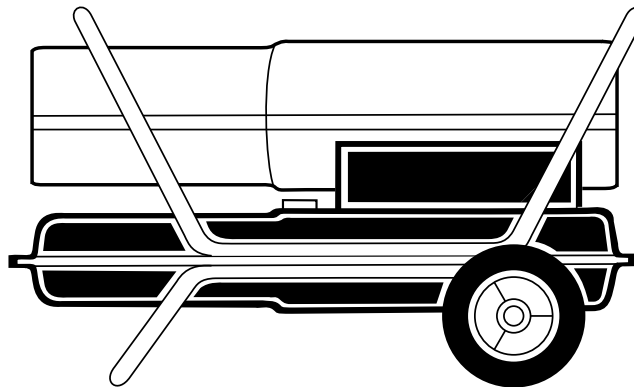
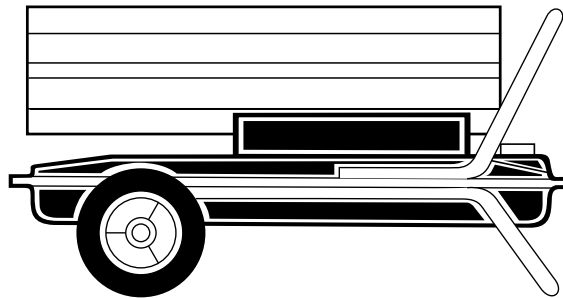


PORTABLE FORCED AIR HEATERS

OWNER'S MANUAL



Models: D20N, D30N, and D44N

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.




D20N, D30N AND D44N MODELS PORTABLE FORCED AIR HEATERS

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.

- 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.

OWNER'S MANUAL

PRODUCT IDENTIFICATION

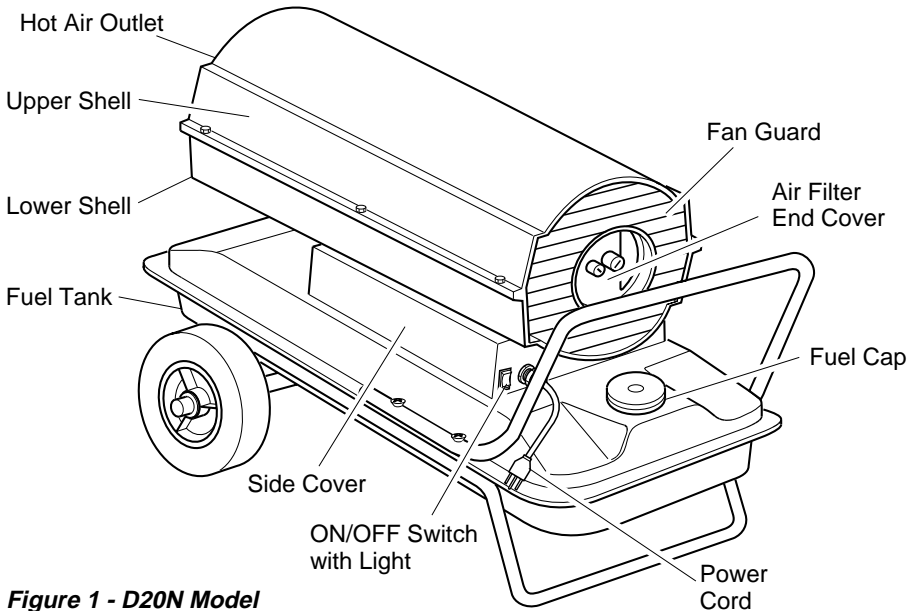


Figure 1 - D20N Model

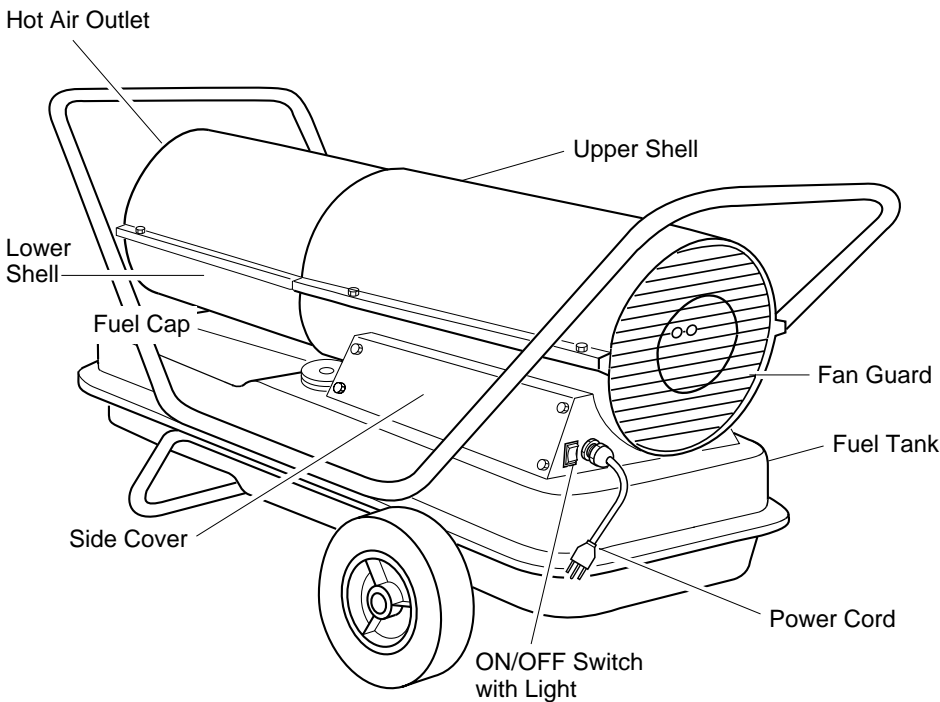


Figure 2 - D30N and D44N Models

UNPACKING

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.

