



MODEL B100ESKD

Spec. No. 3114G27

**OPERATING, MAINTENANCE and SERVICE
INSTRUCTIONS with PARTS LIST**



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The safety control circuit essentially consists of three parts: a light-sensitive cell (flame sensor), a trigger circuit, and a circuit breaker. The circuit breaker automatically trips if the flame fails, thereby causing the heater to shut down. (See figure 2.)

The flamesensing cell is used to sense the presence of light due to the flame inside the combustion chamber. It varies its electrical resistance in relation to light rays. When under the influence of light, the cell has very low resistance. The resistance is high when little or no light strikes the light-sensitive surface. The cell's function is to control the voltage to energize the trigger circuit.

The trigger circuit contains an SCR which acts as a voltage-operated switch. When the voltage reaches a certain level, the gate of the SCR is tripped causing the SCR to conduct and allow a current to flow through the heating coil of the circuit breaker. When the voltage drops, such as when the sensing cell senses light and decreases in resistance, the SCR will turn off and block the flow of current.

The circuit breaker is a thermally operated switch. Current flowing through the heating coil will cause it to heat. When a specific temperature of a bi-metal element is reached, the contacts of the breaker will open to interrupt the current flow to the motor and transformer. This action takes approximately 15 seconds at 70 degrees F. The breaker must be manually reset by pressing the red circuit breaker reset button. The flow of current through the heating coil is controlled by the action of the SCR. If ignition takes place before the breaker trips, the flow of current through the coil is virtually stopped, the heating action stops and the contacts remain closed, thus allowing current to continue to flow to the motor and transformer.

The trigger circuit is mounted on top of the circuit breaker and may be replaced.

A thermostat accessory (Model No. HA-1200) may be incorporated into the electrical circuit. The accessory can be set to any desired temperature between 30 degrees F. and 90 degrees F. When the temperature of the surrounding air reaches the present temperature, the thermostat contacts open to shut down the heater. When the air cools, the contacts close and the heater recycles. To shut down the heater when using the thermostat accessory, place the dial in the "NO HEAT" position.

C. POWER REQUIREMENTS

The heaters are manufactured for use on 230 volt, 50 cycle power.

D. SPECIFICATIONS

Output Rating (BTU per hour)	90,000
Amperage (During normal run)	2.0
Air Pump Pressure (PSI)	4
Weight (Approx. lbs.) Shipping	79
Dry (net)	62
Fuel Tank Capacity, U.S. Gallons	9.0
Air Output-CFM	345
Fuel Consumption, Approx. U.S. Gal. per hour	0.66
Electrical Requirements Voltage	230
Cycles	50
Motor RPM	2850
Fuel	Kerosene or No. 1 Fuel Oil only
Duct	No Duct Recommended

E. ACCESSORIES

A thermostat control kit, Part No. HA1200 is available as an accessory for use with these heaters. The thermostat can be set for any temperature between 30° and 90° F, and will cycle the heater on and off to maintain the surrounding air at the desired temperature. At its NO HEAT position, the thermostat shuts the heater off.

F. PREPARING FOR OPERATION

This heater is shipped with the wheel support frame, handles, axle and wheels removed. To assemble these parts proceed as follows:

1. Remove all protective material which may have been applied to the heater for shipment.
2. Remove the plastic bag, which contains the wheels, axle, and hardware, and the handles. Remove the carton liner and lift out the heater.
3. Check the heater for possible shipping damage. If any damage is found, IMMEDIATELY notify the agent of the carrier which delivered the heater to you, and make out a claim for the damage.
4. Slide the axle through the wheel support frame. Install a flat washer, wheel and a cap nut onto each end of the axle. Set the heater body onto the wheel support frame so that the wheels will be located as shown.

Attach each handle onto the fuel tank flange and secure with the screws and nuts provided. Do not tighten nuts until all screws have been installed. Draw up nuts until snug, then tighten each in turn.

