



MODEL NO. F30

Spec. No. 5000G04

OPERATING, MAINTENANCE and SERVICE INSTRUCTIONS with PARTS LIST



Koehring
Atomaster Division
Bowling Green, Kentucky 42101

general

GENERAL

1. Purpose of Heater. This portable heater is designed to provide a source wherever you need temporary heat. It must be used with adequate ventilation and proper electrical power. DO NOT use the heater in sleeping quarters.

2. Purpose of Manual. This manual contains detailed instructions for operating, maintaining, trouble shooting, and servicing the heater. A service parts list is included at the end of the manual.

HOW THE HEATER WORKS

Operation of the heater involves three basic systems. (See Figure 1.)

1. Fuel System. An air pump on one end of the motor shaft forces air through the nozzle. The moving air lifts fuel from the tank by a siphon action and carries it into the combustion chamber in a fine spray.

2. Ignition System. An electric arc that fires constantly between a pair of spark plug electrodes

while the heater is in operation ignites the mixture of fuel and air.

3. Air System. A fan on the other end of the motor shaft supplies additional air to the heater. Part of this air enters around nozzle bracket through burner head opening and helps complete the combustion of the burning fuel-air mixture.

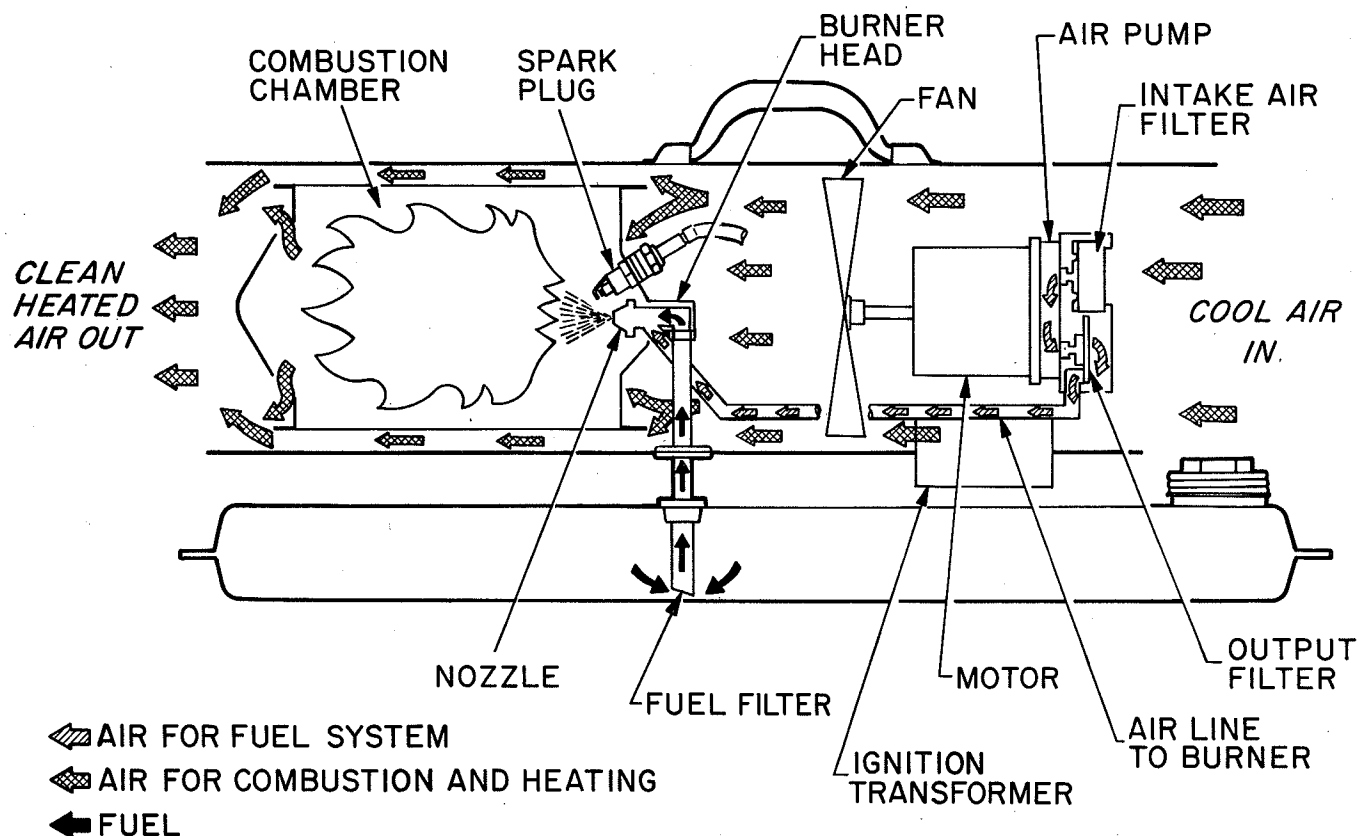
The rest of the air from the fan passes over and around the combustion chamber. At the front of the heater it mixes with the hot air coming from inside the combustion chamber. The air then flows out of the heater as a jet of clean, heated air.

