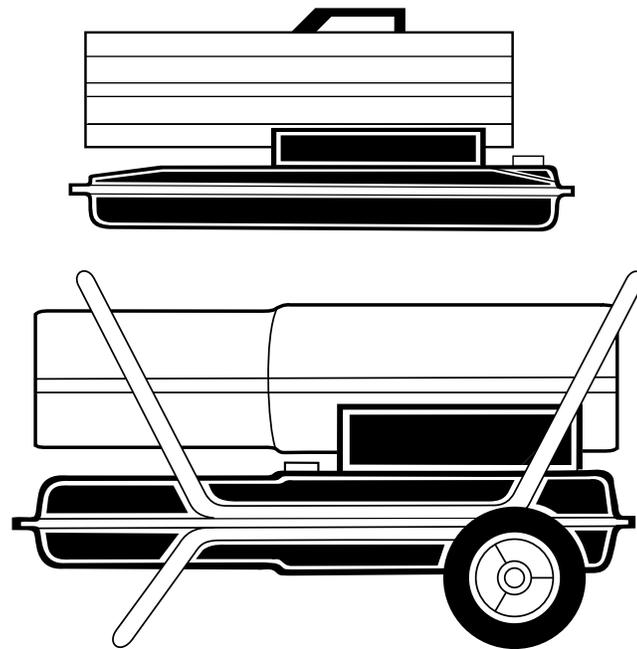


MASTER[®]

PORTABLE FORCED AIR HEATERS

OWNER'S MANUAL



Heater Sizes: 35,000 70,000 100,000 150,000 Btu/Hr
Models: BY35CEA, BY70CEA, BY100CEA, and BY150CEA

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.



CONTENTS

SECTION	PAGE
Safety Information	2
Product Identification	4
Unpacking	5
Assembly	5
Theory of Operation	6
Fuels	6
Ventilation	7
Operation	7
Storing, Transporting, or Shipping	8
Preventative Maintenance Schedule	8
Troubleshooting	9
Service Procedures	10
Upper Shell Removal	10
Fuel Filter (35/70,000 Btu/Hr Models)	11
Fuel Filter (100/150,000 Btu/Hr Models)	11
Spark Plug (35,000 Btu/Hr Model)	12
Spark Plug (70/100/150,000 Btu/Hr Models)	13
Air Output, Air Intake, and Lint Filters	14
Pump Pressure Adjustment	14
Nozzle (35,000 Btu/Hr Model)	15
Nozzle (70/100/150,000 Btu/Hr Models)	16
Pump Rotor	17
Fan	18
Specifications	18
Wiring Diagrams	19
Illustrated Parts Breakdown and Parts List	20
35,000 Btu/Hr Model	20
70,000 Btu/Hr Model	22
100,000 Btu/Hr Model	24
150,000 Btu/Hr Model	26
Wheels and Handles (100/150,000 Btu/Hr Models)	28
Accessories	29
EC Conformity Declaration	30
Warranty and Repair Service	Back Cover

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

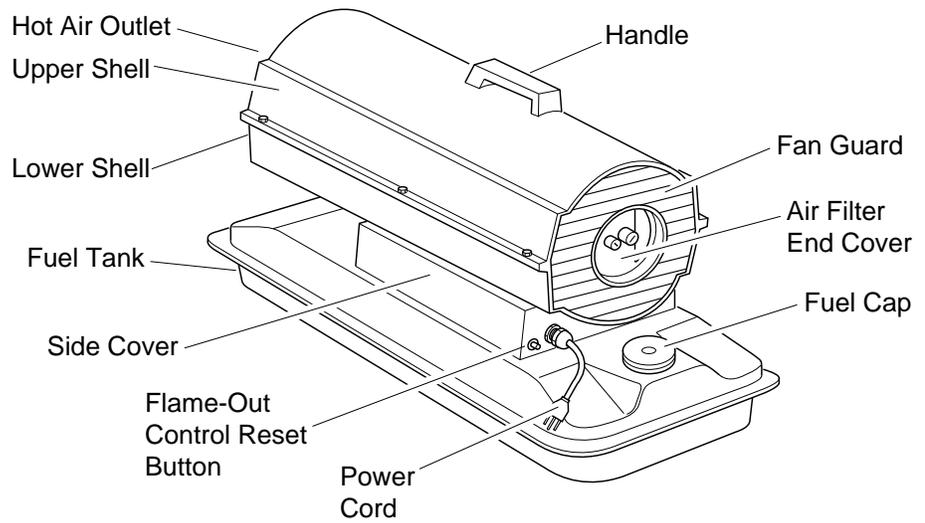


Figure 1 - 35/70,000 Btu/Hr Models

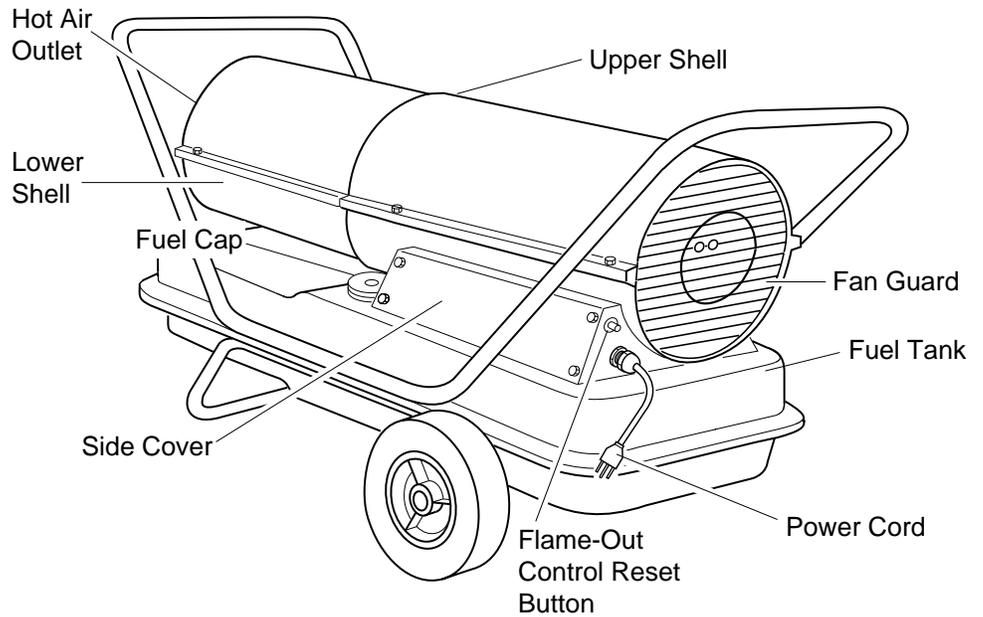


Figure 2 - 100/150,000 Btu/Hr Models

UNPACKING

ASSEMBLY

(For 100,000 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.

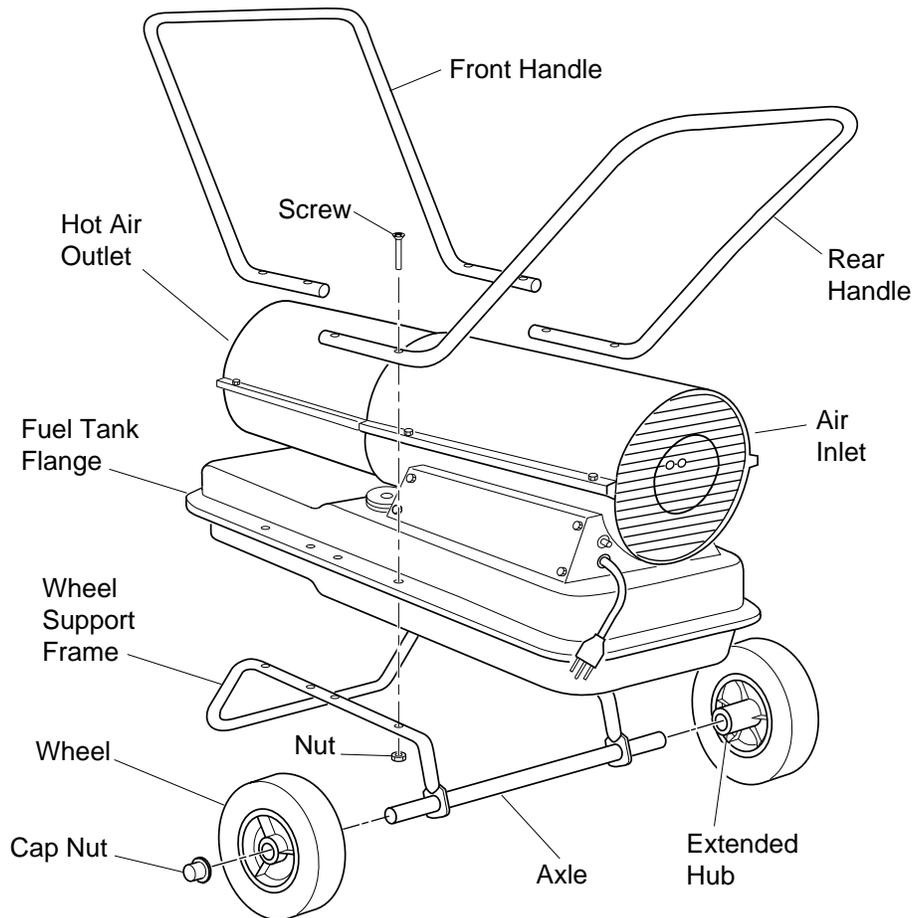


Figure 3 - Wheel and Handle Assembly, 100/150,000 Btu/Hr Models Only

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.