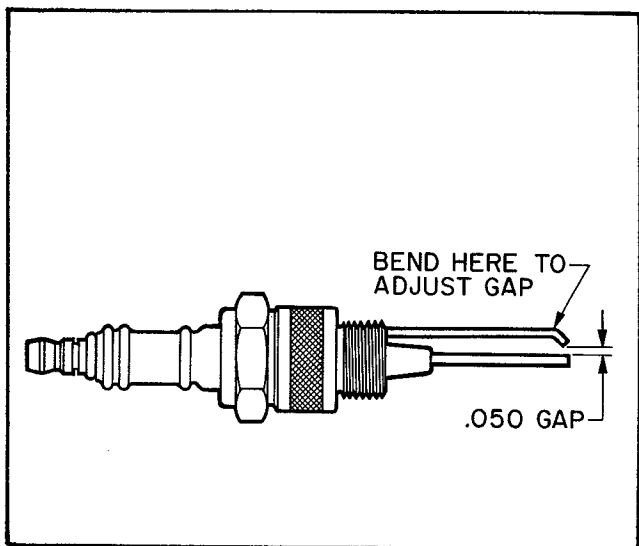


Figure 6. Spark Plug Gap Setting

3. Adjust the gap by bending the outside electrode where shown in figure 6. If you do not install the plug immediately, protect it from damage until it is re-installed.

4. Install the plug into the burner head, if no further burner head maintenance is required. Make sure the spark plug is seated firmly in the burner head.

G. CLEANING THE FUEL FILTER

The fuel filter is in the tube which leads up from the fuel tank to the burner. Clean it twice each season, or if the Trouble Shooting Chart indicates.

1. To remove the fuel filter, loosen the hex nut attaching the filter tube to the burner head.

2. Slide the tube down into the tank so that the tube will clear the male connector in the nozzle adapter. Push the tube to one side. Withdraw the filter element and tube from the fuel tank. Withdraw the filter element out of the tube. Rinse it several times in clean fuel.

3. Blow the element dry, with a gentle stream of compressed air, through the large end. Use care to prevent damaging the filter element with air pressure.

4. If the filter element is damaged or lost, it must be replaced with a new element. NEVER operate the heater without the element in place. Failure to use the filter element may result in clogging and permanent damage to the nozzle.

5. Insert the fuel filter element into the tube making sure that it seats properly in the tube. Install the

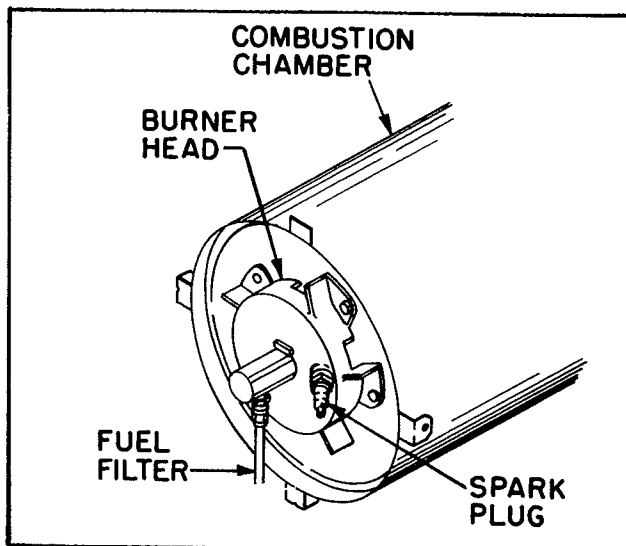


Figure 7. Burner Head, Spark Plug, and Fuel Filter

flared nut onto the tube. Insert the filter element and tube into the fuel tank. Position the filter tube carefully to seat on the male connector and thread the flare nut to secure the filter and tube.

NOTE: If the burner head is to be removed for maintenance, do not reinstall the fuel filter until ready to reinstall the burner.

H. BURNER REMOVAL, CLEANING AND REPLACEMENT

1. Be sure the heater cord is unplugged, and remove the lead wire from the spark plug. Remove fuel filter from burner head. Disconnect the air line from the fitting in the right side of the nozzle adapter.

2. Remove the screws that fasten the burner head to the rear of the combustion chamber and remove the burner head.

3. Remove the nozzle carefully, using a socket wrench. Hold the nozzle adapter with another wrench while removing the nozzle.

CAUTION

Do not attempt to open the nozzle passage with a steel drill, a wire or any other tool, as you will damage it beyond repair. Protect the nozzle face from damage while the burner is out of the heater. This is important!

4. Soak the remaining parts of the burner head assembly for one hour in non-flammable liquid cleaning agent. (DO NOT use kerosene or fuel oil). Blow dry through the face (OUTLET) end ONLY. See Figure 8.

