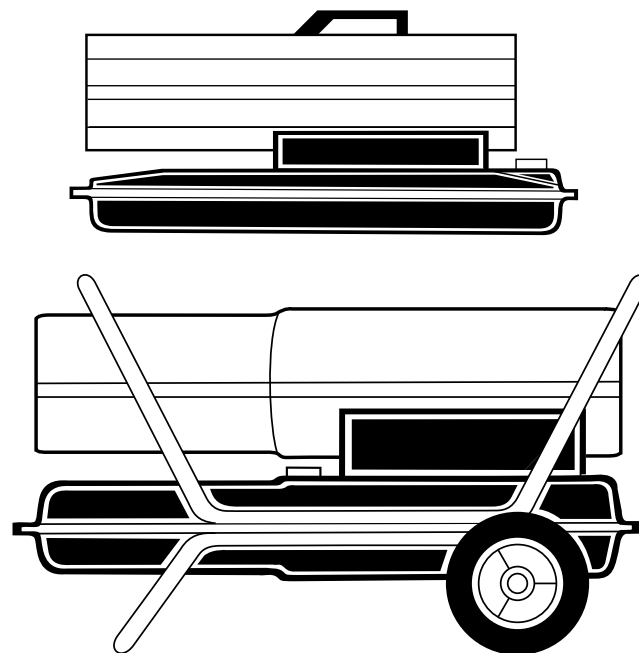


MASTER[®]

PORTABLE FORCED AIR HEATERS

OWNER'S MANUAL



Heater Sizes: 30,000 70,000 90,000 150,000 Btu/Hr
Models: BY30CE, BY70CE, BY100CE, and BY150CE

IMPORTANT

Read and understand this manual before assembling, starting or servicing heater. Improper use of heater can cause serious injury. Keep this manual for future reference.



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SAFETY INFORMATION

WARNINGS

IMPORTANT: Read this Owner's Manual carefully and completely before trying to assemble, operate, or service this heater. Improper use of this heater can cause serious injury or death from burns, fire, explosion, electrical shock, and carbon monoxide poisoning.

DANGER

Carbon monoxide poisoning may lead to death!

Carbon Monoxide Poisoning: Early signs of carbon monoxide poisoning resemble the flu, with headaches, dizziness, and/or nausea. If you have these signs, the heater may not be working properly. **Get fresh air at once!** Have heater serviced. Some people are more affected by carbon monoxide than others. These include pregnant women, persons with heart or lung disease or anemia, those under the influence of alcohol, and those at high altitudes.

Make certain you read and understand all Warnings. Keep this manual for reference. It is your guide to safe and proper operation of this heater.

Continued

SAFETY INFORMATION

Continued

WARNINGS *(Continued)*

- Use only kerosene or No. 1 fuel oil to avoid risk of fire or explosion. Never use gasoline, naphtha, paint thinners, alcohol, or other highly flammable fuels.
- Fueling
 - a) Personnel involved with fueling shall be qualified and thoroughly familiar with the manufacturer's instructions and applicable regulations regarding the safe fueling of heating units.
 - b) Only the type of fuel specified on the heater's data plate shall be used.
 - c) All flame, including the pilot light, if any, shall be extinguished and the heater allowed to cool, prior to fueling.
 - d) During fueling, all fuel lines and fuel-line connections shall be inspected for leaks. Any leaks shall be repaired prior to returning the heater to service.
 - e) At no time shall more than one day's supply of heater fuel be stored inside a building in the vicinity of the heater. Bulk fuel storage shall be outside the structure.
 - f) All fuel storage shall be located a minimum of 762cm (25 feet) from heaters, torches, welding equipment, and similar sources of ignition (exception: the fuel reservoir integral with the heater unit).
 - g) Whenever possible, fuel storage shall be confined to areas where floor penetrations do not permit fuel to drip onto or be ignited by a fire at lower elevation.
 - h) Fuel storage shall be in accordance with the authority having jurisdiction.
- Never use heater where gasoline, paint thinner, or other highly flammable vapors are present.
- Follow all local ordinances and codes when using heater.
- Heaters used in the vicinity of tarpaulins, canvas, or similar enclosure materials shall be located a safe distance from such materials. The recommended minimum safe distance is 304.8cm (10 feet). It is further recommended that these enclosure materials be of a fire retardant nature. These enclosure materials shall be securely fastened to prevent them from igniting or from upsetting the heater due to wind action.
- Use only in well-vented areas. Before using heater, provide at least a 2800 square cm (three-square-foot) opening of fresh, outside air for each 100,000 BTU/Hr of rating.
- Use only in places free of flammable vapors or high dust content.
- Use only the electrical voltage and frequency specified on model plate.
- Use only a three-prong, grounded extension cord.
- Minimum heater clearances from combustibles:
 - Outlet: 250 cm (8 Ft.) Sides, Top, and Rear: 125 cm (4 Ft.)
- Locate heater on a stable and level surface if heater is hot or running or a fire may occur.
- When moving or storing heater, keep heater in a level position or fuel spillage may occur.
- Keep children and animals away from heater.
- Unplug heater when not in use.
- When used with thermostat, heater may start anytime.
- Never use heater in living or sleeping areas.
- Never block air inlet (rear) or air outlet (front) of heater.
- Never move, handle, refuel, or service a hot, operating, or plugged-in heater.
- Never attach duct work to front or rear of heater.

PRODUCT IDENTIFICATION

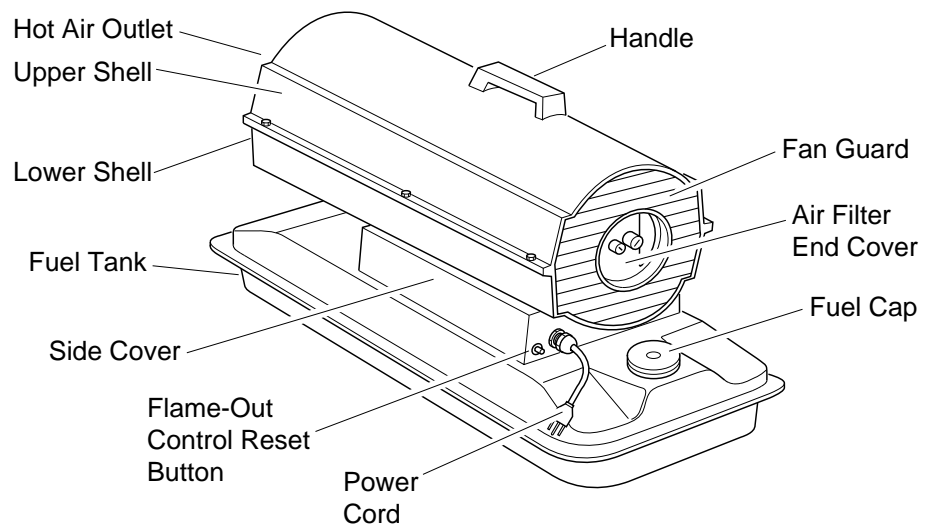


Figure 1 - 30/70,000 Btu/Hr Models

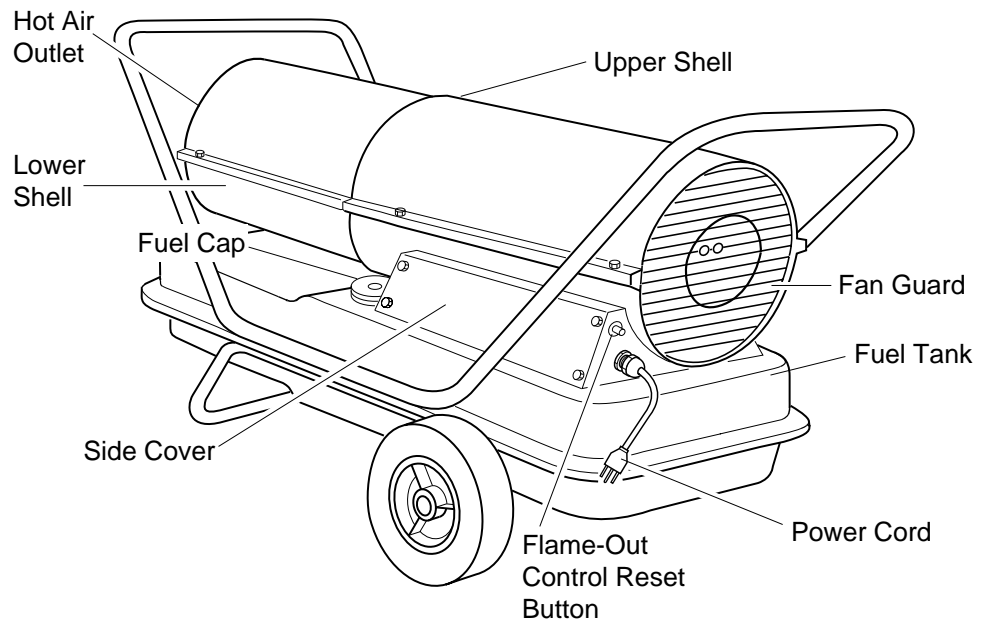


Figure 2 - 90/150,000 Btu/Hr Models

UNPACKING

ASSEMBLY

(For 90,000 and 150,000
Btu/Hr Models Only)

1. Remove all packing items applied to heater for shipment.
2. Remove all items from carton.
3. Check items for any shipping damage. If heater is damaged, promptly inform dealer where you bought heater.

These models are furnished with wheels and handles. Wheels, handles, and the mounting hardware are found in the shipping carton.

Tools Needed

- Medium Phillips Screwdriver
 - 3/8" Open or Adjustable Wrench
 - Hammer
1. Slide axle through wheel support frame. Install wheels on axle.
IMPORTANT: When installing wheels, point extended hub of wheels toward wheel support frame (see Figure 3).
 2. Place cap nuts on axle ends. Gently tap with hammer to secure.
 3. Place heater on wheel support frame. Make sure air inlet end (rear) of heater is over wheels. Line up holes on fuel tank flange with holes on wheel support frame.
 4. Place front handle and rear handle on top of fuel tank flange. Insert screws through handles, fuel tank flange, and wheel support frame. Attach nut finger tight after each screw is inserted.
 5. After all screws are inserted, tighten nuts firmly.

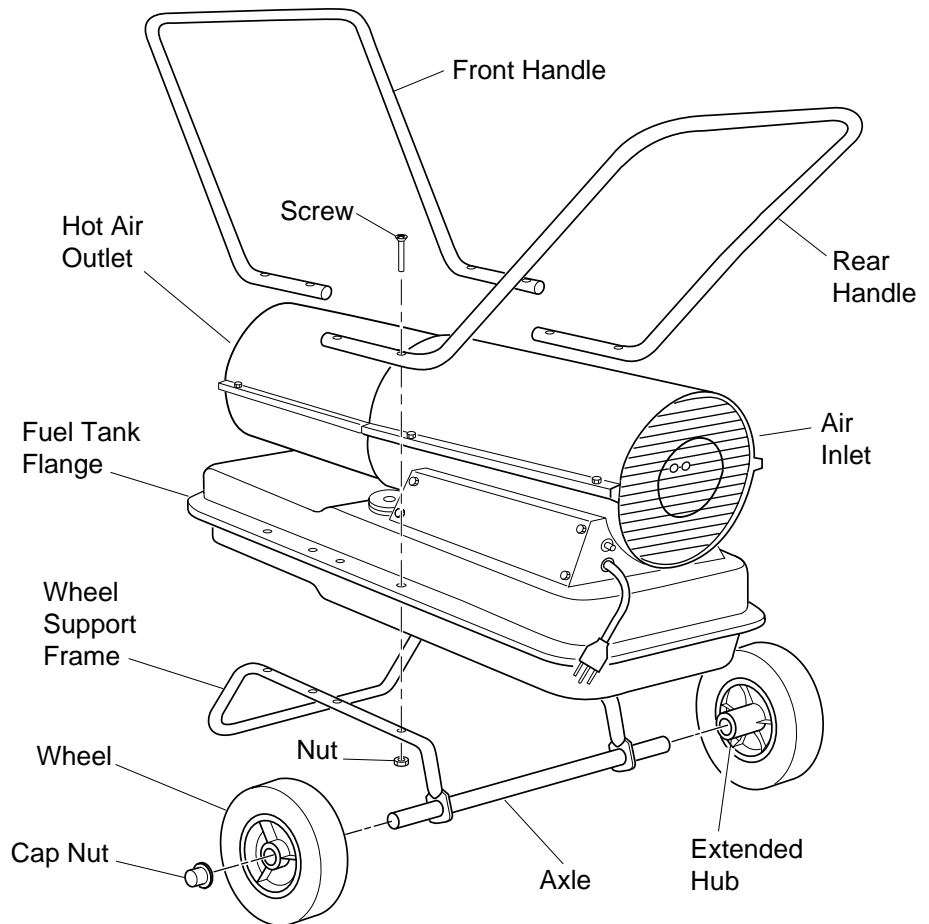


Figure 3 - Wheel and Handle Assembly, 90/150,000 Btu/Hr Models Only

THEORY OF OPERATION

The Fuel System: The air pump forces air through the air line. The air is then pushed through the burner head nozzle. This air causes fuel to lift from the tank. A fine mist of fuel is sprayed into the combustion chamber.

The Air System: The motor turns the fan. The fan pushes air into and around the combustion chamber. This air is heated and provides a stream of clean, hot air.

The Ignition System: The electronic ignitor sends voltage to the spark plug. The spark plug ignites the fuel and air mixture.