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
- 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.

D20N, D30N AND D44N MODELS PORTABLE FORCED AIR HEATERS

ASSEMBLY

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. For D20N model, make sure outlet end (front) of heater is over wheels. For D30N and D44N models, 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. For D20N model, place rear handle on top of fuel tank flange. For D30N and D44N models, place front handle and rear handle on top of fuel tank flange. Insert screws through handle(s), 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.

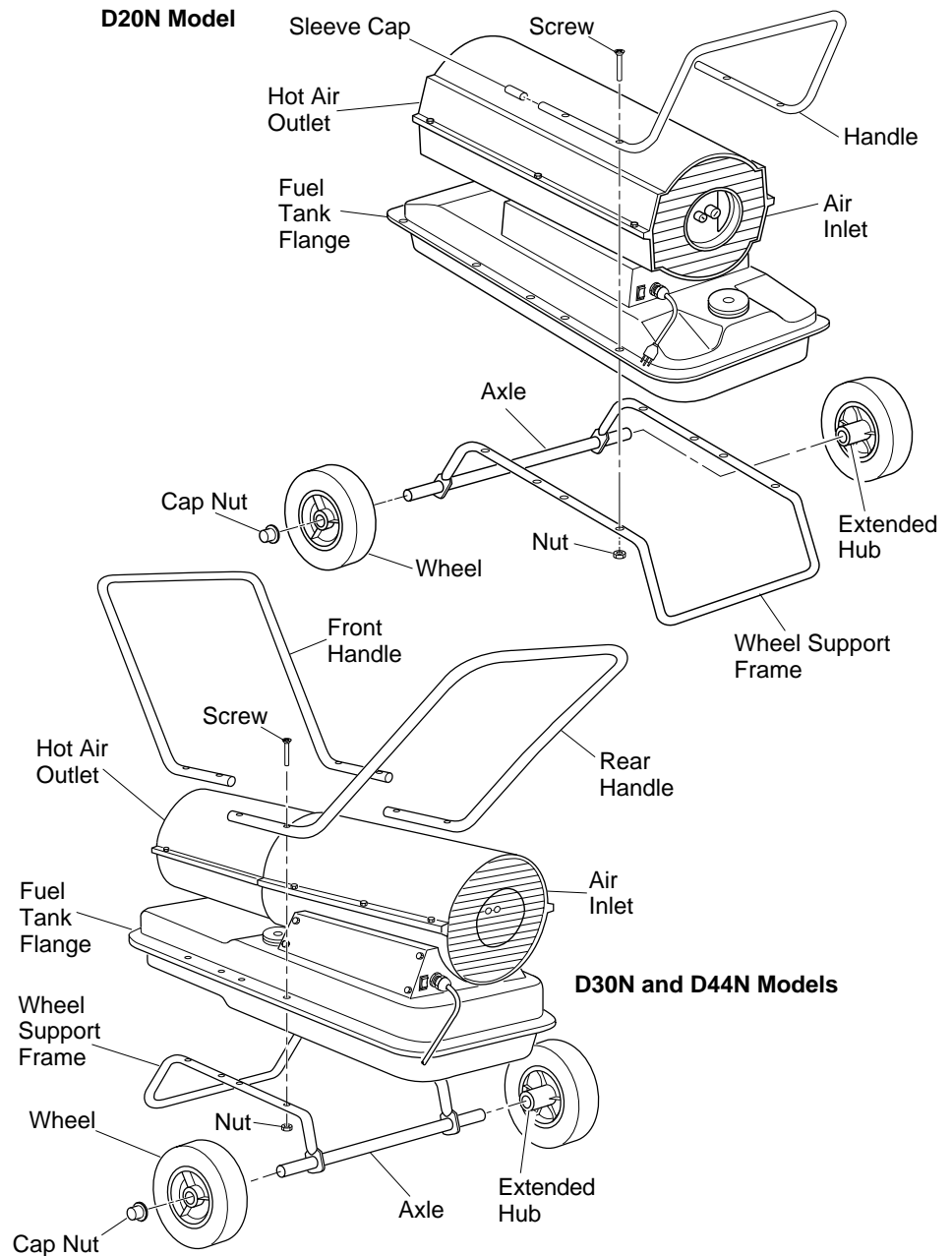


Figure 3 - Wheel and Handle Assembly

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 single-car garage door [2.75 m (9 ft.) opening] raised 15.25 cm (6 inches)
- two, 76 cm (30 inch) windows raised 28 cm (11 inches)
- a two-car garage door [4.9 m (16 ft.) opening] raised 9 cm (3.5 inches)

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 ignition control assembly provides power to the ignitor. This ignites the fuel/air mixture in the combustion chamber.