TROUBLE SHOOTING CHART (Continued)

PROBLEM	POSSIBLE CAUSE	REMEDY
7. Nuisance trip-outs.	1. Defective control.	1. Jumper the photocell wires and start heater. If the circuit breaker trips out, then the control is defective.
	2. Open or damaged photocell.	2. Check photocell with Ohmmeter. Resistance when exposed to light should be less than 5,000 ohms. Resistance when in total darkness should be greater than 1,400,000 ohms.
	3. Miswired circuit.	3. Refer to wiring diagram and repair wiring.
8. Heater continues to run even though flame is not established.	1. Defective control.	1. Disconnect the photocell wires and start heater. The circuit breaker should trip out in approx. 15 sec. If not, replace the control.
	2. Shorted or damaged photocell.	2. Check photocell with Ohmmeter. Resistance when exposed to light should be less than 5,000 ohms. Resistance when in total darkness should be greater than 1,400,000 ohms.
	3. Miswired circuit.	3. Refer to wiring diagram and repair wiring.

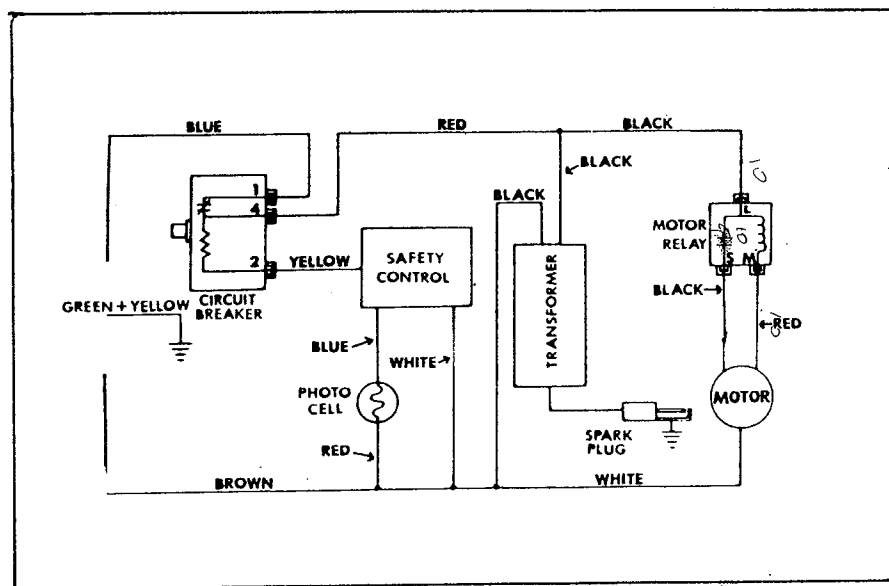


Figure 9. Wiring Diagram

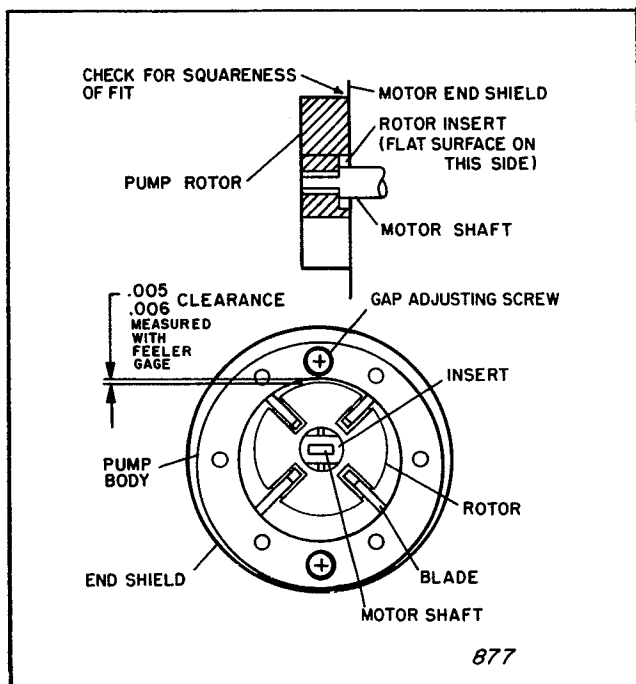


Figure 11. Checking Clearance of Air Pump Rotor

loss of air pressure. If the blades are worn, or are sticking in the rotor slots, replace them. (It is not necessary to remove the rotor or the pump body to replace the carbon blades).