The Flame-Out Control System: This system causes the heater to shut down if the flame goes out.

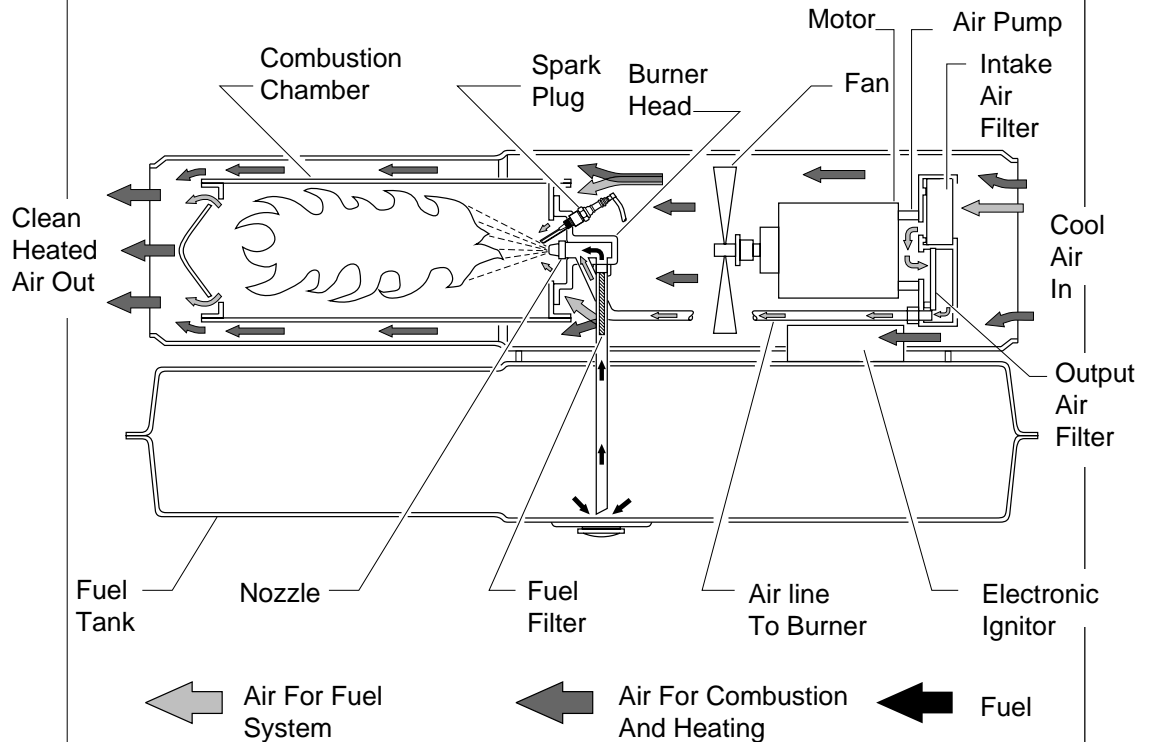


Figure 4 - Cross Section Operational View

FUELS

⚠ WARNING

Use only kerosene or No. 1 fuel oil to avoid risk of fire or explosion. Never use gasoline, naphtha, paint thinners, alcohol or other highly flammable fuels.

Do not use heavy fuels such as No. 2 fuel oil or No. 2 Diesel. Using heavy fuels will result in:

- clogged fuel filter and nozzle
- carbon build up on spark plug
- use of non-toxic anti-icer in fuel during very cold weather

IMPORTANT: Use a KEROSENE ONLY container. Be sure storage container is clean. Foreign matter such as rust, dirt, or water will cause the flame-out control to shut down heater. Foreign matter may also require you to clean fuel system often.

VENTILATION

⚠ WARNING

Follow the minimum fresh, outside air ventilation requirements. If proper fresh, outside air ventilation is not provided, carbon monoxide poisoning can occur. Provide proper fresh, outside air ventilation before running heater.

Provide a fresh air opening of at least 2800 square cm (three square feet) for each 100,000 BTU/Hr rating. Provide extra fresh air if more heaters are being used.

Example: A 150,000 Btu/Hr heater requires one of the following:

- a two-car garage door raised 15.24 cm (six inches)
- a single-car garage door raised 22.86 cm (nine inches)
- two, 76.20 cm (thirty-inch) windows raised 30.48 cm (twelve inches)

OPERATION

⚠ WARNING

Review and understand the warnings in the Safety Information Section. They are needed to safely operate this heater. Follow all local codes when using this heater.

To Start Heater

1. Follow all ventilation and safety information.
2. Fill fuel tank with kerosene or No. 1 fuel oil.
3. Attach fuel cap.
4. Plug power cord of heater into standard 230 volt/50 hertz, grounded (earthed) outlet. Use an extension cord if needed. Use only a three-prong, grounded (earthed) extension cord.

Extension Cord Wire Size Requirements

Up to 30.5 meters (100 feet) long, use 1.0 mm² (16 AWG) conductor

30.6 to 61 meters (101 to 200 feet) long, use 1.5 mm² (14 AWG) conductor

Heater will start when power cord is plugged into outlet. If not, push in flame-out control reset button (see Figures 5 and 6).

Flame-Out Control
Reset Button

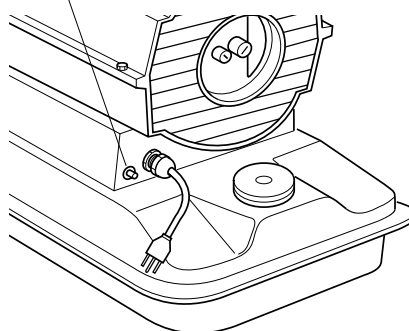


Figure 5 - Flame-Out Control Reset Button, 30/70,000 Btu/Hr

Flame-Out Control
Reset Button

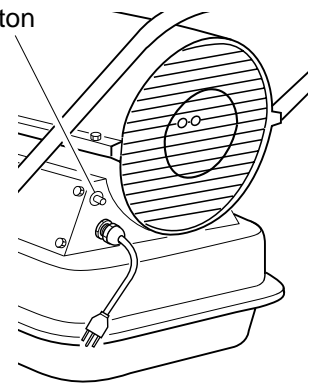


Figure 6 - Flame-Out Control Reset Button, 90/150,000 Btu/Hr

Continued

OPERATION

Continued

STORING, TRANSPORTING, OR SHIPPING

PREVENTATIVE MAINTENANCE SCHEDULE

To Stop Heater

1. Unplug power cord from outlet.

To Restart Heater

1. Wait 2 minutes after stopping heater.
2. Repeat steps under *To Start Heater*, page 7.

Note: If shipping, transport companies require fuel tanks to be empty.

1. Drain fuel tank.
Note: Some models have drain plug on underside of fuel tank. If so, remove drain plug to drain all fuel. If heater does not have drain plug, drain fuel through fuel cap opening. Be sure all fuel is removed.
2. Replace drain plug if provided.
3. If any debris is noted in old fuel, add 1 or 2 quarts of clean kerosene to tank, stir, and drain again. This will prevent excess debris from clogging filters during future use.
4. Replace fuel cap or drain plug. Properly dispose of old and dirty fuel. Check with local automotive service stations that recycle oil.
5. If storing, store heater in dry place. Make sure storage place is free of dust and corrosive fumes.

IMPORTANT: Do not store kerosene over summer months for use during next heating season. Using old fuel could damage heater.

WARNING


Never service heater while it is plugged in, operating, or hot. Severe burns and electrical shock can occur.

<u>Item</u>	<u>How Often</u>	<u>How To</u>
Fuel tank	Flush every 150-200 hours of operation or as needed.	See <i>Storing, Transporting, or Shipping</i> , above.
Air output and lint filters	Replace every 500 hours of operation or once a year.	See <i>Air Output, Air Intake, and Lint Filters</i> , page 14.
Air intake filter	Wash and dry with soap and water every 500 hours of operation or as needed.	See <i>Air Output, Air Intake, and Lint Filters</i> , page 14.
Fuel filter	Clean twice a heating season or as needed.	See <i>Fuel Filter</i> , page 11.
Spark plug	Clean and regap every 600 hours operation or replace as needed.	See <i>Spark Plug</i> , pages 12 and 13.
Fan blades	Clean every season or as needed.	See <i>Fan</i> , page 18.
Motor	Not required/permanently lubricated	

TROUBLE-SHOOTING

WARNING

Never service heater while it is plugged in, operating, or hot. Severe burns and electrical shock can occur.

<u>OBSERVED FAULT</u>	<u>POSSIBLE CAUSE</u>	<u>REMEDY</u>
Heater ignites, but flame-out control shuts off heater after a short period of time.	Wrong pump pressure	See <i>Pump Pressure Adjustment</i> , page 14.
	Dirty air output, air intake, and lint filters	See <i>Air Output, Air Intake and Lint Filters</i> , page 14.
	Dirty fuel filter	See <i>Fuel Filter</i> , page 11.
	Dirt in nozzle	See <i>Nozzle</i> , pages 15 and 16.
	Dirty photocell lens	Clean photocell lens.
	Bad flame-out control	Replace flame-out control.
Heater will not ignite, but motor runs for a short period of time.	Wrong pump pressure	See <i>Pump Pressure Adjustment</i> , page 14.
	Carbon deposits on spark plug and/or improper gap	See <i>Spark Plug</i> , pages 12 and 13.
	Dirty fuel filter	See <i>Fuel Filter</i> , page 11.
	Dirt in nozzle	See <i>Nozzle</i> , pages 15 and 16.
	Water in fuel tank	Drain and flush fuel tank with clean kerosene. See <i>Storing, Transporting, or Shipping</i> , page 8.
 WARNING: High voltage!		
	Electronic ignitor not grounded (earthed)	Make sure electronic ignitor mounting is tight.
	Bad electronic ignitor	Replace electronic ignitor.
Motor does not start when heater is plugged in, fan rotates slowly or does not turn.	Flame-out control not reset	Reset flame-out control button, see Figures 5 and 6, page 7.
	Binding pump rotor	If fan is hard to turn, see <i>Pump Rotor</i> , page 17.

SERVICE PROCEDURES

Upper Shell Removal

1. Remove screws and lock washers along each side of heater using 5/16" nut-driver. These screws attach upper and lower shells together.
2. Lift upper shell off.
3. Remove fan guard.

⚠ WARNING

Never service heater while it is plugged in, operating, or hot. Severe burns and electrical shock can occur.

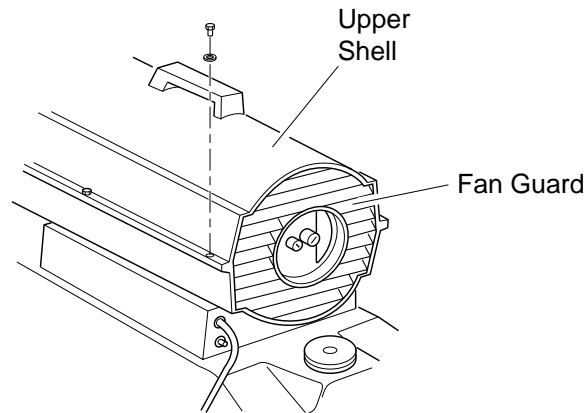


Figure 7 - Upper Shell Removal, 30/70,000 Btu/Hr Models

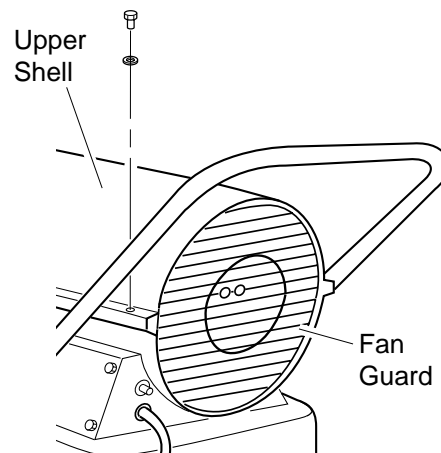


Figure 8 - Upper Shell Removal, 90/150,000 Btu/Hr Models

Fuel Filter

(30/70,000 Btu/Hr Models)

1. Remove side cover screws using 5/16" nut-driver.
2. Remove side cover.
3. Pull rubber fuel line off fuel filter neck.
4. Carefully pry bushing and fuel filter out of fuel tank.
5. Wash fuel filter with clean fuel and replace in tank.
6. Attach rubber fuel line to fuel filter neck.
7. Replace side cover.

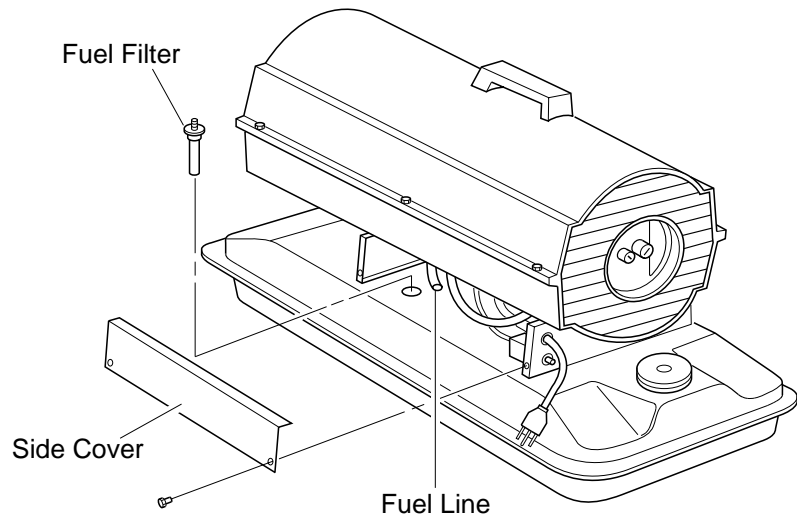


Figure 9 - Fuel Filter Removal, 30/70,000 Btu/Hr Models

Fuel Filter

(90/150,000 Btu/Hr Models)

1. Remove side cover screws using 5/16" nut-driver.
2. Remove side cover.
3. Pull upper fuel line off fuel filter neck.
4. Carefully pry bushing, lower fuel line, and fuel filter out of fuel tank.
5. Wash fuel filter with clean fuel and replace in tank.
6. Attach upper fuel line to fuel filter neck.
7. Replace side cover.

