Master

PORTABLE HEATERS

MODEL BV-125E AND BV-125EA

SPEC. NO. 3133G01 and 3133G03

OPERATING, MAINTENANCE and SERVICE INSTRUCTIONS with PARTS LIST

PATENTED atoMaster BURNER SYSTEM

KOEHRING®
ATOMASTER DIVISION
BOWLING GREEN, KENTUCKY 42101

Form No. 2788-1

Litho in U. S. A.

TABLE I. SPECIFICATIONS

Input Rating, BTU/Hr 88,000	Weight, Pounds Empty ..... 80 lb.
Voltage, Nominal ..... 230 V 50 Hz.	Nozzle ..... Air Atomizing, 70-90° spray angle, 0.65 GPH
Amperage, Running 2.12	Motor ..... Capacitor-start induction run type 1/4 HP, 2850 rpm with internal thermal protector
Fuel ..... Kerosene or No. 1 Fuel Oil	
Fuel Tank Capacity (U.S. Gallons) 13.5	Vent ..... 130 MM

SECTION I
INTRODUCTION

A. GENERAL

The Model BV-125 Series Heater is designed for use where heated fresh air is needed, without contamination from products of combustion. It must be used where an adequate amount of air is available for combustion and ventilation and where a flue pipe, smokestack or chimney can be arranged to carry the products of combustion outside the heated area. Proper electrical power must be available for the heater.

This manual contains operating, maintenance and trouble-shooting instructions for the heater. A complete parts list is included at the end of the manual.

B. PRINCIPLES OF OPERATION

Operation of the heater involves four simple systems.

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. Air System. The air system is divided into two parts, both of which are supplied with air from a fan which is attached to the other end of the motor.

a. Part of the air from the fan enters the combustion chamber where it mixes with the atomized fuel to become a combustible mixture, and also mixes with the burning gases to complete the process of combustion.

b. The exhaust gases from the combustion chamber circulate within the heat exchanger, warming its inner surfaces. Then they are ducted out of the heater through the stack adapter on its top, and out of the heated space through a flue pipe which is to be supplied by the user.

c. The rest of the air from the fan passes over and around the combustion chamber and through the heat exchanger, where it is heated and emerges from the front of the heater as a powerful stream of heated fresh air, without being mixed with the products of combustion.

3. Ignition System. A transformer provides high voltage to a spark plug which extends through the burner into the combustion chamber. A constantly-firing spark between the electrodes of the spark plug ignites the mixture of fuel and air.

4. Control System. The control system is actuated by a light-sensitive cell which "sees" the presence of flame in the combustion chamber. The control system will shut the heater off if it fails to ignite, or if it runs out of fuel.

C. SPECIFICATIONS

Refer to Table I for specifications.

D. INSTALLATION

The installation of this unit shall be in accordance with the regulations of authorities having jurisdiction.

Refer to Section II for venting instructions

E. OPERATING SEQUENCE

The following is a description of the normal operating sequence of the heater.

1. The heater is turned on by plugging in the power cord.

2. The transformer and the motor, fan and air pump start operating immediately.

order to assure proper combustion and avoid contamination of the ventilating air with exhaust gases. The draft regulator, vent pipe and fittings described in the following paragraphs are not supplied with the heater, and must be furnished at installation. See Figure 1.

1. If the run of vent pipe (either horizontal, vertical, or combined horizontal and vertical) is 20 feet or less, it is NOT necessary to use a draft regulator.

2. If the total run of vent pipe is more than 20 feet, use a draft regulator in the pipe. Any standard 4-inch back-draft type draft regulator is satisfactory. Place it a maximum of 30 inches above the heater exhaust outlet.

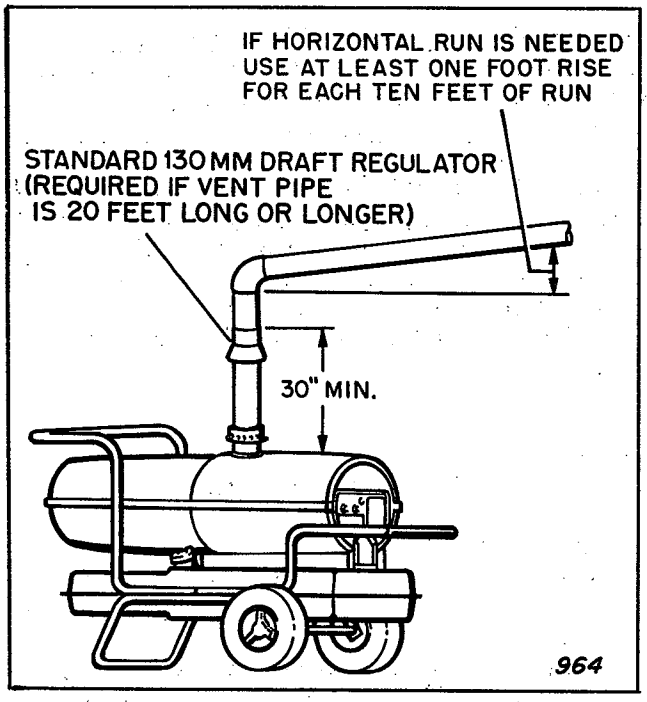

Figure 1. Venting Instructions

3. If it is necessary to run the vent pipe in an almost horizontal direction, be sure that there is at least one foot of rise for each ten feet of run. The more rise (upward slope) the pipe has, the more efficient will be the venting.

G. OPERATION OF SAFETY CONTROLS

1. Motor Thermal Protector.

The motor contains a thermal protector which will prevent motor burnout in case of overload or low voltage. If the thermal protector trips, check for cause of motor overheating before attempting to use the heater after a trip-out.

In addition, check for correct voltage at the heater, and for obstructions or damage which would cause an overloaded heater motor.