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

OPERATION

⚠ WARNING: Review and understand the warnings in the Safety Information section, page 2. 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

Push ON/OFF switch to ON (I) position and heater should start in 5 seconds. If ON/OFF switch light does not come on or heater does not start, see *Troubleshooting* (pages 6 and 7).

TO STOP HEATER

1. Push ON/OFF switch to OFF (O) position.

TO RESET HEATER

1. Push ON/OFF switch to OFF (O) position and wait 10 seconds (2 minutes if heater has been running).
2. Repeat steps under *To Start Heater*.

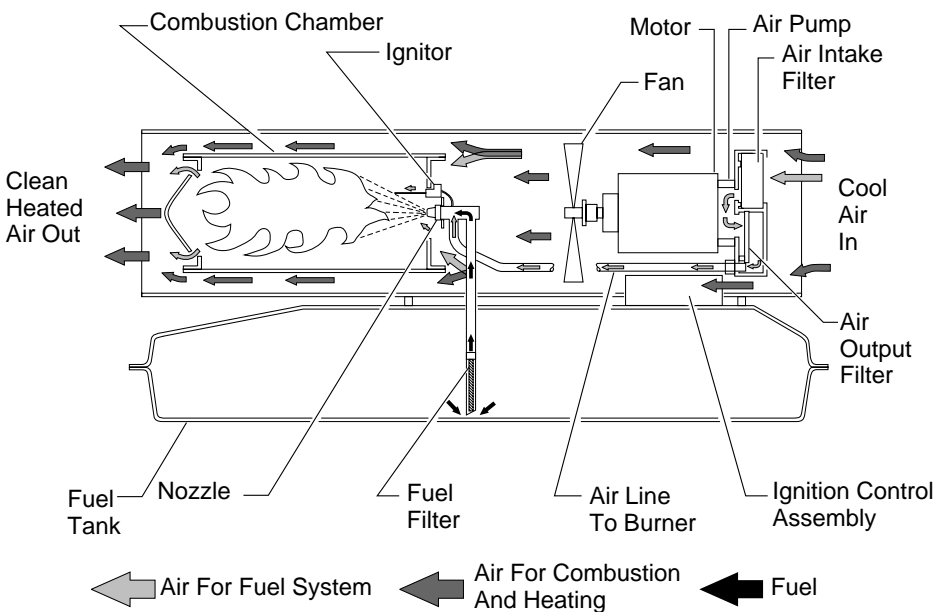


Figure 4 - Cross Section Operational View

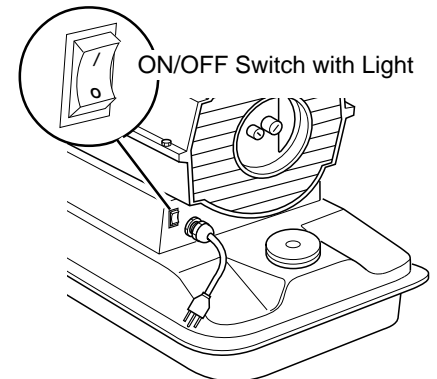


Figure 5 - ON/OFF Switch, D20N Model

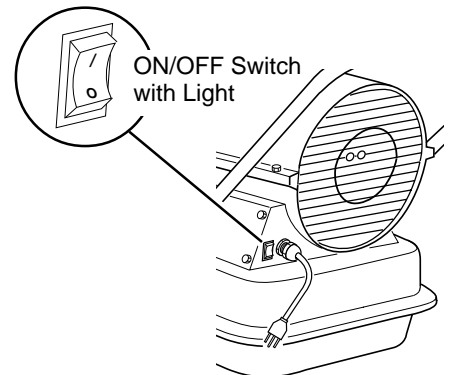


Figure 6 - ON/OFF Switch, D30N and D44N Models

D20N, D30N AND D44N MODELS PORTABLE FORCED AIR HEATERS

STORING, TRANSPORTING, OR SHIPPING

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.

TROUBLESHOOTING

PREVENTATIVE MAINTENANCE SCHEDULE

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

Item	How Often	How To
Fuel tank	Flush every 150-200 hours of operation or as needed	See <i>Storing, Transporting, or Shipping</i>
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 10
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 10
Fuel filter	Clean twice a heating season or as needed	See <i>Fuel Filter</i> , page 8
Ignitor	No maintenance required	
Fan blades	Clean every season or as needed	See <i>Fan</i> , page 13
Motor	Not required/permanently lubricated	

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

ATTENTION: The ignition control has built-in protection against current overloads. Use the light in the ON/OFF switch to troubleshoot the fault condition.

FAULT CONDITION

Motor does not start five seconds after heater is plugged in (ON/OFF switch light remains on)

POSSIBLE CAUSE

1. Bad electrical connection between motor and ignition control assembly or ignition control assembly and power cord

REMEDY

1. Check all electrical connections. See *Wiring Diagram*, page 21

⚠ WARNING: High voltage!