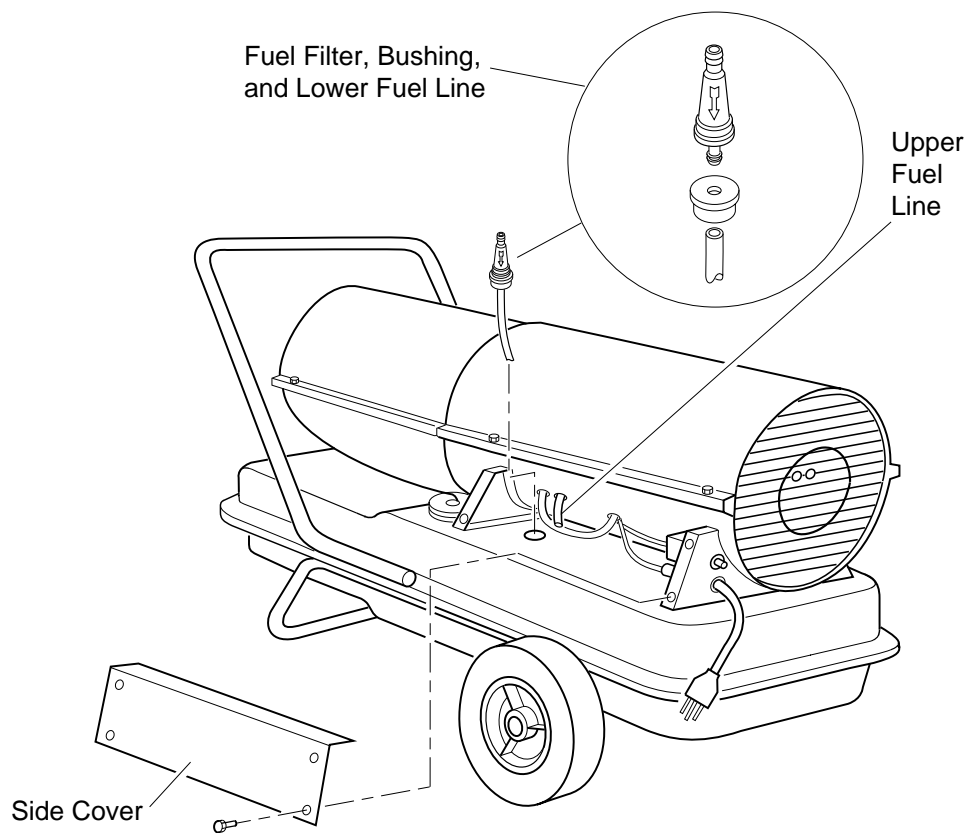


Figure 10 - Fuel Filter Removal, 90/150,000 Btu/Hr Models

Spark Plug

(30,000 Btu/Hr Model)

1. Remove upper shell (see page 10).
2. Remove fan (see page 18).
3. Remove fuel and air line hoses from nozzle assembly.
4. Remove spark plug wire from spark plug.
5. Remove two screws using 5/16" nut-driver and remove burner strap.
6. Place hex-body of spark plug into vise and tighten.
7. Remove spark plug mounting nut using 11/16" open-end wrench.
8. Remove burner strap from spark plug.
9. Clean and regap spark plug electrodes to 1.4 mm (.055") gap.
10. Replace burner strap onto spark plug. Rotate burner strap to position spark plug electrodes (see Figure 13).
11. Tighten spark plug with spark plug mounting nut.
12. Release hex-body of spark plug from vise.
13. Replace burner strap onto combustion chamber.
14. Attach spark plug wire to spark plug.
15. Attach fuel and air line hoses to nozzle assembly.
16. Replace fan (see page 18).
17. Replace fan guard and upper shell.

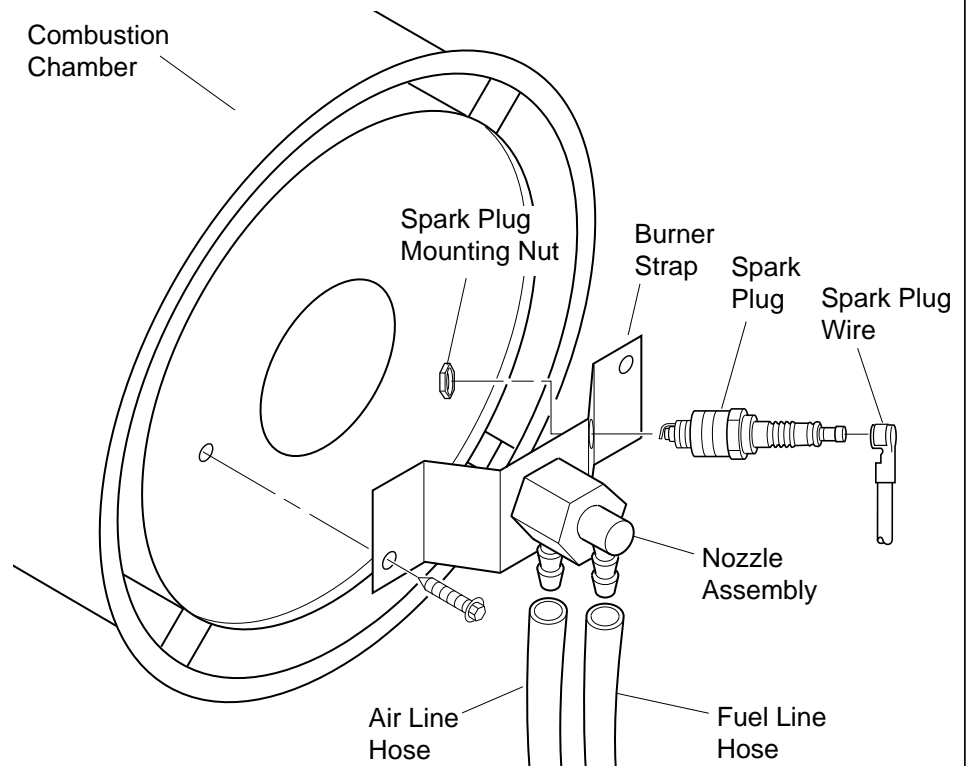


Figure 11 - Spark Plug Removal, 30,000 Btu/Hr Model

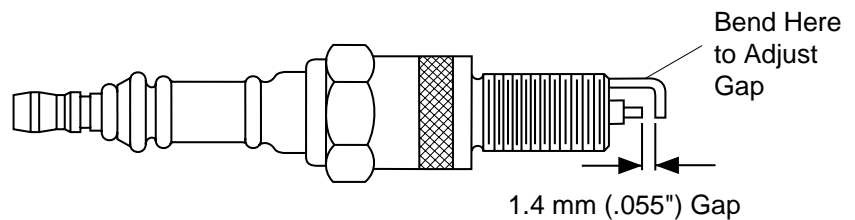


Figure 12 - Spark Plug Gap, 30,000 Btu/Hr Model

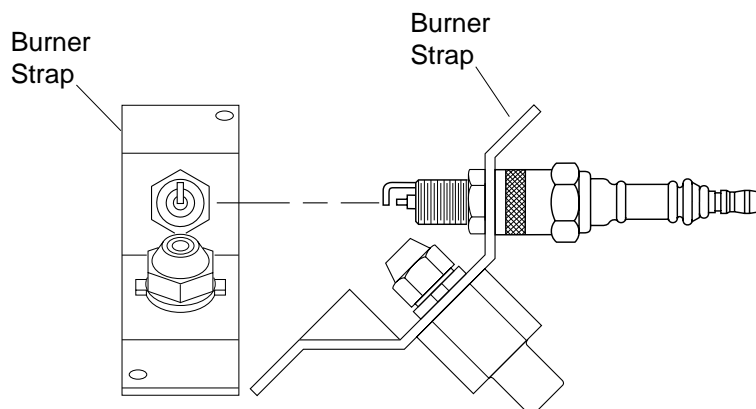


Figure 13 - Spark Plug Rotation, 30,000 Btu/Hr Model Only

Spark Plug

(70/90/150,000 Btu/Hr Models)

1. Remove upper shell (see page 10).
2. Remove fan (see page 18).
3. Remove spark plug wire from spark plug.
4. Remove spark plug from burner head using 13/16" open-end wrench.
5. Clean and regap spark plug electrodes as follows:
70/90,000 Btu/Hr Models:
1.4 mm (.055") gap
150,000 Btu/Hr Model:
2.2 mm (.085") gap
6. Install spark plug in burner head.
7. Attach spark plug wire to spark plug.
8. Replace fan (see page 18).
9. Replace fan guard and upper shell.

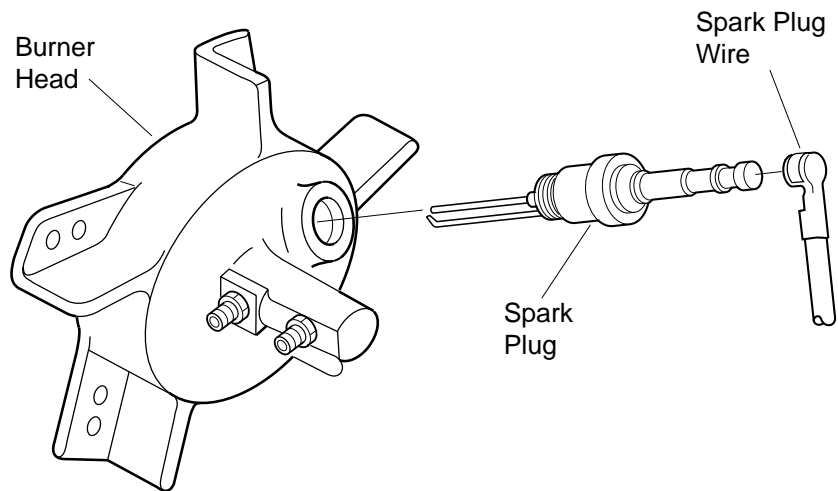


Figure 14 - Spark Plug Removal, 70/90/150,000 Btu/Hr Models

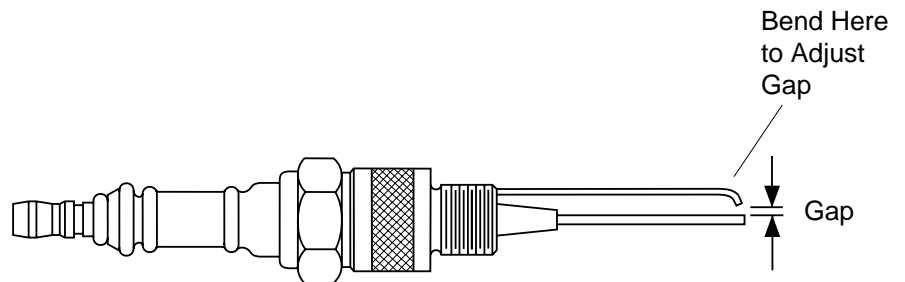


Figure 15 - Spark Plug Gap, 70/90/150,000 Btu/Hr Models

Air Output, Air Intake, and Lint Filters

1. Remove upper shell (see page 10).
2. Remove filter end cover screws using 5/16" nut-driver.
3. Remove filter end cover.
4. Replace air output and lint filters.
5. Wash or replace air intake filter (see *Preventative Maintenance Schedule*, page 8).
6. Replace filter end cover.
7. Replace fan guard and upper shell.

