) to the heater case; remove the shroud and on models 8240-E, 8259-HL1, and 8259-HL2, remove the gasket (48).

n. Loosen the four nuts (50) and disengage the four sets of cover clamps (51) and hook bolts (52) that secure the burner cover (49) to the heat exchanger (61). Remove the burner cover and O-ring (53) to provide access to the solenoid valve and fuel tube assembly (54).

o. Disconnect the fuel tube (54) from the solenoid valve inlet. Remove the O-ring (56) from the fuel tube assembly.

p. Remove the three screws (58) that secure the burner assembly (57) to the heat exchanger (61). Pull straight out on the burner assembly to remove it.

q. Remove the grounding screw (59) that bonds the heat exchanger to the heater case (63). Remove the five screws (60); spread the heater case (63) and lift it off of the heat exchanger (61).

r. Do not remove the nameplate (62) from the heater case.

4-5. VENTILATING AIR BLOWER DISASSEMBLY — 8240 SERIES HEATERS (See figure 4-2)

a. Remove the screw (1) and lock washer (2) that secure the ground lead assembly (13) to the end of the blower motor (10).

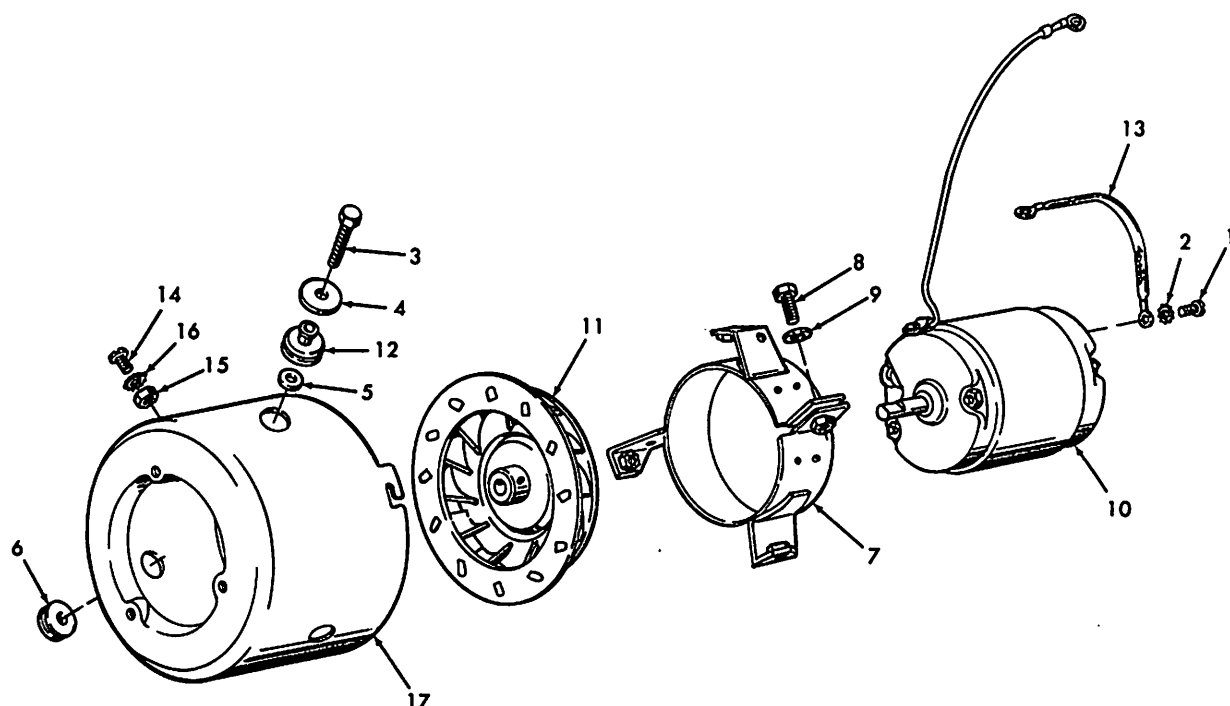
b. Remove the three screws (3) and flat washers (4 and 5) that secure the assembled blower motor (10), blower wheel (11), and mounting bracket assembly (7) to the blower housing (17). Carefully pull the motor and assembled parts straight out of the housing while feeding the motor electrical lead through the grommet (6). Push the grommet and lead into the inside of the housing.

c. Mark the position of the mounting bracket assembly (7) in both horizontal and rotational directions. Loosen the screw (8) to release the mounting bracket assembly from the motor and slide the bracket from the motor.

d. Loosen the setscrew in the blower wheel (11) and slide the blower wheel from the end of the motor shaft.

e. Push the shock mounts (12) from the mounting holes in the blower housing (17).

f. Remove the screw (14), nut (15), and lock washer (16) that secure the ground lead assembly (13) to the blower housing.



- | | |
|--------------------|------------------------------|
| 1. Screw | 6. Grommet |
| 2. Lock washer | 7. Mounting bracket assembly |
| 3. Screw (3 reqd) | 8. Screw |
| 4. Washer (3 reqd) | 9. Washer |
| 5. Washer (3 reqd) | |

- | | |
|--------------------------|--------------------|
| 10. Motor assembly | 14. Screw |
| 11. Blower wheel | 15. Nut |
| 12. Shock mount (3 reqd) | 16. Lock washer |
| 13. Ground lead assembly | 17. Blower housing |

Figure 4-2. Exploded View of Ventilating Air Blower Assembly, 8240 Series Heaters

4-6. VENTILATING AIR BLOWER DISASSEMBLY — 8259 SERIES HEATERS (See figure 4-3)

a. Remove the thru bolt nut that secures the one end of the ground lead assembly (8) to the motor thru bolt; disengage the ground lead assembly.

b. Remove the nut and washer of the insulated terminal (1) and push the terminal and its wire into the interior of the blower housing.

c. Remove the three nuts (3) and spacer sleeves (4) that secure the motor assembly (2) to the blower housing. Pull straight out on the motor assembly to prevent damage to the blower wheel blades. Remove the blower wheel (5) from the end of the motor shaft by loosening the setscrew in the blower wheel.

d. Remove the grommets (6) from the motor mounting flange.

e. Remove the nut (7) that secures the ground lead (8) to the interior of the blower housing (9).

4-7. COMBUSTION AIR BLOWER AND FUEL PUMP DISASSEMBLY (See figure 4-4)

a. Remove the air inlet adapter (1) by removing the screw (2) and lock washer (3). Remove the speed nut (4) from the bracket on the front blower housing (17).

b. Loosen the four screws (6) and remove the fuel pump shroud cover (5) which is supplied on all models except 8259-L. This model does not use a fuel pump shroud.

c. Pry the plugs (9) from the fuel pump shroud (13). Insert a 1/4-inch socket through the plug holes and remove two nuts (11) which secure the fuel pump (10) to the blower motor (26). Remove and disassemble the fuel pump from the shroud (13). Remove the washers (12) from the fuel pump mounting studs on the motor.

d. Remove the coupling (14) from the connector (15) on the motor or on the pump. The connectors have left-hand threads. Turn them clockwise to unscrew them. Remove the washer (16).

e. Remove the front blower housing (17) by removing the four screws (18) and nuts (19). Loosen the setscrew in the blower wheel hub and remove the blower wheel (20) from the motor shaft.

f. Remove the nuts (22) and lock washers (23) and remove the rear blower housing (21) from the motor mounting bracket (24). Remove the four screws (25) and remove the motor mounting bracket from the motor (26).

4-8. BURNER DISASSEMBLY (See figure 4-5)

a. Match mark the burner support (1), mixer assembly (5), and fuel nozzle and solenoid assembly (3) to facilitate proper orientation of parts at reassembly.

b. Remove the three screws (2) and remove the assembled burner support (1) and fuel nozzle and solenoid assembly (3) from the mixer assembly (5). Remove the retaining ring (4) and separate the burner support from the fuel nozzle and solenoid assembly.

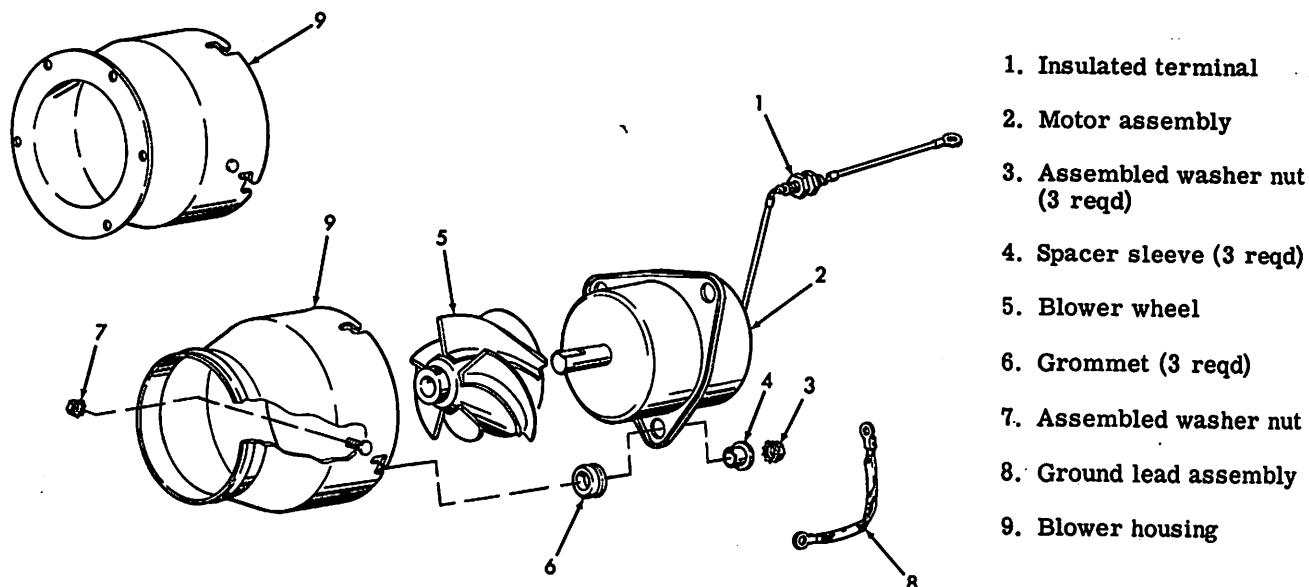
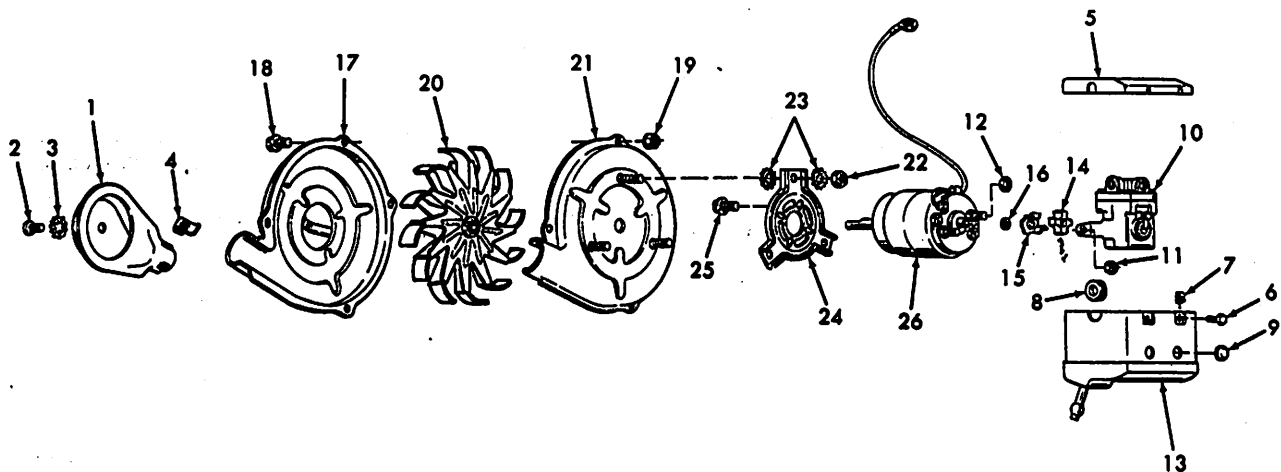