CONTROL SYSTEM

1. Description.

The simplified solid state control installed on this heater is designed to shut down the heater in case it does not ignite at start-up or if the flame should go out during operation.

The control consists of a light sensitive cell, which



How Heater Works
Figure 1

has a low electrical resistance under the influence of light rays and a high resistance when light is absent; a trigger circuit, whose excitation voltage is controlled by the light sensitive cell; and a circuit breaker whose internal heating coil is controlled by the trigger circuit.

2. Operation.

When the heater is plugged into a power source and it fails to ignite, the high resistance of the Cadmium Sulphide cell (due to the lack of flame) will trip the trigger circuit. When this occurs, full line current will flow through the circuit breaker heating coil causing it to heat up. After about 15 seconds, the circuit breaker will trip and shut off the power to the heater.

After a trip-out the circuit breaker may be reset

after permitting the heating coil to cool three to five minutes.

If a flame is established in the heater combustion chamber, the resistance of the Cadmium Sulphide cell will drop. This in turn reduces the trigger circuit voltage below its trip level. Current flow through the circuit breaker coil is such that it does not heat up. The circuit breaker will remain closed and keep the heater operating.

ACCESSORIES

A thermostat control kit 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.

HEATER SPECIFICATIONS

Output rating (BTU per hour)	30,000	Fuel	Kerosene or No. 1 Fuel Oil
Air output, approx. (Cu. ft. per minute)	103	Fuel tank capacity U.S. gallons	2.25
Air pump pressure	3 psi	Fuel consumption, approx. (Gallons per hour)	0.23
Amperage (During normal run)	2.35	Voltage and cycles	As shown on heater instruction plate
Weight, approx. (pounds)		Motor RPM	1665
Shipping	32	Duct	Not recommended

INSTRUCTIONS TO OPERATOR

1. Use the Portable Heater in a well ventilated area only.

WARNINGS

- a. DO NOT USE THE HEATER IN SLEEPING QUARTERS.
 - b. USE ONLY KEROSENE OR NO. 1 FUEL OIL.
 - c. DO NOT USE GASOLINE IN THE HEATER.
 - d. PLUG HEATER INTO THE POWER SOURCE SPECIFIED ON THE NAME PLATE. (115-volt, 60-cycle, AC.)
 - e. CHECK FUEL LEVEL AND OPERATION OF HEATER AT REGULAR INTERVALS.
2. Place rear of heater within two feet of fresh air opening.
 3. Do not use No. 2 or No. 3 fuel oil as these will not ignite properly and will contaminate the heater.
 4. Make sure the heater is grounded during operation. When using a grounding adapter, make sure the receptacle is grounded. Use a three-conductor extension cord only.
 5. Keep the heater at least five feet from combustible materials.
 6. Do not use the heater in the presence of volatile or explosive liquids or around flammable vapors such as those given off by paint or gasoline.
 7. Always make sure the fuel is clean and water free. Never allow water to enter the fuel tank.
 8. When the heater is used in temperatures below -10°F , the fuel may congeal. To prevent such a condition, add a non-toxic anti-icer to the fuel. Mix in accordance with the instructions on the anti-icer container.
 9. Never stand directly in front of the hot air outlet while the heater is operating.
 10. Do not operate the heater with air intake of heater located less than 12 inches from a wall, or other obstruction.
 11. Do not add fuel while heater is operating.
 12. In areas where there is little or no leakage to the outside, use an exhaust fan to remove combustion gases and replenish fresh air.

unpacking and operation

UNPACKING

This portable heater is shipped in one carton with the handles removed.

To assemble, simply attach the handles to the fuel tank flange in position as shown on figure 9, page 13. A package of nuts and screws should be attached to the unit.

GENERAL INFORMATION

Adjustments are carefully checked prior to packaging the heater for shipment; however, rough handling in transit may necessitate some inspections. Reference to figure 1 and Repair Parts exploded drawings (and parts listings) may be helpful in acquiring a more thorough understanding of your Portable Heater.

OPERATION

CAUTION: Be sure to read "Safety Rules" and "Instructions to Operator" before using the heater.

1. The power source must be 115-volt, 60 cycle A. C.
2. When using an extension power cord, make sure it is a three-wire cord and of adequate size, as listed in the following table.

Extension Cord Size

<u>Length of Cord</u>	<u>Wire Size (AWG)</u>
100 ft.	No. 14

3. Starting the Heater.

All that is required to place the unit into operation is to fill the fuel tank with kerosene or #1 fuel oil and plug it into an electrical outlet.