IMPORTANT: Do not oil filters

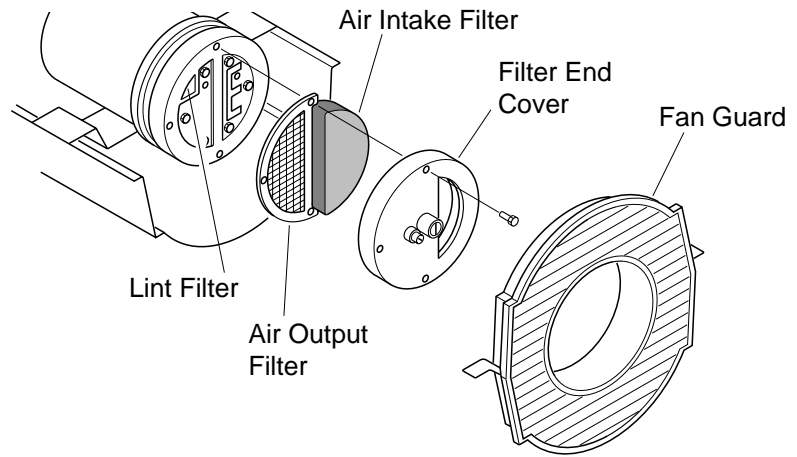


Figure 16 - Air Output, Air Intake, and Lint Filters, 30/70,000 Btu/Hr Models

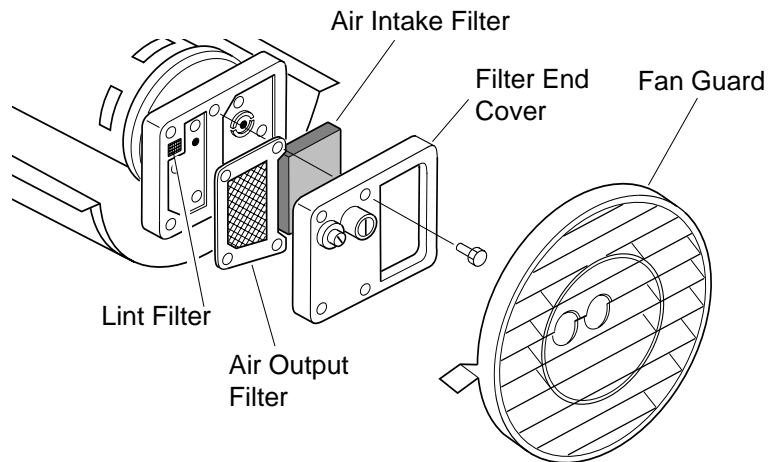


Figure 17 - Air Output, Air Intake, and Lint Filters, 90/150,000 Btu/Hr Models

Pump Pressure Adjustment

1. Remove pressure gauge plug from filter end cover.
2. Install accessory pressure gauge (part number HA1180).
3. Start heater (see *Operation*, page 7). Allow motor to reach full speed.
4. Adjust pressure. Turn relief valve to right to increase pressure. Turn relief valve to left to decrease pressure. See specifications at right for correct pressure for each model.
5. Remove pressure gauge. Replace pressure gauge plug in filter end cover.

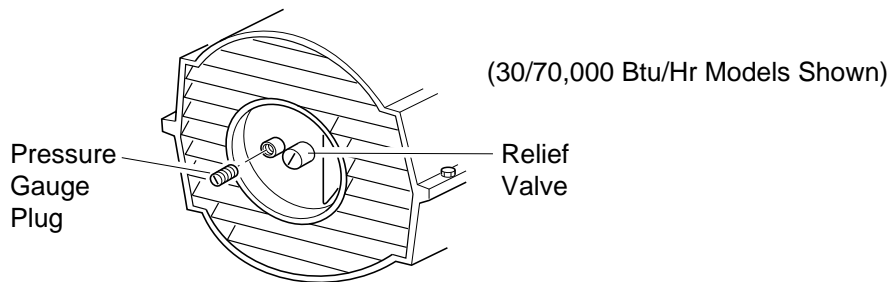


Figure 18 - Pressure Gauge Plug Removal

Model	Pump Pressure
30,000 Btu/Hr	2.6 PSI
70,000 Btu/Hr	3.8 PSI
90,000 Btu/Hr	4.4 PSI
150,000 Btu/Hr	4.8 PSI

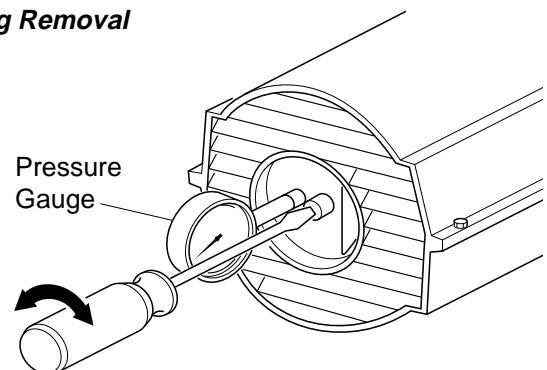


Figure 19 - Adjusting Pump Pressure

Nozzle

(30,000 Btu/Hr Model)

1. Remove upper shell (see page 10).
2. Remove fan (see page 18).
3. Remove fuel and air line hoses from nozzle assembly.
4. Turn nozzle assembly 1/4 turn to left and pull toward motor to remove.
5. Place plastic hex-body into vise and lightly tighten.
6. Carefully remove nozzle from the nozzle adapter using 5/8" socket wrench.
7. Blow compressed air thru face of nozzle. This will free any dirt in nozzle area.
8. Inspect nozzle seal for damage.
9. Replace nozzle into nozzle adapter until nozzle seats. Tighten 1/3 turn more using 5/8" socket wrench (4.5-5.1 n-m/40-45 inch-pounds).
10. Attach nozzle assembly to burner strap.
11. Attach fuel and airline hoses to nozzle assembly.
12. Replace fan (see page 18).
13. Replace fan guard and upper shell.

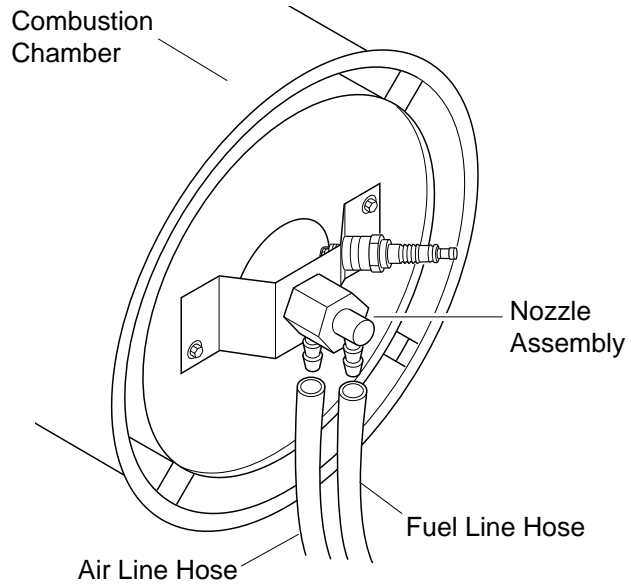


Figure 20 - Removing Air and Fuel Line Hoses, 30,000 Btu/Hr Model

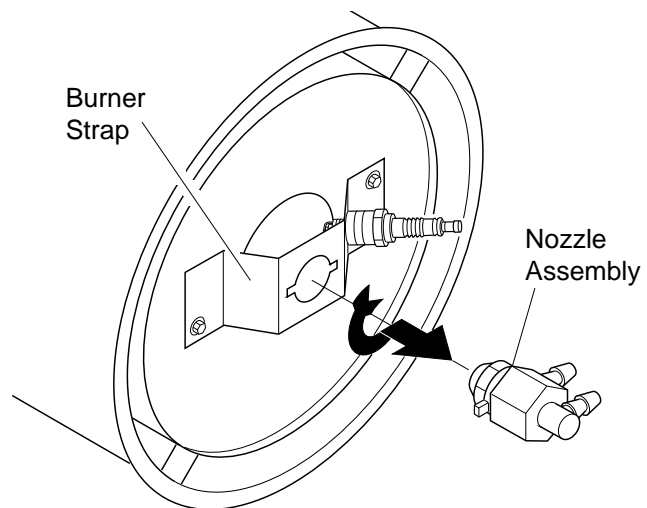


Figure 21 - Removing Nozzle Assembly, 30,000 Btu/Hr Model

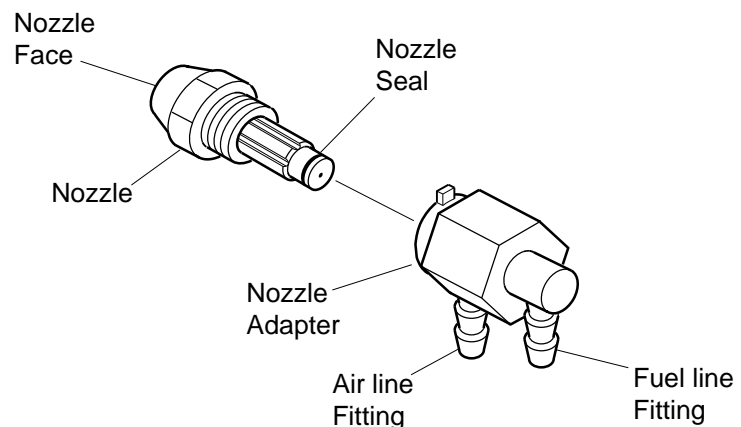


Figure 22 - Nozzle and Nozzle Adapter, 30,000 Btu/Hr Model

Nozzle

(70/90/150,000 Btu/Hr Models)

1. Remove upper shell (see page 10).
2. Remove fan (see page 18).
3. Remove fuel and air line hoses from burner head.
4. Remove spark plug wire from spark plug.
5. Remove spark plug from burner head using 13/16" open-end wrench.
6. Remove three screws using 5/16" nut-driver and remove burner head from combustion chamber.
7. Place burner head into vise and lightly tighten.
8. Carefully remove nozzle from burner head using 5/8" socket wrench (see Figure 24).
9. Blow compressed air thru face of nozzle. This will free any dirt in nozzle area.
10. Inspect nozzle seal for damage.
11. Replace nozzle into burner head and tighten firmly (9.1-12.4 n-m/80-110 inch-pounds).
12. Attach burner head to combustion chamber.
13. Install spark plug in burner head.
14. Attach spark plug wire to spark plug.
15. Attach fuel and airline hoses to burner head.
16. Replace fan (see page 18).
17. Replace fan guard and upper shell.

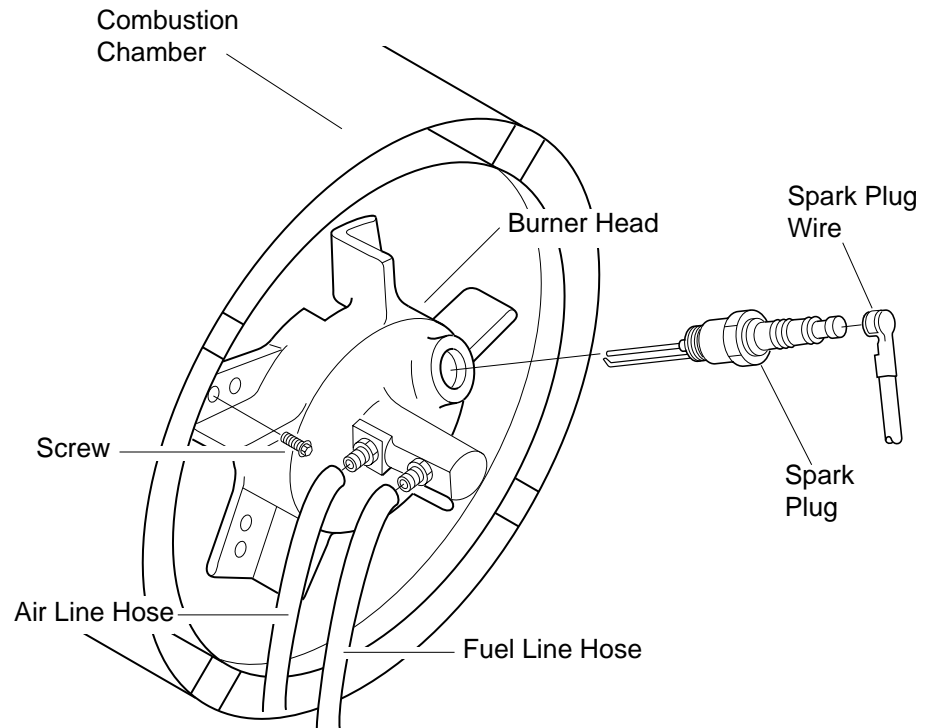


Figure 23 - Removing Burner Head, 70/90/150,000 Btu/Hr Models

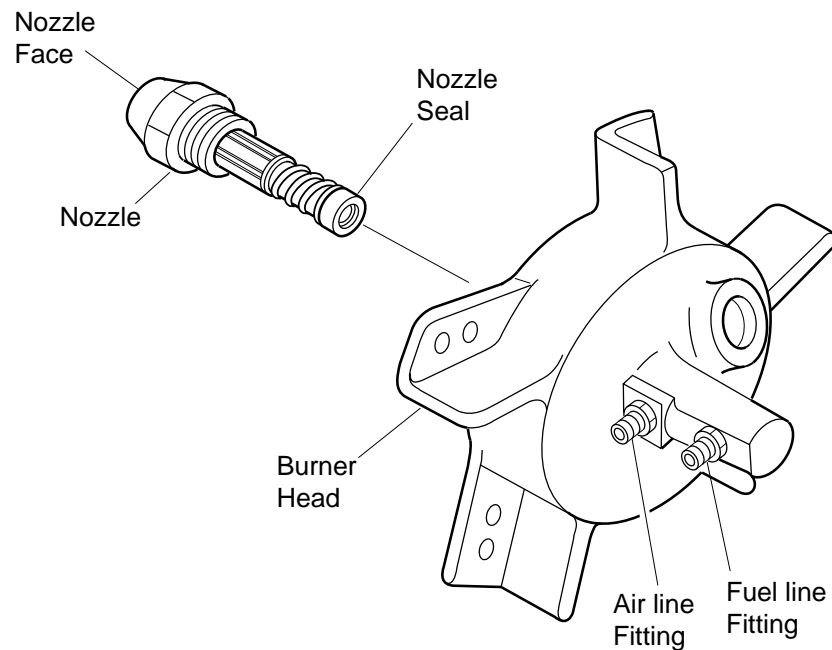


Figure 24 - Removing Nozzle, 70/90/150,000 Btu/Hr Models

Pump Rotor

(Procedure if rotor is binding)

1. Remove upper shell (see page 10).
2. Remove filter end cover screws using 5/16" nut-driver.
3. Remove filter end cover and air filters.
4. Remove pump plate screws using 5/16" nut-driver.
5. Remove pump plate.
6. Remove rotor, insert, and blades.
7. Check for debris in pump. If debris is found, blow out with compressed air.
8. Install insert and rotor.
9. Check gap on rotor. Adjust to .076/.101 mm (.003"/.004") if needed (see Figure 27).