Figure 4-3. Exploded View of Ventilating Air Blower Assembly, 8259 Series Heaters



- | | | |
|---------------------------|-------------------------------------|-------------------------------------|
| 1. Air inlet adapter | 10. Fuel pump | 19. Assembled washer nut (4 reqd) |
| 2. Screw | 11. Nut (2 reqd) | 20. Blower wheel assembly |
| 3. Lock washer | 12. Washer (2 reqd) | 21. Rear blower housing |
| 4. Speed nut | 13. Fuel pump shroud | 22. Nut (3 reqd) |
| 5. Fuel pump shroud cover | 14. Coupling | 23. Lock washer (3 or 6 reqd) |
| 6. Screw (4 reqd) | 15. Connector | 24. Motor mounting bracket |
| 7. Speed nut (4 reqd) | 16. Washer | 25. Assembled washer screw (4 reqd) |
| 8. Grommet | 17. Front blower housing | 26. Blower motor |
| 9. Plug (2 reqd) | 18. Assembled washer screw (4 reqd) | |

Figure 4-4. Exploded View of Combustion Air Blower and Fuel Pump Assembly

4-9. FUEL NOZZLE AND SOLENOID DISASSEMBLY (See figure 4-6)

a. Use a socket to remove the fuel nozzle (1) from the fuel nozzle holder (18). Remove the gasket (2) and sleeve spacer (3).

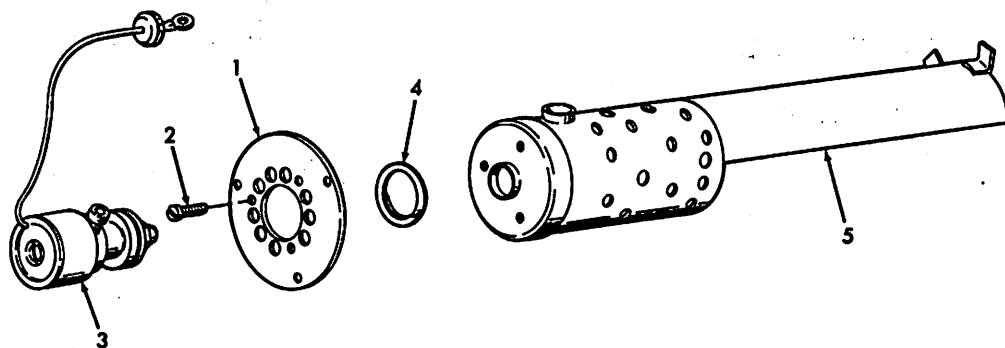
b. Use a 1/4-inch allen wrench to remove the valve seat screw (4); remove the valve seat (5) and gasket (6).

c. Remove the screw (8) and lock washer (9); remove the solenoid coil assembly (7) and washer (10) from the solenoid cup (11).

d. Remove the three screws (12) and remove the solenoid cup (11) from the fuel nozzle holder (18). Remove the sleeve and core assembly (13), valve spring (14), solenoid plunger (15), and gasket (16). Remove the screen (17) from the fuel inlet port of the fuel nozzle holder.

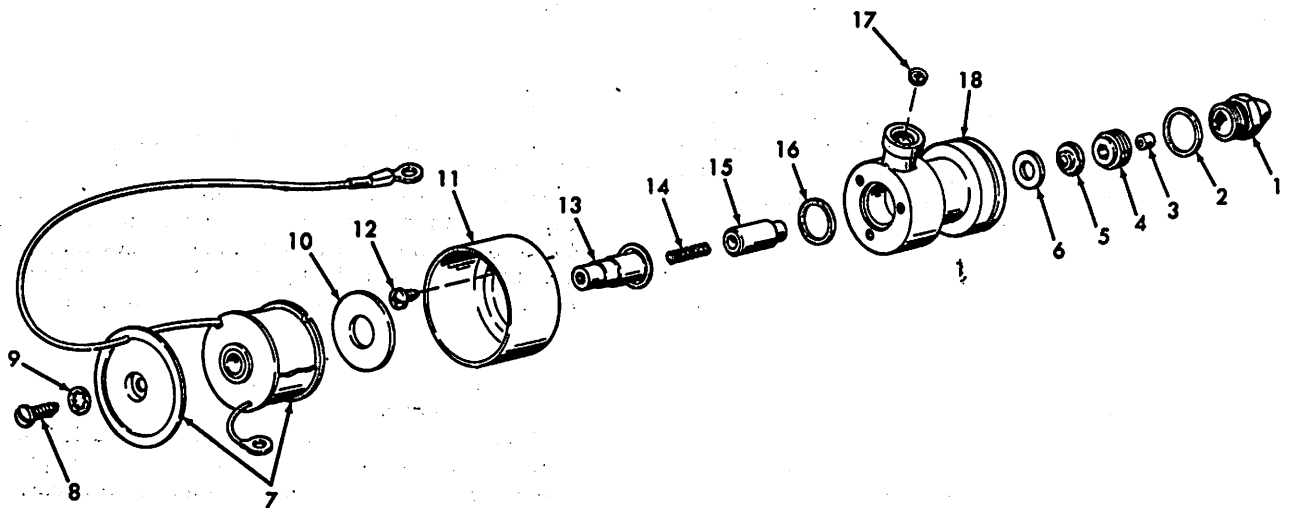
CAUTION

Discard and replace gaskets (2, 6, and 16) to assure that the old ones will not be reused at reassembly.



1. Burner support
2. Screw (3 reqd)
3. Fuel nozzle and solenoid assembly
4. Retaining ring
5. Mixer assembly

Figure 4-5. Exploded View of Burner Assembly



- | | | | |
|---------------------|---------------------------|------------------------------|------------------------|
| 1. Fuel nozzle | 6. Gasket | 11. Solenoid cup | 15. Solenoid plunger |
| 2. Gasket | 7. Solenoid coil assembly | 12. Screw (3 reqd) | 16. Gasket |
| 3. Spacer | 8. Screw | 13. Sleeve and core assembly | 17. Screen |
| 4. Valve seat screw | 9. Lock washer | 14. Valve spring | 18. Fuel nozzle holder |
| 5. Valve seat | 10. Washer | | |

Figure 4-6. Exploded View of Fuel Nozzle and Solenoid Valve Assembly

SECTION 5

CLEANING, INSPECTION, AND REPAIR

5-1. GENERAL

Carefully follow the instructions contained in this section to assure that the subassemblies and the disassembled parts of the various disassembled components are in good condition before the parts are reassembled.

5-2. AIRFLOW SWITCH ASSEMBLY

Clean the airflow switch assembly with dry cleaning solvent, if required. Inspect the air vane for freedom of movement and test the microswitch for continuity with an ohmmeter. Replace the entire assembly if the vane does not move freely, or if the microswitch is defective. The aluminum air vane shaft bushing and cam must be clean and dry, and should not be lubricated.

5-3. BURNER ASSEMBLY PARTS

a. The appearance of the burner assembly will give an indication of burning conditions within the heater. The nozzle and the inside of the mixer will normally be covered with a thin layer of black carbon

around the nozzle. The outer end of the mixer will be burned to a gray or reddish color, and some scaling or loose particles are usually present. These are indications of normal operation and should not be regarded as defects. A heavy, one-sided buildup of black carbon, or an excessively burned or eroded spot on the mixer will indicate an unsymmetrical spray or dripping from the nozzle. A badly burned, fouled, or pitted spark plug is also an indication of a defective nozzle. If carbon builds up below the nozzle, the nozzle is probably dripping, indicating a loose nozzle or scored seat, or possibly a solenoid valve that does not seal. A heavy deposit of soft black carbon may be caused by an oversize nozzle, or insufficient combustion air. This condition can also be caused by a nozzle which has a coarse spray (large droplet size), or one which has too wide a spray angle. After noting condition of the burner, repair or replace parts as directed below.

b. Clean inside and outside of mixer assembly (5, figure 4-5) with a wire brush, and blow out with compressed air (or sandblast, if available). Carefully check for holes and thin spots due to erosion of the metal.

c. Inspect the solenoid coil assembly (7, figure 4-6) for condition of insulation and electric continuity. Inspect nozzle holder (18) for clogging and damaged threads. Clean inside passage with methyl alcohol or carburetor cleaning solution. Inspect plunger (15) for condition of rubber tip at the end. If tip is swollen or has a deep impression from the valve seat, replace the plunger. Inspect the valve seat (5) for condition of seating surface, and replace if surface is scored or corroded. Install a new nozzle (1), gaskets (2, 6, and 16), and spacer (3) at each overhaul.

5-4. HEAT EXCHANGER

a. Inspect the heat exchanger (61, figure 4-1) for leaks, cracks, clogged drain openings, and carbon deposits. The interior will normally contain a deposit of lead by-products. Remove as much of this as possible, with a flexible scraper. Remove combustion residue from inside heat exchanger by soaking this assembly in a 20 percent by weight solution of ammonium acetate at a temperature of 180°F, for a period of 5 to 10 hours. Flush out exchanger with water after cleaning, and dry with compressed air.

b. Check for warping of inner passages, or bulging of the header plate. Replace the heat exchanger if warping or bulging is excessive, or if any part is burned through.

c. Small cracks may be repaired by welding, provided they are accessible and the heat exchanger is otherwise in good condition. Do not attempt to repair large cracks, or to straighten a deformed heat exchanger.

d. When welding cracks in the heat exchanger, Type 310 weld rod is preferred, although Type 349, 321 or 347 may be used. Before welding, it is very important to clean all combustion deposits away from the area to be welded, since the lead compounds in the exchanger can contaminate the weld to such an

extent that a tight weld is almost impossible. Keep all weld beads as small as possible, preferably not over 1/8 inch.