2. Flame Safety Control (BV-125E Only.)

A light-sensitive cell, arranged to "see" the flame in the combustion chamber, is connected to the flame safety control. If the cell fails to see the flame within 10 seconds, the control will stop operation of the motor and transformer. This will happen either if the heater fails to ignite on starting, or if the flame should go out for any reason, such as lack of fuel.

Because the action of the control depends on a tiny electrical heater inside the control, its reaction time will be longer at lower ambient temperatures.

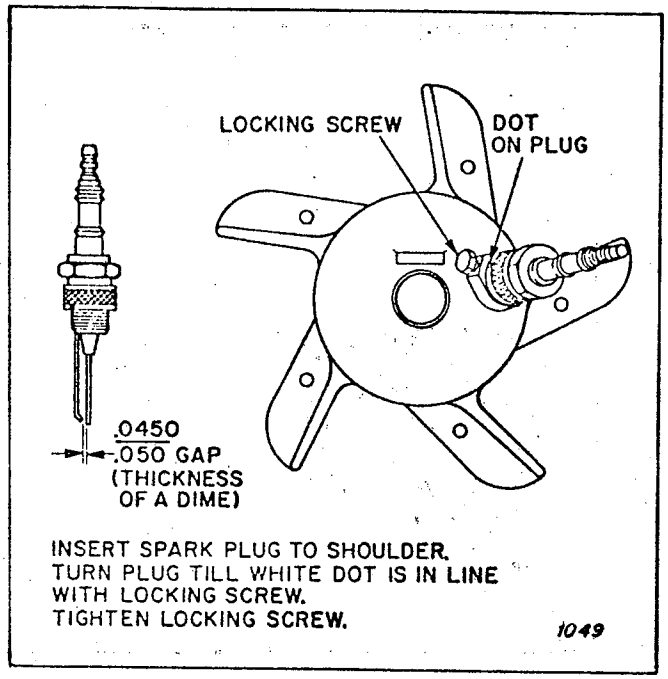

Figure 6. Spark Plug Gap Setting

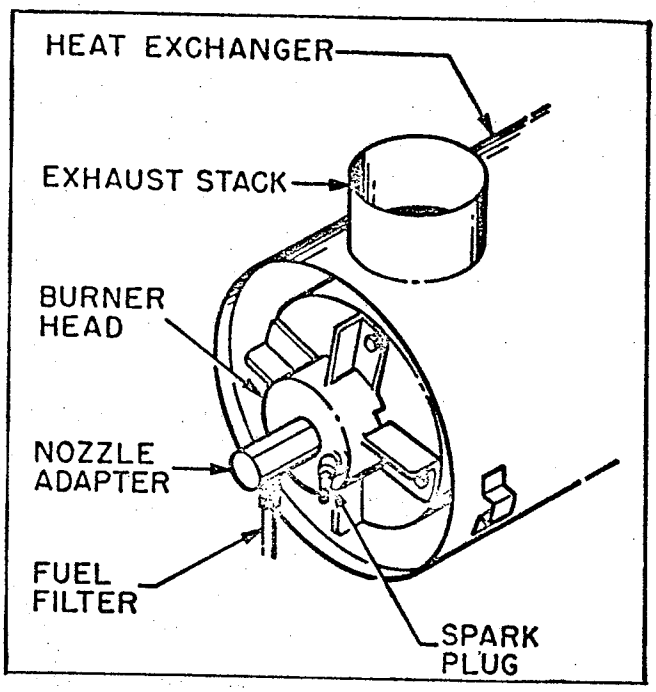

Figure 7. Burner Head, Spark Plug, and Fuel Filter

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 if burner head maintenance is not required. Install the plug into burner heads which retain the plug with a screw so that the white dot on the plug (just below the knurled surface) is in line with the retaining screw. The spark plug gap must be across the nozzle spray pattern.

G. CLEANING THE FUEL FILTER

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

1. To remove the filter, loosen the flare nut attaching the filter to the burner head. Remove the split grommet from the lower shell. Loosen grommet in tank and pull filter assembly through hole in tank and shell.

2. Rinse the filter several times in clean fuel, then blow the filter dry through the wire mesh.

3. To install the fuel filter, insert the filter in the fuel tank, then seat the bushing into the fuel tank. Install the split grommet around the filter tube and work it into place in the lower shell. Tighten flare nut to secure the filter in the burner head.

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. Disconnect fuel filter from burner head. Disconnect the air line from the fitting in the right side of the nozzle adapter.

2. Loosen the screws that fasten the burner head to the rear of the combustion chamber.

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 and render it useless. 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 fittings in rear of burner. Blow the nozzle dry through the face (OUTLET) end ONLY. See Figure 8.

CAUTION

Do not attempt to repair the nozzle, as a part of routine maintenance. If the nozzle needs to be repaired, see Section V of this manual.