Note: Rotate rotor one full turn to insure the gap is .076/.101 mm (.003"/.004") at tightest position. Adjust if needed.

10. Install blades, pump plate, air filters, and filter end cover.
11. Replace fan guard and upper shell.
12. Adjust pump pressure (see page 14).

Note: If rotor is still binding, proceed as follows.

13. Perform steps 1 thru 6 above.
14. Place fine grade sandpaper (600 grit) on flat surface. Sand rotor lightly in "figure 8" motion four times (see Figure 28).
15. Reinstall insert and rotor.
16. Perform steps 10 thru 12 above.

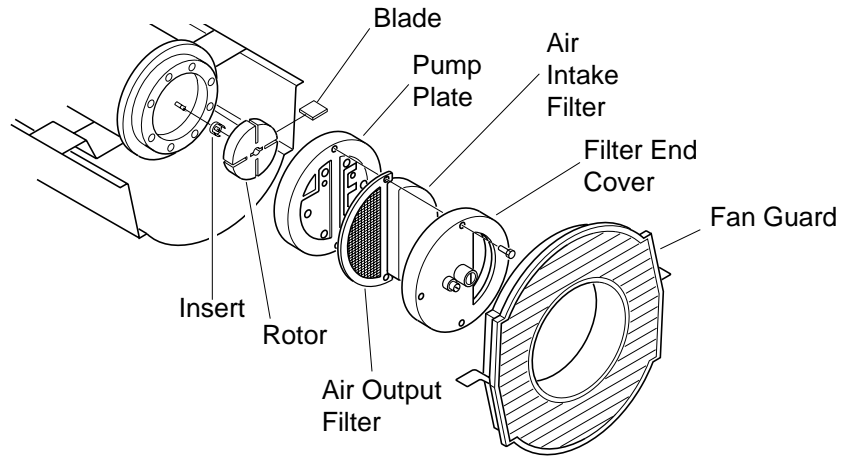


Figure 25 - Rotor Location, 30/70,000 Btu/Hr Models

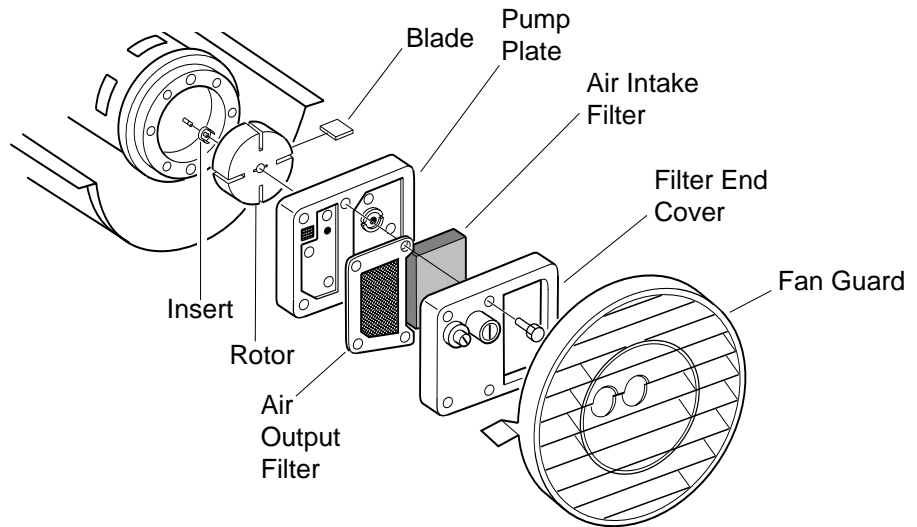


Figure 26 - Rotor Location, 90/150,000 Btu/Hr Models

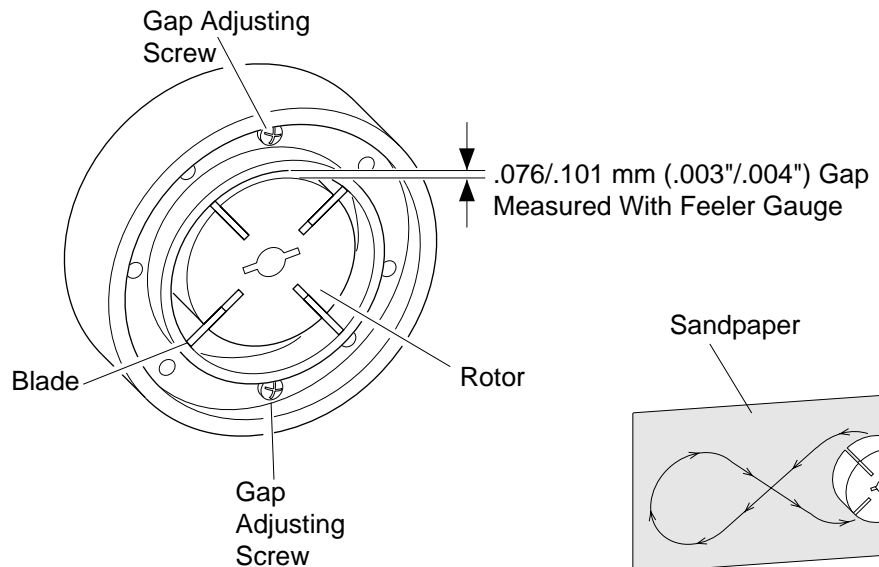


Figure 27 - Gap Adjusting Screw Locations

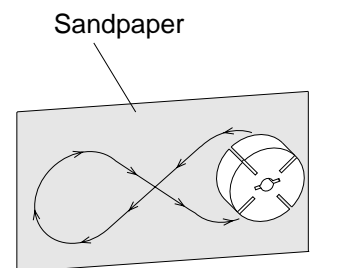


Figure 28 - Sanding Rotor

Fan

IMPORTANT: Remove fan from motor shaft before removing motor from heater. The weight of the motor resting on the fan could damage the fan pitch.

1. Remove upper shell (see page 10).
2. Use 1/8" allen wrench to loosen setscrew which holds fan to motor shaft.
3. Slip fan off motor shaft.
4. Clean fan using a soft cloth moistened with kerosene or solvent.
5. Dry fan thoroughly.
6. Replace fan on motor shaft. Place fan hub flush with end of motor shaft (see Figure 30).
7. Place setscrew on flat of shaft. Tighten setscrew firmly (40-50 inch-pounds/ 4.5-5.6 n-m).
8. Replace fan guard and upper shell.

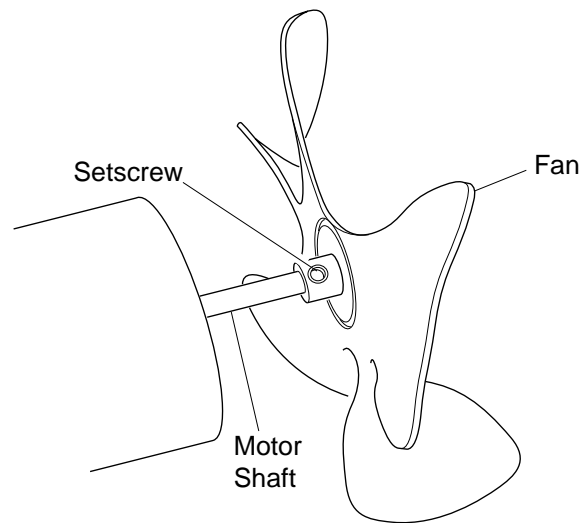


Figure 29 - Fan, Motor Shaft, and Setscrew Location

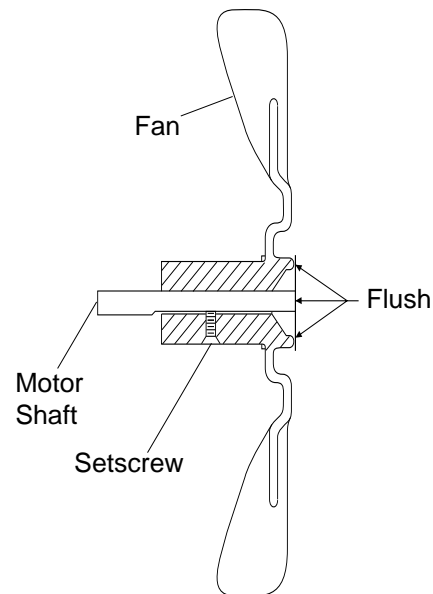


Figure 30 - Fan Cross Section

SPECIFICATIONS

Output Rating (Btu/Hr)	30,000	70,000	90,000	150,000
Fuel	Use Only Kerosene or No. 1 Fuel Oil			
Fuel Tank Capacity (U.S. Gal./Liters)	3.0/11.4	5.0/18.9	9.0/34	13.5/51.1
Fuel Consumption (Gal. Per Hr./Liters Per Hr.)	.23/.87	.49/1.85	.66/2.5	1.1/4.1
Electric Requirements	230 V/50 Hz (Same All Models)			
Amperage (Normal Run)	.8	1.0	1.6	1.2
Hot Air Output (CFM/CMM)	140/4	225/6.4	425/12	500/14.2
RPM	1425	2850	2850	2850

WIRING DIAGRAMS

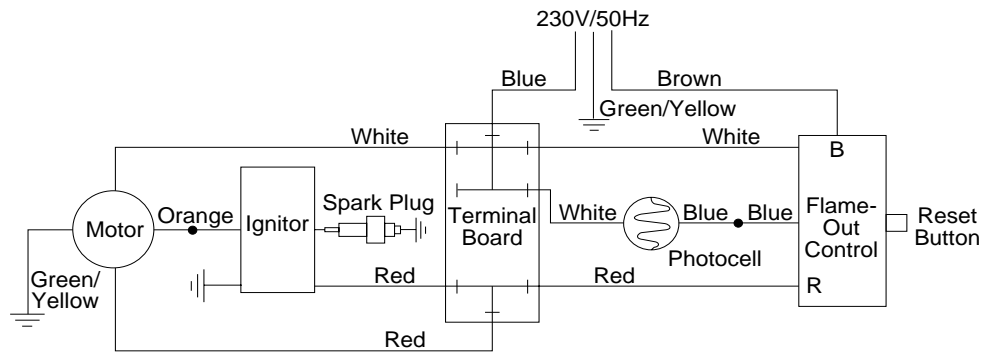


Figure 31 - Wiring Diagram, 30/150,000 Btu/Hr Models

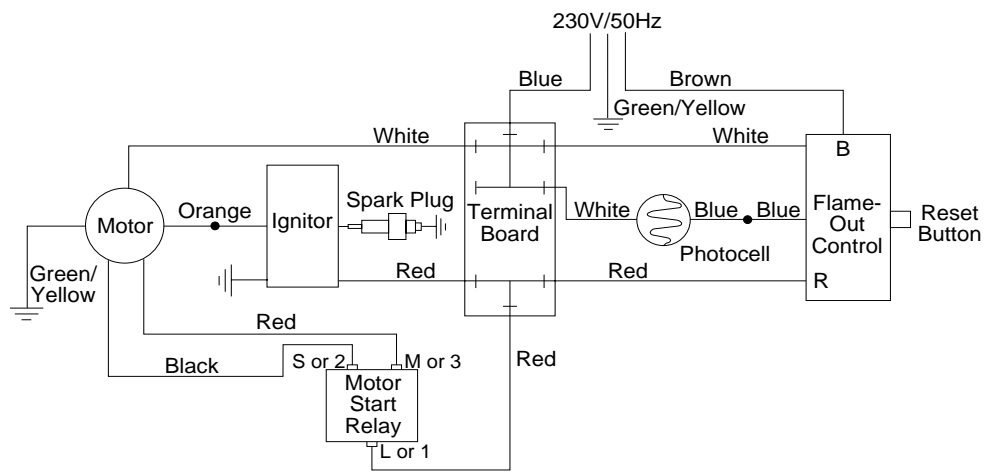
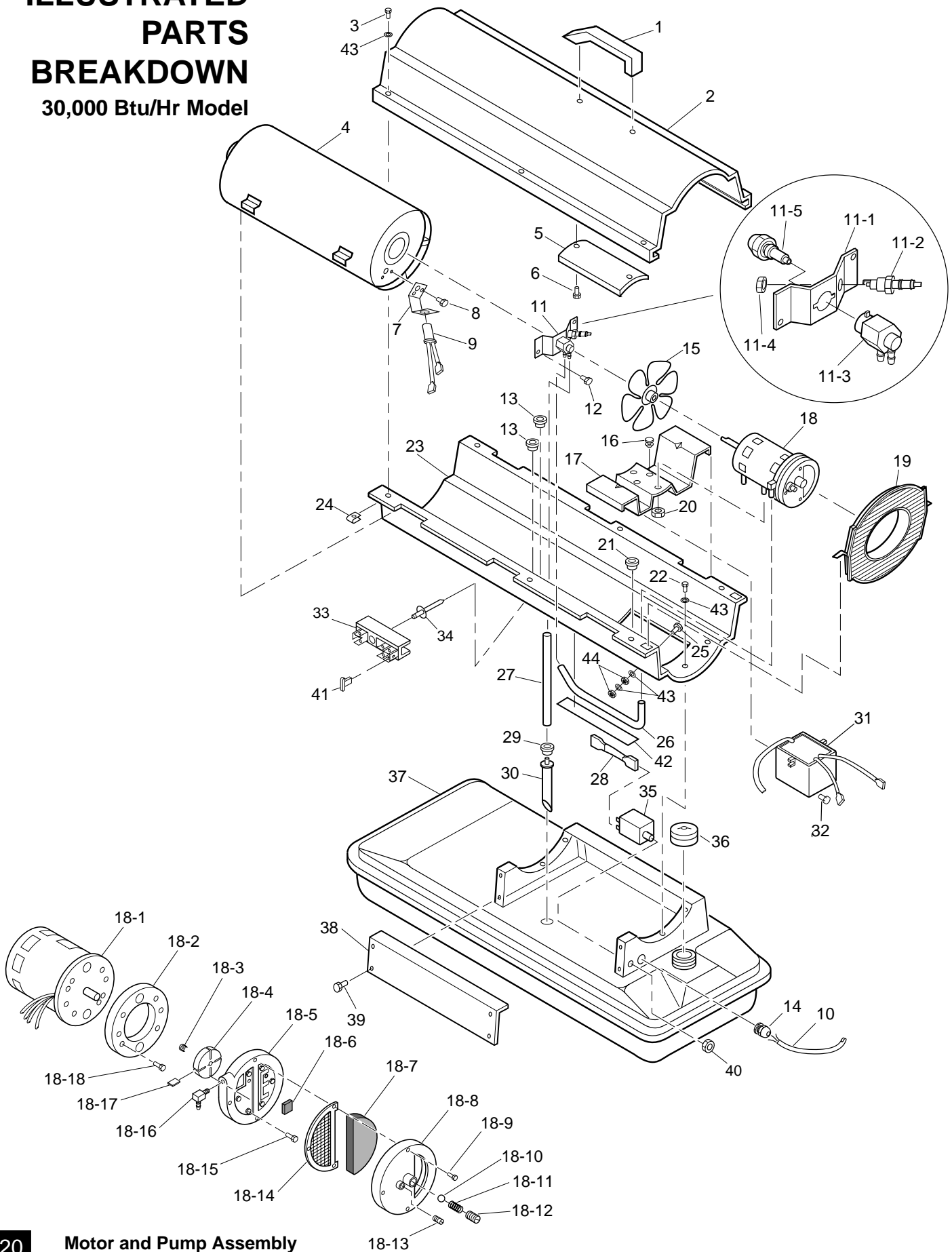