5-5. SPARK PLUG

a. Examine the spark plug (15, figure 4-1) for erosion, burning, or build-up of lead deposits. Such conditions usually indicate a defective nozzle. If the plug is in very bad condition, it is wise to inspect the mixer for further analysis of the problem. If the plug is not badly burned or eroded, in most cases cleaning will make it serviceable again. Generally with one or two cleaning operations the spark plug will outlast the heater.

b. To clean the spark plug, remove the terminal nut and the hex nut from the outer end of the plug. After this the center electrode may be pulled out of the plug from the burner end. The end of the plug is now open so that it can be cleaned by conventional spark plug cleaning methods. The center electrode should be cleaned with a wire brush. After cleaning, the plug should be reassembled and the terminal nuts tightened firmly but with care to avoid breaking the porcelain. The annular spark gap should be examined to make sure that it is uniform. This type of plug does not have an adjustable gap. The gap should be about 3/32 inch, and even, around the ground shield. This disc on the end of the center electrode may be sprung slightly, if necessary, to even up the annular gap.

5-6. VENTILATING AIR BLOWER (See figure 4-2 or 4-3)

Clean the housing, fan, bracket, and outside of motor with cleaning solvent. Replace vibration grommets or shock mounts at each overhaul. Check that the blower wheel is free from cracks and distortion. Overhaul motors as directed in paragraph 5-7.

5-7. MOTORS

An overhaul kit (Part No. G-720466) is available for all motors used on the combustion and ventilating air blowers of the 8240 and 8259 Series heaters. This kit contains new bearings, new brushes, and other parts required for the installation of these parts. At overhaul, the motors should be disassembled, dirt blown out, the commutator cleaned or turned, as required, and the new kit parts installed.

5-8. COMBUSTION AIR BLOWER (See figure 4-4)

Clean the inlet adapter (1), housings (17 and 21), blower wheel (20), and outside of motor (26) with cleaning solvent. Inspect the two connectors (15). Discard the connectors if they are bent or broken. Install a new coupling (14) at each overhaul. To overhaul the motor, refer to paragraph 5-7.

5-9. FUEL PUMP (See figure 5-1)

Replace the valves in the fuel pump at each overhaul, using the Part No. G-735736 Overhaul Kit which contains a new valve plate and gaskets. Valves are

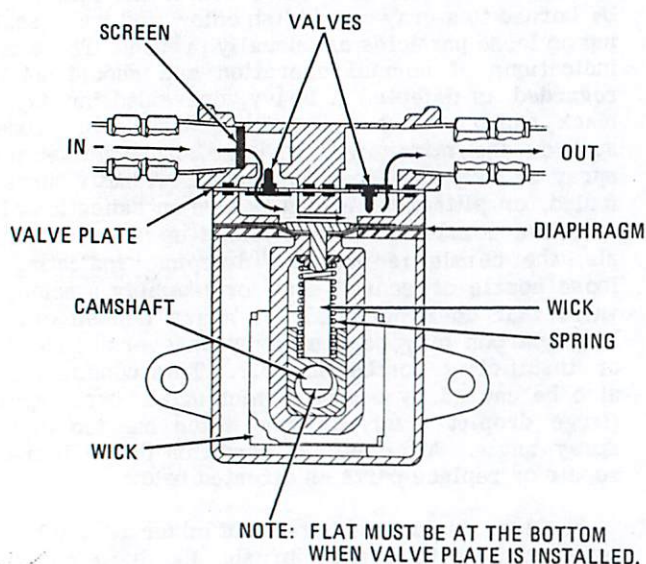


Figure 5-1. Cross Section of Fuel Pump Showing Proper Valve Installation

already installed in the plate. Remove the four screws from the cover of the fuel pump assembly and lift off the cover. Remove the valve plate and gaskets and replace with new parts from the overhaul kit. Make sure the new valve plate is installed the same as the one which was removed. The valve at the inlet side of the pump must have the pointed side up. The outlet valve will then have the circular disc exposed. Loosen the clip and remove the bearing from the end of the camshaft before tightening cover screws. The flat of the camshaft must be at the bottom when the cover is installed. Add one cc of Winsor Lube No. L-245X (manufactured by F.E. Anderson Oil Co., Portland, Conn.) to wick through the bearing opening before the bearing is reinstalled. Tighten cover screws securely to prevent leakage.

5-10. IGNITION UNIT

Inspect the ignition unit for electrical components which show signs of overheating and other damage. Check that all electrical leads are securely connected. Test the ignition unit as directed in paragraph 7-6.

5-11. MISCELLANEOUS HEATER PARTS

- Examine the gasket shielding (45, figure 4-1) to make sure it retains sufficient resiliency to make good electric contact. Replace shielding if permanently compressed, or if torn or seriously deformed.
- Inspect all electric wiring for condition or insulation and tightness of terminals. Repair by soldering, if required.
- Replace all rubber grommets at each overhaul.
- Clean the duct limit switch (31) and overheat switch (24) with dry cleaning solvent. Contacts of the duct limit switch may be cleaned by sliding a piece of bond paper between contacts, but the overheat switch must be replaced if defective in any way.
- Clean the heater case (63), shelf assembly (43), ignition covers, and outside of coil (19) with cleaning solvent before reassembly.
- Inspect the fuel tube assembly (54) for cracks, damaged threads, dents, and obstructions. Replace if damaged.

SECTION 6 REASSEMBLY

6-1. FUEL NOZZLE AND SOLENOID VALVE REASSEMBLY (See figure 4-6)

a. Reassemble in reverse order of index numbers in figure 4-6, using a new nozzle (1), gaskets (2, 6, 16), and spacer (3). Make sure cover screw (8) passes through eyelet of the coil ground lead, when the solenoid cover is reinstalled.

b. When reassembled, the fuel nozzle and solenoid valve must be tested as directed in paragraph 7-3 before installing in the heater assembly.

6-2. BURNER REASSEMBLY (See figure 4-5)

Test assembled fuel nozzle and solenoid valve, as directed in paragraph 7-3, before reassembly. Reassemble burner in a (1), (3), (4), (5), (2) order of index numbers in figure 4-5, making sure the retaining ring (4) is securely seated in the groove of the nozzle holder.

CAUTION

Do not overtighten screws (2) mounting nozzle holder to burner. Before tightening these screws, make sure that the fuel line port is properly oriented to the spark plug hole for the model heater being serviced. Refer to figure 6-1.

6-3. COMBUSTION AIR BLOWER AND FUEL PUMP REASSEMBLY (See figure 4-4)

a. Reassemble the combustion air blower in reverse order of disassembly, using a new rubber coupling (14). Note that connectors (15) on motor shaft and fuel pump have left-hand threads. Be sure washers are in place under connectors. Make a trial fit of fuel pump to determine if spacing is correct between the two connectors (15) before installing the pump.

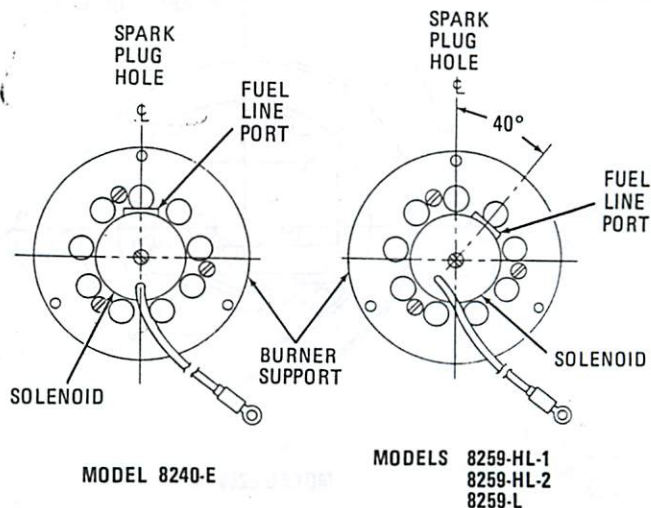


Figure 6-1. Orientation of Spark Plug Hole to Fuel Line Port of Burner Assembly

Use an additional spacer washer (16) if required. At least one washer, but not more than two washers are to be inserted under the connector installed on the motor. One washer must be installed under the connector secured to the fuel pump shaft. The two connectors must fit snugly around the coupling (14) to insure proper pump operation and prevent breaking of the connector tabs.

b. Before installing inlet adapter (1), loosen set-screw of blower wheel (20) and adjust the wheel to clear both the front and rear blower housings (17 and 21) uniformly. Retighten the setscrew.

c. Refer to figure 6-2 to orient the parts of the combustion blower and fuel pump to the positions required on the various heater models.

d. Test the assembled combustion air blower and fuel pump as directed in paragraph 7-4 before installation.

6-4. VENTILATING AIR BLOWER REASSEMBLY FOR 8240 SERIES HEATERS (See figure 4-2)

a. Reassemble the ventilating air blower in reverse order of disassembly. Use new grommet (8) and shock mounts (12).

b. Position the mounting bracket assembly (7) on the motor (10), being sure to align matchmarks made at disassembly. After installing the blower wheel (11), check the fit of the assembled parts in the blower housing (17), while rotating the blower wheel. It must not rub. Check blower wheel face to housing