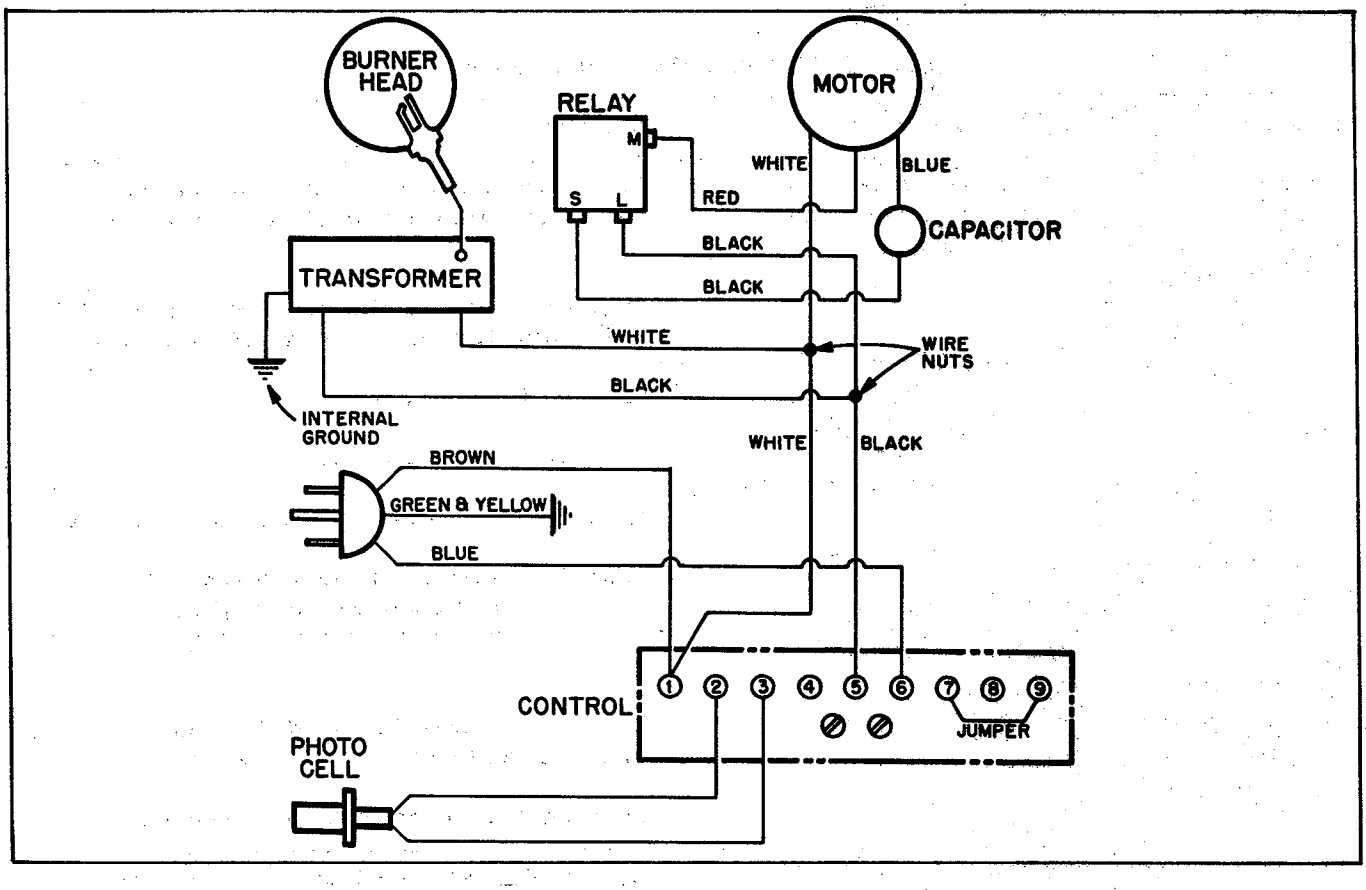

Figure 9. Wiring Diagram, Model BV-125E

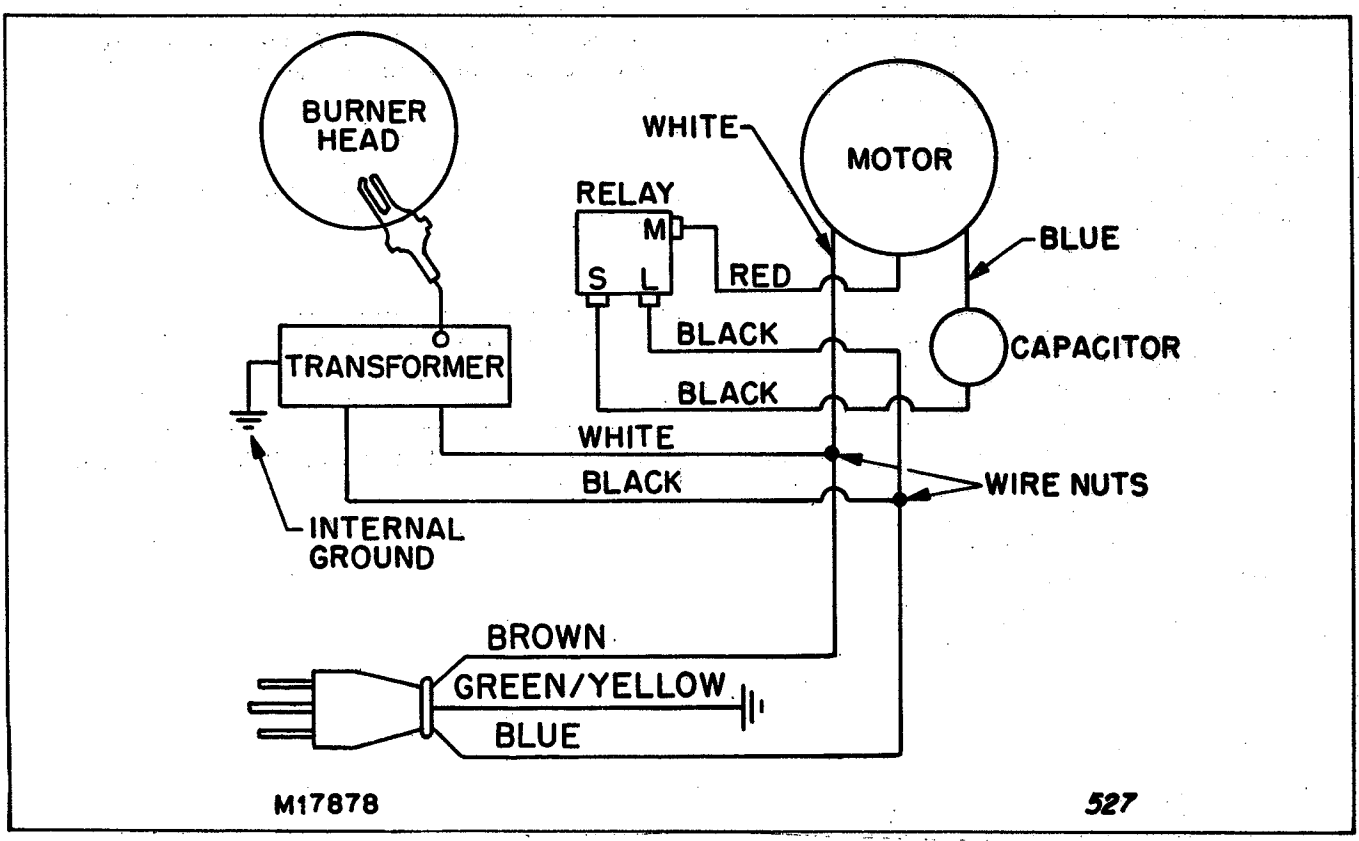

Figure 9A. Wiring Diagram, Model BV-125 EA

Dirt and oil on pump parts will hinder the performance of the pump.

If pump repair is required, you may order a complete pump package, or individual parts, as shown in the Parts List, Section VI.

1. Disassembly.

CAUTION

Do not take the pump apart any further than you need to in order to reach the parts which must be replaced.

a. Remove the end cover and take out the intake and outlet air filters and the lint filter. Disconnect the air line from the elbow.

b. Hold a clean, dry cloth under the pump, and remove the six screws that hold the end cover to the pump body. Catch the carbon blades in the cloth, if they fall out as the pump body is removed.