Figure 32 - Wiring Diagram, 70/90,000 Btu/Hr Models

ILLUSTRATED PARTS BREAKDOWN

30,000 Btu/Hr Model



PARTS LIST

30,000 Btu/Hr Model

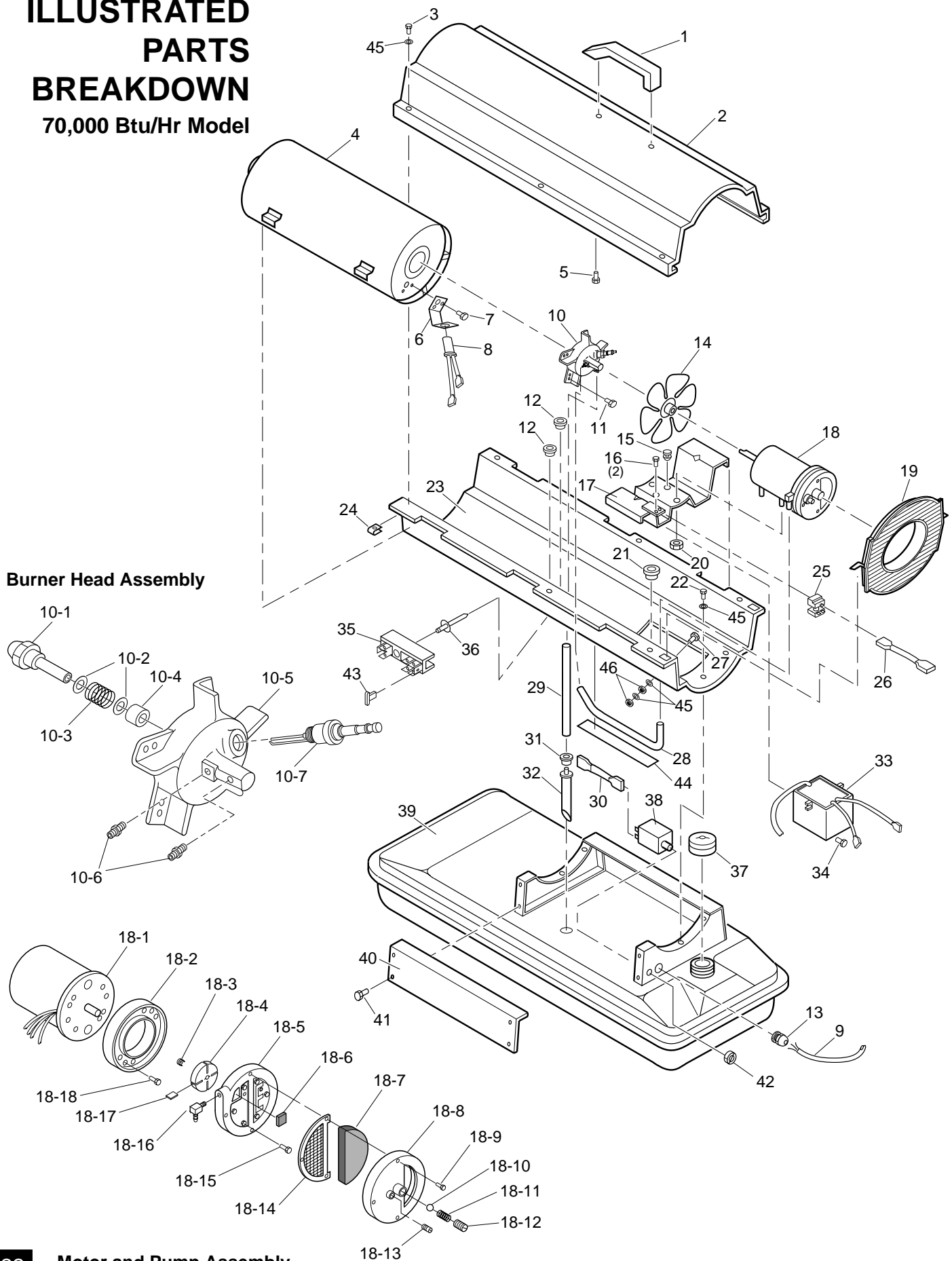
This list contains replaceable parts used in your heater. When ordering parts, be sure to provide the correct model and serial numbers (from the model plate), then the part number and description of the desired part.

KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.	KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	M51104-01	Handle	1	21	M50104-02	Bushing (wires)	1
2	098511-54	Upper Shell	1	22	M11084-26	Screw, #10-16 x 3/8"	6
3	100647-01	Screw, #10-16 x 1/2"	6	23	098511-12	Lower Shell	1
4	098512-20	Combustion Chamber	1	24	M11271-8	Clip Nut	6
5	M51108-01	Heat Shield	1	25	RF3-5B	Screw, #10-32 x 1/2"	1
6	M11084-29	Screw, #10-16 x 3/4"	2	26	M29652-04	Rubber Airline	1
7	M16660	Photocell Bracket	1	27	M29652-05	Fuel Line	1
8	M10908-2	Screw, #6-32 x 3/8"	2	28	M16841-57	Wire Assembly (red 8 1/2")	1
9	HA3019	Photocell Assembly	1	29	M10990-3	Rubber Bushing	1
10	M15779-27	Power Cord	1	30	M50876-04	Fuel Filter Assembly (Includes bushing)	1
11	**	Burner Strap Assembly	1				
11-1	097124-01	Bracket	1	31	098557-07	Electronic Ignitor	1
11-2	M29835-2	Spark Plug	1	32	M11084-29	Screw, #10-16 x 3/4"	2
11-3	079980-01	Nozzle Adapter	1	33	099125-02	Terminal Board	1
11-4	M29824	Nut, 14mm	1	34	099157-01	Rivet	1
11-5	M29681	Nozzle	1	35	097630-02	Flame-Out Control	1
12	M11084-26	Screw, #10-16 x 3/8"	2	36	097702-01	Fuel Tank Cap	1
13	M30865-02	Bushing	2	37	098513-73	Fuel Tank	1
14	M50400	Strain Relief Bushing	1	38	M50899-03AA	Side Cover	1
15	M30884	Fan	1	39	M11084-26	Screw, #10-16 x 3/8"	2
16	M50631	Rubber Bumper	2	40	099177-01	Hex Nut	1
17	098138-01	Motor Bracket	1	41	078918-01	Terminal Board Tab Cap	1
18	**	Motor and Pump Assembly	1	42	097785-01	Vinyl Foam Gasket	1
18-1	098642-02	Motor (230V/50Hz)	1	43	WLE-3	Lock Washer, #10	14
18-2	079975-03	Pump Body	1	44	NPF-3B	Nut, #10-32	2
18-3	M22009	Insert	1	PARTS AVAILABLE - NOT SHOWN			
18-4	M22456-2	Rotor	1				
18-5	M29608	End Pump Cover	1		HA2210	Filler Neck Screen	1
18-6	M29632	Lint Filter	1		097649-01	Tradename Decal	1
18-7	M29633	Intake Filter	1		M9900-192	Combustion Chamber Ground Wire	1
18-8	M29609	End Filter Cover	1		101887-13	Operation Decal (English/French)	1
18-9	M12461-31	Screw, #10-32 x 1"	3		101887-14	Operation Decal (Spanish/Dutch)	1
18-10	M8940	Steel Ball (1/4" Dia.)	1		101639-02	Warning Decal (English/French/Spanish)	1
18-11	M10993-1	Pressure Relief Spring	1		101639-03	Warning Decal (Dutch)	1
18-12	M27694	Adjusting Screw	1				
18-13	M22997	Plug	1				
18-14	M29612-01	Output Filter	1				
18-15	M12461-32	Screw, #10-32 x 1 1/8"	6				
18-16	M50016	Elbow, 90° (Barb Fitting)	1				
18-17	M8643-2	Blade	4				
18-18	FHPF3-6C	Screw, #10-32 x 3/4"	2				
19	M51105-01	Fan Guard	1				
20	NTC-4C	Hex locknut	2				

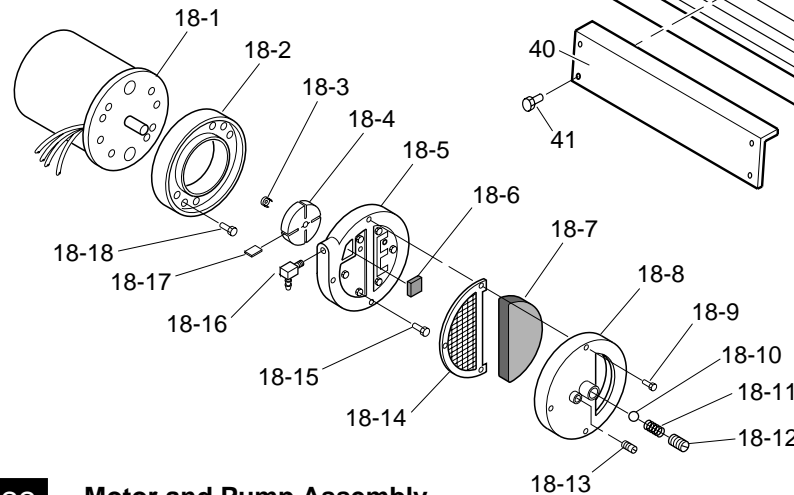
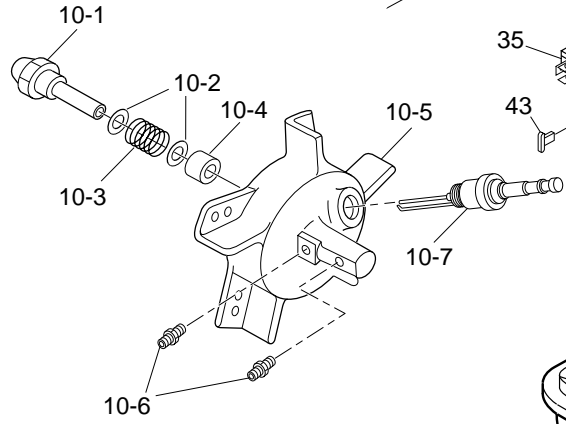
**Not available as an assembly, order parts separately.