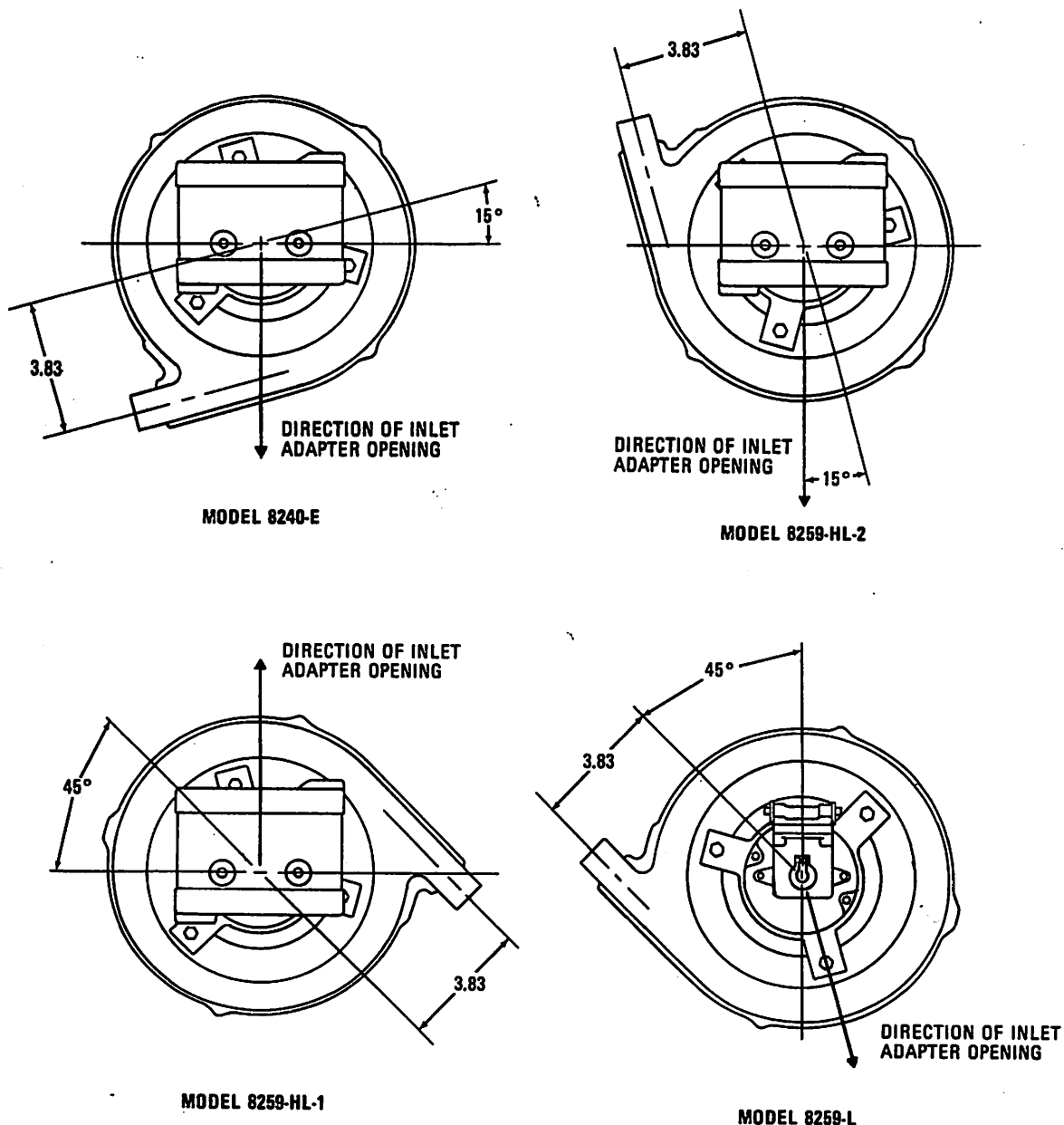


Figure 6-2. Assembly Positions of Combustion Air Blower and Fuel Pump Components

clearance. It must be 0.03 to 0.06 inch. Readjust position of blower wheel on shaft or motor on bracket if necessary to obtain clearance.

6-5. VENTILATING AIR BLOWER REASSEMBLY FOR 8259 SERIES HEATERS (See figure 4-3)

a. Install new grommets (6) in the mounting holes of the motor bracket. Position one end of the ground lead (8) on the stud inside the blower housing (9); secure the lead with the nut (7).

b. Position the blower wheel (5) on the shaft of the motor (2) but do not tighten the setscrew in the blower wheel.

c. Position the assembled motor and blower wheel in the blower housing (9) and secure with three spacer

sleeves (4) and nuts (3). Position the blower wheel on the motor shaft to provide 0.08 ± 0.05 inch clearance between the blower housing and blower wheel. Tighten the setscrew to lock the blower wheel to the motor shaft.

d. Insert the electrical lead and insulated terminal (1) through the hole in the blower housing; secure with the terminal nut and washer. Secure the loose end of the ground lead to the motor with one of the through-bolt nuts which uses an internal-external tooth lock washer.

6-6. HEATER REASSEMBLY (See figure 4-1)

a. Before reassembling and installing the heater assembly, make sure that the following components

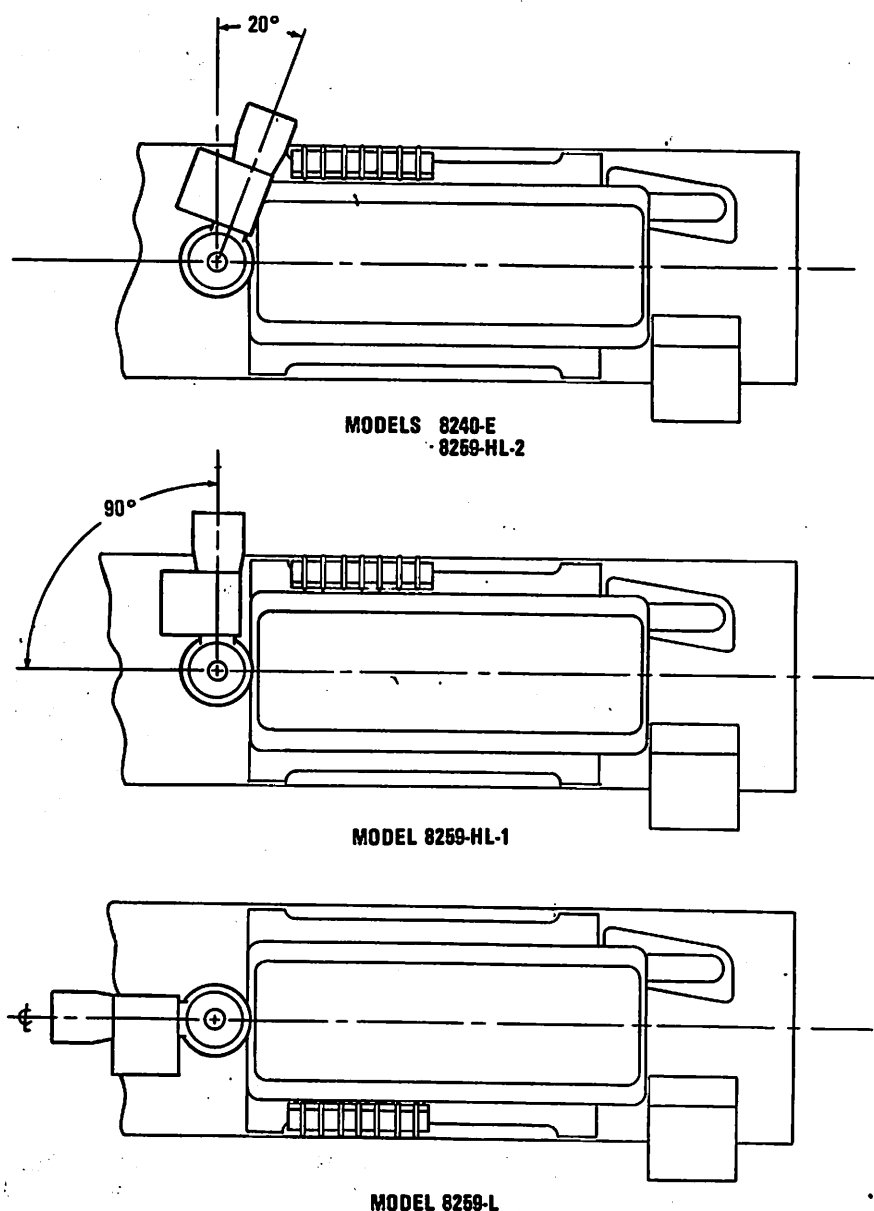


Figure 6-3. Airflow Switch Positions for Different Heater Models

are tested to assure their proper operation before installing them in the heater.

Component	Test paragraph
Fuel nozzle and solenoid	7-3
Combustion air blower and fuel pump	7-4
Fuel pump	7-5
Ignition unit	7-6
Airflow switch	7-7
Overheat switch	7-8

b. Reassembly of the heater is essentially the reverse of disassembly. Use new parts where necessary.

c. Refer to the wiring diagram in figure 1-3 for wire connection information.

d. Certain areas of the heater require sealing during reassembly. Use General Electric Silicone Sealant 102 or Dow Corning Silastic 731 RTV adhesive sealant to seal the heater as follows:

(1) Run a 1/8-inch wide bead of sealant the full length of the formed lap at the bottom of the heater

case (63, figure 4-1) before installing screws (60). Wipe off excessive sealant. Check the full length of the seal to assure that there is visible evidence of a seal inside and outside of the case.

(2) When installing the shelf assembly (43), apply sealant to the weld nuts in the heater case before inserting the screws (44).

(3) Apply a 1/8-inch bead of sealant to the area of the heater case which will be covered by the duct limit switch (31) before installing the switch. Tighten the screws (32) firmly and wipe off excessive sealant.

(4) Apply a 1/8-inch bead of sealant to the area approximately midway between the ventilating air blower mounting studs and the end of the heater before installing the ventilating air blower (1). Wipe off excessive sealant after tightening the nuts (2).

e. Different models of the heater assembly require different positioning of the inlet port of the airflow switch (12). Refer to figure 6-3 for information regarding airflow switch orientation at reassembly.

SECTION 7 TESTING

7-1. GENERAL

Testing of the heater must be accomplished in two stages; first, the testing and adjusting of major subassemblies before final assembly of the heater, then test burning and final adjustment of the fully assembled unit. The entire test must be performed on a heater which has been disassembled for overhaul, and the applicable test and adjustment must be made of any subassembly which may be removed for separate servicing.

7-2. TEST EQUIPMENT

The following test equipment and apparatus is required for testing:

X a. A filtered dc power supply with a range of 0-30 volts and 15-ampere output.

X b. A dc voltmeter (0-30 volts) and a dc ammeter (0-15 amperes).

+ c. A source of 100-octane aviation gasoline with pressure regulation from 20 to 50 psig.

d. An orifice tube, 1-1/4 in. OD x 0.025 in. wall, 15 inches long with an 0.860-inch diameter thin-wall orifice plate at the discharge end.

e. A water manometer.

X f. A combustion blower assembly, Part No. G-714750 or equivalent.

g. An air duct, 1-1/2 inch diameter x 0.035 in. wall x 10-1/2 inches long with a 0.625 in. ID orifice in one end. Duct must have pressure tap midway between orifice and inlet of tube.

h. A 24-volt pilot lamp with alligator clips on leads.

i. A buzzer or vibrator to provide low magnitude, relatively high frequency vibration.

j. A fixture fitted with a spark plug, having an adjustable spark gap from zero to 0.250 inch.

k. A S-W Part No. 719843 ignition coil known to be in good condition.

l. A SPST, normally on, momentary off switch; a SPST ON-OFF switch; a 2000 MFD capacitor; and a one-ampere, slo-blo fuse.

m. A means of measuring vent air outlet temperature.