The heater will start and run.

NOTE: If the heater should fail to ignite or the fire should go out during operation, the safety control will shut off all power to the heater and render the heater inoperable. The heater may be restarted after the cause of the shut down has been corrected. To restart the heater wait 3 to 5 minutes then press in on the safety control reset button.

4. Stopping the Heater.

Simply unplug the power cord.

5. Transporting.

Disconnect power and allow the heater to cool.

6. Storage.

To prepare the unit for storage, drain the fuel tank completely. Remove, and clean and replace air filter.

PREVENTIVE MAINTENANCE

Preventive maintenance consists of those operations which the owner or user can perform to keep his heater in good operating condition. If these procedures fail to return the heater to good operation condition, return the heater to your dealer for service.

Each time the heater is removed from storage, take off the upper shell assembly and examine the heater for accumulation of foreign matter. Check all electrical wiring and extension cord for damage and deterioration. Make sure all electrical and mechanical connections are tight.

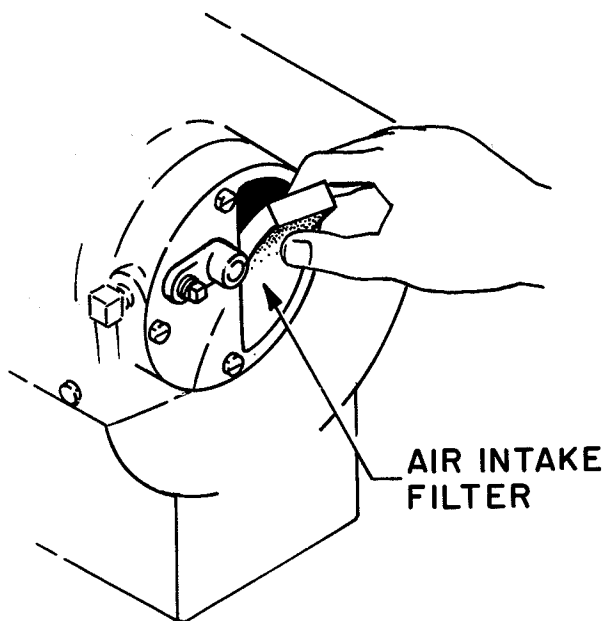
Rotate the fan by hand and check for binding in the motor or air pump. If damage to electrical or mechanical components is detected and instructions for correcting such defects are not included in this manual, take your heater to your nearest service dealer for repair.

WARNING

Unplug the power cord before servicing the heater or whenever you remove upper shell assembly. Failure to do so may result in injury or electrical shock.

FUEL TANK

Drain the fuel tank at the beginning of each heater season and after every 150 hours of operation thereafter. Flush tank with fresh clean fuel after draining the tank. Refill with fresh clean kerosene or No. 1 fuel oil. Make sure that the fuel is free of water and contaminants.



Removing Intake Filter

Figure 2

AIR FILTERS

The air filters should be changed at the beginning of each heater season. Check and clean the air intake filter whenever a film of dust is visible on its exterior surface. Clean this filter daily if the heater is operated in dusty air. (See figure 2.)

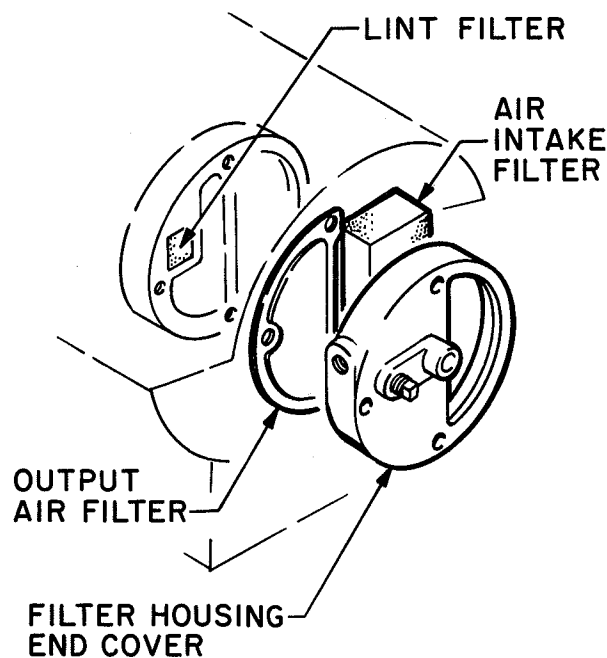
Simply pull the filter out of its housing and wash with a mild detergent and hot or cold water. Dry it thoroughly before installing it into end cover. Make sure there are no gaps between filter and housing.

CAUTION: DO NOT oil filter element.

To reach the output and lint filters, remove the three screws attaching filter housing end cover and withdraw end cover and output air filter. Pick out the lint filter. Install a replacement lint filter and output air filter, then reinstall the filter housing end cover and secure with screws and washers.