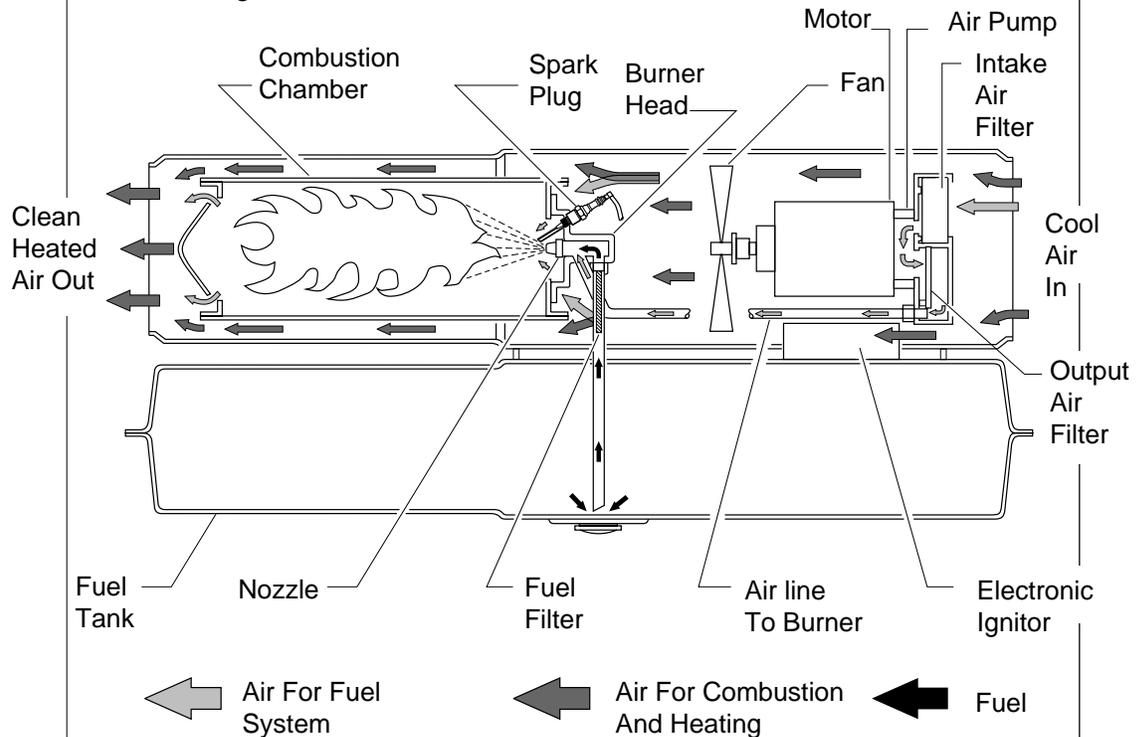


Figure 4 - Cross Section Operational View

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 cm (six inches)
- a single-car garage door raised 23 cm (nine inches)
- two, 76 cm (thirty-inch) windows raised 31 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

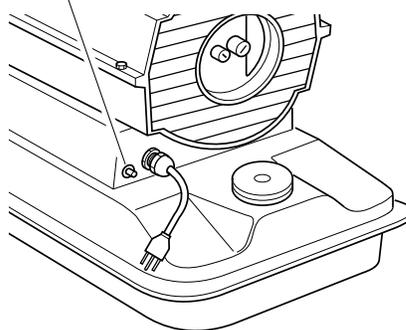


Figure 5 - Flame-Out Control Reset Button, 35/70,000 Btu/Hr

Flame-Out Control
Reset Button

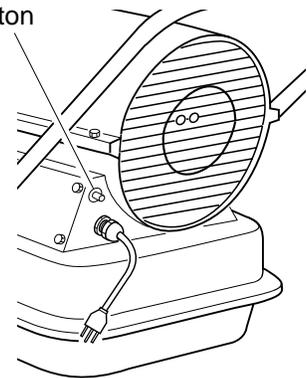


Figure 6 - Flame-Out Control Reset Button, 100/150,000 Btu/Hr

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.

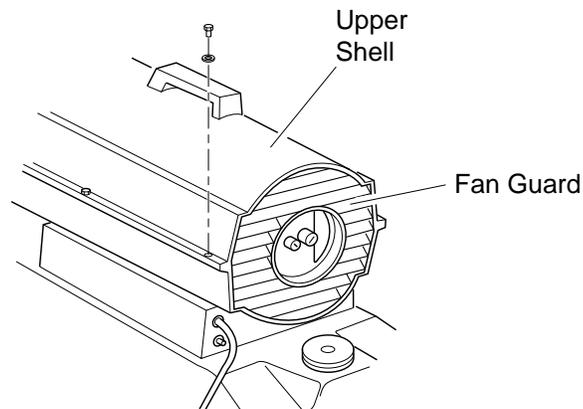


Figure 7 - Upper Shell Removal, 35/70,000 Btu/Hr Models

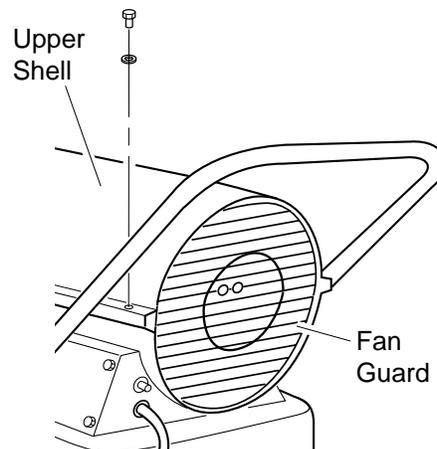


Figure 8 - Upper Shell Removal, 100/150,000 Btu/Hr Models

Fuel Filter

(35/70,000 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.

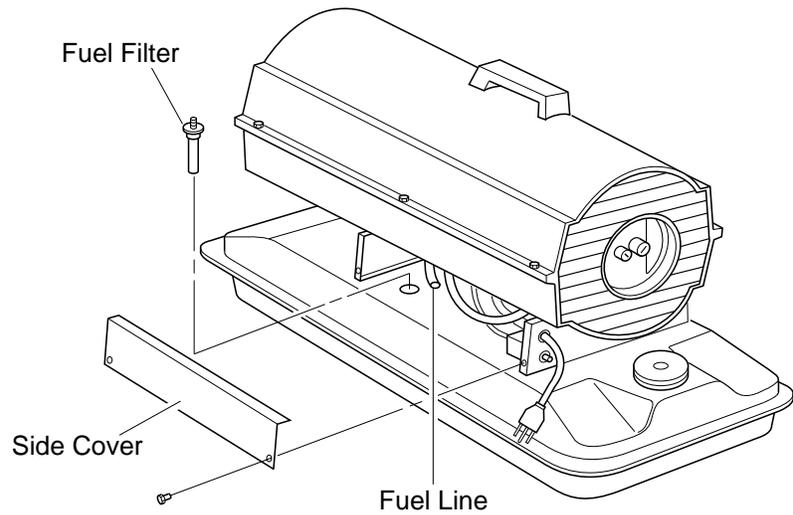


Figure 9 - Fuel Filter Removal, 35/70,000 Btu/Hr Models

Fuel Filter

(100/150,000 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.

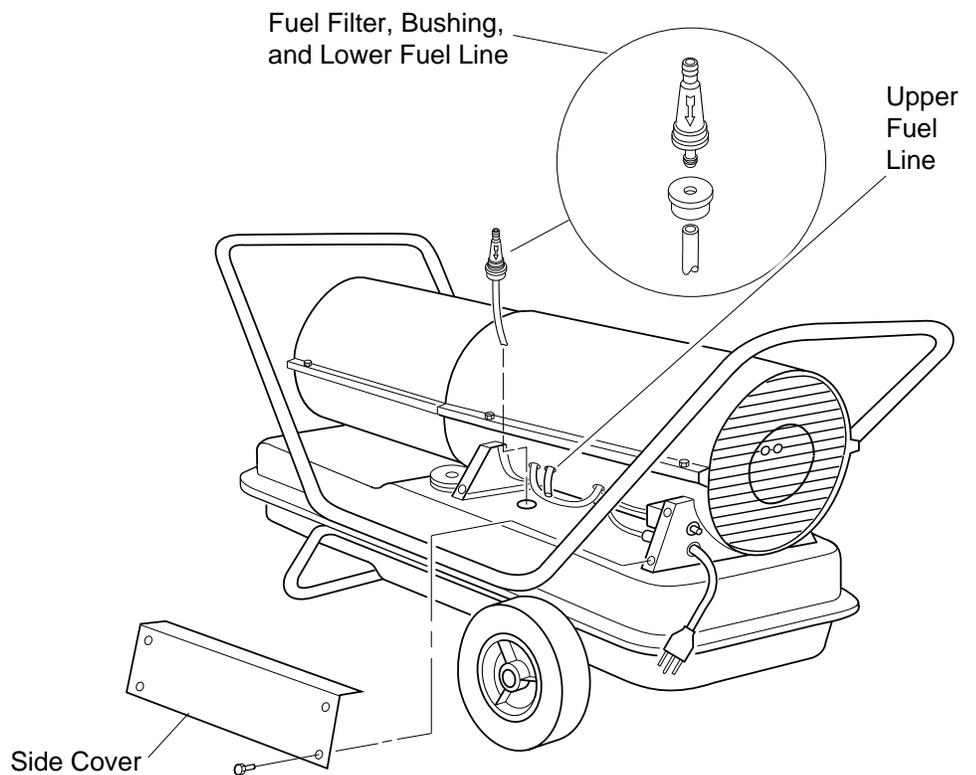


Figure 10 - Fuel Filter Removal, 100/150,000 Btu/Hr Models

Spark Plug

(35,000 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.