7-3. FUEL NOZZLE AND SOLENOID TEST (See figure 4-6)

WARNING

Since the spray from the fuel nozzle is highly inflammable, proper precautionary measures must be observed.

a. Connect the fuel port of the fuel nozzle and solenoid assembly to a source of gasoline with controllable pressure to 50 psig. Ground the solenoid cup, and connect the solenoid lead to a switch-controlled source of 24 volts dc.

b. Apply fuel pressure and operate the switch to energize the solenoid until air has been bled from the system as evidenced by a steady spray of fuel from the nozzle. Deenergize the solenoid and increase fuel pressure to 50 psi. Examine nozzle (1) carefully for signs of leakage and check for leakage around the core gasket (16). No leakage is permitted. If leakage occurs through nozzle, replace the plunger (15). If leakage occurs at the core gasket, tighten cup screws (12), or replace gasket (16). Energize the solenoid and examine for leaks around the nozzle. If leakage is detected, replace nozzle gasket (2).

c. Reduce fuel pressure to 20 psig and energize solenoid at varying voltages thru a snap action switch. Note minimum pull-in voltage. Pull-in voltage must not be more than 20 volts. Replace core (13), spring (14), and plunger (15), or replace coil and cover assembly (7) as required, if pull-in voltage is too high.

d. Reduce fuel pressure to 20 psi, energize solenoid, and examine spray from nozzle. The spray must be uniform in shape without heavy or light areas, gaps, or drippings; and the spray angle must

be approximately 80°. Replace the nozzle if spray is not satisfactory.

e. If the fuel rate of the nozzle is questionable but the spray angle and pattern are satisfactory, the flow rate through the nozzle should be checked at this time. Arrange the nozzle to spray down into a funnel which drains into a graduate. The proper flow rate in cc/min for the 714710 nozzle used on the 8240 Series heater is shown for a small range of fuel pressures in figure 7-1. The flow rate for the 716295 nozzle used on the 8259 Series heaters is shown in figure 7-2.

7-4. FUEL PUMP AND BLOWER ASSEMBLY - BLOWER TEST

a. Securely mount the combustion air blower in a fixture and attach the 1-1/4-inch duct, 15 inches long and with 0.880-inch orifice, to the outlet of the blower. Leave the fuel pump disconnected for this test. Connect the water manometer to the pressure tap of the duct.

b. Connect the blower motor to a source of 24 volts dc, with a voltmeter and ammeter in the circuit.

c. Energize the blower and adjust voltage to 24 volts. Read static pressure in the duct as indicated by the water manometer. This must be 3.0 inch H₂O, or more, and current draw must not exceed 2.4 amperes.

d. If the blower motor fails to operate within limits, overhaul or replace it.

e. Increase voltage to 28.5 and close off blower outlet. Let fan gain maximum speed. The fan must run freely, without striking the housing. Readjust fan on the motor shaft, or replace the fan if scraping occurs.

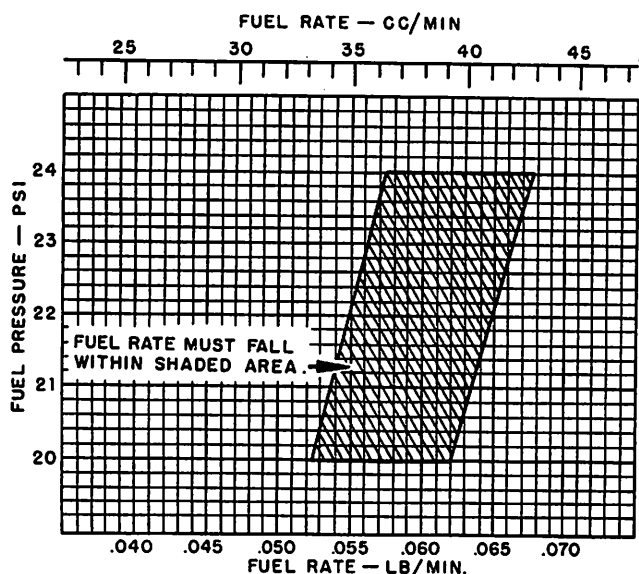


Figure 7-1. Nozzle Flow Rate, 8240 Series Heaters

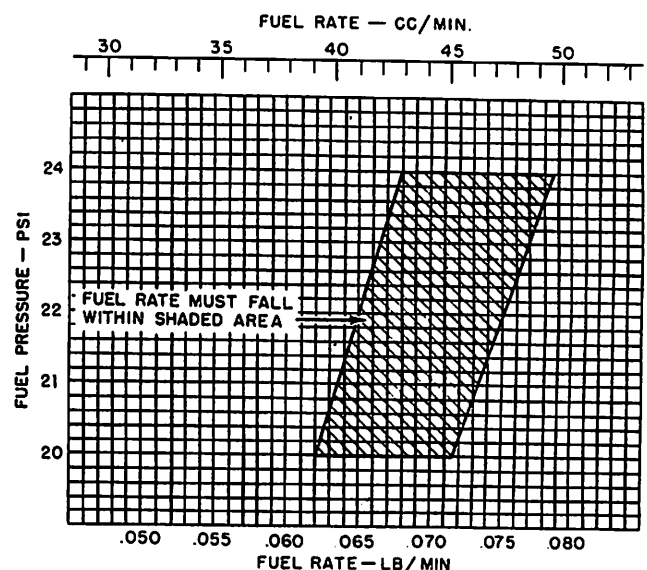


Figure 7-2. Nozzle Flow Rate, 8259 Series Heaters

7-5. FUEL PUMP AND BLOWER ASSEMBLY -- FUEL PUMP TEST

a. With the fuel pump and blower assembly mounted firmly in a test fixture, connect a source of filtered aviation gasoline to the fuel pump inlet. The fuel level of the source must be approximately level with the pump inlet.

b. Connect the discharge port of the pump to a fuel nozzle holder and solenoid assembly. Observe warning in paragraph 7-3. Connect a pressure gage between the pump outlet and the solenoid assembly.

c. Connect a source of 24-volt ripple-free dc power to the motor and to the solenoid through separate switches.

d. Operate both switches to ON and operate the pump until all of the air is purged from the system. Pressure gage must read between 19 and 24 psig after the air is cleared out.

e. Switch solenoid to OFF. Pressure gage reading must not rise above 27 psig.

f. Visually check for leakage at all gasketed joints. No leakage is allowed.

g. If the pump leaks or fails to operate within limits, overhaul it using overhaul kit Part No. G-735736. Refer to paragraph 5-9. Recheck after overhaul.

7-6. IGNITION UNIT TEST

WARNING

Voltages produced during this test are high enough to cause injury or even death. Use signs to warn of high voltages during use of test stand. Place control switch in OFF position before connecting or disconnecting any test units. Use a guard to enclose the spark plug but still provide for visual observation of the spark.

a. Connect the ignition unit into a test setup as shown in figure 7-3. Adjust spark gap to .090 inch. Make sure the ground lead is securely connected to the ignition unit housing and the power lead is connected to the feed-through capacitor.

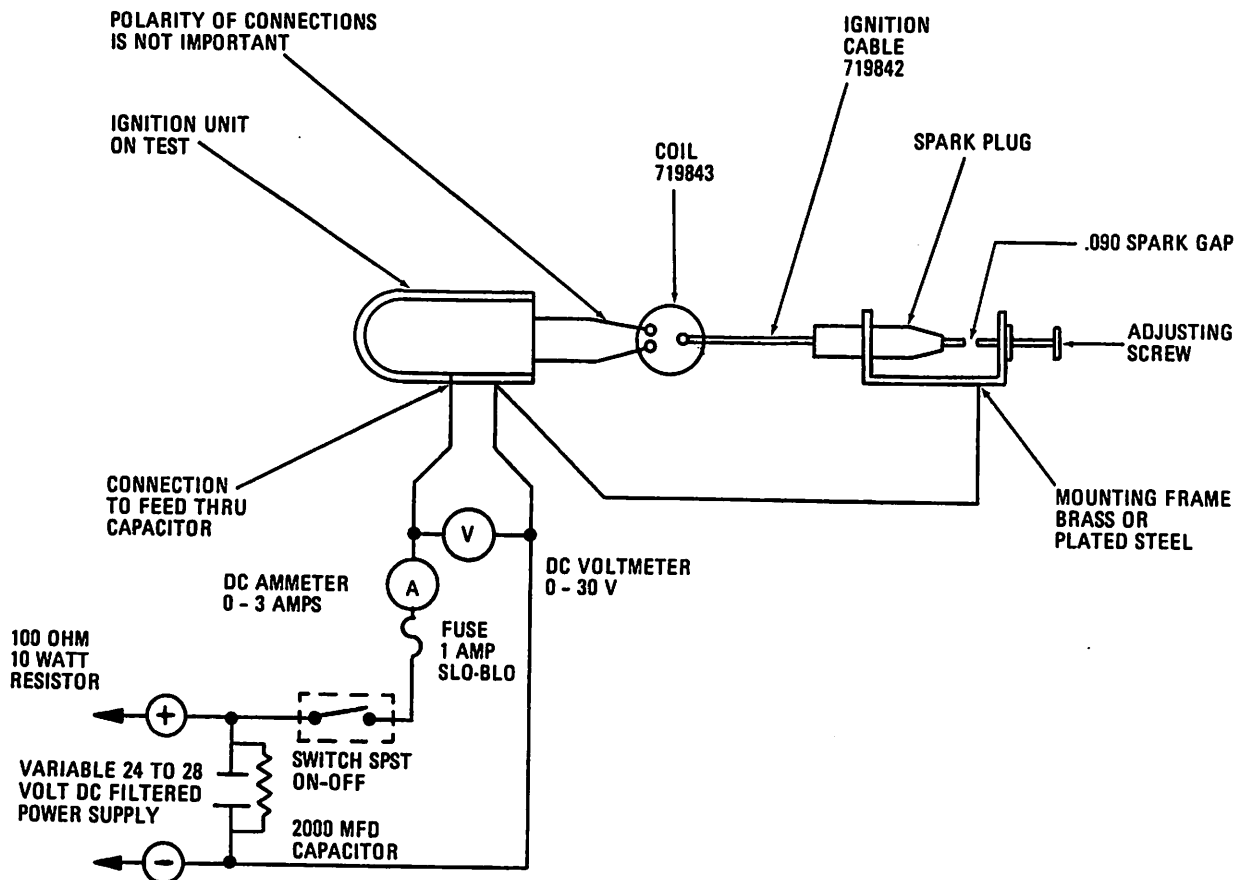


Figure 7-3. Schematic Diagram of Ignition Unit Test Setup

b. Turn the ON-OFF switch to ON while watching the spark gap. A bright, hot spark must start immediately when the power is turned on. A steady spark shall continue as long as the power remains on. Reject the ignition unit if intermittent sparking is observed.

c. Adjust the input voltage to exactly 24 volts. A good ignition unit will ignite a business card or a manila tag held between the electrodes of the spark gap.

d. Reject ignition units which fail to provide the required output levels.

7-7. AIRFLOW SWITCH TEST

a. Before attaching the air vane switch to the test fixture, make preliminary adjustments as follows:

(1) Hold the air vane in the full open position by inserting finger in the inlet opening.