CLEANING THE FAN

Clean fan blades after every 100 hours of opera-



Access to Air Filters

Figure 3

tion, or whenever blades are noticeably dirty. A build-up of dirt will reduce the air supply and alter the combustion characteristics.

Wipe the blades with a cloth moistened with kerosene or solvent. Be careful to prevent bending the blades. Dry blades thoroughly.

CLEANING THE FUEL FILTER

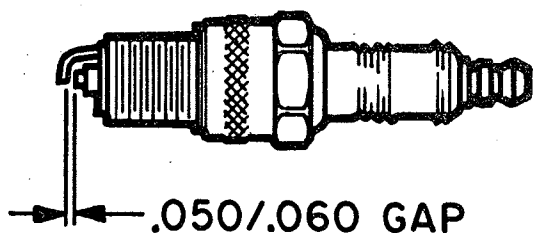
The fuel filter is attached to the tube which leads up from the fuel tank to the nozzle adapter. It should be cleaned at the beginning of each heater season and at least twice thereafter. Disconnect the fuel tubing from nozzle adapter assembly. Remove the grommet from the lower shell and work rubber bushing and fuel filter out of the fuel tank assembly.

Rinse filter several times in clean fuel and blow dry with a stream of compressed air. If filter assembly is damaged, replace it. DO NOT operate heater with a damaged filter. Entrained contaminants will result in clogging and/or a damaged nozzle.

Connect fuel filter assembly onto fuel tubing, then

NOZZLE

Remove the nozzle carefully, using a socket wrench. Hold nozzle adapter with another wrench while removing nozzle. Do not try to open the nozzle passage with a steel drill, a wire or any other tool. If passage is damaged, nozzle must be replaced. Install nozzle into nozzle adapter, then install spark plug as shown in figure 5, and attach bracket to combustion chamber assembly.



Spark Plug Gap Setting

Figure 4

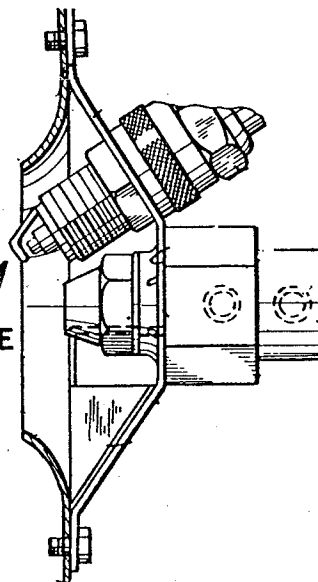
push fuel tubing up through grommet. Work tubing onto nozzle adapter assembly then seat bushing into fuel tank and grommet into lower shell. (See Figure 5A)

SPARK PLUG

At the beginning of each heater season and after every 300 hours of operation thereafter, remove the bracket, loosen nut and remove, clean and adjust spark plug electrodes. (See figure 4.)

If electrodes are burned or eroded, replace plug. Install plug in burner head as shown in figure 5. If nozzle must be removed for cleaning, do not install the spark plug until nozzle has been serviced or replaced.

ROTATE SPARK PLUG
TO POSITION ELECTRODE
AS SHOWN



Positioning Spark Plug in Burner Head

Figure 5

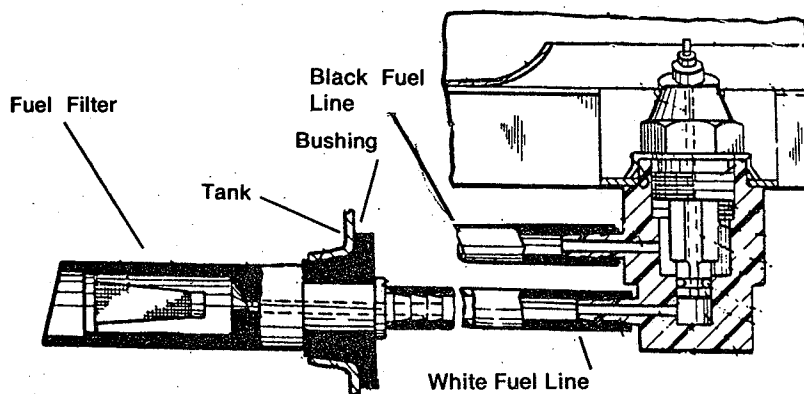


Figure 5A. Fuel Filter

TROUBLE SHOOTING

GENERAL

If preventive maintenance fails to keep a heater in good operating condition, it probably requires service or replacement of some parts. Examine it for clues as to why it is not operating properly, then test-fire it to gain first-hand knowledge of why service might be needed.