- | | |
|--|---|
| 2. Blown fuse on ignition control assembly | 2. See <i>Ignition Control Assembly</i> , page 13 |
| 3. Binding pump rotor | 3. If fan does not turn freely, see <i>Pump Rotor</i> , page 12 |
| 4. Defective ignition control assembly | 4. Replace ignition control assembly |
| 5. Defective motor | 5. Replace motor |

OWNER'S MANUAL

TROUBLESHOOTING

Continued

FAULT CONDITION	POSSIBLE CAUSE	REMEDY
Motor starts and runs but heater does not ignite (ON/OFF switch light remains on)	<ol style="list-style-type: none">1. No fuel in tank2. Pump pressure incorrect3. Dirty fuel filter4. Obstruction in nozzle assembly5. Water in fuel tank	<ol style="list-style-type: none">1. Fill tank with kerosene2. See <i>Pump Pressure Adjustment</i>, page 103. See <i>Fuel Filter</i>, page 84. See <i>Nozzle Assembly</i>, page 115. Drain and flush fuel tank with clean kerosene. See <i>Storing, Transporting, or Shipping</i>, page 6

 **WARNING: High voltage!**

	<ol style="list-style-type: none">6. Bad electrical connection between ignitor and ignition control assembly7. Defective ignitor8. Defective ignition control assembly	<ol style="list-style-type: none">6. Check electrical connections. See <i>Wiring Diagram</i>, page 217. Replace ignitor, see page 98. Replace ignition control assembly
--	--	---

Heater ignites but ignition control assembly shuts heater off after a short period of time (ON/OFF switch light remains on)	<ol style="list-style-type: none">1. Pump pressure incorrect2. Dirty air intake, air output, and/or lint filter3. Dirty fuel filter4. Obstruction in nozzle assembly5. Photocell assembly not properly installed (not seeing the flame)	<ol style="list-style-type: none">1. See <i>Pump Pressure Adjustment</i>, page 102. See <i>Air Output, Air Intake, and Lint Filters</i>, page 103. See <i>Fuel Filter</i>, page 84. See <i>Nozzle Assembly</i>, page 115. Make sure photocell boot is properly seated in bracket
---	---	--

 **WARNING: High voltage!**

	<ol style="list-style-type: none">6. Dirty photocell lens7. Bad electrical connection between photocell and ignition control assembly8. Defective photocell9. Defective ignition control assembly	<ol style="list-style-type: none">6. Clean photocell lens7. Check electrical connections. See <i>Wiring Diagram</i>, page 218. Replace photocell9. Replace ignition control assembly
--	--	---

ON/OFF switch light does not come on when switch is turned to the ON(I) position and heater does not start	<ol style="list-style-type: none">1. No power to heater	<ol style="list-style-type: none">1. Verify that power cord is plugged into an electrical outlet and that the circuit breaker in the electrical panel is reset
--	---	--

 **WARNING: High voltage!**

	<ol style="list-style-type: none">2. Bad electrical connections3. Electrical short in ignitor	<ol style="list-style-type: none">2. Check electrical wiring and connections. See <i>Wiring Diagram</i>, page 213. Check ignitor wiring. If no problems are found, replace ignitor (see page 9)
--	--	--

ON/OFF switch light comes on when switch is turned to the ON(I) Position but turns off after five seconds	<ol style="list-style-type: none">1. Electrical short in motor	<ol style="list-style-type: none">1. Check motor wiring. If no problems are found, replace motor
---	--	--

 **WARNING: High voltage!**

D20N, D30N AND D44N MODELS PORTABLE FORCED AIR HEATERS

SERVICE PROCEDURES

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

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.

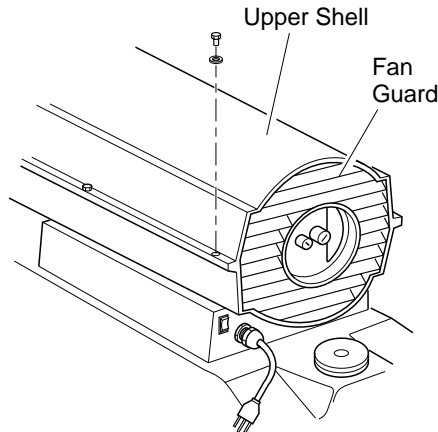


Figure 7 - Upper Shell Removal, D20N Model

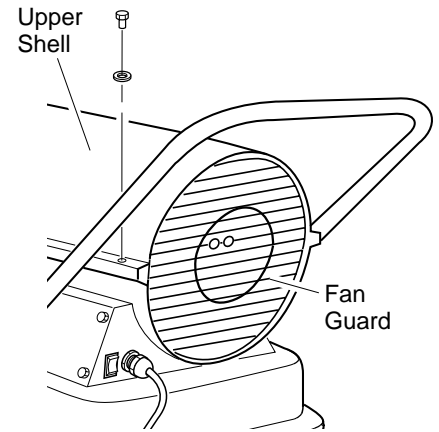


Figure 8 - Upper Shell Removal, D30N and D44N Models

FUEL FILTER (D20N Model)

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.

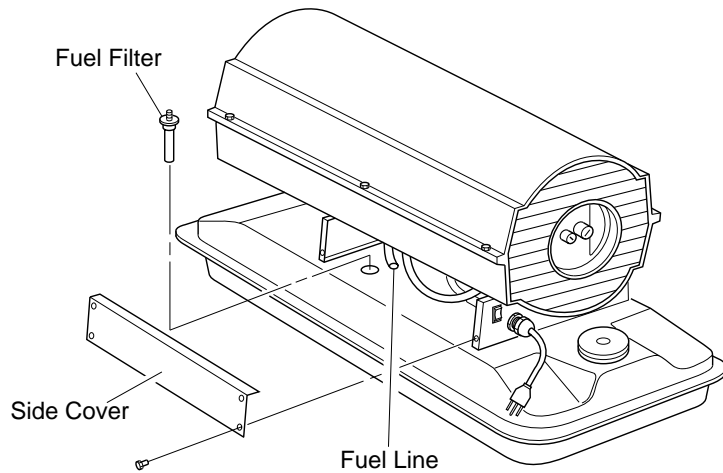


Figure 9 - Fuel Filter Removal, D20N Model

FUEL FILTER (D30N and D44N 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.