(2) Rotate the cam until the highest point on the cam lobe is at 90° to the plane of the air vane.

(3) Turn the adjusting screw in until the pressure of the actuating arm of the microswitch will just hold the air vane in the full open position.

(4) Slowly back out the adjusting screw until the vane will fall into the closed position. Firmly tighten the two screws to hold the switch bracket in place.

NOTE

In the closed position, the smallest radius of the cam must be adjacent to the actuating arm of the microswitch. If this is not true, the cam is out of plane 180 degrees. Reposition and repeat above as required.

b. Connect the outlet of the blower assembly to the inlet of the air vane switch assembly. Refer to figure 7-4.

c. Connect the outlet of the air vane switch assembly to the 1-1/2-inch diameter air duct.

d. Connect the pilot lamp lead and the power lead to the microswitch terminals or wire leads.

NOTE

Plug all other openings in the air vane switch assembly.

e. Turn on vibrator.

f. Turn on the blower and manually elevate the voltage slowly. Observe the manometer reading at which the pilot lamp is turned on.

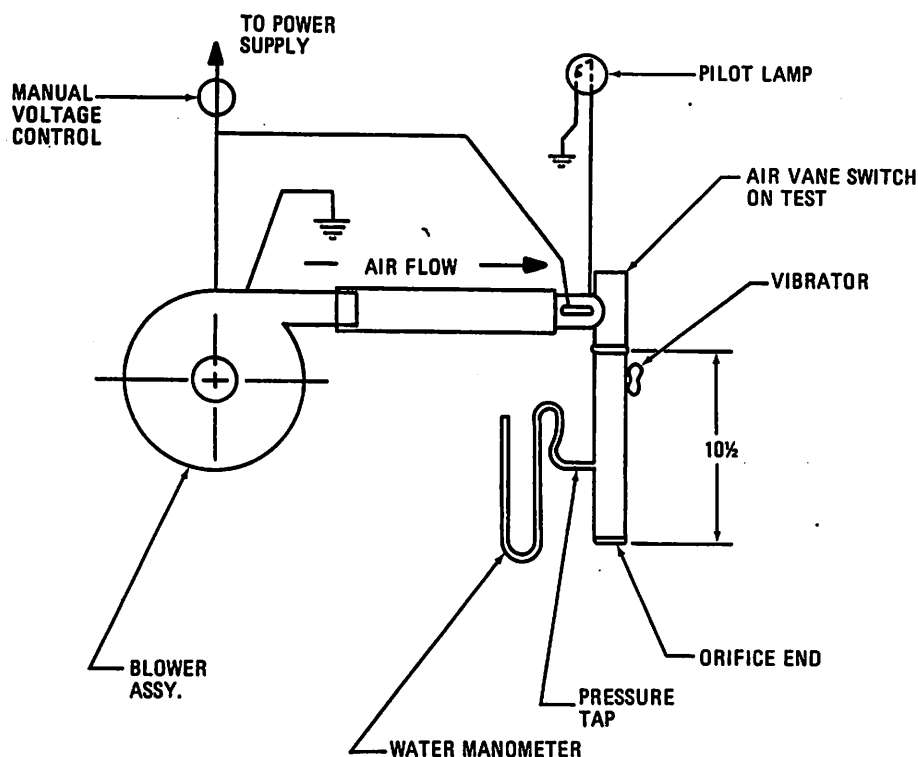


Figure 7-4. Airflow Switch Test Setup

g. Slowly reduce the voltage and observe the manometer reading at which the pilot lamp is turned off. Limitations are listed below.

Pilot lamp on	$1.8 \pm .3$ in. H ₂ O
Pilot lamp off	$.6 \pm .2$ in. H ₂ O

h. Repeat steps f and g. Switch should repeat within specified limits.

i. If switch does not operate within limits, readjust the cam or microswitch to obtain operation within the limits specified.

j. Inability to adjust and obtain operation within the required limits is cause for rejection.

k. Turn off all power and remove unit from the test fixture.

7-8. OVERHEAT SWITCH TEST

Connect wires to terminals 1 and 3 of the overheat switch, and provide a test light to indicate switch operation. Suspend the switch in an oven with a thermometer and very gradually raise temperature until the switch opens. Note oven temperature at this time. Switch opening temperature must be within the limits of ~~280° to 340°F~~. Replace the switch if not within limits. It is not adjustable.

7-9. HEATER TEST AND ADJUSTMENT

a. Set up the heater assembly for test as follows:

(1) Mount the heater in a suitable test stand.

(2) Provide a source of combustion air. Use the fuel pump and blower assembly provided with the heater. Interconnect the blower and heater with a

1-1/4-inch flexible tube measuring 36 ± 2 inches long, including adapters. Avoid sharp bends.

(3) Connect a source of 100-octane aviation gasoline under pressure of 22 psig. The fuel pump of the fuel pump and blower assembly provided with the heater is a suitable fuel pump.

(4) Connect a source of ripple-free 27 vdc, capable of supplying a 15-ampere load. Refer to the wiring diagram in figure 1-3 for the required connections.

(5) Remove the drain plug and replace it with an AN816-6S fitting.

b. Test the heater as follows:

(1) Apply 27 volts to the heater. The combustion air blower, fuel pump, ignition unit, and ventilating air blower must start. Heater must ignite smoothly within 5 seconds.

(2) Allow the heater to run, noting the vent air outlet temperature at which the duct limit switch causes the heater to cycle. It should be between 195° and 210°F. If necessary adjust the duct limit switch by turning the adjusting screw. Lock the nut on the adjusting screw to secure the adjustment.

(3) Apply 24 vdc to heater and check to assure that heater starts smoothly within 5 seconds of application of power. Models 8240-E, 8259-HL1, and 8259-HL2 are sealed and there shall be no evidence of ventilating air leakage at any seam or component attachment while the heater is operating. If leakage is evident, the heater will have to be resealed per paragraph 6-6d.

(4) Turn heater on and off 3 or 4 times; heater must re-ignite instantly and smoothly.

Changes Dated 1 July 1992

* $227^\circ \pm 22^\circ\text{F}$ for Model 8259L and $300^\circ \pm 29^\circ\text{F}$ for Models 8240E, 8259HL1 and 8259HL2.

SECTION 8 PARTS LIST

MODELS 8240-E, 8259-HL1, 8259-HL2, AND 8259-L AIRCRAFT HEATERS

8-1. GENERAL

This section lists and identifies service parts for heaters covered in this manual. Commercial hardware parts are identified by one and two digit index numbers and parts peculiar to the heaters are identified by their part numbers. These numbers are shown both on the exploded views and in numerical sequence in the parts list associated with the illustration. Some commercial hardware listed are preassembled "Sems" screws or "Keps" nuts. The same type of screw and nut may be used with loose external tooth lockwashers when the preassembled unit is not available. Commercial parts are not available from Stewart-Warner and should be purchased locally.

8-2. USABLE ON CODE

A Usable on Code column is provided to identify model usage of the different components installed in the heaters. Assigned codes are given below. If the identical component is used on all models, the word ALL is inserted in the Usable on Code column.

CODE	MODEL
A	8240-E
B	8259-HL1
C	8259-HL2
D	8259-L

PARTS LIST FOR FIGURE 8-1

MODELS 8240-E, 8259-HL1, 8259-HL2, AND 8259-L AIRCRAFT HEATERS

PART NO.	DESCRIPTION	QTY PER UNIT	USABLE ON CODE
1	NUT, 3/8-24 Light Hexagon Jam	1	ALL
2	WASHER, Lock, No. 6 type A int tooth	2	D
3	SCREW, Mach, No. 10-32 x 1/2 fil hd "Sems"	3	ALL
4	SCREW, Mach, No. 8-32 x 5/8 pan hd	2	D
5	SCREW, Mach, No. 8-32 x 5/16 sltd pan hd "Sems"	2	ALL
6	NUT, No. 10-32 "Keps"	2	ALL
7	SCREW, Mach, No. 6-32 x 5/16 sltd pan hd "Sems"	12	D
8	NUT, No. 6-32 "Keps"	1	ALL
9	NUT, No. 8-32 "Keps"	8	ALL
10	SCREW, No. 6-32 x 1/4 ph rec pan hd	12	ABC
11	SCREW, Mach, No. 8-32 x 5/8 ph rec fil hd	2	ABC
12	SCREW, No. 6-32 x 1/4 sltd pan hd "Sems"	4	ALL
13	SCREW, Mach, No. 8-32 x 1/4 sltd hex wshr hd	20	ALL
14	SCREW, Mach, No. 8-32 x 3/8 sltd hex wshr hd	5	A
15	SCREW, Mach, No. 8-32 x 3/8 sltd hex wshr hd	3	BCD
16	SCREW, Mach, No. 5-40 x 1/4 sltd pan hd	2	ALL
17	WASHER, Lock, No. 5 int tooth	2	ALL
18	WASHER, Lock, No. 6 ext tooth	14	ABC
477727	WASHER	1	ALL
484140	STRIP, Terminal	1	D
700748	VALVE ASSY, Solenoid	1	ALL
703546	CLAMP, Cover	4	ALL
703547	BOLT, Hook	4	ALL
704883	PACKING, O-ring	1	ALL
G-704910	BLOWER ASSY, Ventilating air (See Fig. 8-2)	1	D
G-704944	STRIP, Marker		ABC
704945	STRIP, Terminal		ABC
711205	NUT, No. 6-32 type J speed	4	ALL
714722	PAD	2	ALL
G-714750	FUEL PUMP AND BLOWER ASSY (See Fig. 8-4)	1	D
714786	SHROUD, Exhaust	1	D