EXAMINATION

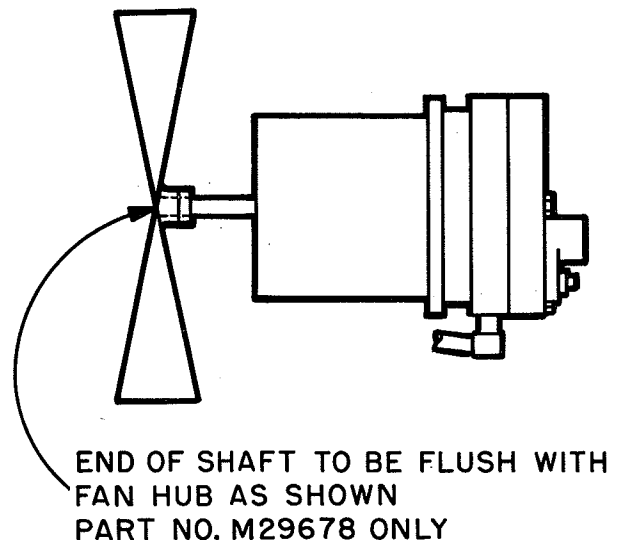
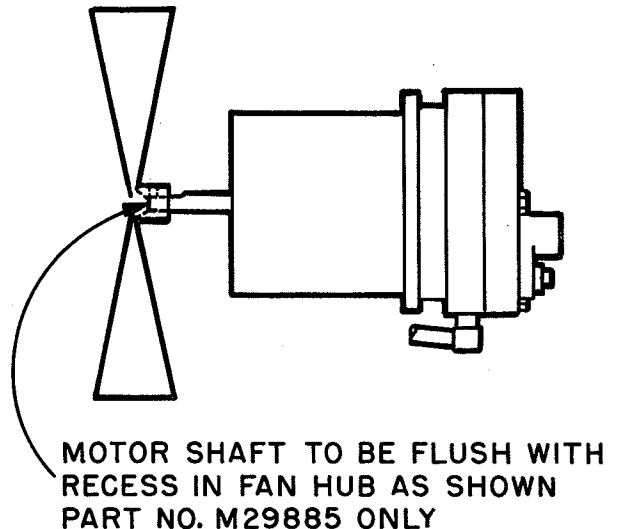
1. Check the fuel tank for sludge and water. If you find it, examine nozzle and fuel filter.
2. Spin the fan to be sure it turns freely and is not slipping on shaft. Check that fan is positioned on shaft correctly. (See figure 6.)
3. Check the heater for dirt and foreign materials around the pump, fan, and filters. Be sure the heater is clean before test-firing it.
4. Check the heater cord for obvious breaks or unsafe condition. If the cord is doubtful, repair it or install a new one before test-firing.

TEST-FIRING

1. Clean the fuel tank and pour a minimum of 3/4 gallon of fuel into the tank.
2. Allow the heater to run for 15 minutes. Observe its operation during the test-run.
3. If any troubles show up during the test-firing, refer to the Trouble Shooting Chart to find out how to correct them.

TROUBLE SHOOTING

Your portable heater has been designed for utmost simplicity and maximum reliability. Severe use and/or negligence in keeping the unit cleaned, or otherwise properly maintained, will eventually result in some type of inefficiency or failure. The following "Trouble Shooting" Table has been prepared to aid the operator in locating any malfunction and referencing applicable instructions for correction. Refer to proper paragraphs under "Preventive Maintenance" for instructions covering necessary repairs.