c. Take all four carbon blades out of the rotor. Pull the rotor and the insert off the motor shaft.

2. Replacing Carbon Blades.

a. Worn or sticking carbon blades cause 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. Blow dust from rotor slots, end cover and pump body using compressed air. DO NOT immerse them in cleaning solvent. Use a stiff bristle brush to remove caked deposits.

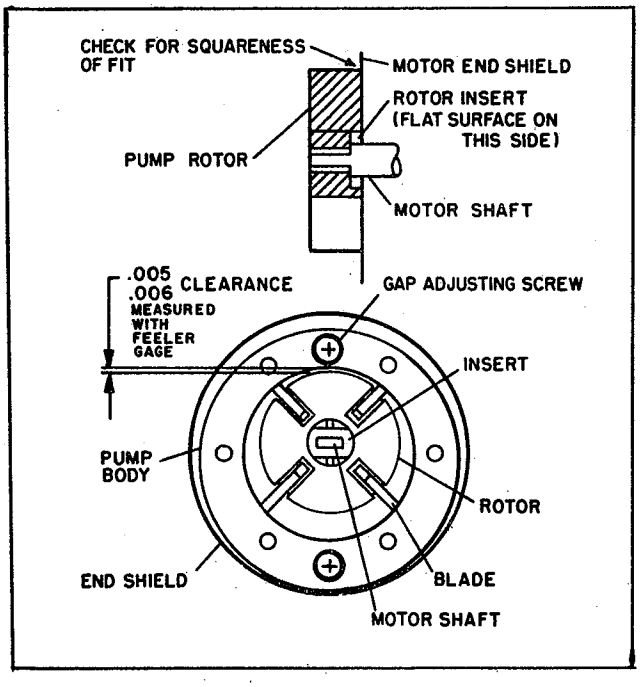

Figure 11. Checking Clearance of Air Pump Rotor

c. 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.

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. Start the heater. (You do not need to have fuel in the tank for this pressure check and adjustment.)

3. Pump pressure must be 4 psi plus or minus 1/4 pound. 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 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.