- b. Install the carbon blades into the slots.
3. Replacing the Rotor.

Use a new rotor only if deep grooves or uneven wear appear on the surfaces. Check the insert for wear, and replace it if worn or loose.

To remove the rotor, first remove the pump body.

4. Reassembly of Air Pump.

a. Install the insert in the pump rotor as shown in Figure 11, then assemble rotor on the motor shaft. When installing the rotor, take care to keep it perpendicular to the motor shaft. Attach the pump body to the motor with the two recessed screws which were removed to take it off.

b. Adjust the pump body to provide 0.005 to 0.006 inch clearance at the point shown in Figure 11. Measure the clearance with a feeler gage. Spin the motor by hand to be sure the rotor does not rub on the pump body. The proper clearance must be maintained. Be sure the recessed screws are tight after adjusting.

c. Insert carbon blades as described above.

d. Install the end cover, using the six screws which were removed. Reconnect the air line.

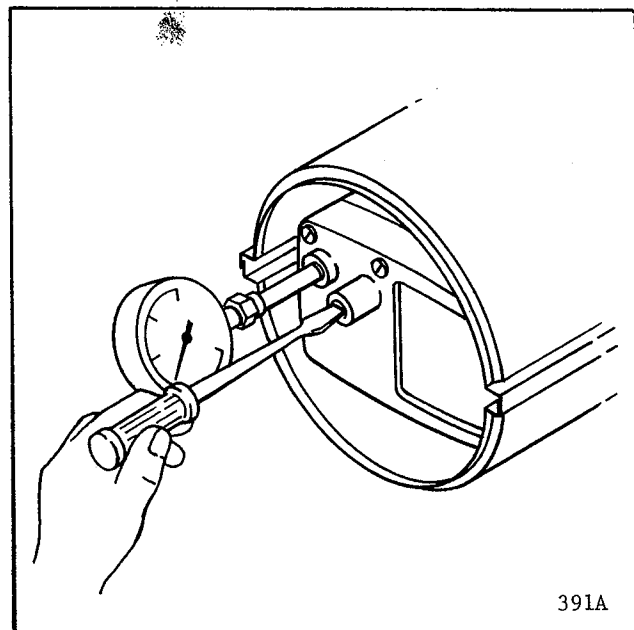


Figure 12. Checking and Adjustment of Air Pump Pressure

L. ADJUSTMENT OF PUMP PRESSURE

1. Remove the plug from the air filter housing, and install the pressure gage (listed in paragraph B of this Section) into the hole. See figure 12.

2. Remove the upper shell and wire nuts at the photocell connections. Install a jumper lead across the photocell to bypass it. Tape these connections to prevent accidentally grounding against the shell. Reinstall the shell, then start up the heater.

3. Pump pressure must be 4 psi. If the pressure is not within this range, adjust the pressure relief valve.

4. To adjust pump pressure, screw the valve stem in to raise the pressure; out to lower it.

5. Remove shell and disconnect jumper wire from photocell connections. Reinstall wire nuts to electrical leads (see figure 9). Install upper shell, then remove the gage and replace the plug.