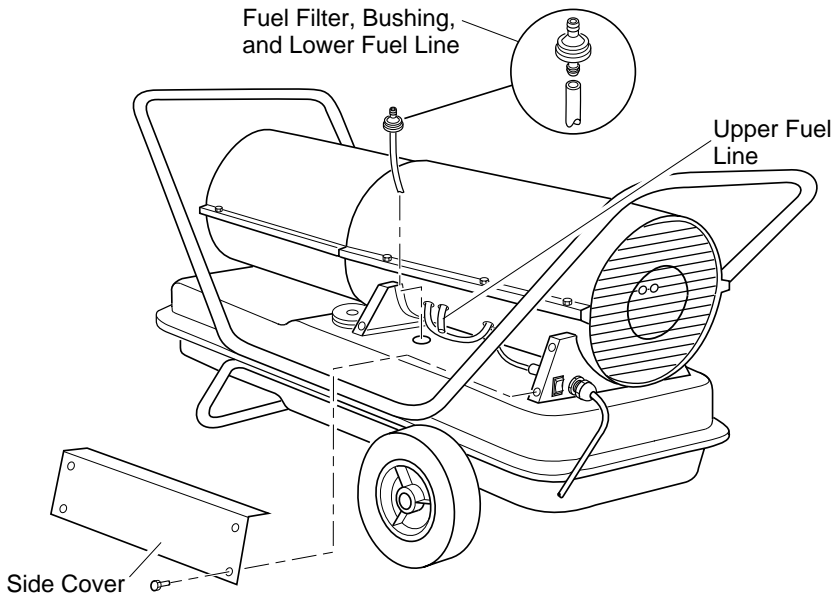


Figure 10 - Fuel Filter Removal, D30N and D44N Models

SERVICE PROCEDURES

Continued

IGNITOR

1. Remove upper shell and fan guard (see page 8).
2. Remove fan (see page 13).
3. Remove 4 side cover screws with a 5/16" nut driver. Remove side cover (see Figure 9 or 10, page 8).
4. Disconnect ignitor wires (gray) from ignition control assembly (see Figure 11). Pull the ignitor wires up through the hole in the lower shell.
5. Disconnect fuel line hose and air line hose. Remove photocell from photocell bracket (see Figure 11).

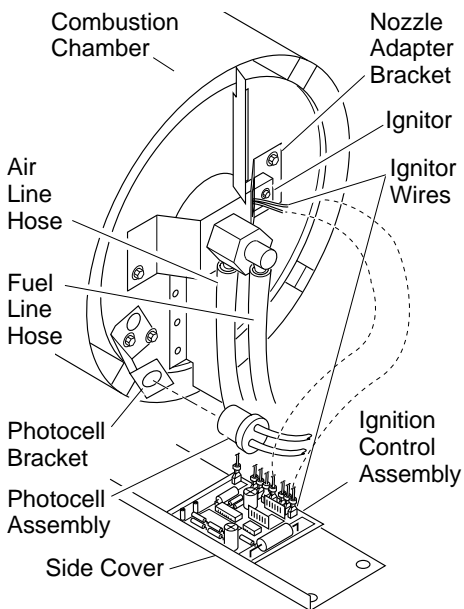


Figure 11 - Disconnecting Ignitor Wires from Ignition Control Assembly

6. Remove combustion chamber. Stand combustion chamber on end with nozzle adapter bracket on top (see Figure 12).
7. Remove ignitor screw with a 1/4" nut driver. Carefully remove ignitor from nozzle adapter bracket.

CAUTION: Do not bend or strike ignitor element. Handle with care.

8. Carefully remove replacement ignitor from styrofoam packing.
9. Carefully guide ignitor into opening in nozzle adapter bracket. Do not strike ignitor element. Attach ignitor to nozzle adapter bracket with screw using a 1/4" nut driver (see Figure 12). Torque 8 to 15 in. lbs. Do not over torque.

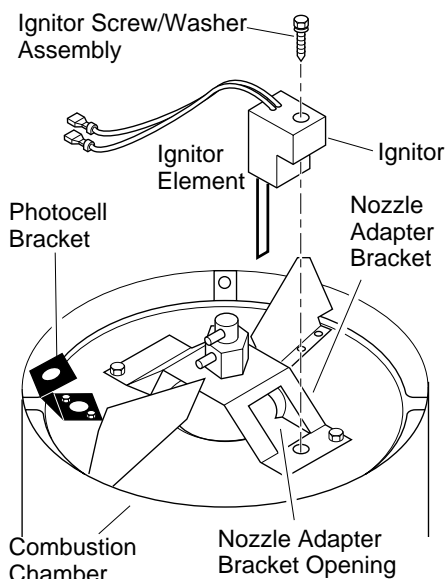


Figure 12 - Ignitor Replacement

10. Replace combustion chamber.
11. Route the ignitor wires back down through the hole in the lower shell. Connect wires to the ignition control assembly.
12. Replace side cover (see Figure 9 or 10, page 8).
13. Connect and route fuel line hose and air line hose to burner head. See *Fuel and Air Line Replacement and Proper Routing*, page 11.
14. Replace photocell in photocell bracket. Route wires as shown in Figures 17, 18, and 19 page 11.
15. Replace fan (see page 13).
16. Replace fan guard and upper shell (see page 8).