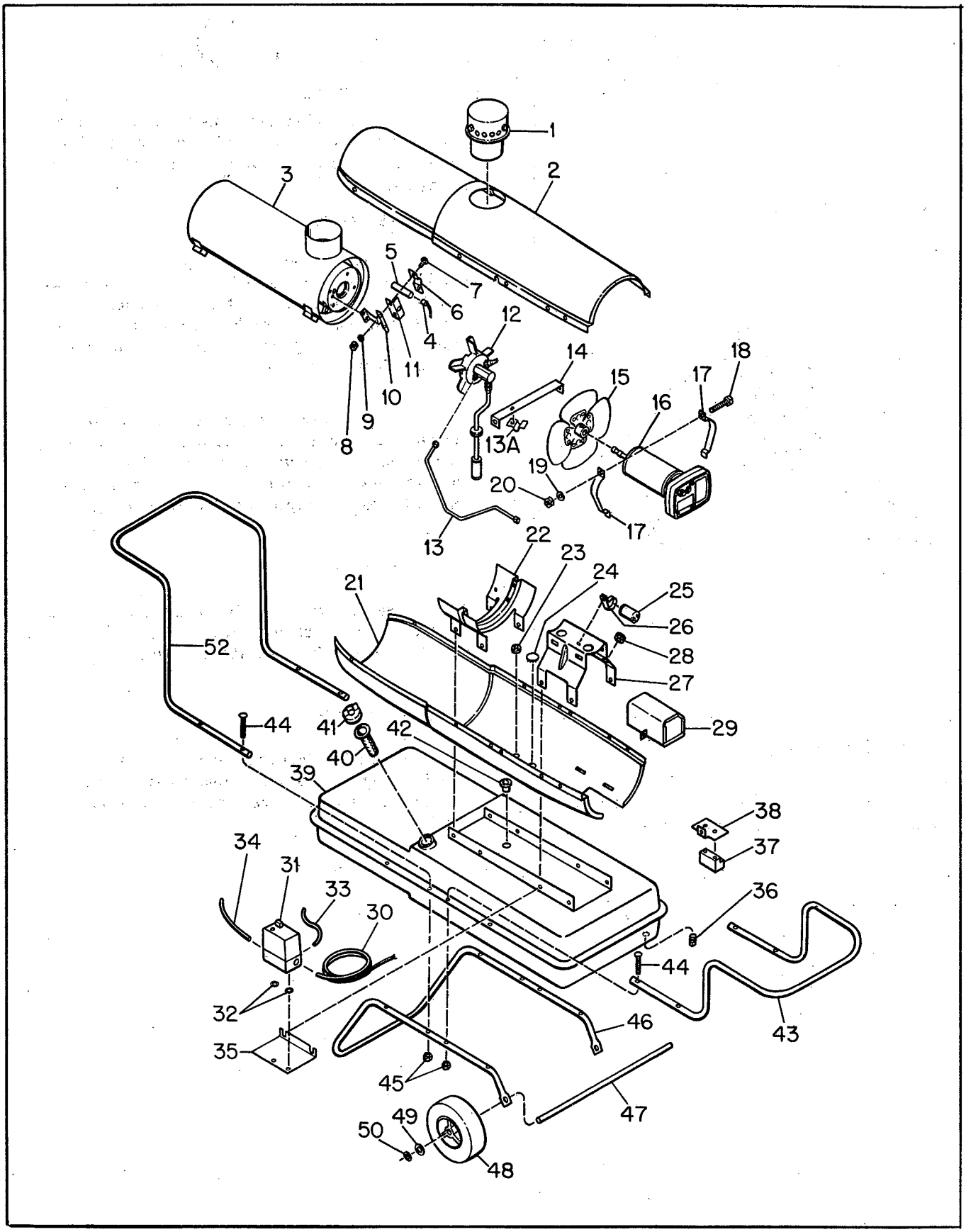

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Figure 13. Portable Heater, Exploded View

SECTION VI
PARTS LIST

This section contains a list of all service parts used in the equipment covered by this manual. Standard hardware items are indicated by the symbol (*).

Check the model decal for correct model number of the equipment. Include the model, specification, and serial numbers when ordering parts. Order parts by part name and part number only. Do not use index numbers from the illustration when ordering parts. Specify color when ordering painted parts.

PARTS LIST FOR FIGURE 13

Index No.-	Part Number	Part Name	BV-125E	BV-125EA
1	M23546-1-A	Interrupter Assembly	1	1
-	RC1-4C	Screw, Rd hd No. 6-32 x 1/2 in.	2	-
-	WP-1C	Washer, Plain	2	-
-	NPC-1C	Nut, Plain	2	-
2	M23748A	Shell Assembly, Upper	1	1
-	M11084-27	Screw	8	8
3	M23734-1	Combustion Chamber Assembly	1	1
-	M11084-27	Screw	6	6
4	M23392	Photo Cell	1	-
5	M13962A	Tube	1	-
6	M13963A	Clamp	1	-
7	FHC1-4C	Screw	4	-
8	NTC-1C	Nut	4	-
9	WP-1C	Washer	2	-
-	M23608	Adaptor, Photo Cell	1	-
10	M13961A	Bracket, Photo Cell	1	-
11	M23551A	Bracket	2	-
12	M23150-3	Burner Head Assembly (See Fig. 14)	NA	
-	M11084-27	Screw, Self-tapping, hex hd No. 10-12 x 1/2	3	3
13	M23753	Air Line	1	1
13A	M24717	Clamp, Air line	-	1
-	NPF-3C	Nut (Air line clamp attaching)	-	1
-	WLM-3	Lockwasher (Air line clamp attaching	-	1
-	M12461-27	Screw (Air line clamp attaching)	-	1
14	M16871	Strap, Retainer	1	1
-	M11084-27	Screw, Self tapping, 10-12 x 1/2	2	2
15	M17058	Fan	1	1
	SF3-2-1/2K	Setscrew, Socket hd, cup pt. 1/4-28	2	2
16	M17875-2	Motor Package Assembly (See Fig. 15)	NA	
17	M16661	Clamp, Motor	4	4
18	HC4-10C	Screw	2	2
19	WLM-4	Washer, Lock, 1/4 in.	2	2
20	NPC-4C	Nut, Hex, 1/4-20	2	2
21	M23758A	Shell, Lower	1	1
22	M12828	Bracket, Shell Support	1	1
-	M11084-27	Screw	2	2
-	M11084-29	Screw	2	2

Index No.	Part Number	Part Name	BV-125E	BV-125EA
23	1000576	Grommet		
24	M15809	Plug, Button, 1/2 in.	1	-
-	M25042	Plug, Button	-	1
25	M12650-3	Capacitor	1	1
26	M12651-1	Clamp, Tinnerman	1	1
-	M11084-27	Screw	1	1
27	M16645	Bracket, Motor Support	1	1
-	M11084-27	Screw	6	6
28	1000577	Grommet	1	1
-	M15823-26	Screw	1	-
29	M17921	Transformer	1	1
-	M11084-27	Screw	2	2
30	M15779-8	Extension Cord Assembly	1	1
-	M13942-4	Connector, Wire nut	2	2
-	M9900-77	Wire Assembly, Capacitor	1	1
31	M23759	Control, Danfoss	1	-
32	M19135	O-Ring	2	-
-	RF3-5C	Screw, Rd hd, 10-32 x 5/8 in.	2	-
-	NTF-3C	Nut, Torque Lock	2	-
33	M23396-7	Tubing, Plastic	1	-
34	M23396-8	Tubing, Plastic	1	-
35	M23749A	Bracket, Control	1	-
36	M27417	Plug, Drain	1	1
-			-	
-	M18598-2	Relay and Bracket Assy	NA	
37	M12462-5	. Relay, Starting	1	1
-	RC2-2C	. Screw, Rd hd No. 8-32 x 1/4 in.	2	1
-	WLI-2	. Washer, Lock	2	1
38	M11952	. Bracket, Mounting	1	1
-	M11084-27	. Screw	1	1
-	M9900-62	Wire Assembly	1	1
-	M17063-22	. Cable Assembly, Control to Motor and Transformer	1	-
39	M18371-3A	Fuel Tank Assembly	1	1
40	M18053	Screen, Fuel Tank Neck	1	1
41	M23284	Cap, Fuel Tank	1	1
42	M23347	Grommet, Split	1	1
43	M14243-3	Handle, Rear	1	1
44	M12345-34	Screw	8	8
45	NTC-3C	Nut, Torque Lock No. 10-24	8	8
46	M12831-3	Frame, Wheel Support	1	1
47	M16801-2	Axle	1	1
48	M19295	Wheel	2	2
49	WP-8C	Washer, Flat, 1/2 in.	2	2