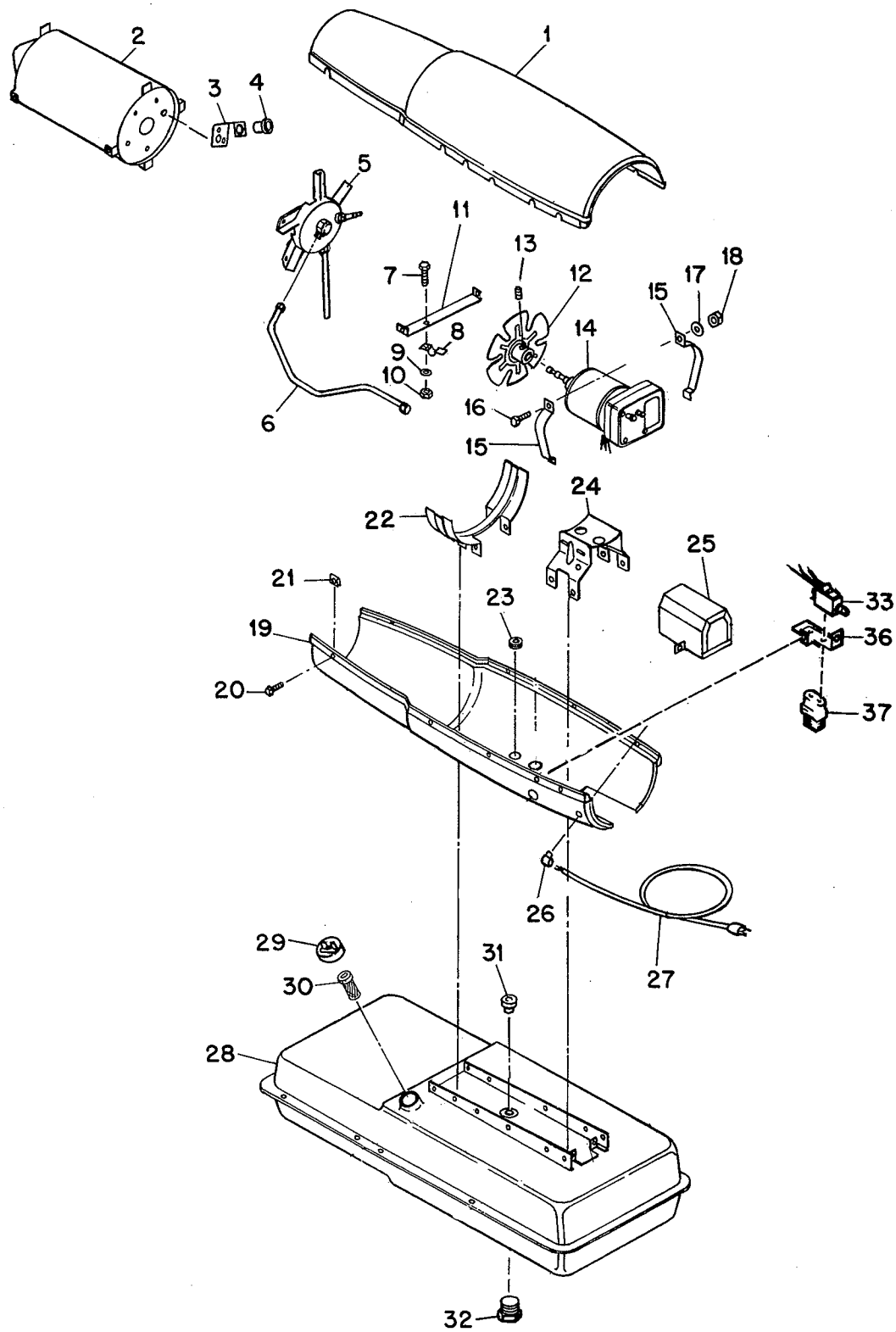
M. REASSEMBLY OF HEATER

1. Put the heater back together in the reverse order of disassembly.

2. Check all wiring to be sure it agrees with the wiring diagram. Be sure all electrical connections are tight.

3. Tighten the connections at both ends of the air line, and tighten the connection where the fuel filter is assembled to the burner head.

4. Make sure the electrode lead is snapped onto the spark plug and the transformer output terminal.



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Figure 13. Heater Exploded View

HEATER GENERAL ASSEMBLY, EXPLODED VIEW

Fig. 13

Index No.	Part Number	Part Name	Qty.
1	M13134-3A	Shell, Upper	1
2	M16781-4	Chamber, Combustion	1
	M11084-27*	Screw (Combustion Chamber attaching front)	2
	M11084-29*	Screw (Combustion Chamber attaching rear)	2
3	M16660	Bracket, Photocell	1
	M10908-1*	Screw (Photocell Bracket to Combustion Chamber rear head)	2
4	M16656-1	Cell and Bushing Assy.	1
5	M23150-2	Burner Head Assembly (See Figure 14)	1
	M11084-27*	Screw (Burner Head to Combustion Chamber)	3
6	M16879	Air Line	1
7	M12461-27	Screw, Slotted hex hd., No. 10-32 x 1/2 in.	1
8	M24717	Clamp, Tube	1
9	WLM-3	Lockwasher, No. 10	1
10	NPF-3C	Nut, Plain No. 10-32	1
11	M15807	Strap, Retainer	1
	M11084-27*	Screw (Retainer Strap to Lower Shell)	2
12	M23148	Fan	1
13	SF4-2-1/2K	Setscrew, Soc. Hd.; cup pt., 1/4-20 (Fan to Motor Shaft)	2
14	M23149-2	Motor Package Assembly (See Figure 16)	1
15	M16661	Clamp, Motor	4
16	HC4-10C	Screw (Motor Clamps)	2
17	WLM-4*	Lockwasher, 1/4 in. (Motor Clamps)	2
18	NPC-4C*	Nut, Hex, 1/4-20 (Motor Clamps)	2
19	M16777A	Shell, Lower	1
20	M11084-27*	Screw (Upper Shell to Lower Shell)	6
21	M11271-6*	Nut, Tinnerman (Upper Shell to Lower Shell)	6