Locating Fan on Motor Shaft

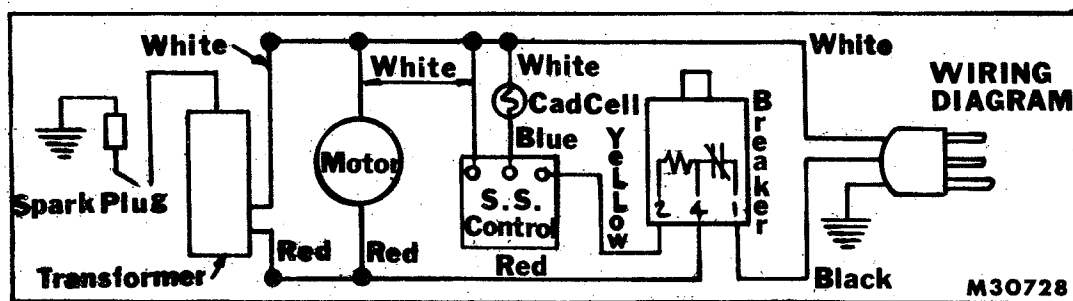
Figure 6

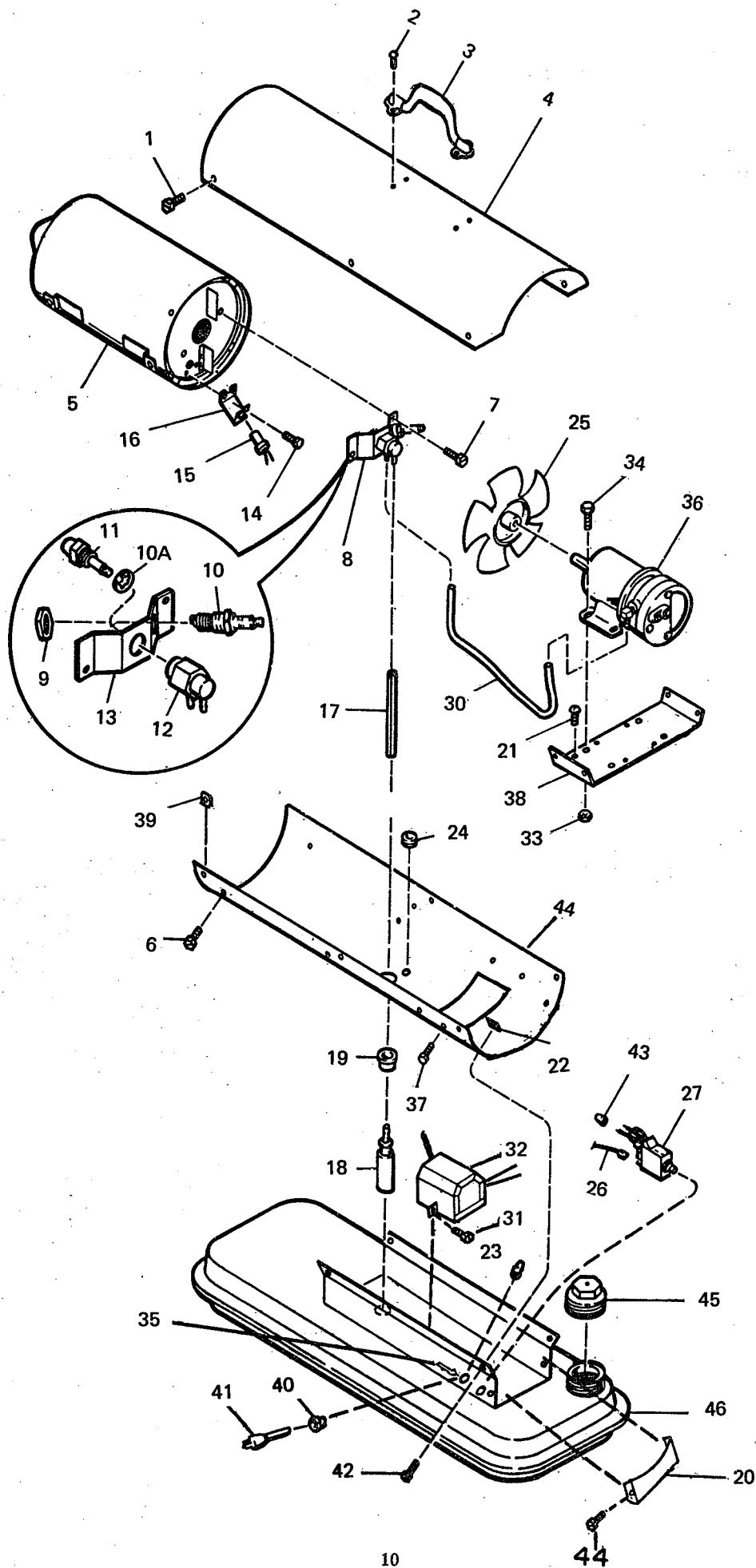
TROUBLE SHOOTING CHART

TROUBLE	PROBABLE CAUSE	REMEDY
Heater motor fails to run when power cord is plugged in.	<ol style="list-style-type: none"> 1. No power at receptacle. 2. Open circuit to motor in heater wiring. 3. Motor burned out. 4. Safety Control. 5. Photo Cell. 6. Control not activated. 	<ol style="list-style-type: none"> 1. Check fuses to circuit breakers and make sure power is available at the receptacle. 2. Refer to wiring diagram and repair wiring. 3. Return the heater to the nearest Authorized Service Center. 4. Return heater to the nearest Authorized Service Center for check and replacement of control components. 5. Return the heater to the nearest Authorized Service Center for service. 6. Press and release reset button on control.
Nuisance trip-outs.	<ol style="list-style-type: none"> 1. Open or damaged photo cell. 	<ol style="list-style-type: none"> 1. Return heater to the nearest Authorized Service Center for check and replacement of control components.
Flames show past end of unit.	<ol style="list-style-type: none"> 1. Air at intake is blocked off. 2. Fan blades dirty. 3. Pump air pressure too high. 4. Fan loose or improperly located on shaft. 	<ol style="list-style-type: none"> 1. Make sure fan guard is free and clear of debris. 2. Clean fan blades. 3. Return heater to the nearest Authorized Service Center for check and adjustment of output pressure. Pressure must be 3 psi. 4. Check; correct if loose or improperly positioned.
Heater smokes or will not burn steady.	<ol style="list-style-type: none"> 1. Heater running out of fuel. 2. Water in fuel. 3. Dirty air filters, fuel filter or nozzle. 4. Low pump output. 5. Debris clinging to fan blades. 	<ol style="list-style-type: none"> 1. Shut down heater and check fuel tank. Refill tank with fresh, clean fuel. 2. Check for water in bottom of fuel tank. If present drain and flush the tank with clean fuel; then refill tank. 3. If cleaning intake air filter does not correct the trouble, refer to preventive maintenance for filter and nozzle service. 4. Return heater to your nearest Authorized Service Center for check and adjustment of output pressure. Pressure must be 3 psi. 5. Clean fan blades.