PARTS LIST FOR FIGURE 13 (Continued)

Index No.	Part Number	Part Name	BV-125E	BV-125EA
50	M28526	Cap Nut	2	2
52	M14244-3	Handle, Front	1	1
-	M11084-26	Screw, Self tapping, No. 10-12 x 3/8 in.	2	2

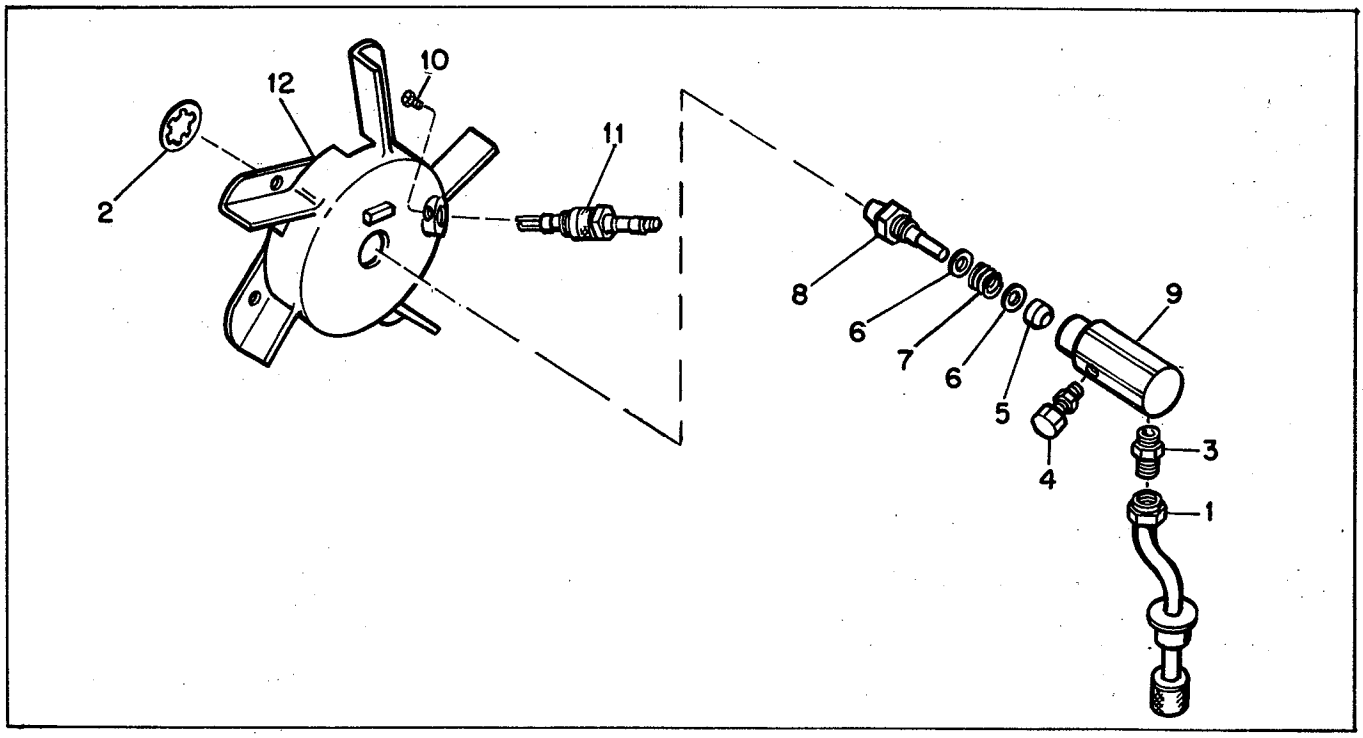


Figure 14. Burner Head Assembly

Index No.	Part Number	Part Name	Qty.
1	#M23269-4	Filter Assy, Fuel (BV-125E)	1
-	M27670-05	Filter Assy, Fuel (BV-125EA)	1
-	#M23150-3	Burner Head Assembly (See Fig. 13, Index No. 12)	1
2	M16741-18	. Ring, Retaining	1
-	M23151-1	. Nozzle Adapter Assy	1
3	M16791	. . Connector, Male	1
4	M5976	. . Connector, Male	1
5	M8882	. . Sleeve, Nozzle Seal	1
6	M10659-1	. . Washer, Nozzle Seal	2
7	M10809-1	. . Spring, Nozzle Seal	1
8	M23103	. . Nozzle, Aspirating 0.65 gph	1
9	M16535	. . Adapter, Nozzle	1
10	M12461-51	. Screw, Hex hd No. 10-24 x 1/2	1
11	M10962-2	. Spark Plug Assy	1
12	M23736	. Body, Burner Head	1

#Parts recommended for normal replacement by owner or user.