*Standard Hardware - Purchase Locally.

Fig. 13

Index No.	Part Number	Part Name	Qty.
22	M12330	Bracket, Shell Support	1
	M11084-27*	Screw (Support Bracket to Lower Shell and Fuel Tank)	4
	M11084-29*	Screw (Lower Shell to Support Bracket)	2
23	1000576	Grommet (Ignition cable thru Lower shell)	1
24	M25059-2	Bracket, Motor Support	1
	M11084-27*	Screw (Motor Support Bracket to Lower Shell and Fuel Tank)	6
25	M17921	Transformer, 5000 volt	1
	M11084-27	Screw (Transformer to Motor Support Bracket)	2
26	M11143-1	Bushing, Strain Relief (Service Cord to Lower Shell)	1
27	M15779-22	Cord Assembly, Extension	1
28	M27552-01A	Tank Assembly, Fuel	1
29	M23284	Cap, Fuel Tank	1
30	M18053	Screen, Filler neck	1
31	M10990-3	Bushing, Rubber (Fuel Filter into Fuel Tank)	1
32	M27417	Plug, Drain	1
33	M28898-04	Safety Control Assembly	1
34	M31349-01	Trigger Assembly	1
35	M25295	Circuit Breaker	1
36	M25296-1	Bracket, Starting Relay Mtg.	1
37	M12462-11	Relay, Starting	1
	RC2-2C*	Screw (Starting Relay to Mounting Bracket)	2
	M11084-26	Screw (Grounding)	1
	M11084-27	Screw (Relay Bracket to Shell)	1
	M9900-62	Wire Assembly, Black (To Starting Relay)	1
	M9900-80	Wire Assy. (To Breaker)	1
	M16615-1	Harness Assy.	1
	M13942-7	Connector (Cell and Bushing and Relay to Circuit Breaker)	1
	M13942-5	Connector (Relay Leads)	4
	M16615-1	Wire Assembly	1

Fig. 14

Index	Part		
No.	Number	Part Name	Qty.
14-	M23150-2	Burner Head Assembly	Ref
1	M16790-8	. Filter Tube	1
2	M13847	. Filter, Fuel	1
3	M13849	. Nut, Flared	1
4	M16741-18	. Ring, Retaining	1
	M23151-1	. Nozzle Adapter Assy	1
5	M16791	. . Connector, Male	1
6	M5976	. . Connector, Male	1
7	M8882	. . Sleeve, Nozzle Seal	1
8	M10659-1	. . Washer, Nozzle Seal	2
9	M10809-1	. . Spring, Nozzle Seal	1
10	M23103	. . Nozzle, Aspirating 0.66 GPH	1
11	M16535	. . Adapter, Nozzle	1
12	M10962-2	. Spark Plug	1
13	M16534	. Body, Burner Head	1