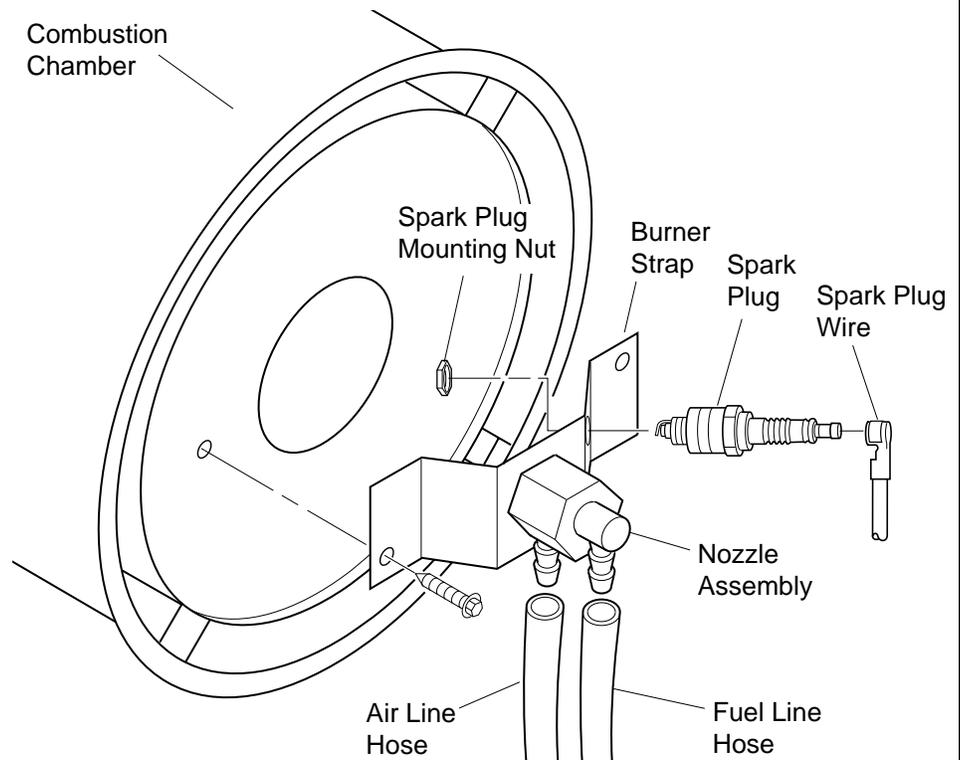


Figure 11 - Spark Plug Removal, 35,000 Btu/Hr Model

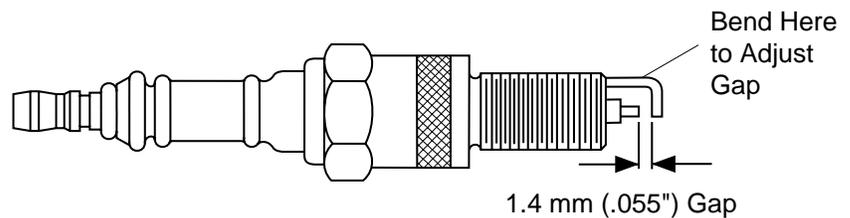


Figure 12 - Spark Plug Gap, 35,000 Btu/Hr Model

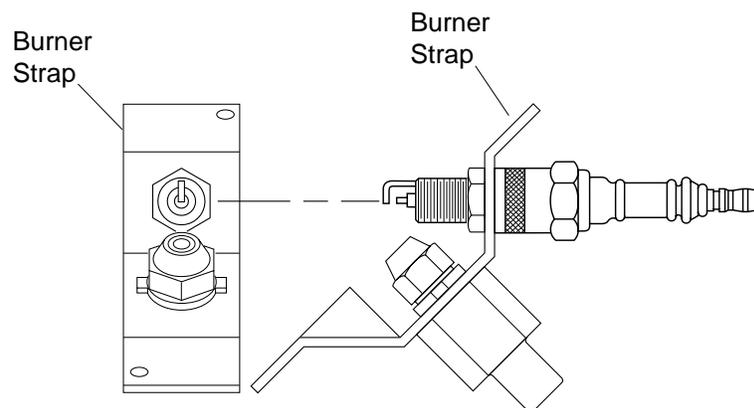


Figure 13 - Spark Plug Rotation, 35,000 Btu/Hr Model Only

Spark Plug

(70/100/150,000 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:
70/100,000 Btu/Hr Models: 1.9 mm (.075") gap
150,000 Btu/Hr Model: 2.8 mm (0.110") 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.

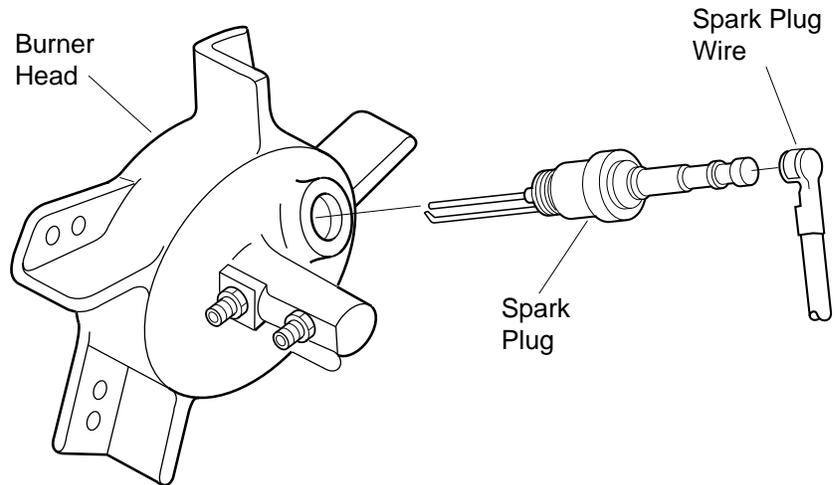


Figure 14 - Spark Plug Removal, 70/100/150,000 Btu/Hr Models

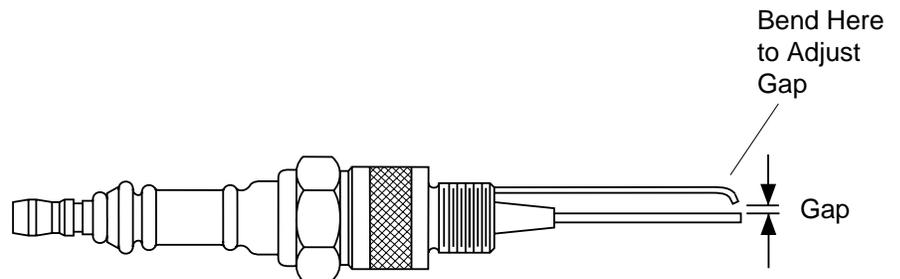


Figure 15 - Spark Plug Gap, 70/100/150,000 Btu/Hr Models

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

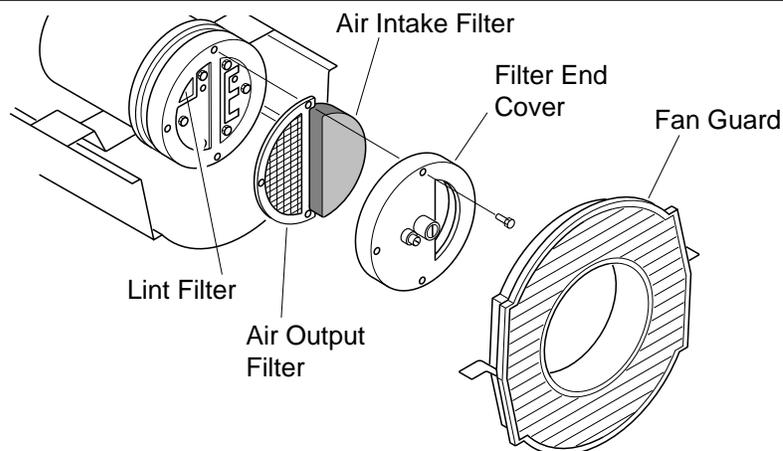


Figure 16 - Air Output, Air Intake, and Lint Filters, 35/70,000 Btu/Hr Models

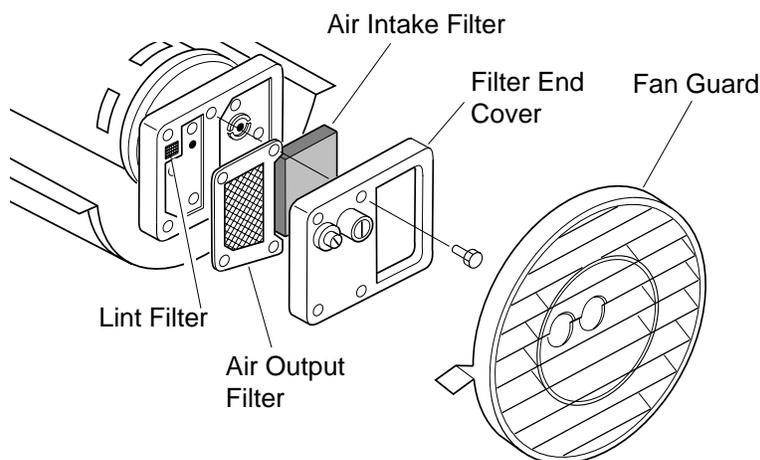


Figure 17 - Air Output, Air Intake, and Lint Filters, 100/150,000 Btu/Hr Models

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.

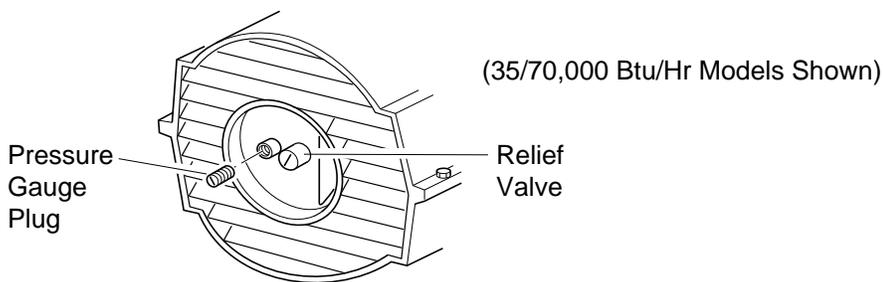


Figure 18 - Pressure Gauge Plug Removal

<u>Model</u>	<u>Pump Pressure (PSI/Bar)</u>
35,000 Btu/Hr	2.9/0.20
70,000 Btu/Hr	3.8/0.26
100,000 Btu/Hr	3.9/0.27
150,000 Btu/Hr	4.8/0.33

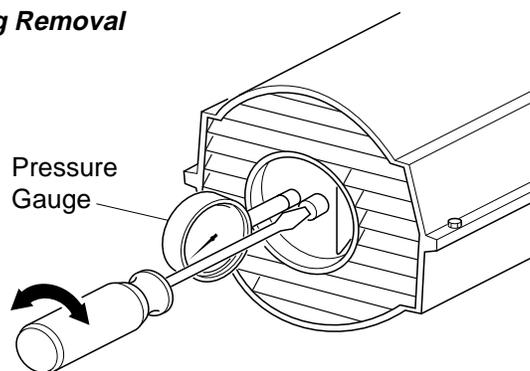


Figure 19 - Adjusting Pump Pressure

Nozzle

(35,000 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.

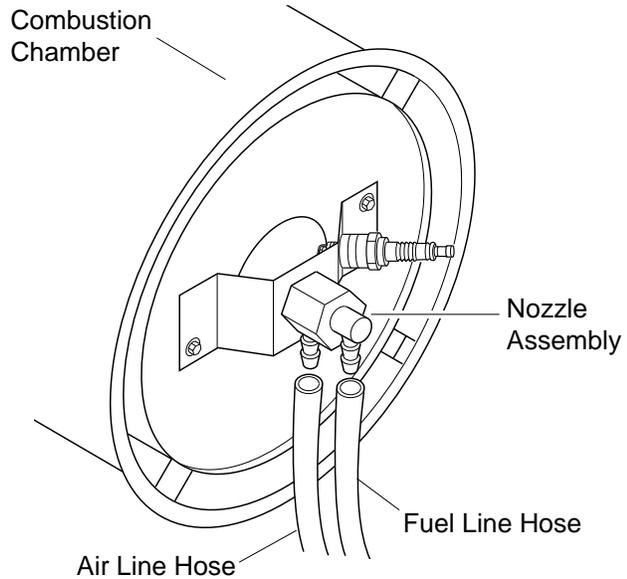


Figure 20 - Removing Air and Fuel Line Hoses, 35,000 Btu/Hr Model

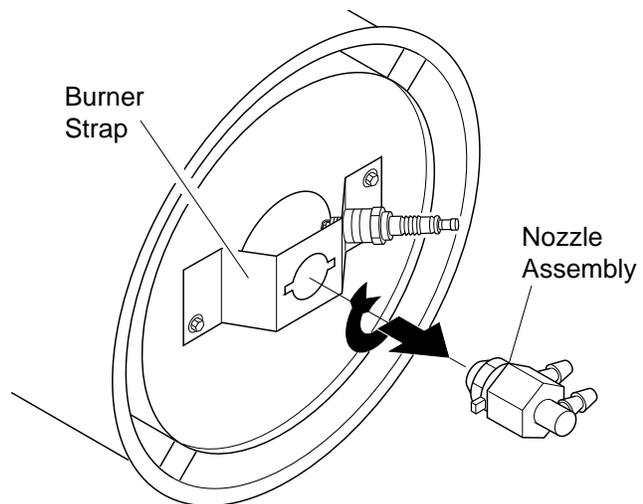


Figure 21 - Removing Nozzle Assembly, 35,000 Btu/Hr Model

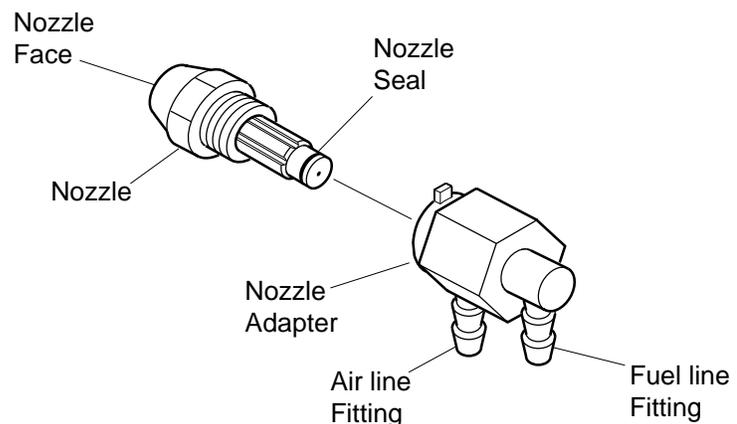


Figure 22 - Nozzle and Nozzle Adapter, 35,000 Btu/Hr Model

Nozzle

(70/100/150,000 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.