722092 Housing only

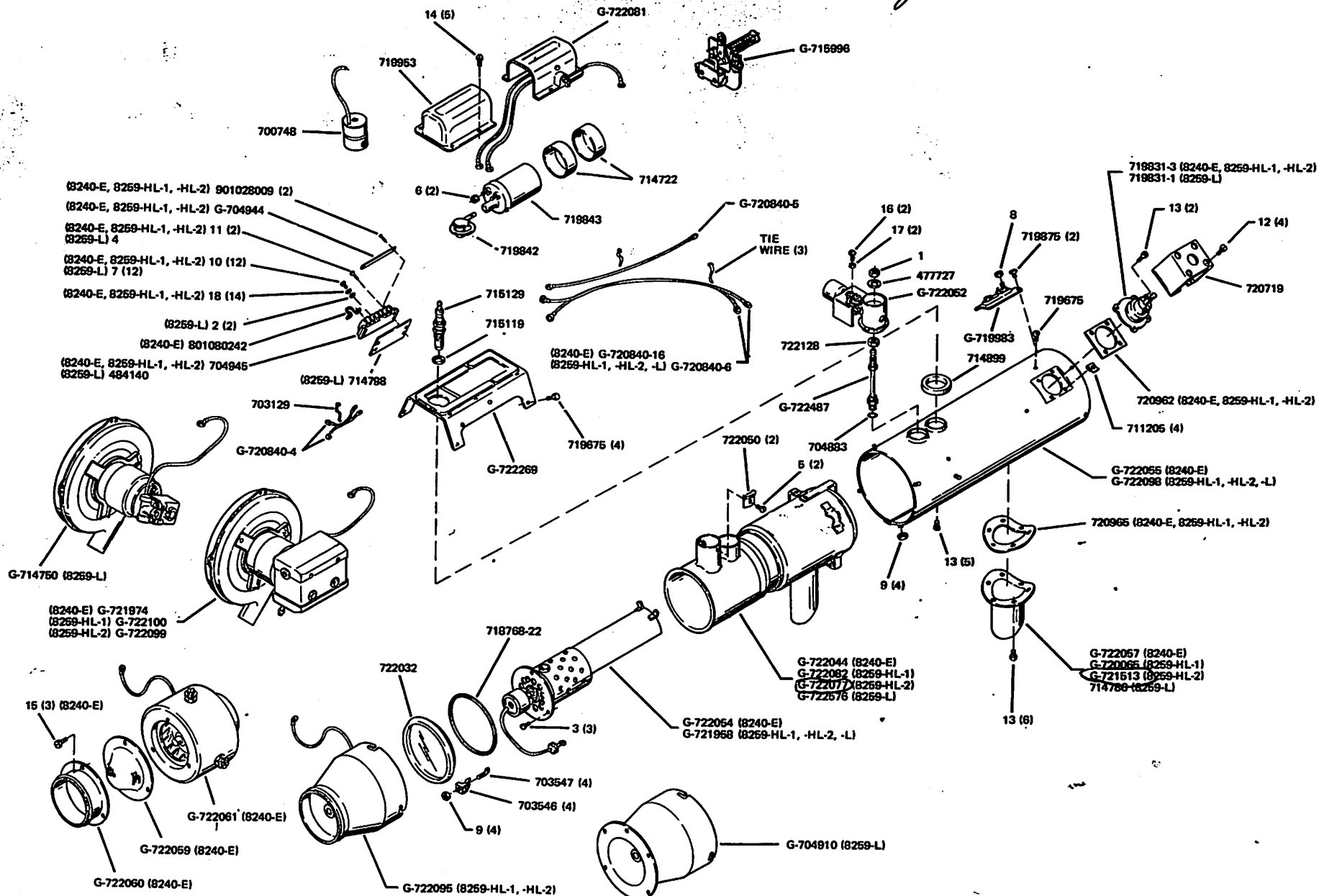


Figure 8-1. Models 8240-E, 8259-HL1, 8259-HL2, and 8259-L Aircraft Heaters, Exploded View

PART NO.	DESCRIPTION	QTY PER UNIT	USABLE ON CODE
714798	STRIP, Double marking	1	D
714899	SHIELDING	1	ALL
715119	GASKET, Spark plug	1	ALL
715129	SPARK PLUG	1	ALL
715998	THERMOSTAT	1	ALL
718788-22	GASKET, O-ring	1	ALL
719831-1	SWITCH, Overheat	1	ALL
719831-3	SWITCH, Overheat	1	D
719842	CABLE, Ignition	1	ABC
719843	COIL	1	ALL
719953	HOUSING, Spark plug cable	1	ALL
G-719988	SWITCH ASSY, Duct limit	1	ALL
G-720065	SHROUD, Exhaust	1	ALL
720719	GUARD, Overheat switch	1	B
G-720840-4	WIRE ASSY	1	ALL
G-720840-5	WIRE ASSY	2	ALL
G-720840-6	WIRE ASSY	1	ALL
G-720840-16	WIRE ASSY	2	BCD
720962	GASKET, Overheat switch	2	A
720965	GASKET, Exhaust shroud	1	ABC
G-721513	SHROUD, Exhaust	1	ABC
G-721958	BURNER ASSY (See Fig. 8-5)	1	C
G-721974	FUEL PUMP AND BLOWER ASSY (See Fig. 8-4)	1	BCD
722032	COVER, Burner	1	A
G-722044	EXCHANGER ASSY, Heat	1	ALL
722050	CLAMP	1	A
G-722052	SWITCH ASSY, Airflow	2	ALL
G-722054	BURNER ASSY (See Fig. 8-5)	1	ALL
G-722055	HOUSING ASSY, Heater	1	A
G-722057	SHROUD, Exhaust	1	A
722059	SCREEN, Vent blower	1	A
G-722060	ADAPTER	1	A
G-722061	BLOWER ASSY, Ventilating air (See Fig. 8-3)	1	A
G-722077-586	EXCHANGER ASSY, Heat	1	A
G-722081	IGNITION UNIT	1	C
G-722082	EXCHANGER ASSY, Heat	1	ALL
G-722095	BLOWER ASSY, Ventilating air (See Fig. 8-2)	1	B
G-722098	HOUSING ASSY, Heater	1	BC
G-722099	FUEL PUMP AND BLOWER ASSY (See Fig. 8-4)	1	BCD
G-722100	FUEL PUMP AND BLOWER ASSY (See Fig. 8-4)	1	C
722128	NUT, 3/8-24	1	B
G-722269	SHELF ASSY	1	ALL
G-722487	TUBE ASSY, Fuel	1	ALL
G-722576	EXCHANGER ASSY, Heat	1	ALL
801080242	JUMPER	1	D
901028009	PIN, Drive	1	A
		2	ABC

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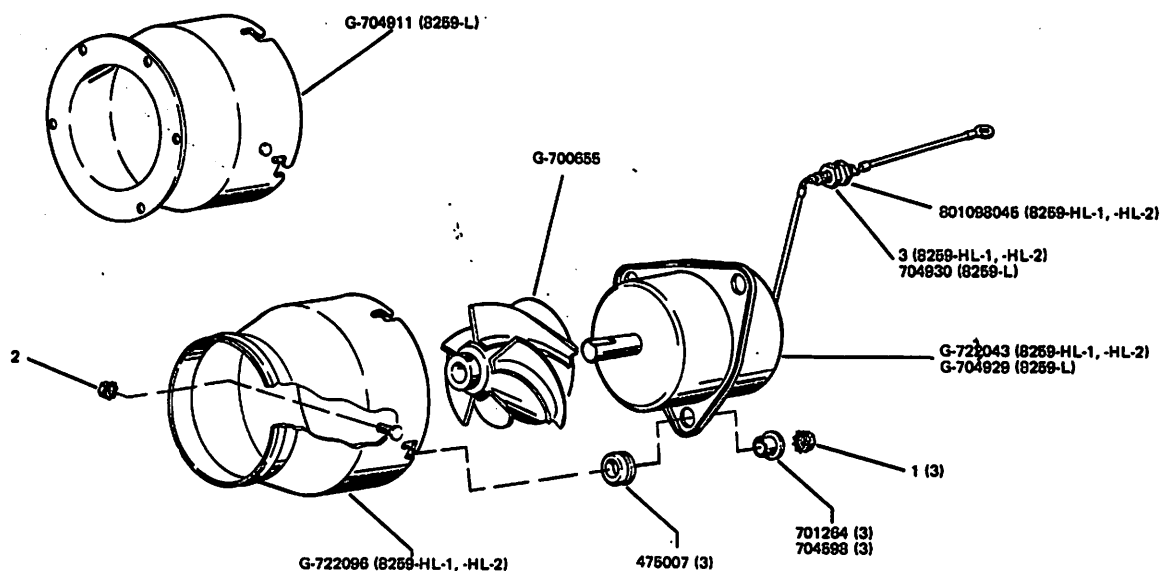


FIGURE 8-2

G-704910 BLOWER ASSY, VENTILATING AIR, USED ON MODEL 8259-L
G-722095 BLOWER ASSY, VENTILATING AIR, USED ON MODEL 8259-HL1 AND 8259-HL2

PART NO.	DESCRIPTION	QTY PER UNIT
1	NUT, No. 10-32 "Keps"	3
2	NUT, No. 8-32 "Keps"	1
3	WASHER, Plain, ID .250, OD .562, max thkns .065, min thkns .036	1
475007	* GROMMET	3
G-700655	WHEEL, Blower	1
701264	* WASHER	3
704598	* SPACER	3
G-704911	HOUSING ASSY, Blower (used on 8259-L)	1
G-704929	† MOTOR ASSY (with lead and terminal) (used on 8259-L)	1
704930	BUSHING, Strain relief (used on 8259-L)	1
G-704981	KIT, Motor mounting	1
G-720466	KIT, Motor overhaul	1
G-722043	MOTOR ASSY (with terminal) (used on 8259-HL1 and 8259-HL2)	1
G-722096	HOUSING ASSY, Blower (used on 8259-HL1 and 8259-HL2)	1
801098045	TERMINAL, Insulated (used on 8259-HL1 and 8259-HL2)	1
* Available only in kit G-704981		
† Includes kit G-704981		

PARTS LIST FOR FIGURE 8-3

G-722061 BLOWER ASSY, VENTILATING AIR, USED ON MODEL 8240-E

PART NO.	DESCRIPTION	QTY PER UNIT
1	WASHER, Lock, No. 8 int-ext tooth	2
2	NUT, No. 8-32 "Keps"	1
3	SCREW, Mach, No. 8-32 x 3/8 sltd pan hd "Sems"	2
4	* SCREW, Mach, No. 10-32 x 7/8 sltd hex hd	3
5	WASHER, Plain, ID 17/64, OD 5/8	1
6	SCREW, Mach, 1/4-28 x 1 hex hd	1
484869	* WASHER	3
G-486216	LEAD ASSY, Ground	1
488993	GROMMET	1
700146	* MOUNT, Shock	3
700383	* WASHER	3