D20N, D30N AND D44N MODELS PORTABLE FORCED AIR HEATERS

SERVICE PROCEDURES

Continued

AIR OUTPUT, AIR INTAKE, AND LINT FILTERS

1. Remove upper shell (see page 8).
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 6).
6. Replace filter end cover.
7. Replace fan guard and upper shell.

IMPORTANT: Do not oil filters

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 5). 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 below for correct pressure for each model.
5. Remove pressure gauge. Replace pressure gauge plug in filter end cover.

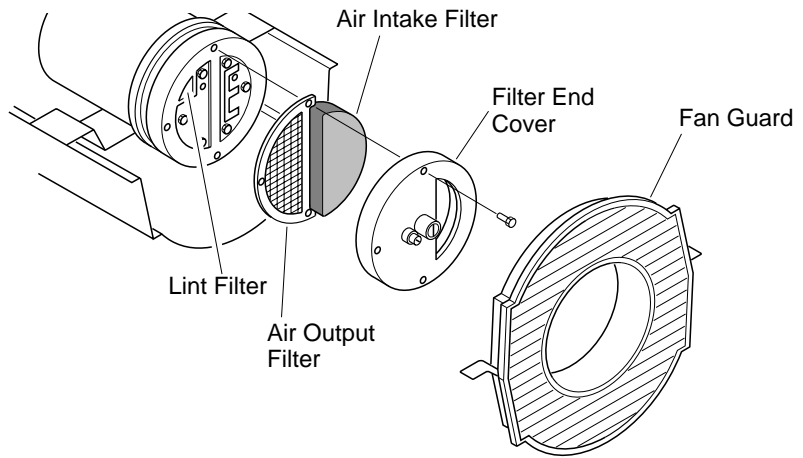


Figure 13 - Air Output, Air Intake, and Lint Filters, D20N Model

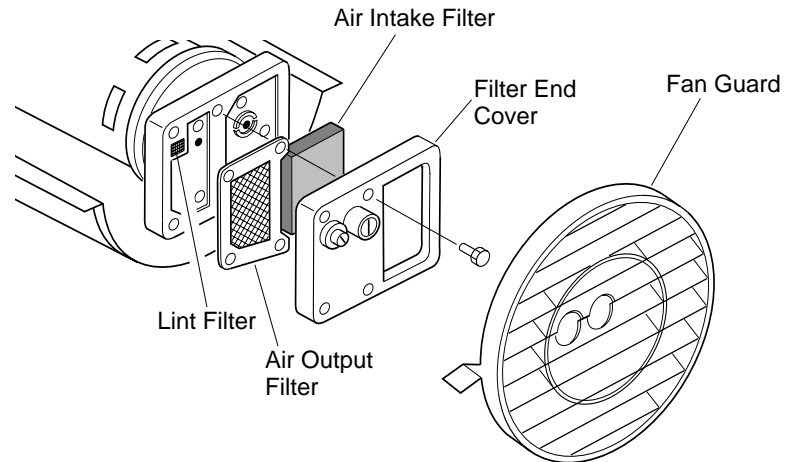
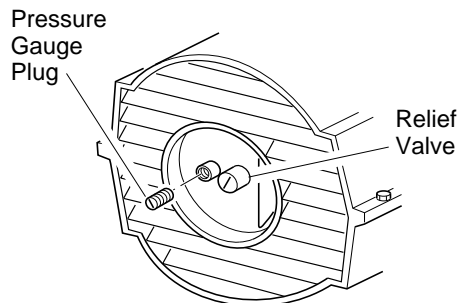


Figure 14 - Air Output, Air Intake, and Lint Filters, D30N and D44N Models



**Figure 15 - Pressure Gauge Plug Removal
(D20N Model Shown)**

Model	Pump Pressure (PSI/Bar)
D20N	4.7/0.324
D30N	4.9/0.338
D44N	5.5/0.380

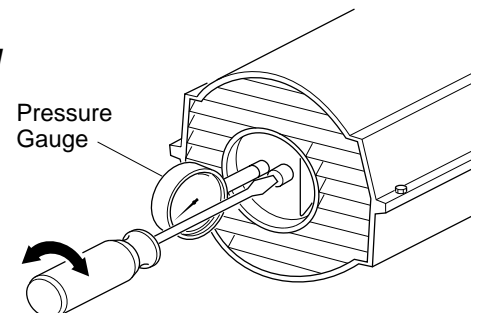


Figure 16 - Adjusting Pump Pressure

SERVICE PROCEDURES

Continued

NOZZLE ASSEMBLY

1. Remove upper shell (see page 8).
2. Remove fan (see page 13).
3. Remove fuel and air line hoses from nozzle assembly (see Figure 17, 18, or 19).
4. Turn nozzle assembly 1/4 turn to left and pull toward motor to remove (see Figure 20).
5. Place plastic hex-body into vise and lightly tighten.
6. Carefully remove nozzle from the nozzle adapter using 5/8" socket wrench (see Figure 21).
7. Blow compressed air through 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 (40-45 inch-pounds). See Figure 21.
10. Attach nozzle assembly to burner strap.
11. Attach fuel and airline hoses to nozzle assembly. See *Fuel and Airline Replacement and Proper Routing*.
12. Replace fan (see page 13).
13. Replace fan guard and upper shell (see page 8).