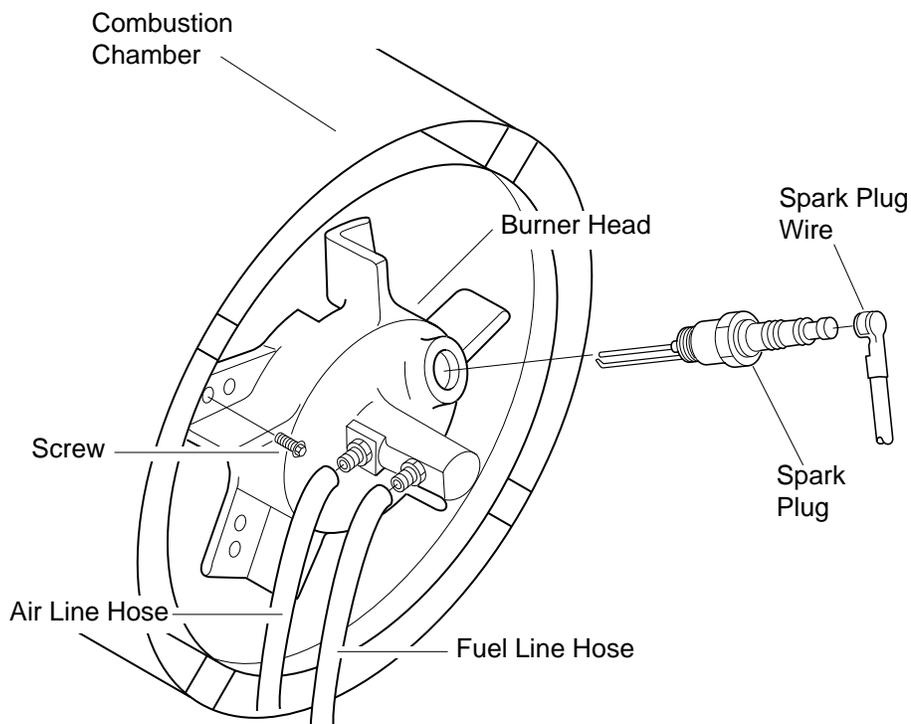


Figure 23 - Removing Burner Head, 70/100/150,000 Btu/Hr Models

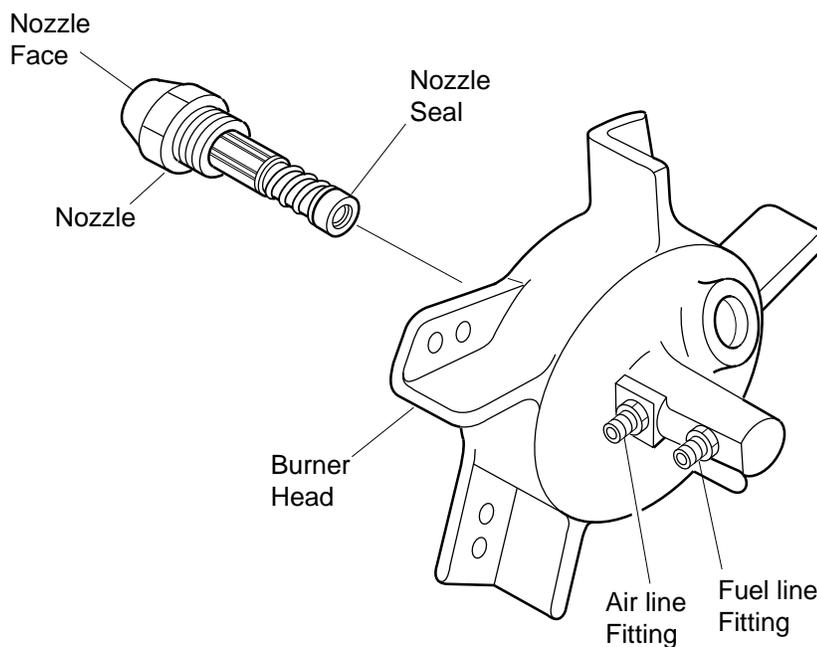


Figure 24 - Removing Nozzle, 70/100/150,000 Btu/Hr Models

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 through 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 through 12 above.

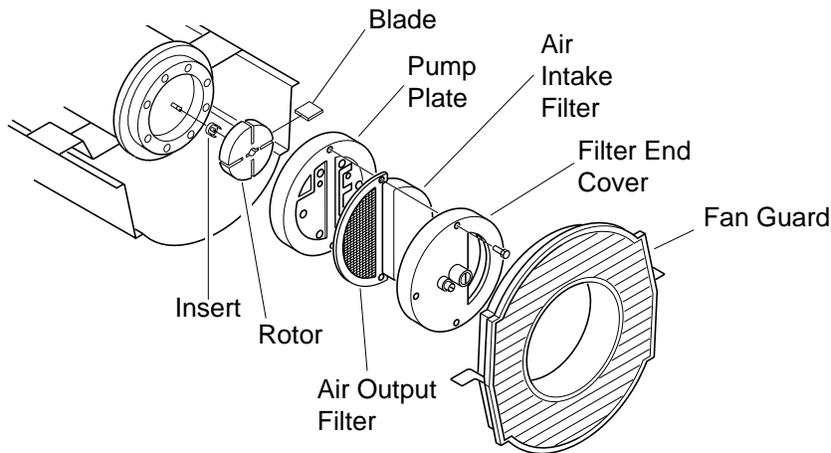


Figure 25 - Rotor Location, 35/70,000 Btu/Hr Models

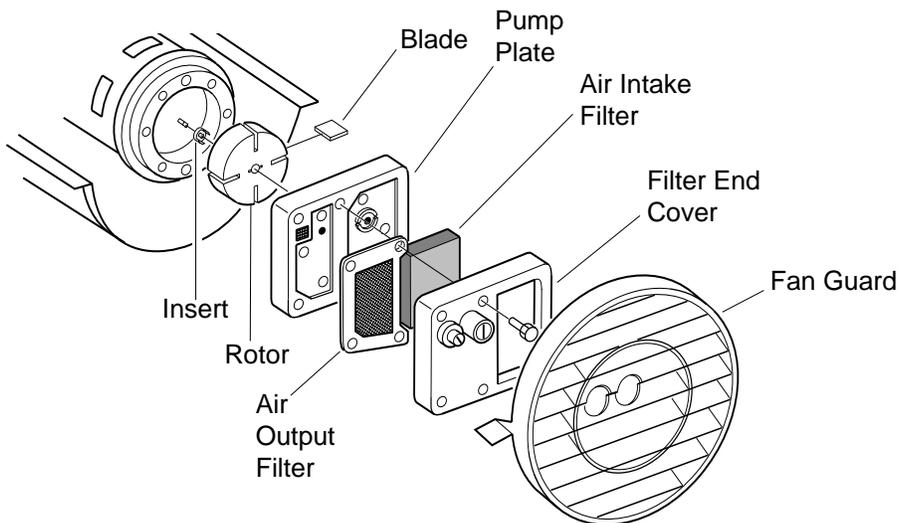


Figure 26 - Rotor Location, 100/150,000 Btu/Hr Models

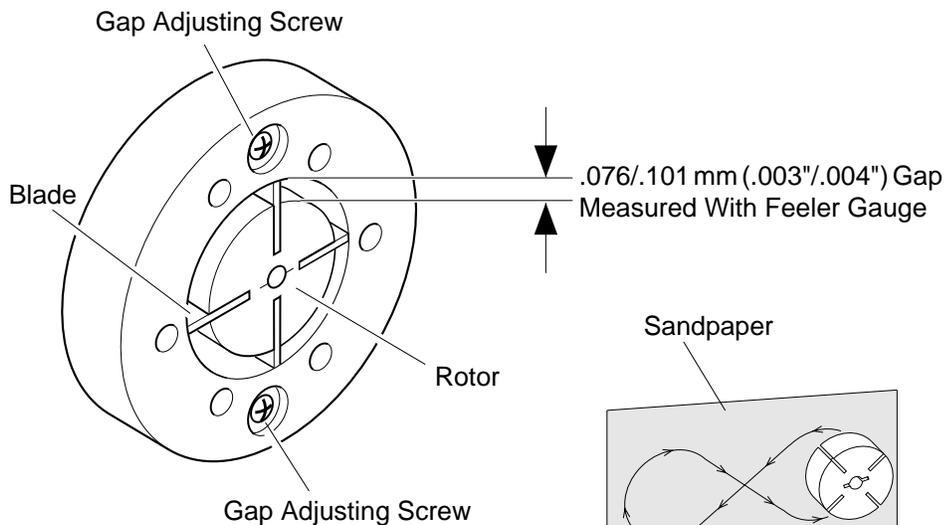


Figure 27 - Gap Adjusting Screw Locations

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.