Index No.	Part Number	Part Name or Description	Ref. Notes	Quan.
-	M17875-2	Motor Package Assembly (See Figure 13, Index No. 9)	@	1
-	M16675G2	. Pump and Filter Parts Package		1
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	. . End Cover, Pump (Port Plate)		1
8	M12461-34	. . Screw (End Cover to Motor)	$	6
9	WLI-3	. . Lockwasher, Internal, No. 10	$	6
10	M8643-3	. . Blade		4
11	M22456-3	. . Rotor, Pump		1
12	M22009	. . Insert, Rotor		1
13	M8645-3	. . Pump Body		1
14	FHPF3-7C	. . Screw (Pump Body to Motor)	$	2
15	M5976	. . Connector, Male		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	~~M17814-2~~ M51159-05	. Motor		1
	M22993-1	Kit, Rotor		1

$ Standard Hardware - procurable locally in most areas. See Listing of Standard Screws, Page 23, for description.
@ Parts recommended for normal replacement by owner or user.

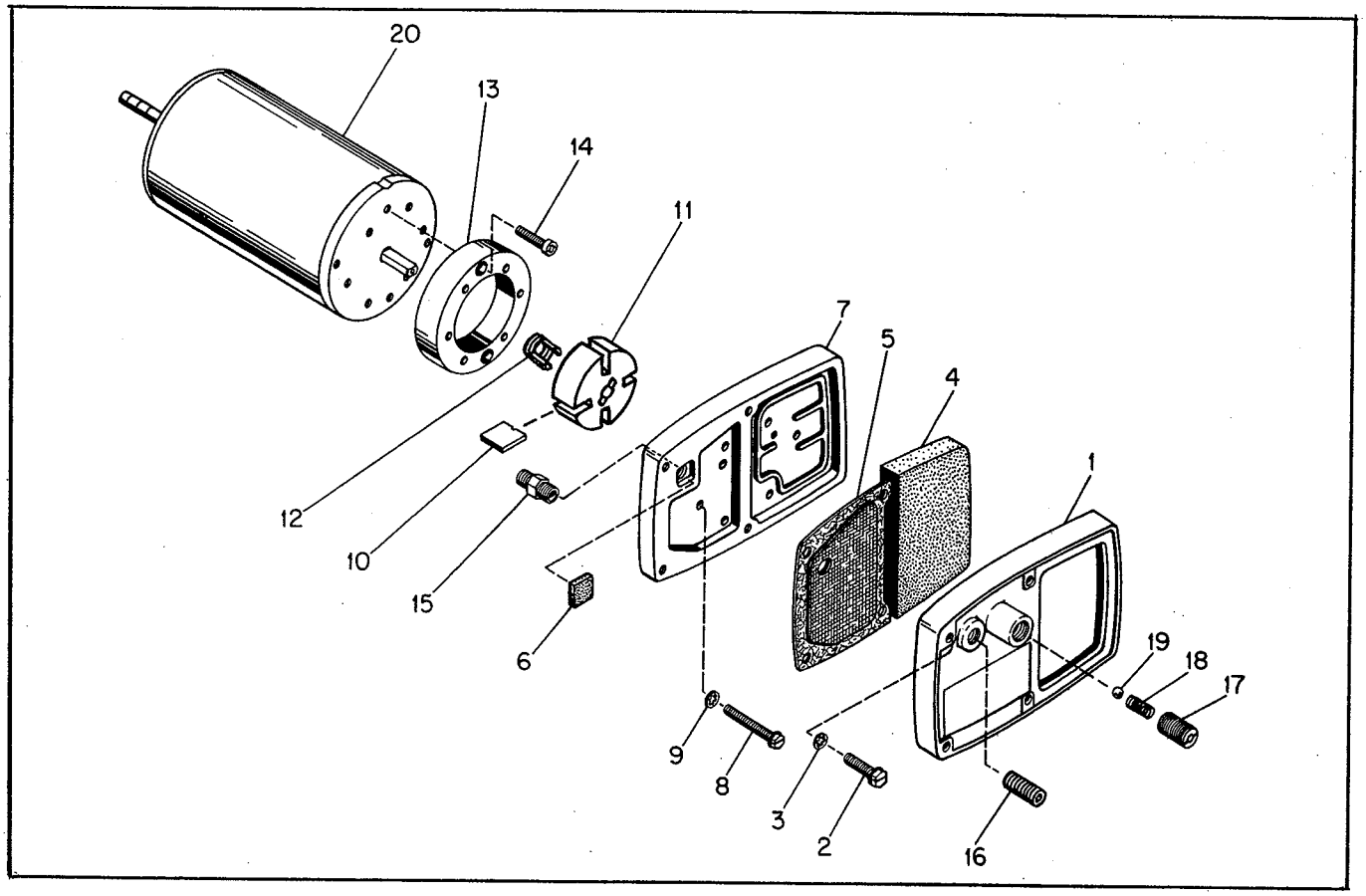


Figure 15. Motor Package Assembly

STANDARD SCREWS

Part Number	Part Name or Description
FHPF3-7C	Screw, Fillister hd, No. 10-32 x 7/8 in.
HC4-10C	Screw, Hex hd., machine, 1/4-20 x 1-1/4 in.
M11084-27	Screw, Self-tapping, hex hd., No. 10-12 x 1/2 in. Type "A"
M11084-29	Screw, Self-tapping, hex hd., No. 10-12 x 3/4 in., Type "A"
M12345-31	Screw, Oval hd., machine, No. 10-24 x 1-1/4 in.
M12345-34	Screw, Oval hd., machine, No. 10-24 x 2 in.
M12461-31	Screw, Hex hd., No. 10-32 x 1 in.
M12461-34	Screw, Hex hd., No. 10-32 x 1-1/2 in.
M15823-26	Screw, Self-tapping, hex hd., No. 10-12 x 3/8 in., Type "B"

TOUCH-UP PAINT

M23353-6	Paint, Yellow, Aerosol Can
M23353-10	Paint, Black, Aerosol Can

DECALS

M17137	Decal, Tradename	1
M18196	Decal, Mfg. By	1
M22743	Decal, Warning	1
M22823	Decal, Flag	1
M22898	Decal, NP	1
M23750	Decal, Wiring (BV-125E)	1
M17878	Decal, Wiring (BV-125EA)	1
M23781-1	Decal, (BV-125E)	1
M23761-3	Decal, (BV-125EA)	1