ILLUSTRATED PARTS BREAKDOWN

70,000 Btu/Hr Model



Burner Head Assembly



PARTS LIST

70,000 Btu/Hr Model

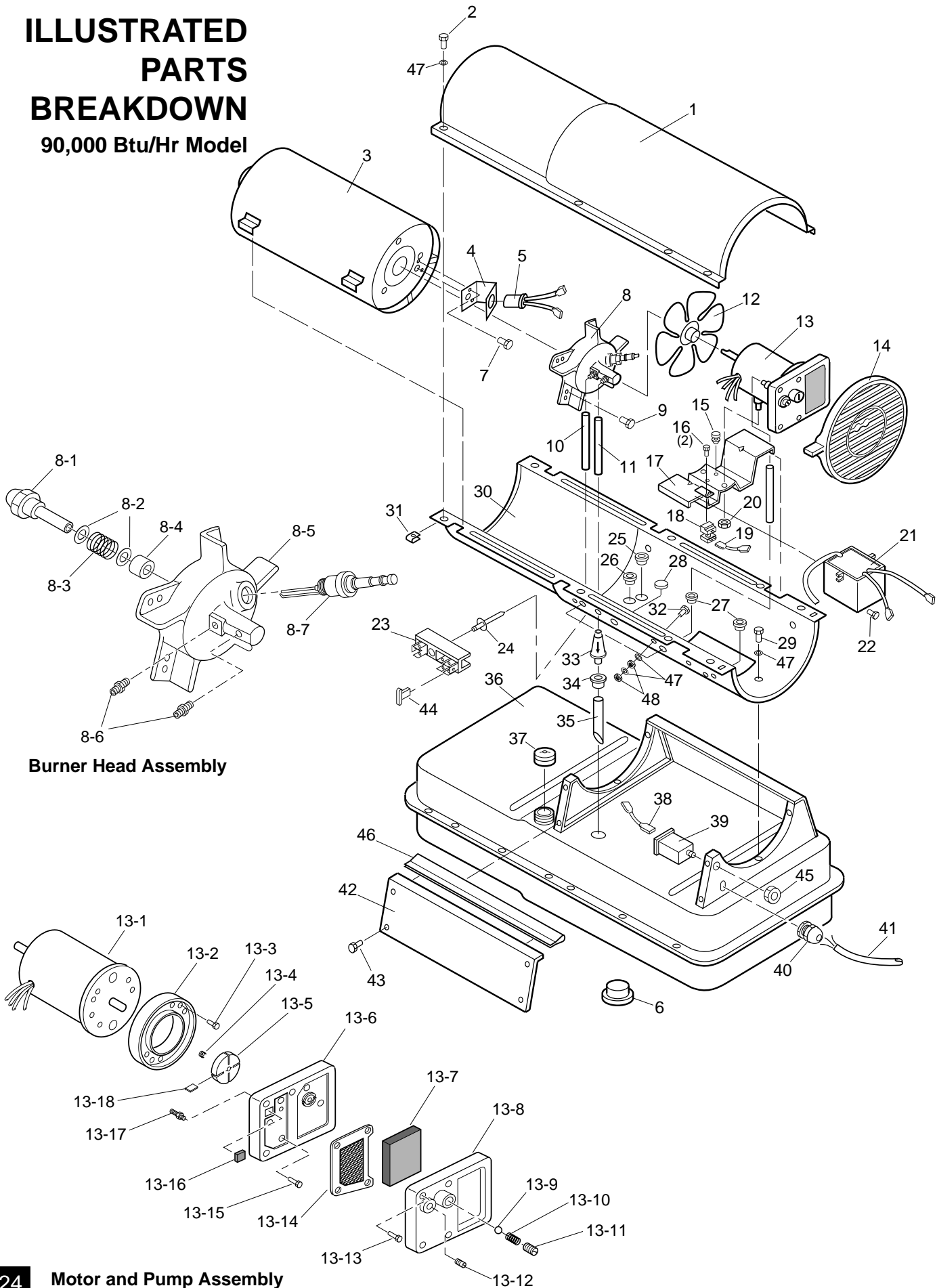
This list contains replaceable parts used in your heater. When ordering parts, be sure to provide the correct model and serial numbers (from the model plate), then the part number and description of the desired part.

KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.	KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	M51104-01	Handle	1	20	NTC-4C	Hex locknut	2
2	098511-54	Upper Shell	1	21	M50104-02	Bushing (wires)	1
3	100647-01	Screw, #10-16 x 1/2"	6	22	M11084-26	Screw, #10-16 x 3/8"	6
4	098512-12	Combustion Chamber	1	23	098511-12	Lower Shell	1
5	M11084-29	Screw, #10-16 x 3/4"	2	24	M11271-8	Clip Nut	6
6	M16660	Photocell Bracket	1	25	098136-02	Relay (motor start)	1
7	M10908-2	Screw, #6-32 x 3/8"	2	26	M16841-58	Wire Assembly (red 9 1/2")	1
8	HA3019	Photocell Assembly	1	27	RF3-5B	Screw, #10-32 x 1/2"	1
9	M15779-27	Power Cord	1	28	M29652-04	Rubber Airline	1
10	**	Burner Head Assembly	1	29	079973-01	Fuel Line	1
10-1	M50880-01	Nozzle	1	30	M16841-57	Wire Assembly (red 8 1/2")	1
10-2	M10659-1	Nozzle Seal Washer	2	31	M10990-3	Rubber Bushing	1
10-3	M10809-1	Nozzle Seal Spring	1	32	M50876-05	Fuel Filter Assembly (Includes bushing)	1
10-4	M8882	Nozzle Seal Sleeve	1				
10-5	M51098-02	Burner Head Body	1	33	098557-07	Electronic Ignitor	1
10-6	M50820-01	Barb Fitting	2	34	M11084-29	Screw, #10-16 x 3/4"	2
10-7	M10962-2	Spark Plug	1	35	099125-02	Terminal Board	1
11	M11084-27	Screw, #10-16 x 1/2"	3	36	099157-01	Rivet	1
12	M30865-02	Bushing	2	37	097702-01	Fuel Tank Cap	1
13	M50400	Strain Relief Bushing	1	38	097630-02	Flame-Out Control	1
14	097026-01	Fan	1	39	098513-74	Fuel Tank	1
15	M50631	Rubber Bumper	2	40	M50899-03AA	Side Cover	1
16	M12461-13	Screw, #8-32 x 1/4" (holds relay in position)	2	41	M11084-26	Screw, #10-16 x 3/8"	2
17	098138-01	Motor and Relay Bracket Assembly	1	42	099177-01	Hex Nut	1
18	**	Motor and Pump Assembly	1	43	078918-01	Terminal Board Tab Cap	1
18-1	098782-02	Motor (230V/50Hz)	1	44	097785-01	Vinyl Foam Gasket	1
18-2	079975-02	Pump Body	1	45	WLE-3	Lock Washer, #10	14
18-3	M22009	Insert	1	46	NPF-3B	Nut, #10-32	2
18-4	M22456-1	Rotor	1	PARTS AVAILABLE - NOT SHOWN			
18-5	M29608	End Pump Cover	1		HA2210	Filler Neck Screen	1
18-6	M29632	Lint Filter	1		097649-01	Tradename Decal	1
18-7	M29633	Intake Filter	1		M9900-192	Combustion Chamber	
18-8	M29609	End Filter Cover	1			Ground Wire	1
18-9	M12461-31	Screw, #10-32 x 1"	3		101887-15	Operation Decal (English/French)	1
18-10	M8940	Steel Ball (1/4" Dia.)	1		101887-16	Operation Decal (Spanish/Dutch)	1
18-11	M10993-1	Pressure Relief Spring	1		101639-02	Warning Decal (English/French/Spanish)	1
18-12	M27694	Adjusting Screw	1		101639-03	Warning Decal (Dutch)	1
18-13	M22997	Plug	1				
18-14	M29612-01	Output Filter	1				
18-15	M12461-31	Screw, #10-32 x 1"	6				
18-16	M50016	Elbow, 90° (Barb Fitting)	1				
18-17	M8643	Blade	4				
18-18	FHPF3-5C	Screw, #10-32 x 5/8"	2				
19	M51105-01	Fan Guard	1				

**Not available as an assembly, order parts separately.

ILLUSTRATED PARTS BREAKDOWN

90,000 Btu/Hr Model



Burner Head Assembly

PARTS LIST

90,000 Btu/Hr Model

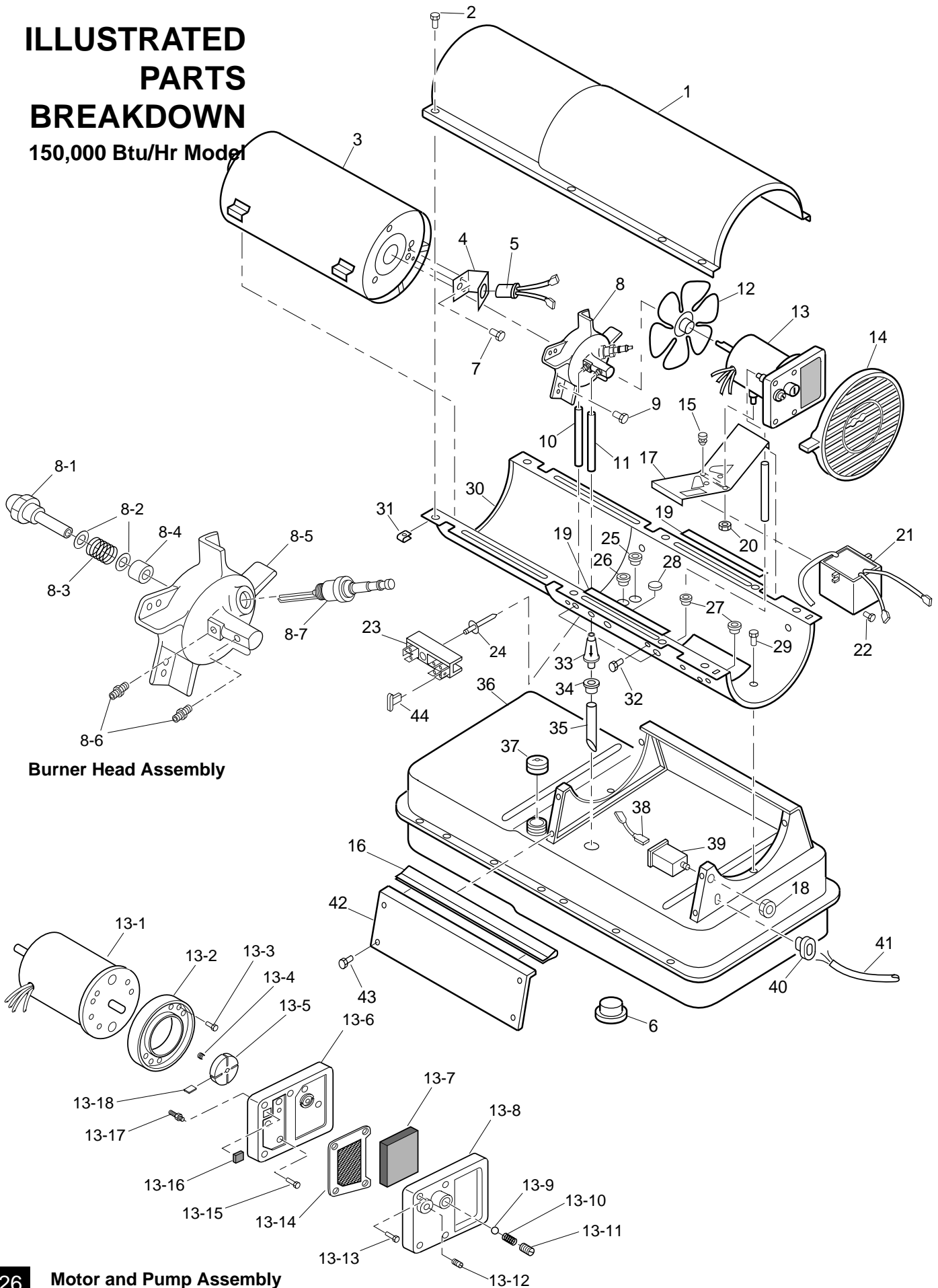
This list contains replaceable parts used in your heater. When ordering parts, be sure to provide the correct model and serial numbers (from the model plate), then the part number and description of the desired part.

KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.	KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	098511-138	Upper Shell	1	21	098557-07	Electronic Ignitor	1
2	100647-01	Screw, #10-16 x 1/2"	8	22	M11084-29	Screw, #10-16 x 3/4"	2
3	098512-07	Combustion Chamber	1	23	099125-02	Terminal Board	1
4	M16660	Photocell Bracket	1	24	099157-01	Rivet	1
5	HA3019	Photocell Assembly	1	25	M50104-03	Bushing	1
6	M27417	Drain Plug	1	26	M50104-03	Bushing	1
7	M10908-2	Screw, #6-32 x 3/8"	2	27	M50104-01	Bushing	2
8	**	Burner Head Assembly	1	28	099213-01	Button Plug	1
8-1	M23103	Nozzle	1	29	M11084-27	Screw, #10-16 x 1/2"	6
8-2	M10659-1	Nozzle Seal Washer	2	30	098511-191	Lower Shell	1
8-3	M10809-1	Nozzle Seal Spring	1	31	M11271-8	Clip Nut	8
8-4	M8882	Nozzle Seal Sleeve	1	32	RF3-5B	Screw, #10-32 x 1/2"	1
8-5	M50924-03	Burner Head Body	1	33	M51150-01	Fuel filter	1
8-6	M50820-02	Barb Fitting	2	34	M10990-3	Rubber Bushing	1
8-7	M10962-2	Spark Plug	1	35	M51151-01	Fuel Line	1
9	M11084-27	Screw, #10-16 x 1/2"	3	36	098513-75	Fuel Tank	1
10	M50814-06	Air Line	1	37	097702-01	Fuel Tank Cap	1
11	M51345-01	Fuel Line	1	38	M16841-57	Wire Assembly (red 8 1/2")	1
12	097293-01	Fan	1	39	097630-02	Flame-Out Control	1
13	**	Motor and Pump Assembly	1	40	M50400	Strain Relief Bushing	1
13-1	098783-02	Motor (230V/50Hz)	1	41	M15779-27	Power Cord	1
13-2	079975-02	Pump Body	1	42	M51077-01AA	Side Cover	1
13-3	FHPF3-5C	Screw, #10-32 x 5/8"	2	43	M11084-27	Screw, #10-16 x 1/2"	4
13-4	M22009	Insert	1	44	078918-01	Terminal Board Tab Cap	1
13-5	M22456-1	Rotor	1	45	099177-01	Hex Nut	1
13-6	M50545	End Pump Cover	1	46	097468-01	Edge Liner	1
13-7	M12179	Intake Filter	1	47	WLE-3	Lock Washer, #10	16
13-8	M16545	End Filter Cover	1	48	NPF-3B	Nut, #10-32	2
13-9	M8940	Steel Ball (1/4" Dia.)	1	PARTS AVAILABLE - NOT SHOWN			
13-10	M10993-1	Pressure Relief Spring	1		HA2210	Filler Neck Screen	1
13-11	M27694	Adjusting Screw	1		097650-01	Tradename Decal	1
13-12	M22997	Plug	1		M9900-192	Combustion Chamber Ground Wire	1
13-13	M12461-31	Screw, #10-32 x 1"	4		101888-17	Operation Decal (English/French)	1
13-14	M12244-1	Output Filter	1		101888-18	Operation Decal (Spanish/Dutch)	1
13-15	M12461-31	Screw, #10-32 x 1"	6		101639-04	Warning Decal	1
13-16	M11637	Lint Filter	1				
13-17	M50820-02	Barb Fitting	1				
13-18	M8643	Blade	4				
14	M51114-01	Fan Guard	1				
15	M50631	Rubber Bumper	2				
16	M12461-13	Screw, #8-32 x 1/4"	2				
17	101206-01	Motor and Relay Bracket Assembly	1				
18	098136-04	Relay (motor start)	1				
19	M16841-59	Wire Assembly (red 13 1/2")	1				
20	NTC-4C	Hex locknut	2				

**Not available as an assembly, order parts separately.

ILLUSTRATED PARTS BREAKDOWN

150,000 Btu/Hr Model



Burner Head Assembly

26 Motor and Pump Assembly

PARTS LIST

150,000 Btu/Hr Model

This list contains replaceable parts used in your heater. When ordering parts, be sure to provide the correct model and serial numbers (from the model plate), then the part number and description of the desired part.