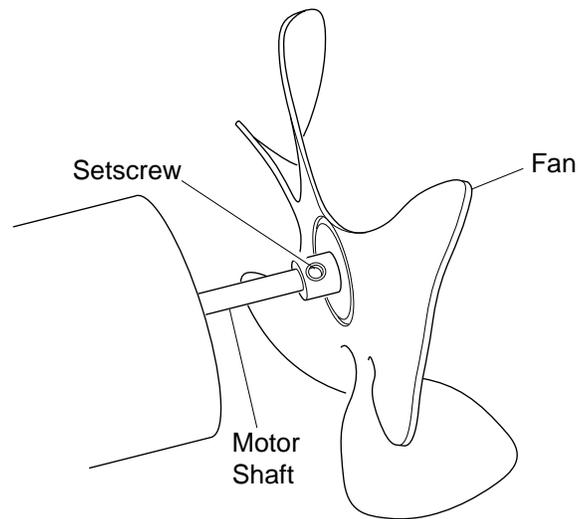


Figure 29 - Fan, Motor Shaft, and Setscrew Location

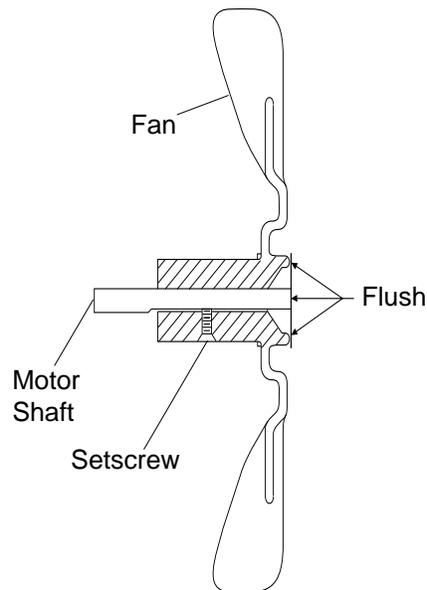


Figure 30 - Fan Cross Section

SPECIFICATIONS

Output Rating (Btu/Hr)	35,000	70,000	100,000	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.)	.26/1.0	.49/1.85	.70/2.7	1.1/4.1
Electric Requirements	230 V/50 Hz (Same All Models)			
Amperage (Normal Run)	.8	1.0	1.2	1.2
Hot Air Output (CFM/CMM)	140/4	225/6.4	425/12	500/14.2
RPM	1425	2850	2850	2850

WIRING DIAGRAMS

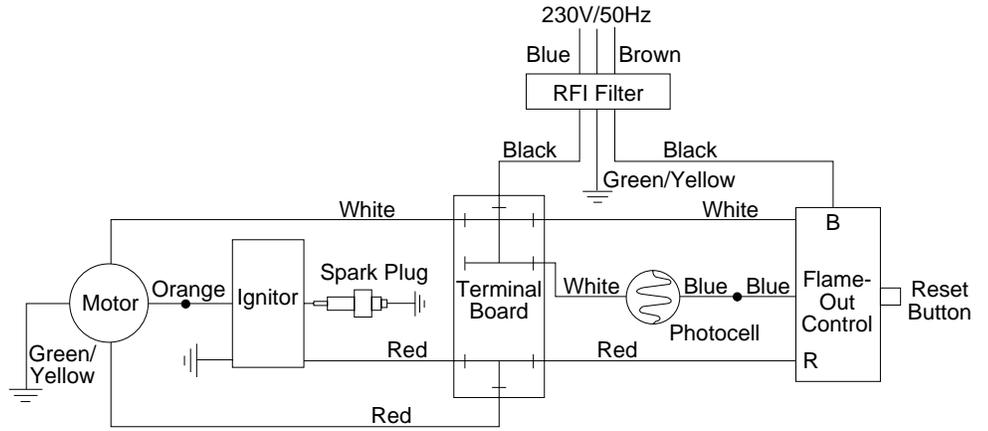


Figure 31 - Wiring Diagram, 35/100/150,000 Btu/Hr Models

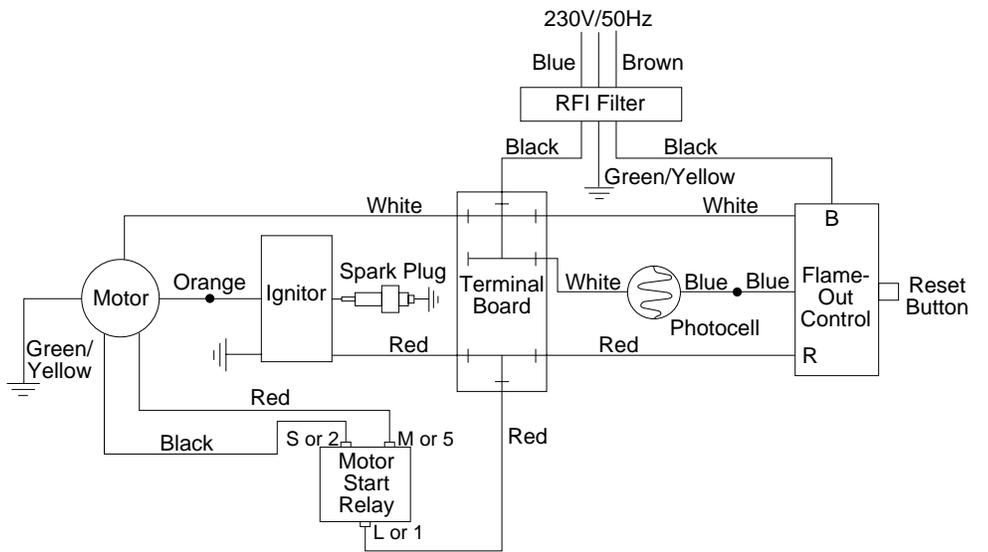
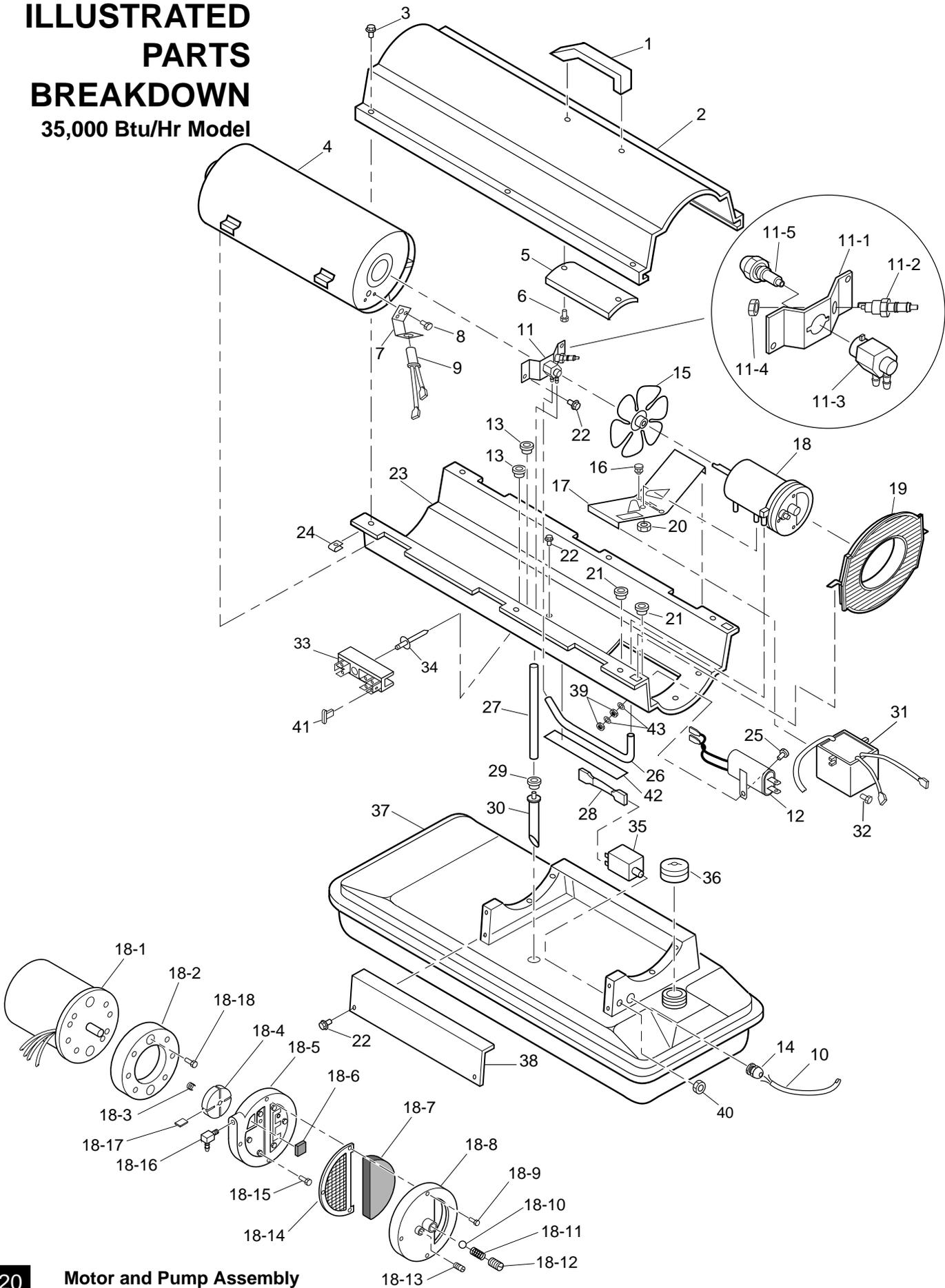