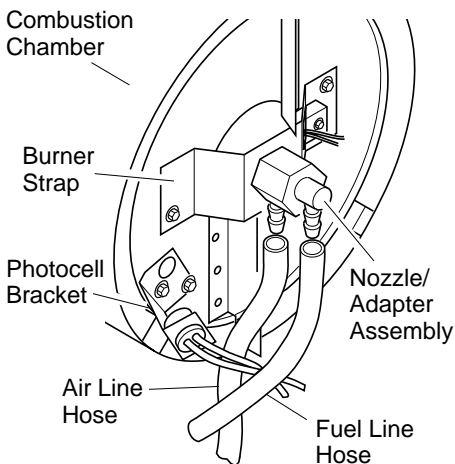


Figure 17 - Removing Air and Fuel Line Hoses (D20N Model Only)

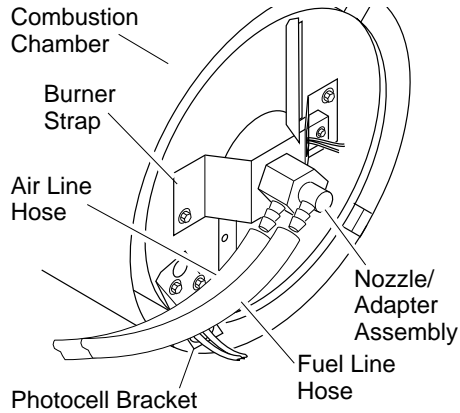


Figure 18 - Removing Air and Fuel Line Hoses (D30N Model Only)

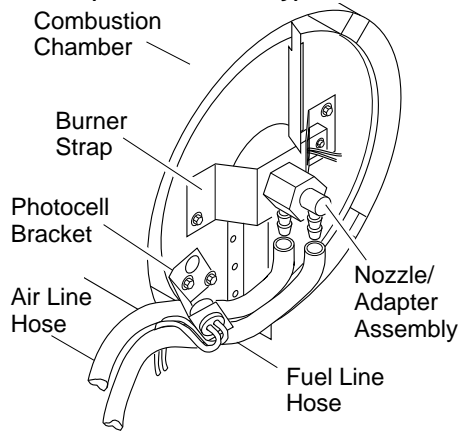


Figure 19 - Removing Air and Fuel Line Hoses (D44N Model Only)

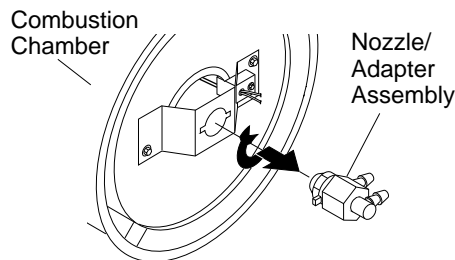


Figure 20 - Removing Nozzle/Adapter Assembly

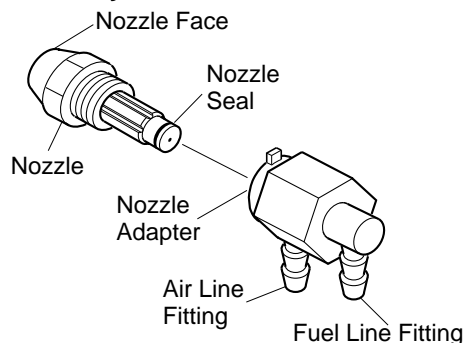


Figure 21 - Nozzle and Nozzle Adapter

FUEL AND AIR LINE REPLACEMENT AND PROPER ROUTING

1. Remove upper shell (see page 8).
2. Remove side cover screws using 5/16" nut driver.
3. Remove side cover.
4. Inspect fuel and air line hoses for cracks and/or holes. If fuel line hose is damaged, disconnect from nozzle adapter (see Figure 17, 18, or 19) and from fuel filter (see page 8). If air line hose is damaged, disconnect from nozzle adapter (see Figure 17, 18, or 19) and from barb fitting on pump end cover (see Figure 22).
5. Install new air and/or fuel line. Attach one end of air line hose to barb fitting on pump end cover (see Figure 22) and the other end to nozzle adapter (see Figure 17, 18, or 19). Attach one end of fuel line hose to fuel filter (see page 8) and the other end to nozzle adapter (see Figure 17, 18, or 19).
Route air and fuel line approximately as shown. For D20N model heater, see Figure 17. For D30N model heater, see Figure 18. For D44N model heater, see Figure 19.
Note: Hoses are not to be touching photocell bracket.
6. Replace side cover.
7. Replace upper shell and fan guard (see page 8).