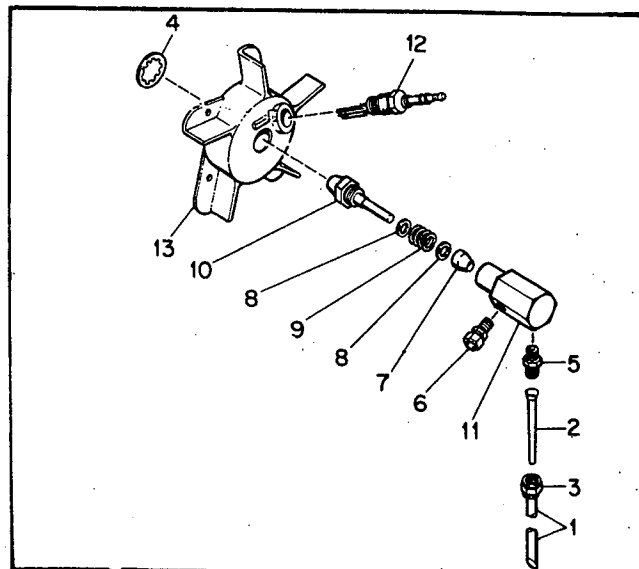


Figure 14. Burner Head Assembly

WHEELS AND HANDLES

Fig. 15

Index	Part		
No.	Number	Part Name	Qty.
1	M15131-3	Handle, Front	1
2	M15131-3	Handle, Rear	1
3	M12342-3	Wheel Support Frame	1
4	*M12345-31	Screw	2
5	*WP-3C	Washer	2
6	*M12345-34	Screw (Handles and Wheel support frame to fuel tank)	8
7	*NTC-3C	Nut, Hex 10-24, Torque Lock	10
8	M16801A	Axle	1
9	M19294	Wheel	2
10	WPC-8C	Washer, Flat	2
11	M28526	Nut, Cap	2

*Standard hardware. Purchase locally.

DECALS

Part			
Number	Part Name	Qty.	
M17137	Decal, Trade Name	1	
M31371	Decal, Wiring	1	
M22743	Decal, Warning	1	
M22898	Decal, Nameplate	1	
M22823	Decal, Flag	1	