Figure 32 - Wiring Diagram, 70,000 Btu/Hr Model

ILLUSTRATED PARTS BREAKDOWN

35,000 Btu/Hr Model



PARTS LIST

35,000 Btu/Hr Model

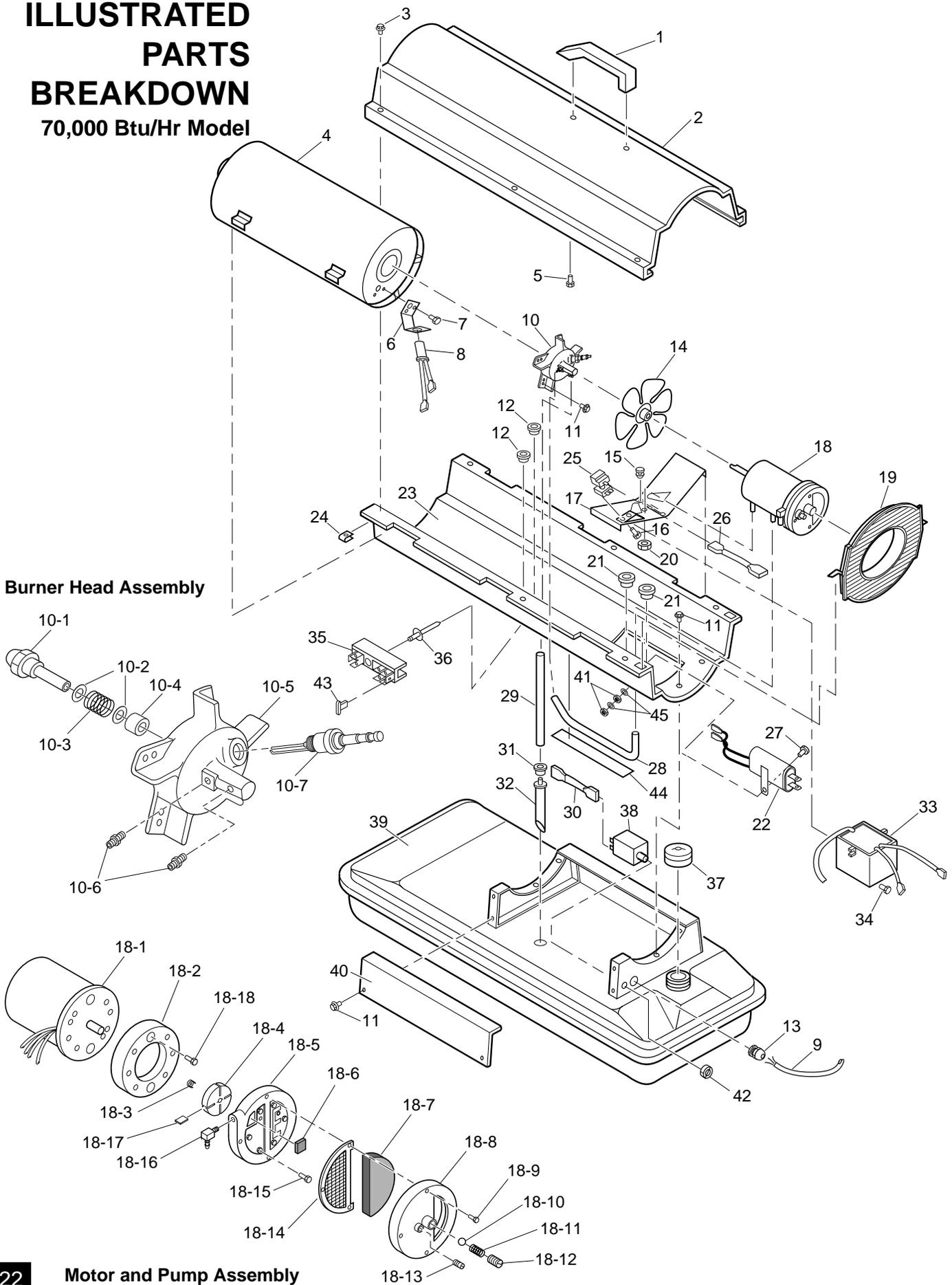
This list contains replaceable parts used in your heater. When ordering parts, be sure to provide the correct model and serial numbers (from the model plate), then the part number and description of the desired part.

KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.	KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	M51104-01	Handle	1	18-16	M50016	Elbow, 90° (Barb Fitting)	1
2	098511-54	Upper Shell	1	18-17	M8643-2	Blade	4
3	102432-01	Screw/Lockwasher, 1/2"	6	18-18	FHPF3-6C	Screw, #10-32 x 3/4"	2
4	098512-43	Combustion Chamber	1	19	M51105-01	Fan Guard	1
5	M51108-01	Heat Shield	1	20	NTC-4C	Hex locknut	2
6	M11084-29	Screw, #10-16 x 3/4"	2	21	M50104-02	Bushing (wires)	2
7	M16660	Photocell Bracket	1	22	102431-01	Screw/Lockwasher, 1/2"	10
8	M10908-2	Screw, #6-32 x 3/8"	2	23	098511-12	Lower Shell	1
9	HA3019	Photocell Assembly	1	24	M11271-8	Clip Nut	6
10	098872-03	Power Cord	1	25	RF3-6B	Screw, #10-32 x 3/4"	1
11	**	Burner Strap Assembly	1	26	M29652-04	Rubber Airline	1
11-1	097124-01	Bracket	1	27	M29652-05	Fuel Line	1
11-2	HA3013	Spark Plug	1	28	M16841-57	Wire Assembly (red 8 1/2")	1
11-3	079980-01	Nozzle Adapter	1	29	M10990-3	Rubber Bushing	1
11-4	M29824	Nut, 14mm	1	30	M50876-04	Fuel Filter Assembly (Includes bushing)	1
11-5	HA3006	Nozzle	1	31	102482-02	Electronic Ignitor	1
12	102801-01	Power Line RFI Filter	1	32	M11084-29	Screw, #10-16 x 3/4"	2
13	M30865-02	Bushing	2	33	099125-02	Terminal Board	1
14	M50400	Strain Relief Bushing	1	34	099157-01	Rivet	1
15	M30884	Fan	1	35	097630-02	Flame-Out Control	1
16	M50631	Rubber Bumper	2	36	097702-01	Fuel Tank Cap	1
17	101205-01	Motor Bracket	1	37	098513-73	Fuel Tank	1
18	**	Motor and Pump Assembly	1	38	M50899-03AA	Side Cover	1
18-1	098642-02	Motor (230V/50Hz)	1	39	NPF-3B	Nut, #10-32	3
18-2	079975-03	Pump Body	1	40	099177-01	Hex Nut	1
18-3	M22009	Insert	1	41	078918-01	Terminal Board Tab Cap	1
18-4	M22456-2	Rotor	1	42	097785-01	Vinyl Foam Gasket	1
18-5	M29608	End Pump Cover	1	43	WLE-3	Lock Washer, #10	2
18-6	M29632	Lint Filter	1	PARTS AVAILABLE - NOT SHOWN			
18-7	M29633	Intake Filter	1		HA2210	Filler Neck Screen	1
18-8	M29609	End Filter Cover	1		097649-01	Tradename Decal	2
18-9	M12461-31	Screw, #10-32 x 1"	3		M9900-192	Combustion Chamber Ground Wire	1
18-10	M8940	Steel Ball (1/4" Dia.)	1		102944-01	Decal Package	1
18-11	M10993-1	Pressure Relief Spring	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				

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

ILLUSTRATED PARTS BREAKDOWN

70,000 Btu/Hr Model



PARTS LIST

70,000 Btu/Hr Model

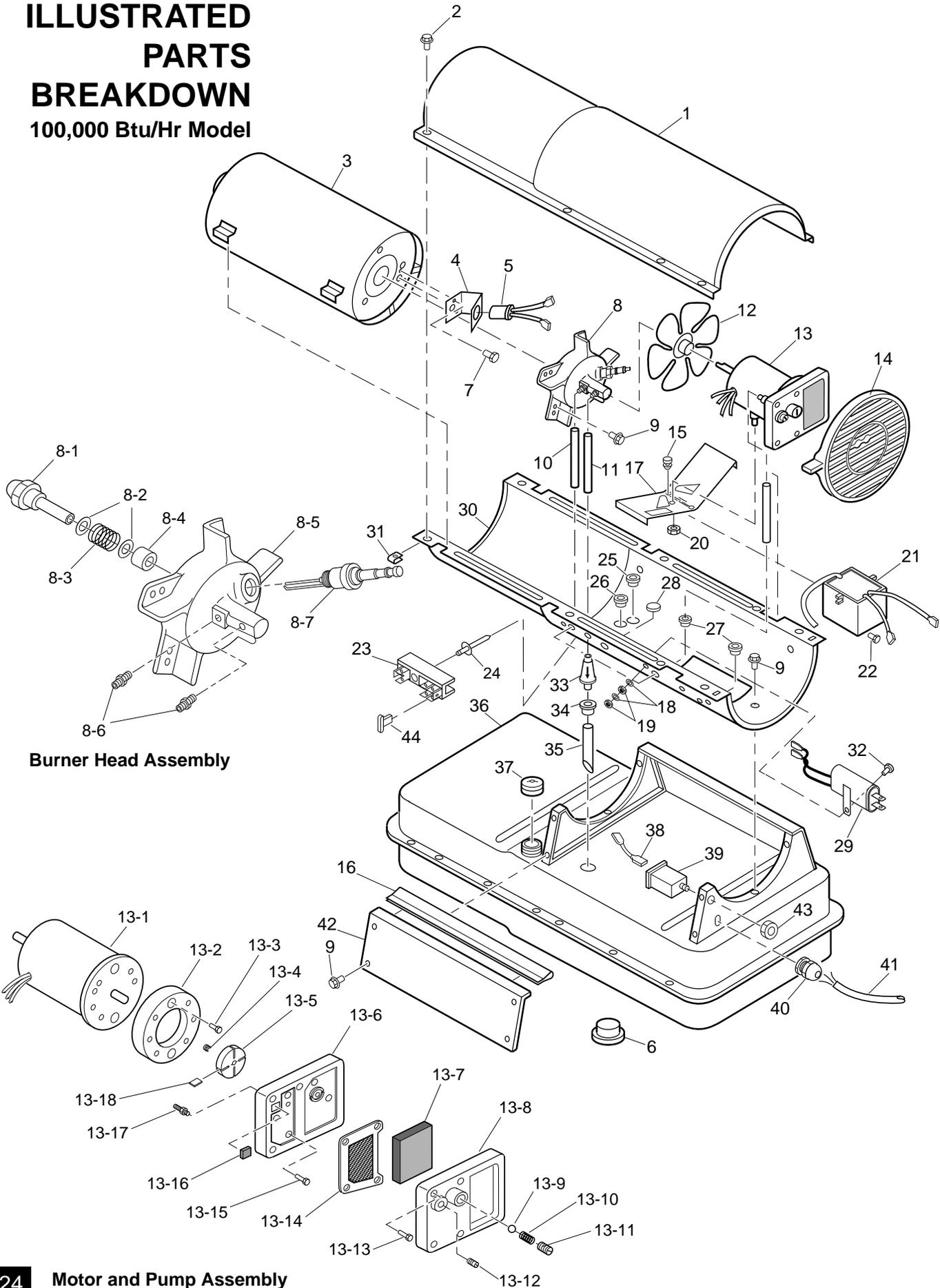
This list contains replaceable parts used in your heater. When ordering parts, be sure to provide the correct model and serial numbers (from the model plate), then the part number and description of the desired part.

KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.	KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	M51104-01	Handle	1	18-15	M12461-31	Screw, #10-32 x 1"	6
2	098511-54	Upper Shell	1	18-16	M50016	Elbow, 90° (Barb Fitting)	1
3	102432-01	Screw/Lockwasher, 1/2"	6	18-17	M8643	Blade	4
4	098512-44	Combustion Chamber	1	18-18	FHPF3-5C	Screw, #10-32 x 5/8"	2
5	M11084-29	Screw, #10-16 x 3/4"	2	19	M51105-01	Fan Guard	1
6	M16660	Photocell Bracket	1	20	NTC-4C	Hex locknut	2
7	M10908-2	Screw, #6-32 x 3/8"	2	21	M50104-02	Bushing (wires)	2
8	HA3019	Photocell Assembly	1	22	102801-01	Power Line RFI Filter	1
9	098872-03	Power Cord	1	23	098511-12	Lower Shell	1
10	**	Burner Head Assembly	1	24	M11271-8	Clip Nut	6
10-1	HA3008	Nozzle	1	25	098136-05	Relay (motor start)	1
10-2	M10659-1	Nozzle Seal Washer	2	26	M16841-58	Wire Assembly (red 9 1/2")	1
10-3	M10809-1	Nozzle Seal Spring	1	27	RF3-6B	Screw, #10-32 x 3/4"	1
10-4	M8882	Nozzle Seal Sleeve	1	28	M29652-04	Rubber Airline	1
10-5	M51098-02	Burner Head Body	1	29	079973-01	Fuel Line	1
10-6	M50820-01	Barb Fitting	2	30	M16841-57	Wire Assembly (red 8 1/2")	1
10-7	HA3012	Spark Plug	1	31	M10990-3	Rubber Bushing	1
11	102431-01	Screw/Lockwasher, 1/2"	11	32	M50876-05	Fuel Filter Assembly (Includes bushing)	1
12	M30865-02	Bushing	2	33	102482-02	Electronic Ignitor	1
13	M50400	Strain Relief Bushing	1	34	M11084-29	Screw, #10-16 x 3/4"	2
14	M30884	Fan	1	35	099125-02	Terminal Board	1
15	M50631	Rubber Bumper	2	36	099157-01	Rivet	1
16	M12461-13	Screw, #8-32 x 1/4" (holds relay in position)	2	37	097702-01	Fuel Tank Cap	1
17	101205-01	Motor/Relay Bracket	1	38	097630-02	Flame-Out Control	1
18	**	Motor and Pump Assembly	1	39	098513-74	Fuel Tank	1
18-1	102001-16	Motor (230V/50Hz)	1	40	M50899-03AA	Side Cover	1
18-2	079975-02	Pump Body	1	41	NPF-3B	Nut, #10-32	3
18-3	M22009	Insert	1	42	099177-01	Hex Nut	1
18-4	M22456-1	Rotor	1	43	078918-01	Terminal Board Tab Cap	1
18-5	M29608	End Pump Cover	1	44	097785-01	Vinyl Foam Gasket	1
18-6	M29632	Lint Filter	1	45	WLE-3	Lock Washer, #10	2
18-7	M29633	Intake Filter	1	PARTS AVAILABLE - NOT SHOWN			
18-8	M29609	End Filter Cover	1		HA2210	Filler Neck Screen	1
18-9	M12461-31	Screw, #10-32 x 1"	3		097649-01	Tradename Decal	2
18-10	M8940	Steel Ball (1/4" Dia.)	1		M9900-192	Combustion Chamber Ground Wire	1
18-11	M10993-1	Pressure Relief Spring	1		102944-02	Decal Package	1
18-12	M27694	Adjusting Screw	1				
18-13	M22997	Plug	1				
18-14	M29612-01	Output Filter	1				

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

ILLUSTRATED PARTS BREAKDOWN

100,000 Btu/Hr Model



Burner Head Assembly

PARTS LIST

100,000 Btu/Hr Model

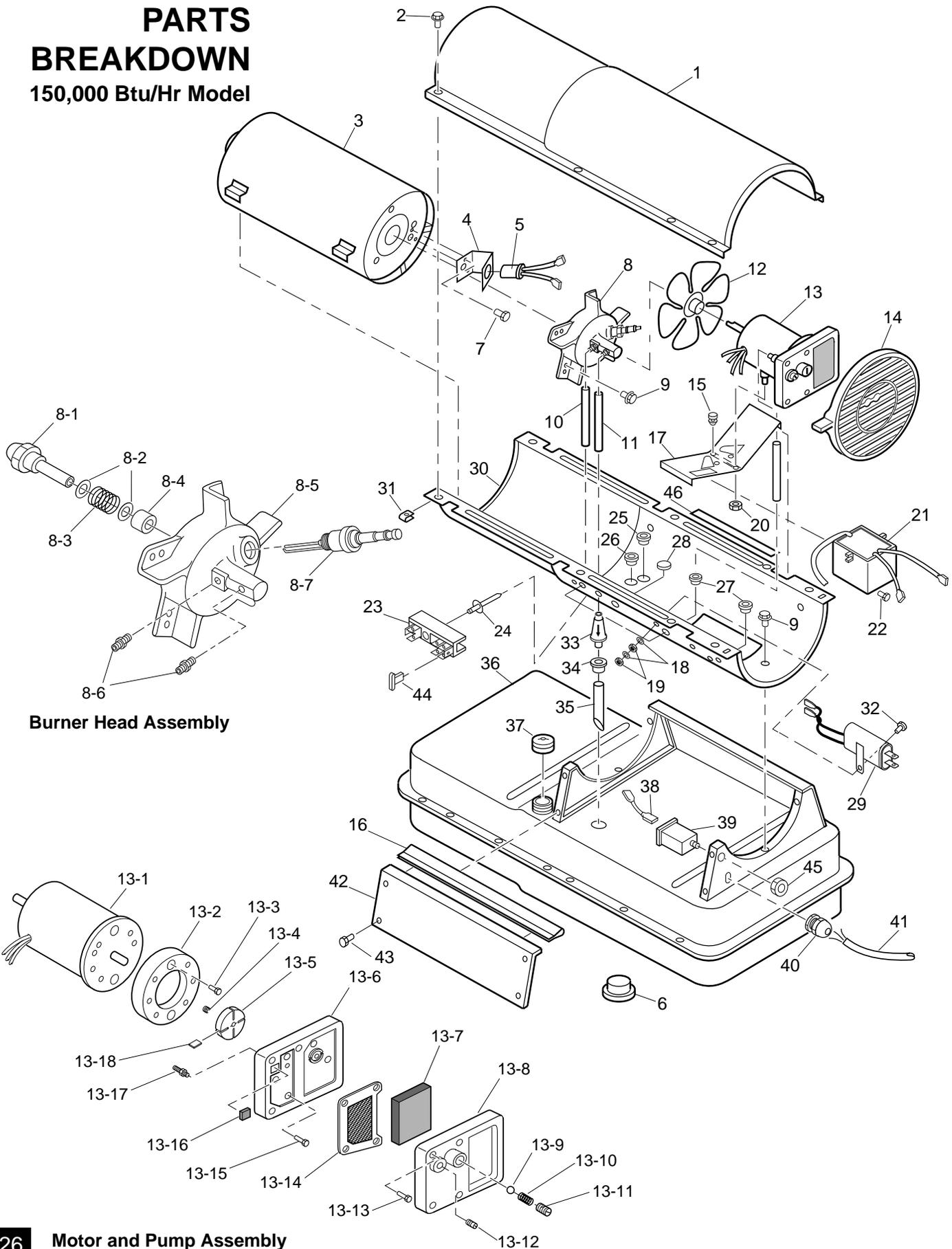
This list contains replaceable parts used in your heater. When ordering parts, be sure to provide the correct model and serial numbers (from the model plate), then the part number and description of the desired part.

KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.	KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	098511-138	Upper Shell	1	15	M50631	Rubber Bumper	2
2	102432-01	Screw/Lockwasher, 1/2"	8	16	097468-01	Edge Liner	1
3	098512-31	Combustion Chamber	1	17	101206-01	Motor and Relay Bracket Assembly	1
4	M16660	Photocell Bracket	1	18	WLE-3	Lock Washer, #10	2
5	HA3019	Photocell Assembly	1	19	NPF-3B	Nut, #10-32	3
6	M27417	Drain Plug	1	20	NTC-4C	Hex locknut	2
7	M10908-2	Screw, #6-32 x 3/8"	2	21	102482-02	Electronic Ignitor	1
8	**	Burner Head Assembly	1	22	M11084-29	Screw, #10-16 x 3/4"	2
8-1	100735-15	Nozzle	1	23	099125-02	Terminal Board	1
8-2	M10659-1	Nozzle Seal Washer	2	24	099157-01	Rivet	1
8-3	M10809-1	Nozzle Seal Spring	1	25	M50104-03	Bushing	1
8-4	M8882	Nozzle Seal Sleeve	1	26	M50104-03	Bushing	1
8-5	M50924-03	Burner Head Body	1	27	M50104-01	Bushing	2
8-6	M50820-02	Barb Fitting	2	28	099213-01	Button Plug	1
8-7	HA3012	Spark Plug	1	29	102801-01	Power Line RFI Filter	1
9	102431-01	Screw/Lockwasher, 1/2"	13	30	098511-191	Lower Shell	1
10	M50814-06	Air Line	1	31	M11271-8	Clip Nut	8
11	M51345-01	Fuel Line	1	32	RF3-6B	Screw, #10-32 x 3/4"	1
12	102042-01	Fan	1	33	M51150-01	Fuel filter	1
13	**	Motor and Pump Assembly	1	34	M10990-3	Rubber Bushing	1
13-1	102001-03	Motor with capacitor (230V/50Hz)	1	35	M51151-01	Fuel Line	1
13-2	079975-02	Pump Body	1	36	098513-75	Fuel Tank	1
13-3	FHPF3-5C	Screw, #10-32 x 5/8"	2	37	097702-01	Fuel Tank Cap	1
13-4	M22009	Insert	1	38	M16841-57	Wire Assembly (red 8 1/2")	1
13-5	M22456-1	Rotor	1	39	097630-02	Flame-Out Control	1
13-6	M50545	End Pump Cover	1	40	M50400	Strain Relief Bushing	1
13-7	M12179	Intake Filter	1	41	098872-03	Power Cord	1
13-8	M16545	End Filter Cover	1	42	M51077-01AA	Side Cover	1
13-9	M8940	Steel Ball (1/4" Dia.)	1	43	099177-01	Hex Nut	1
13-10	M10993-1	Pressure Relief Spring	1	44	078918-01	Terminal Board Tab Cap	1
13-11	M27694	Adjusting Screw	1	PARTS AVAILABLE - NOT SHOWN			
13-12	M22997	Plug	1				
13-13	M12461-31	Screw, #10-32 x 1"	4		HA2210	Filler Neck Screen	1
13-14	M12244-1	Output Filter	1		097650-01	Tradename Decal	2
13-15	M12461-31	Screw, #10-32 x 1"	6		M9900-192	Combustion Chamber Ground Wire	1
13-16	M11637	Lint Filter	1		102944-03	Decal Package	1
13-17	M50820-02	Barb Fitting	1				
13-18	M8643	Blade	4				
14	M51114-01	Fan Guard	1				

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

ILLUSTRATED PARTS BREAKDOWN

150,000 Btu/Hr Model



Burner Head 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.