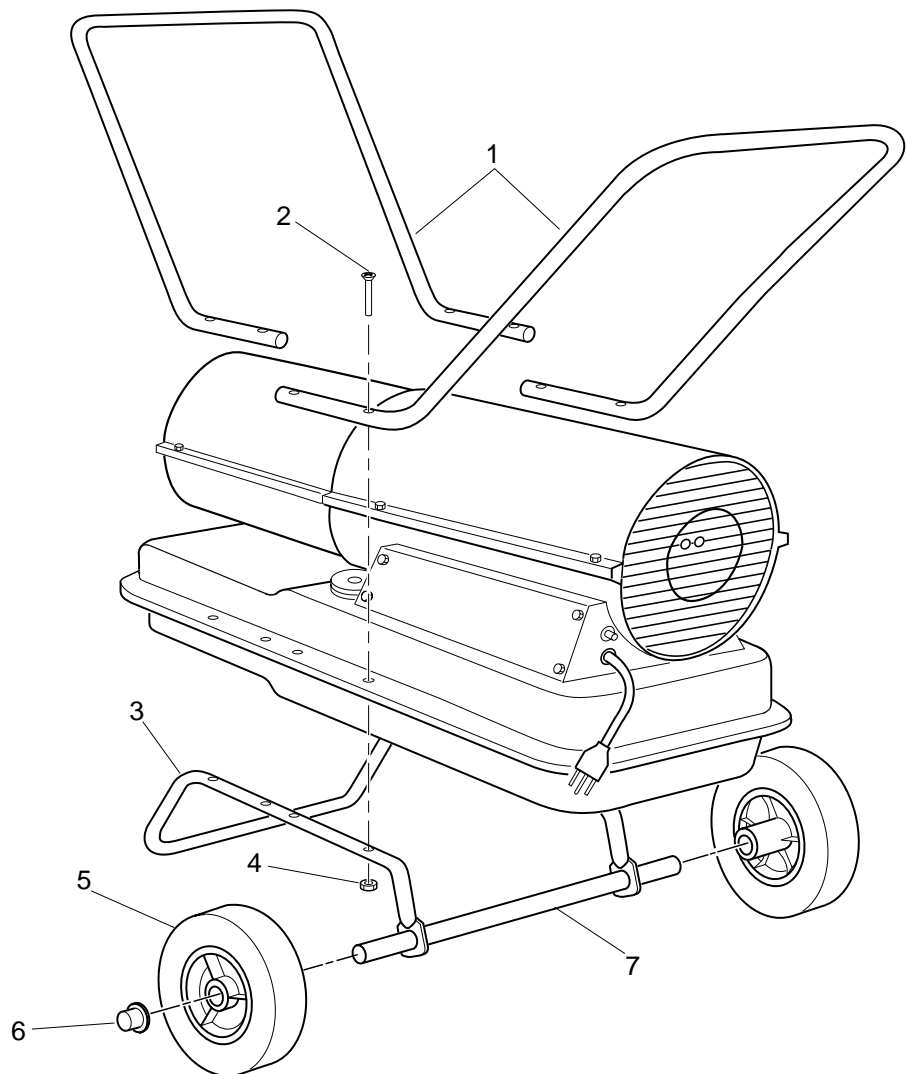
KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.	KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	098511-138	Upper Shell	1	20	NTC-4C	Hex locknut	2
2	100647-01	Screw, #10-16 x 1/2"	8	21	101901-02	Electronic Ignitor	1
3	098512-36	Combustion Chamber	1	22	M11084-29	Screw, #10-16 x 3/4"	2
4	099229-01	Photocell Bracket	1	23	099125-02	Terminal Board	1
5	HA3019	Photocell Assembly	1	24	099157-01	Rivet	1
6	M27417	Drain Plug	1	25	M50104-03	Bushing	1
7	M10908-2	Screw, #6-32 x 3/8"	2	26	M50104-03	Bushing	1
8	**	Burner Head Assembly	1	27	M50104-01	Bushing	2
8-1	100735-11	Nozzle	1	28	099213-01	Button Plug	1
8-2	M10659-1	Nozzle Seal Washer	2	29	M11084-27	Screw, #10-16 x 1/2"	6
8-3	M10809-1	Nozzle Seal Spring	1	30	098511-191	Lower Shell	1
8-4	M8882	Nozzle Seal Sleeve	1	31	M11271-8	Clip Nut	8
8-5	M50924-08	Burner Head Body	1	32	RF3-5B	Screw, #10-32 x 1/2"	1
8-6	M50820-02	Barb Fitting	2	33	M51150-01	Fuel filter	1
8-7	M10962-2	Spark Plug	1	34	M10990-3	Rubber Bushing	1
9	M11084-27	Screw, #10-16 x 1/2"	3	35	M51151-02	Fuel Line	1
10	M50814-06	Air Line	1	36	098513-76	Fuel Tank	1
11	M51345-01	Fuel Line	1	37	097702-01	Fuel Tank Cap	1
12	102042-01	Fan	1	38	M16841-57	Wire Assembly (red 8 1/2")	1
13	**	Motor and Pump Assembly	1	39	097630-02	Flame-Out Control	1
13-1	102040-01	Motor (with capacitor)	1	40	M50400	Strain Relief Bushing	1
13-2	079975-03	Pump Body	1	41	M15779-27	Power Cord	1
13-3	FHPF3-6C	Screw, #10-32 x 3/4"	2	42	M51077-01AA	Side Cover	1
13-4	M22009	Insert	1	43	M11084-27	Screw, #10-16 x 1/2"	4
13-5	M22456-2	Rotor	1	44	078918-01	Terminal Board Tab Cap	1
13-6	M50545	End Pump Cover	1	45	099177-01	Hex Nut	1
13-7	M12179	Intake Filter	1	46	097785-04	Vinyl Foam Gasket	2
13-8	M16545	End Filter Cover	1	PARTS AVAILABLE - NOT SHOWN			
13-9	M8940	Steel Ball (1/4" Dia.)	1		HA2210	Filler Neck Screen	1
13-10	M10993-1	Pressure Relief Spring	1		097650-01	Tradename Decal	1
13-11	M27694	Adjusting Screw	1		M9900-192	Combustion Chamber Ground Wire	1
13-12	M22997	Plug	1		101888-15	Operation Decal (English/French)	1
13-13	M12461-31	Screw, #10-32 x 1"	4		101888-16	Operation Decal (Spanish/Dutch)	1
13-14	M12244-1	Output Filter	1		101639-04	Warning Decal	1
13-15	M12461-32	Screw, #10-32 x 1 1/8"	6				
13-16	M11637	Lint Filter	1				
13-17	M50820-02	Barb Fitting	1				
13-18	M8643-2	Blade	4				
14	M51114-01	Fan Guard	1				
15	M50631	Rubber Bumper	2				
16	097468-01	Edge Liner	1				
17	101206-01	Motor Bracket	1				
18	WLE-3	Lock Washer, #10	16				
19	NPF-3B	Nut, #10-32	2				

**Not available as an assembly, order parts separately.

WHEELS AND HANDLES

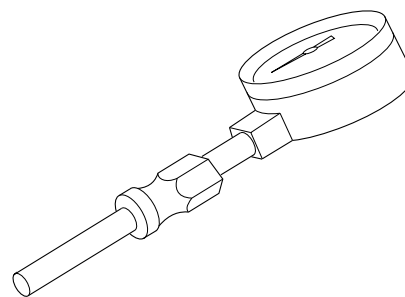
90,000 AND 150,000
Btu/Hr MODELS

KEY NO.	PART NUMBER	PART DESCRIPTION	90,000 QTY.	150,000 QTY.
1	HA2203	Handles	2	—
	HA2204	Handles	—	2
2	M12345-33	Screw, #10-24 x 1 3/4"	8	8
3	M12342-3	Wheel Support Frame	1	—
	M12831-3	Wheel Support Frame	—	1
4	NTC-3C	Hex Nut, #10-24	8	8
5	097896-03	Wheel	2	2
6	M28526	Cap Nut	2	2
7	M51015-01	Axle	1	—
	M16801-2	Axle	—	1



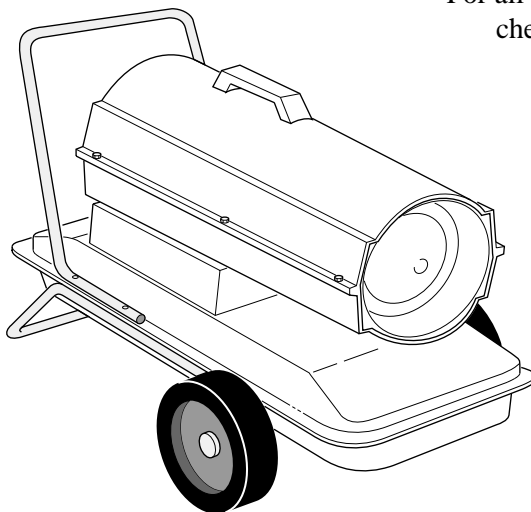
ACCESSORIES

Purchase accessories from your local dealer.



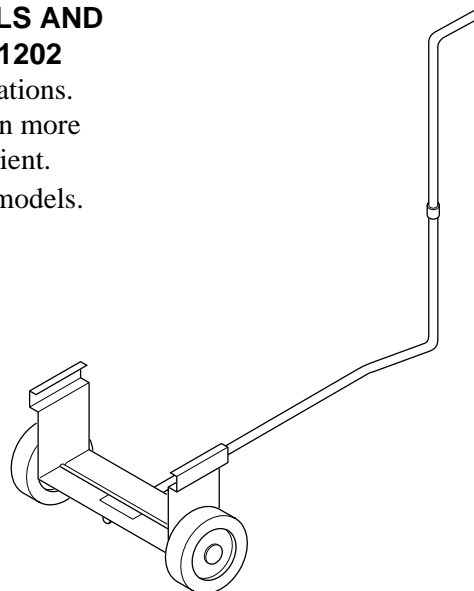
AIR GAUGE KIT - HA1180

For all models. Special tool to check pump pressure.



HEAVY DUTY WHEELS AND HANDLE KIT - HA1202

For heavy duty applications. Makes your heater even more portable and convenient. For 30/70,000 Btu/Hr models.



STANDARD WHEELS AND HANDLE KIT - HA1206

Makes heater even more portable and convenient. Easy to assemble. For 30/70,000 Btu/Hr models.

EC CONFORMITY DECLARATION

EC CONFORMITY DECLARATION

DESA Europe B.V.
Industrieweg 167, 3044 AS
Postbus 11158
3004 ED Rotterdam
Holland

Manufacturer:
DESA International, Inc.
2701 Industrial Drive
Bowling Green, KY 42101 U.S.A.

Kerosene Portable Forced Air Heaters
Model Numbers: BY30CE, BY70CE, BY100CE, BY150CE

It is declared that these models conform to the Machinery Directive 89/392/EEG, including 91/368/EEG.

We declare that the models noted are in conformity.

<u>Company</u>	DESA International, Inc.
<u>Name</u>	Douglas D. Rohrer
<u>Title</u>	Vice President, Specialty Products Engineering

07/04/95 — Bowling Green, KY

Date and Place

Douglas D. Rohrer
Signature

WARRANTY AND REPAIR SERVICE

CERTIFICATE OF GENERAL EQUIPMENT - LIMITED 90 DAY WARRANTY

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WARRANTY SERVICE

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.

A Service Manual is available by writing to the Technical Service Department at:

DESA

INTERNATIONAL

Corporate Headquarters

2701 Industrial Drive

P.O. Box 90004

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