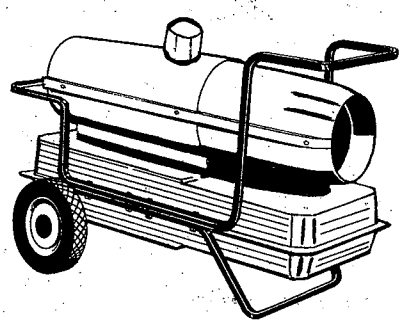
The Heater Body is shipped assembled. Wheels and Handles are packed separately. Check to see that the following items are included:

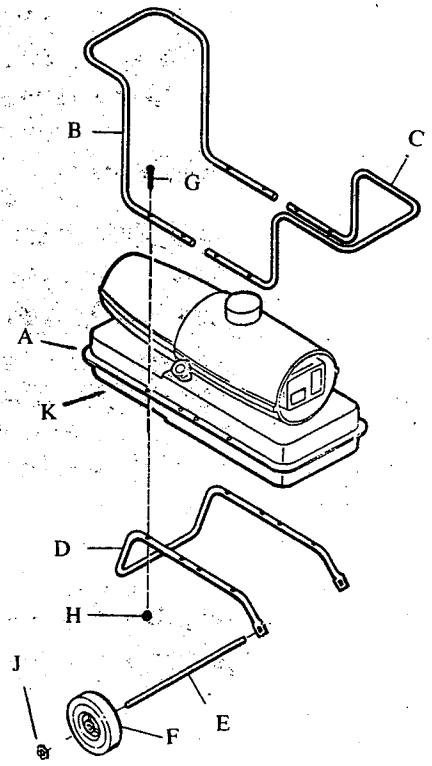
1) Heater Body
2) Handles and Wheel Support Frame
3) 2 ea. Wheels, 1 ea. Axle
4) 8 ea. 10×24×1¾" Screws
5) 8 ea. 10×24 Nuts
6) 2 ea. Cap Nuts
7) 1 ea. Fuel Cap

IMPORTANT Screws, Nuts and Cap Nuts are standard hardware items.

TOOLS REQUIRED Medium Phillips Screwdriver, 3/8" Open or Adjustable Wrench, Lightweight Hammer.

A—Heater Body
B—Front Handle
C—Rear Handle
D—Wheel Suppot Frame
E—Axle
F—Wheel
G—Screw 10×24×1¾"
H—Nut 10×24
J—Cap Nut
K—Fuel Cap





Step 1 - Slide the Axle (E) through the Wheel Support Frame (D). Install Wheels (F) onto the Axle (E); IMPORTANT - The Extended hub of the Wheel should be positioned toward the Wheel Support Frame. Position the Cap Nuts (J) on the Axle (E) and tap with hammer.

Step 2 - Position the unit, Motor end over Wheels, on the Wheel Support Frame.

Step 3 - Use Screws (G) and Nuts (H) attach handle (B-C) to Tank flange and Wheel Support Frame. Install all Screws and Nuts before tightening.

Step 4 - Tighten all Nuts.

Step 5 - Install Fuel Cap (K)

(E)

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

WE RESERVE THE RIGHT TO AMEND THESE SPECIFICATIONS AT ANY TIME WITHOUT NOTICE. THE ONLY WARRANTY APPLICABLE IS OUR STANDARD WRITTEN WARRANTY. WE MAKE NO OTHER WARRANTY, EXPRESSED OR IMPLIED.

CERTIFICATE OF GENERAL EQUIPMENT - LIMITED 90 DAY WARRANTY (EXPORT)

Koehring Company warrants new Products sold by it to be free from defects in material or workmanship for a period of ninety days after date of delivery to the first user and subject to the following conditions:

"Koehring Company's obligation and liability under this Warranty is expressly limited to repairing or replacing at Koehring Company's option, any parts which appear to Koehring Company upon inspection to have been defective in material or workmanship when shipped from the factory. Such parts shall be provided at no cost to the user, at the business establishment of any factory authorized service center or the factory during regular working hours. This Warranty shall not apply to component parts or accessories of Products not manufactured by Koehring Company and which carry the warranty of the manufacturer thereof, or to normal maintenance (such as pressure adjustments) or to normal maintenance parts (such as filters and spark plugs). Replacement or repair parts installed in the Product covered by this Warranty are warranted only for the remainder of this Warranty as if such parts were original components of said Product. KOEHRING COMPANY MAKES NO OTHER EXPRESS WARRANTY. TO THE EXTENT PERMITTED BY LAW KOEHRING COMPANY MAKES NO IMPLIED WARRANTY AND MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. IN ANY EVENT IMPLIED WARRANTIES INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED TO THE DURATION OF THIS EXPRESS WARRANTY.

Any transportation charges, costs of installation, duty, taxes or any other charges whatsoever must be borne by the user. Koehring Company's obligation under this limited Warranty shall not include any liability for direct, indirect, incidental, or consequential damage or delay. If requested by Koehring Company, Products or parts for which a warranty claim is made are to be returned transportation prepaid by user to the factory. Any improper use, including operation after discovery of defective or worn parts, operation beyond capacity, substitution of parts not approved by Koehring Company, or any alteration or repair by others in such manner as in Koehring Company's judgment affects the Product materially and adversely, shall void this Warranty

"NO EMPLOYEE OR REPRESENTATIVE IS AUTHORIZED TO CHANGE THIS WARRANTY IN ANY WAY OR GRANT ANY OTHER WARRANTY UNLESS SUCH CHANGE IS MADE IN WRITING AND SIGNED BY AN OFFICER OF KOEHRING COMPANY AT ITS HOME OFFICE

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