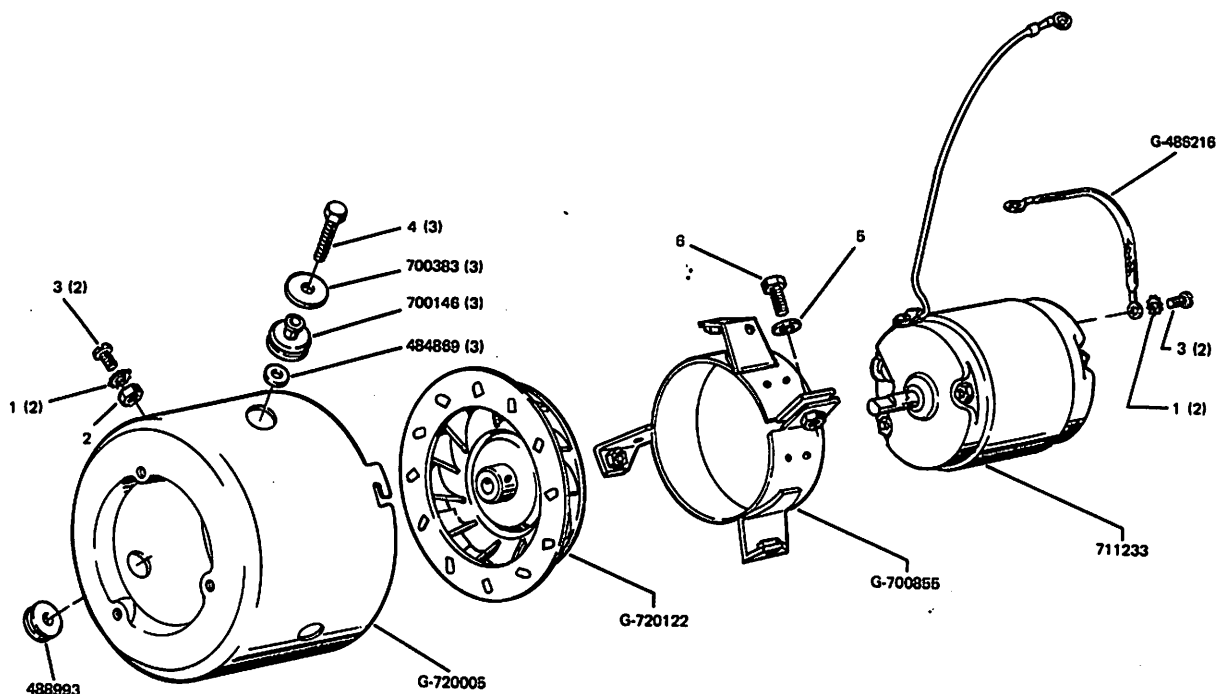


FIGURE 8-3

G-722061 BLOWER ASSY, VENTILATING AIR, USED ON MODEL 8240-E

PART NO.	DESCRIPTION	QTY PER UNIT
G-700855	BRACKET, Motor mounting	1
G-704982	KIT, Motor mounting	1
711233	† MOTOR, Blower	1
G-720005	HOUSING, Blower	1
G-720122	WHEEL, Blower	1
G-720466	KIT, Motor overhaul	1

* Available only in kit G-704982
† Includes kit G-704982

PARTS LIST FOR FIGURE 8-4

G-714750 FUEL PUMP AND BLOWER ASSY USED ON MODEL 8259-L
G-721973 FUEL PUMP, COVER, AND BLOWER ASSY USED ON MODEL 8240-E
G-722099 FUEL PUMP, COVER, AND BLOWER ASSY USED ON MODEL 8259-HL2
G-722100 FUEL PUMP, COVER, AND BLOWER ASSY USED ON MODEL 8259-HL1

PART NO.	DESCRIPTION	QTY PER UNIT
1	SCREW, No. 8 x 1/2 rd hd sheet metal, blunt pt	1
2	NUT, No. 10-32 hex (8259-L only)	3
3	WASHER, Lock, No. 8 int-ext tooth	1
4	WASHER, Lock, No. 10 int-ext tooth	3
5	WASHER, Lock, No. 10 int-ext tooth (8259-L only)	6
6	SCREW, Mach, No. 8-32 x 5/16 sltd pan hd "Sems"	8
7	NUT, No. 8-32 "Keps"	4
8	NUT, No. 10-32 "Keps"	3
9	SCREW, Mach, No. 6-32 x 5/16 sltd hex hd (not used on Model 8259-L)	4
477096	* WASHER	1 OR 2 AS REQ'D
484869	WASHER, Plain	2
488555	NUT, No. 8 type J speed	1
489031	GROMMET (not used on Model 8259-L)	2
711205	NUT, No. 6-32 type J speed (not used on Model 8259-L)	4
714709	MOTOR ASSY, Combustion air	1

Figure 8-4. Fuel Pump and Blower Assembly, Exploded View

PART NO.	DESCRIPTION	QTY PER UNIT
G-714769	PUMP ASSY, Fuel (used on Models 8259-HL and 8259-L)	1
G-714802	HOUSING ASSY, Blower front	1
G-714804	HOUSING ASSY, Blower rear	1
G-714996	ADAPTER ASSY, Inlet	1
715290	BRACKET, Motor mounting	1
720807	NUT, No. 10-32 reduced hex (not used on Model 8259-L)	2
G-720911	WHEEL ASSY, Blower	1
G-721526	PUMP ASSY, Fuel (used on Models 8240-E and 8259-HL2)	1
721978	SHROUD, Fuel pump (not used on Model 8259-L)	1
722058	PLUG (Not used on Model 8259-L)	2
722133	COVER, Fuel pump shroud (not used on Model 8259-L)	1
735100	* CONNECTOR	2
735101	* COUPLING	1
735111	† GASKET	4
G-735405	KIT, Fuel pump coupling	
G-735735	VALVE AND PLATE ASSY	1
G-735736	KIT, Fuel pump valve and seat plate	
* Available only in kit G-735405		
† Available only in kit G-735736		

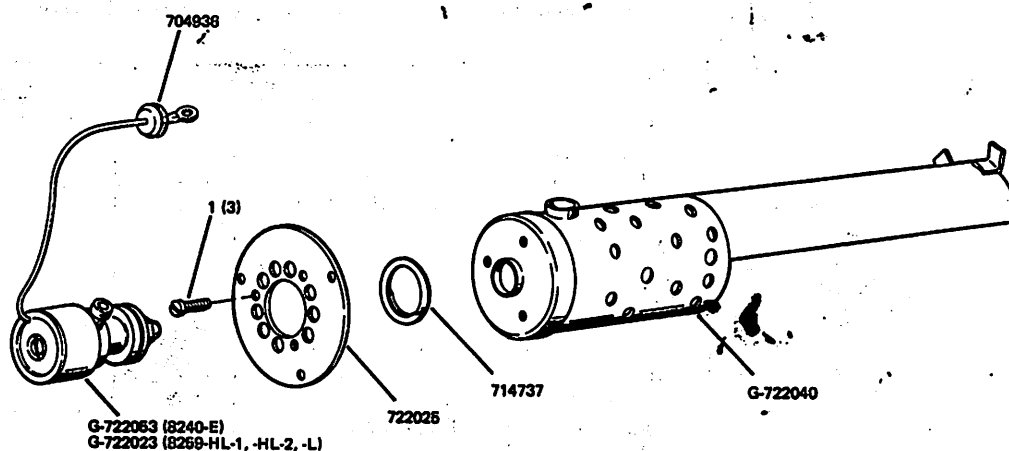


FIGURE 8-5

G-721958 BURNER ASSY USED ON MODEL 8259-HL1, 8259-HL2 and 8259-L
G-722054 BURNER ASSY USED ON MODEL 8240-E

PART NO.	DESCRIPTION	QTY PER UNIT
1	SCREW, Mach, No. 10-32 x 1/2 fil hd	3
704936	GROMMET	1
714737	RING, Retaining	1
G-722023	FUEL NOZZLE AND SOLENOID VALVE ASSY (used on 8259-HL1, 8259-HL2, and 8259-L)	1
722025	SUPPORT, Burner	1
G-722040	MIXER ASSY, Baffle	1
G-722053	FUEL NOZZLE AND SOLENOID VALVE ASSY (used on 8240-E)	1

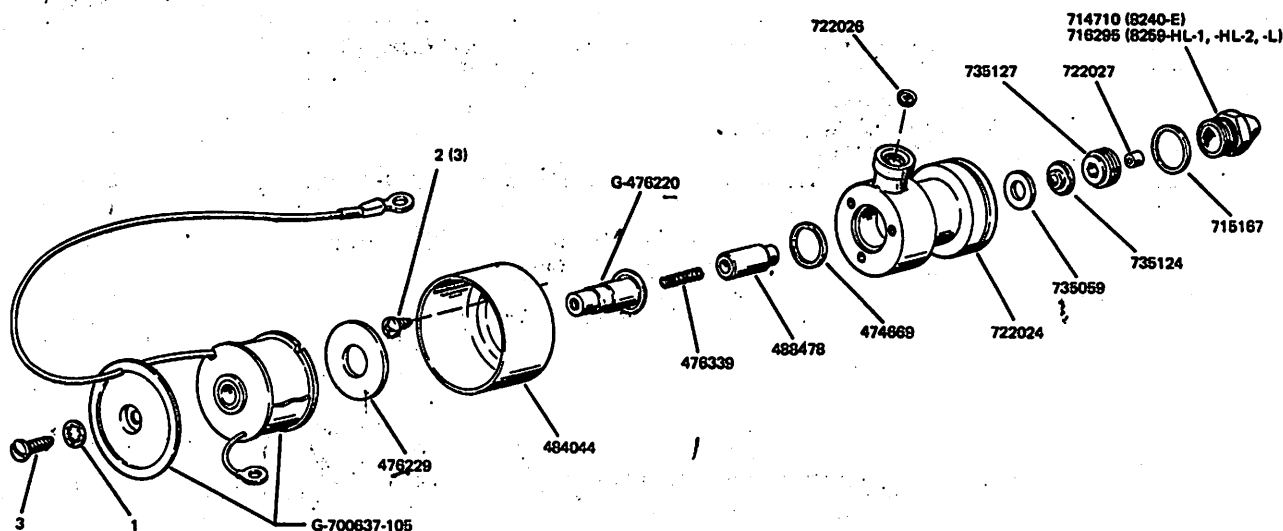


FIGURE 8-6

G-72203 FUEL NOZZLE AND SOLENOID VALVE ASSY
 USED ON 8259-HL1, 8259-HL2 AND 8259-L
 G-722053 FUEL NOZZLE AND SOLENOID VALVE ASSY USED ON MODEL 8240-E

PART NO.	DESCRIPTION	QTY PER UNIT
1	WASHER, Lock, No. 8 int tooth	1
2	SCREW, Mach, No. 6-32 x 1/4 ph rec pan hd	3
3	SCREW, Mach, No. 8-32 x 5/16 sltd pan hd "Sems"	1
474669	* GASKET	1
G-476220	* CORE AND SLEEVE ASSY	1
476229	* WASHER	1
476339	* SPRING, Valve	1
484044	CUP, Solenoid	1
488478	* PLUNGER, Solenoid	1
G-700637-105	COIL ASSY, Solenoid, 24 volt	1
G-704983	KIT, Fuel nozzle holder and solenoid overhaul	
714710	† NOZZLE, Fuel (used on 8240-E)	1
715167	* GASKET, Fuel nozzle	1
716295	† NOZZLE, Fuel (used on 8259-HL1, 8259-HL2 and 8259-L)	1
722024	HOLDER, Fuel nozzle	1
722026	* SCREEN	1
722027	* SPACER	1
735059	* GASKET	1
735124	* SEAT, Valve	1
735127	SCREW, Valve seat	1
	* Available only in kit G-704983	
	† Includes gasket 715167	