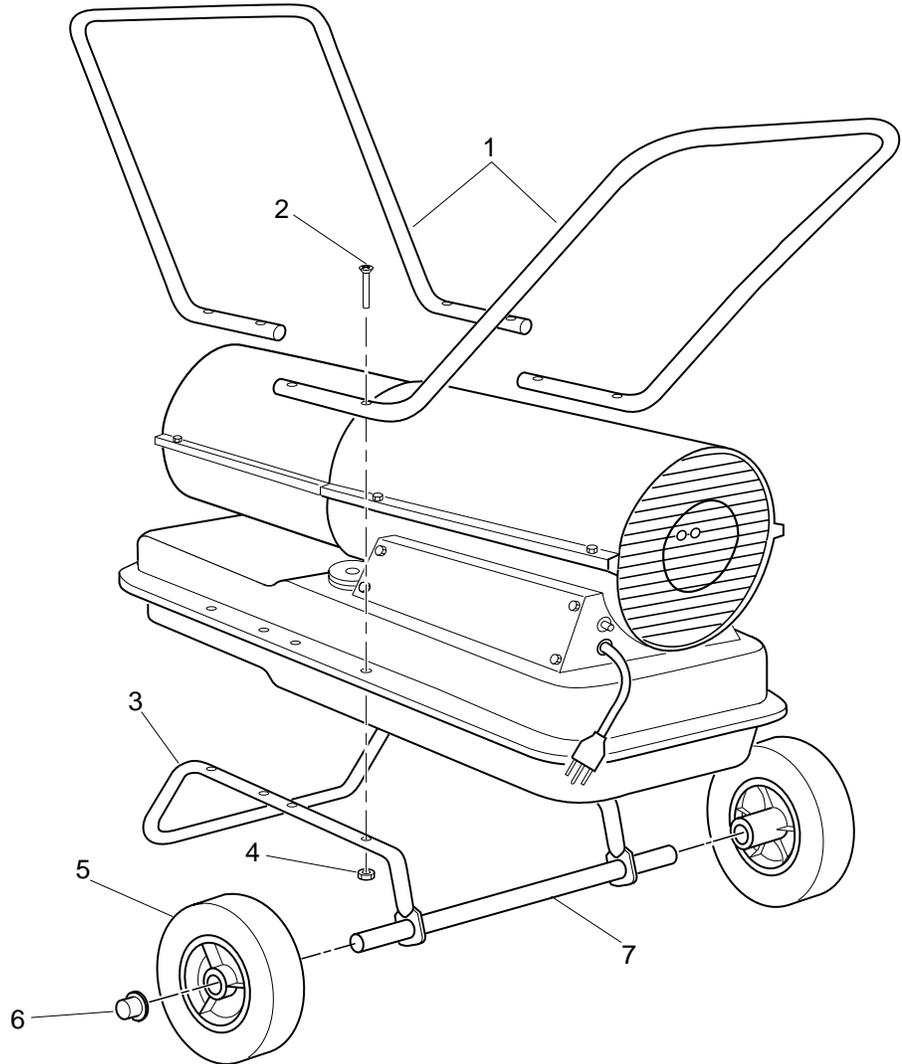
KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.	KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	098511-138	Upper Shell	1	16	097468-01	Edge Liner	1
2	102432-01	Screw/Lockwasher, 1/2"	8	17	101206-01	Motor Bracket	1
3	098512-36	Combustion Chamber	1	18	WLE-3	Lock Washer, #10	2
4	099229-01	Photocell Bracket	1	19	NPF-3B	Nut, #10-32	3
5	HA3019	Photocell Assembly	1	20	NTC-4C	Hex locknut	2
6	M27417	Drain Plug	1	21	102482-02	Electronic Ignitor	1
7	M10908-2	Screw, #6-32 x 3/8"	2	22	M11084-29	Screw, #10-16 x 3/4"	2
8	**	Burner Head Assembly	1	23	099125-02	Terminal Board	1
8-1	100735-11	Nozzle	1	24	099157-01	Rivet	1
8-2	M10659-1	Nozzle Seal Washer	2	25	M50104-03	Bushing	1
8-3	M10809-1	Nozzle Seal Spring	1	26	M50104-03	Bushing	1
8-4	M8882	Nozzle Seal Sleeve	1	27	M50104-01	Bushing	2
8-5	M50924-08	Burner Head Body	1	28	099213-01	Button Plug	1
8-6	M50820-02	Barb Fitting	2	29	102801-01	Power Line RFI Filter	1
8-7	HA3012	Spark Plug	1	30	098511-191	Lower Shell	1
9	102431-01	Screw/Lockwasher, 1/2"	9	31	M11271-8	Clip Nut	8
10	M50814-06	Air Line	1	32	RF3-6B	Screw, #10-32 x 3/4"	1
11	M51345-01	Fuel Line	1	33	M51150-01	Fuel filter	1
12	102042-01	Fan	1	34	M10990-3	Rubber Bushing	1
13	**	Motor and Pump Assembly	1	35	M51151-02	Fuel Line	1
13-1	102001-03	Motor (with capacitor)	1	36	098513-76	Fuel Tank	1
13-2	079975-03	Pump Body	1	37	097702-01	Fuel Tank Cap	1
13-3	FHPF3-6C	Screw, #10-32 x 3/4"	2	38	M16841-57	Wire Assembly (red 8 1/2")	1
13-4	M22009	Insert	1	39	097630-02	Flame-Out Control	1
13-5	M22456-2	Rotor	1	40	M50400	Strain Relief Bushing	1
13-6	M50545	End Pump Cover	1	41	098872-03	Power Cord	1
13-7	M12179	Intake Filter	1	42	M51077-01AA	Side Cover	1
13-8	M16545	End Filter Cover	1	43	M11084-27	Screw, #10-16 x 1/2"	4
13-9	M8940	Steel Ball (1/4" Dia.)	1	44	078918-01	Terminal Board Tab Cap	1
13-10	M10993-1	Pressure Relief Spring	1	45	099177-01	Hex Nut	1
13-11	M27694	Adjusting Screw	1	46	097785-04	Vinyl Foam Gasket	2
13-12	M22997	Plug	1	PARTS AVAILABLE - NOT SHOWN			
13-13	M12461-31	Screw, #10-32 x 1"	4		HA2210	Filler Neck Screen	1
13-14	M12244-1	Output Filter	1		097650-01	Tradename Decal	2
13-15	M12461-32	Screw, #10-32 x 1 1/8"	6		M9900-192	Combustion Chamber	
13-16	M11637	Lint Filter	1			Ground Wire	1
13-17	M50820-02	Barb Fitting	1		102944-04	Decal Package	1
13-18	M8643-2	Blade	4				
14	M51114-01	Fan Guard	1				
15	M50631	Rubber Bumper	2				

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

WHEELS AND HANDLES

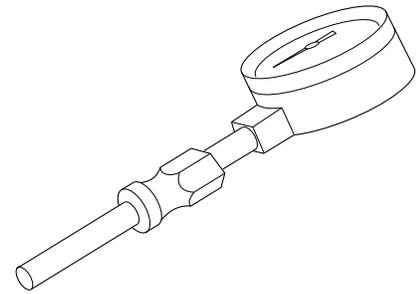
100,000 AND 150,000
Btu/Hr MODELS

KEY NO.	PART NUMBER	PART DESCRIPTION	100,000 QTY.	150,000 QTY.
1	HA2203 HA2204	Handles Handles	2 —	— 2
2	M12345-33	Screw, #10-24 x 1 3/4"	8	8
3	M12342-3 M12831-3	Wheel Support Frame Wheel Support Frame	1 —	— 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 M16801-2	Axle Axle	1 —	— 1



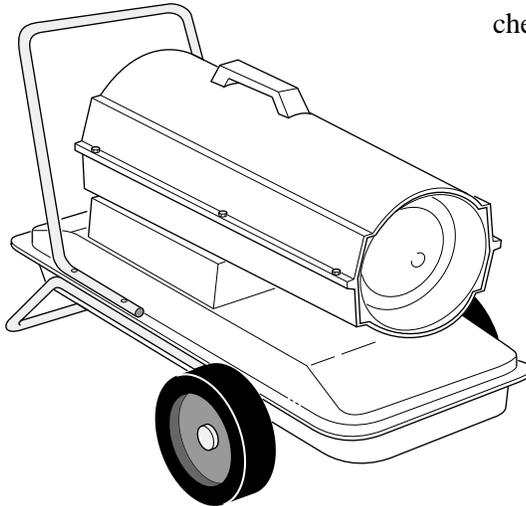
ACCESSORIES

Purchase accessories from your local dealer.



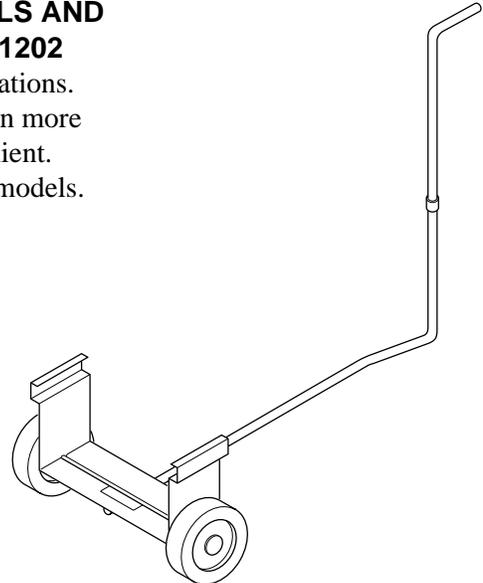
AIR GAUGE KIT - HA1180

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 35/70,000 Btu/Hr models.



STANDARD WHEELS AND HANDLE KIT - HA1206

Makes heater even more portable and convenient. Easy to assemble. For 35/70,000 Btu/Hr models.

EC CONFORMITY DECLARATION

EC CONFORMITY DECLARATION

SGB YOUNGMAN
Stanestreet, Slingfold, Horsham
West Sussex Rh13 7RD
United Kingdom (UK)

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

Kerosene Portable Forced Air Heaters
Model Numbers: BY35CEA, BY70CEA, BY100CEA, BY150CEA

It is declared that these models conform to the Machinery Directive 89/392/EEC, including 91/368/EEC. It is further declared that these models conform to the EMC Directive 89/336/EEC, amended by 92/31/EEC and including EN50081-1 and EN50082-1.

We declare that the models noted are in conformity.

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

03/15/96 — Bowling Green, KY
Date and Place

Douglas D. Rohrer
Signature

WARRANTY AND REPAIR SERVICE

CERTIFICATE OF GENERAL EQUIPMENT - LIMITED 90 DAY WARRANTY

SGB YOUNGMAN 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:

SGB YOUNGMAN's obligation and liability under this Warranty is expressly limited to repairing or replacing at SGB YOUNGMAN's option, any parts which appear to SGB YOUNGMAN 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. The Warranty shall not apply to component parts or accessories of Products not manufactured by SGB YOUNGMAN 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. SGB YOUNGMAN MAKES NO OTHER EXPRESS WARRANTY. TO THE EXTENT PERMITTED BY LAW SGB YOUNGMAN 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. SGB YOUNGMAN's obligation under this limited Warranty shall not include any liability for direct, indirect, incidental, or consequential damage or delay. If requested by SGB YOUNGMAN, Products or parts for which a warranty claim is made are to be returned transportation prepaid by user to SGB YOUNGMAN. Any improper use, including operation after discovery of defective or worn parts, operation beyond capacity, substitution of parts not approved by SGB YOUNGMAN, or any alteration or repair by others in such manner as in SGB YOUNGMAN's judgement 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 SGB YOUNGMAN AT ITS HOME OFFICE.

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.

SGB YOUNGMAN

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