TROUBLE SHOOTING CHART (CONT'D)

TROUBLE	PROBABLE CAUSE	REMEDY
Heater emits a "pulsating" noise during operation.	1. Restricted fuel filter or nozzle.	1. Refer to preventive maintenance for filter and nozzle service.
Air movement restricted through heater.	1. Dirty fan blades. 2. Fan slipping on motor shaft.	1. Clean fan blades. 2. Replace fan.
Poor start-up and cut-off.	1. Restricted nozzle. 2. Air at intake is blocked.	1. Refer to preventive maintenance for nozzle service. 2. Make sure intake air filter is clean and free of debris.
Fan blade strike.	1. Misalignment of motor. 2. Damaged heater housing assembly. 3. Fan loose.	1. Reposition motor mount brackets. 2. Bend to clear, or replace shell. 3. Replace fan.





PORTABLE HEATER

PARTS LIST

WHEN ORDERING REPAIR PARTS ALWAYS GIVE THE FOLLOWING INFORMATION AS SHOWN IN THIS LIST:

1. THE PART NAME
2. THE PART NUMBER
3. THE MODEL AND SPEC. NO. M30
Spec. No. 5000G05
4. THE NAME OF EQUIPMENT - -
PORTABLE HEATER

Always Order by Part Number - Not Index Number

Fig. & Index No.	Part Number	Part Name	Qty.	Fig & Index No.	Part Number	Part Name	Qty.
1	M11084-26	Screw, Hex Hd., 10-12 x 3/8 in.	15	23	M13942-7	Connector, Wire	2
	M30725-04	Upper Shell Assembly	1	24	1000576	Grommet	1
2	M17539-9	. Revet	4	25	M29678	Fan	1
3	M28153	. Handle	1	26	M16841-16	Wire Assembly	1
4	M30724-AC	. Shell	1	27	M28898-03	Safety Control Assembly	1
6	M29634-01	Chamber Assembly, Combustion	1	28	M29939-01	. Trigger Assembly	1
7	M11084-26	Screw, Hex Hd., 10-12 x 3/8 in.	2	29	M30719	. Breaker, Circuit	1
8	M29707-01	Burner Head Assembly	1	30	M29652-01	Tubing, Airline	1
9	M29824	. Nut, Special	1	31	M10908-13	Screw, Hex Hd.	4
10	M29835	. Spark plug	1	32	M16697	Transformer Assembly	1
10A	M16741-18	. Ring, Retainer	1	33	NTC-3C	Nut	4
	M29705-01	Nozzle Adapter Assembly	1	34	M12461-50	Screw	4
11	M29681	. . Nozzle, Siphon	1	35	M29800	Decal, Reset	1
12	M29805	. . Adapter, Nozzle	1	36	M29750-01	Motor Package Assembly (See figure 9)	1
13	M29615-01	. . Bracket Assembly, Nozzle Adapter	1	37	M11084-26	Screw	4
14	M10908-1	Screw, Hex hd., 6-32x1/4 in.	2	38	M29616	Motor Mounting Bracket	1
15	M16656-4	Photo Cell and Bushing Assy	1	39	M11271-6	Nut, Tinnerman	6
16	M16660	Bracket, Photo Cell	1	40	M11143-1	Bushing, Strain Relief	1
17	M29803-01	Tubing, Fuel	1	41	M10813-74	Extension Cord Assembly	1
18	M29814-01	Filter Assembly, Fuel	1	42	M11084-26	Screw	4
19	M10990-3	Bushing, Rubber	1	43	M13942-5	Connector, Wire	1
20	M30726AL	Bracket, End Cover	1	44	M30727-AC	Shell, Lower	1
21	ST2-2AC	Screw	1	45	M30715-01	Cap, Fuel	1
22	M12250-2	Nut, Tinnerman	1	46	M30723-01 AL	Tank Assembly, Fuel	1
					M18196	Decal, Mfg. by	1
					M22743	Decal, warning	1
					M22898	Decal, Nameplate	1
					M19457	Decal, Tradename	1
					M30729-05	Decal, Model	1
					M29800	Decal, Reset	1