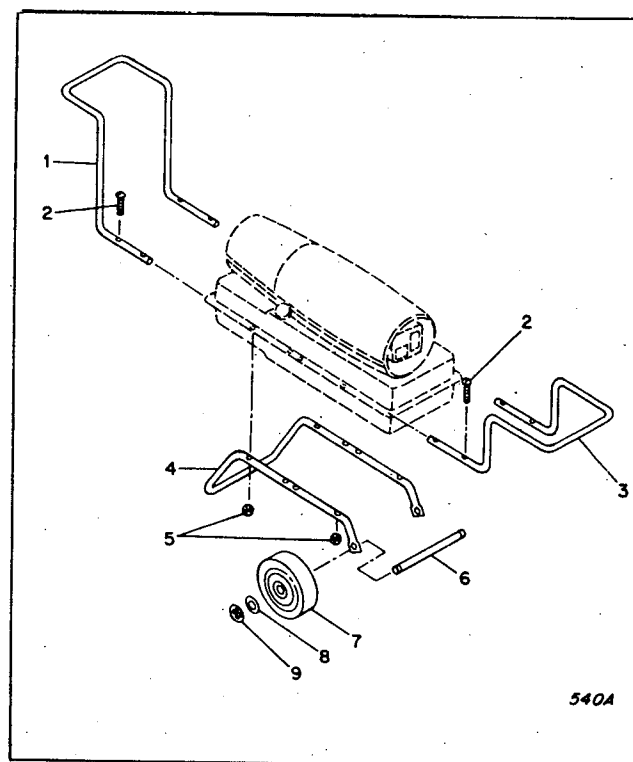


Figure 15. Handles and Wheels

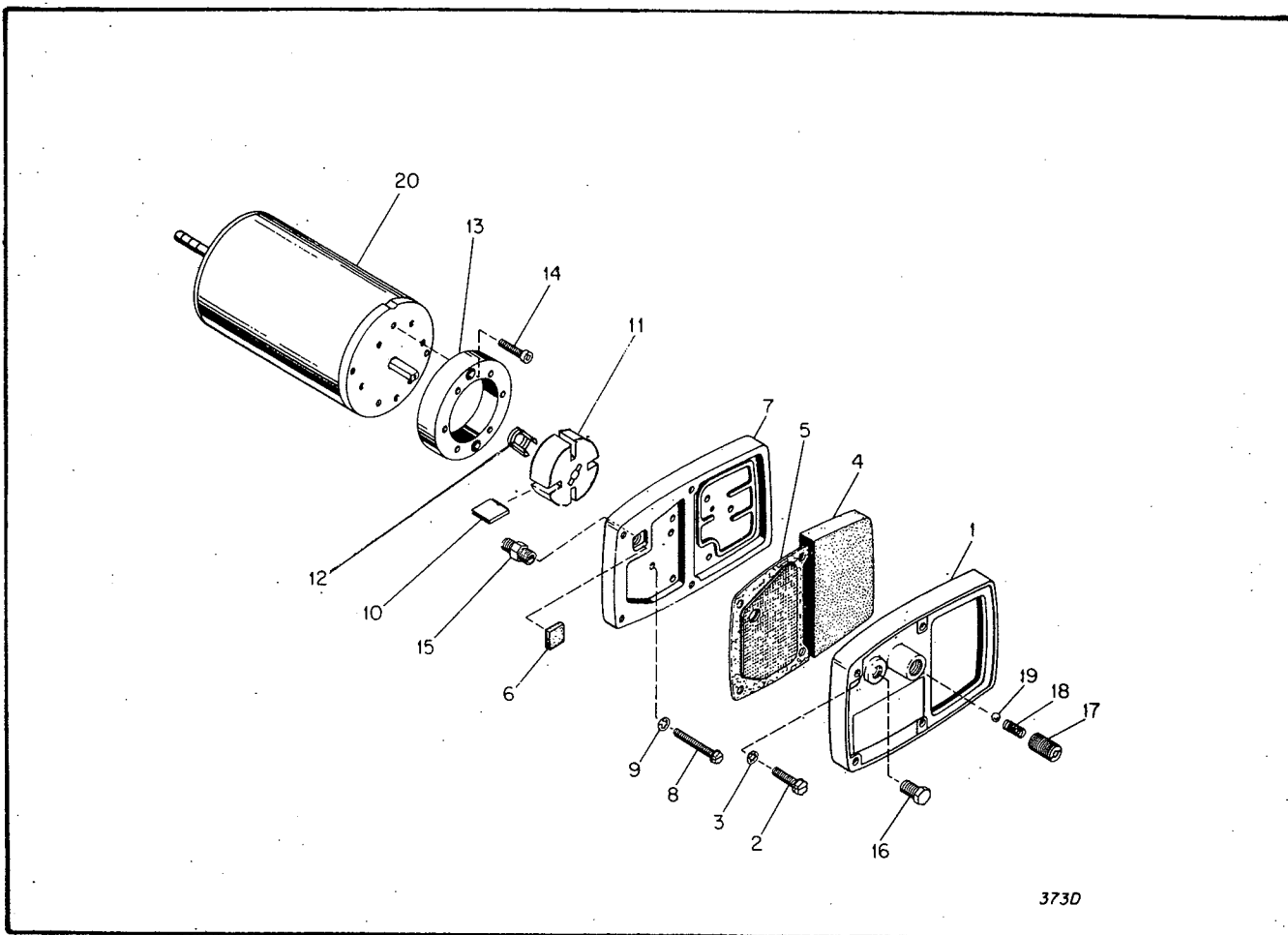


Figure 16. Motor Package Assembly

Fig. 16

Index No.	Part Number	Part Name	Qty.
-	M23149-2	Motor Package Assembly	Ref
1	M16545	End Cover, Filter	1
2	M12461-31*	Screw (Filter End Cover to Pump End cover)	4
3	WLI-3	Lockwasher, Internal No. 10	4
4	M12179	Intake Air Filter	1
5	M12244-1	Output Filter Assy	1
6	M11637	Filter, Lint	1
7	M12233	Front Cover, Pump (Port Plate)	1
8	M12461-32*	Screw (End Cover to Motor)	6
9	WLI-3	Lockwasher, Internal No. 10	6

Fig. 16

Index No.	Part Number	Part Name	Qty.
10	M8643	Blade	4
11	M22456-1	Rotor	1
12	M22009	Insert	1
13	M8645	Pump Body	1
14	FHPF3-4C	Screw (Pump Body to Motor)	2
15	M5976	Connector, Male	1
16	M22997	Plug, Hex hd.	1
17	M27694	Screw, Pressure Adjustment	1
18	M10993-1	Spring, Compression (Pressure Relief)	1
19	M8940	Ball, 1/4 in. dia.	1
20	M23107-2	Motor	1

* Standard hardware. Purchase locally.

ALWAYS SPECIFY MODEL AND SERIAL NUMBERS WHEN COMMUNICATING WITH THE FACTORY.

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This Warranty gives you specific legal rights and you may also have other rights which vary from state to state. For information write Koehring Atomaster Division, P.O. Box 719, Bowling Green, Kentucky 42101, Attention: Customer Service Manager.



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