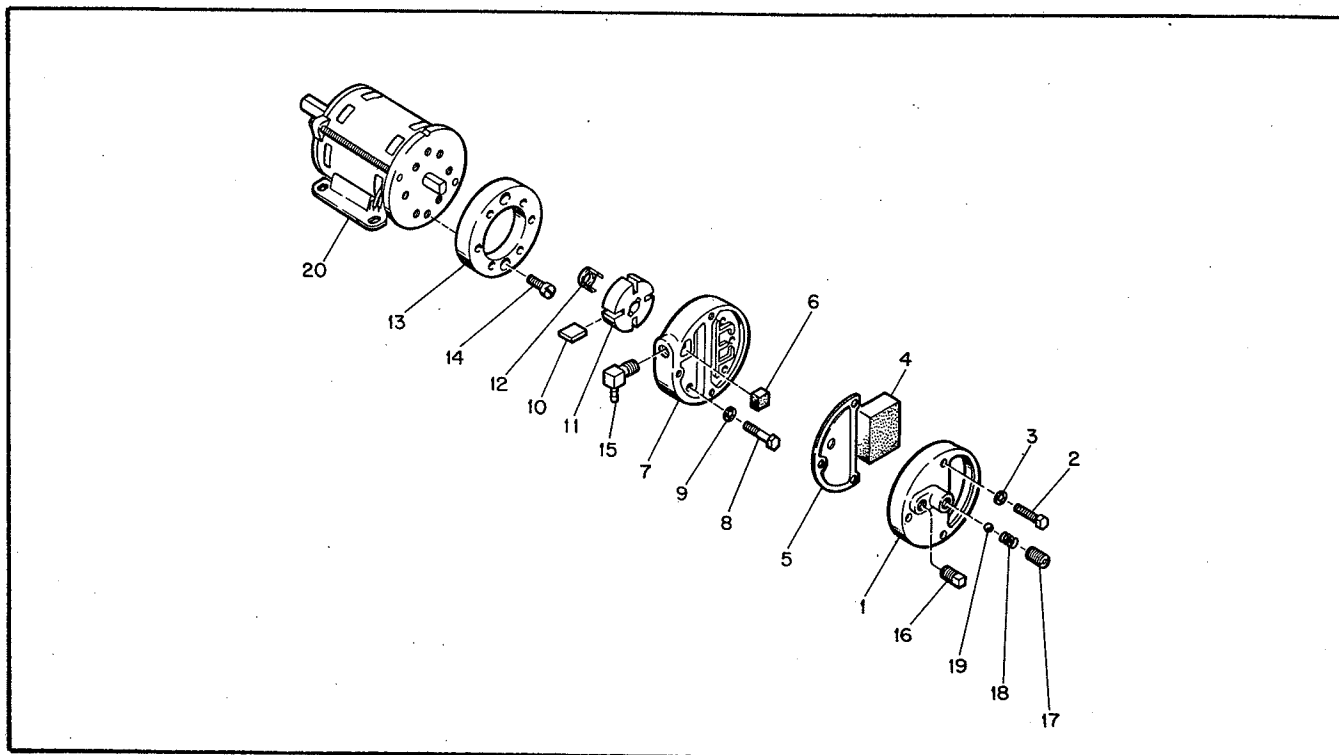


Figure 9. Motor Package Assembly

Fig. & Index No.	Part Number	Part Name	Qty.
-	M29750-01	Motor Package Assembly	1
1	M29609	. End Cover, Filter	1
2	M12461-31	. Screw (Filter End Cover to Pump End Cover)	3
3	WLI-3	. Lockwasher, Internal No. 10	3
4	M29633	. Intake Air Filter	1
5	M29612-01	. Output Filter Assembly	1
6	M29632	. Filter, Lint	1
7	M29608	. End Cover, Pump (Port Plate)	1
8	M12461-32	. Screw (End Cover to Motor)	6
9	WLI-3	. Lockwasher, Internal, No. 10	6
10	M8643	. Blade	4

Fig. & Index No.	Part Number	Part Name	Qty.
11	M22456-1	. Rotor, Pump	1
12	M22009	. Insert, Rotor	1
13	M8645	. Pump Body	1
14	FHPPF3-4C	. Screw (Pump Body to Motor)	2
15	M29797	. Elbow	1
16	M22997	. Plug, Socket 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	M29780-01	. Motor	1

FOR POST-SALE SERVICE IT IS IMPORTANT FOR US TO KNOW WHERE OUR HEATERS ARE.

PLEASE TAKE A MOMENT TO COMPLETE THIS SHORT FORM. THANK YOU.

Serial No.

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 1-9 Model

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 10-17

Customer Name

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Address

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 65-69 Zip

Dealer Name _____
Address _____
City State Zip