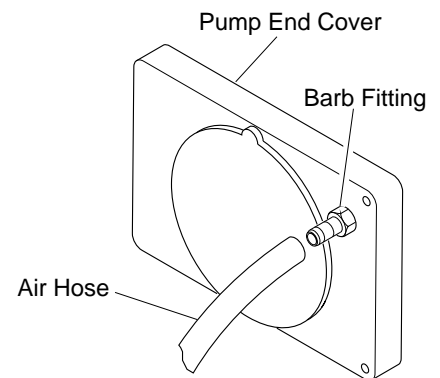


Figure 22 - Air Hose to Barb Fitting

D20N, D30N AND D44N MODELS PORTABLE FORCED AIR HEATERS

SERVICE PROCEDURES

Continued

PUMP ROTOR (Procedure if Rotor is Binding)

1. Remove upper shell (see page 8).
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 25).
10. Install blades, pump plate, air filters, and filter end cover.
11. Replace fan guard and upper shell.
12. Adjust pump pressure (see page 10).

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

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 26).
15. Reinstall insert and rotor.
16. Perform steps 10 through 12 above.

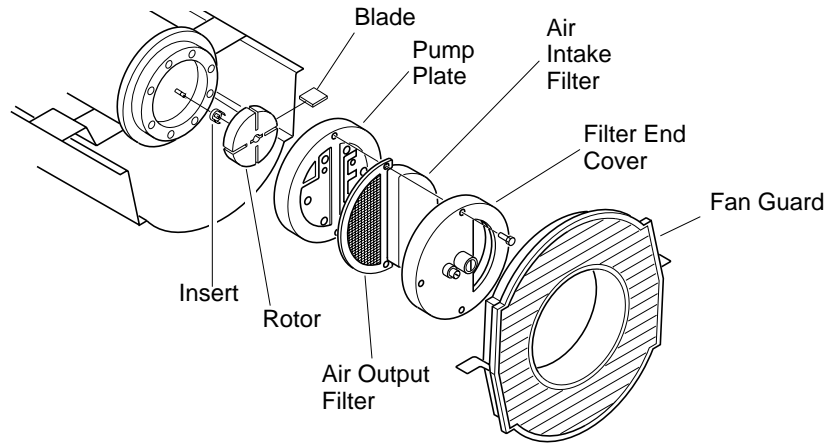


Figure 23 - Rotor Location, D20N Model

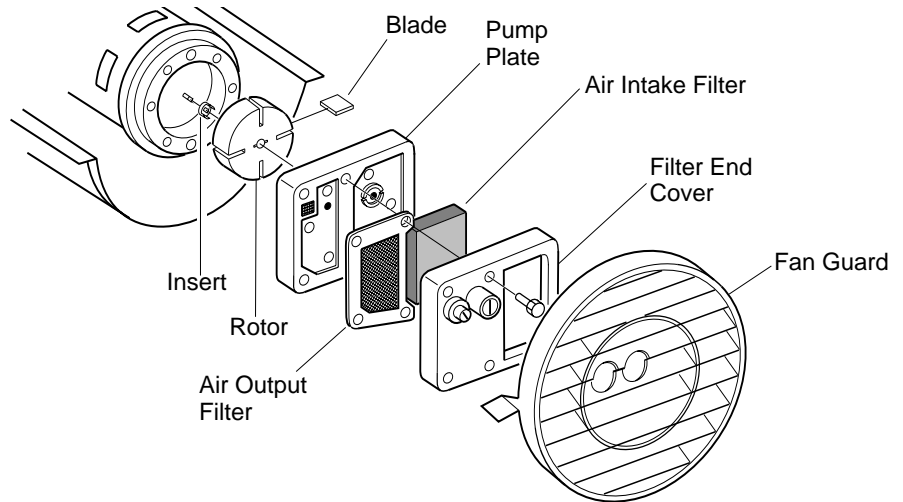


Figure 24 - Rotor Location, D30N and D44N Models

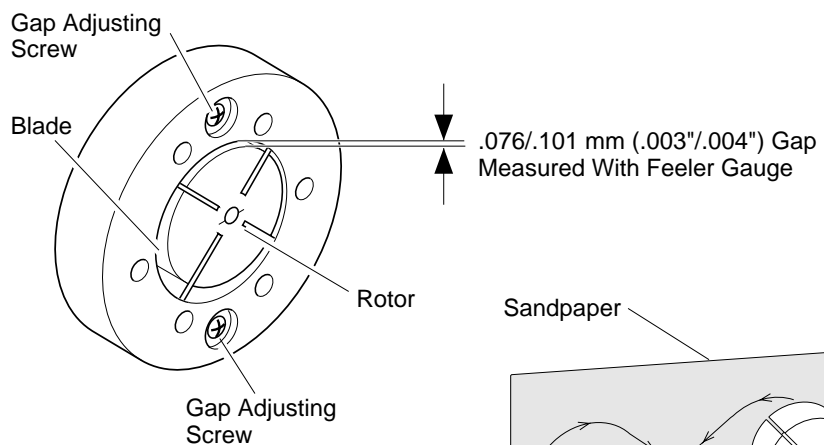


Figure 25 - Gap Adjusting Screw Locations

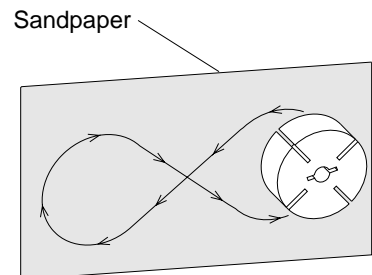


Figure 26 - Sanding Rotor

SERVICE PROCEDURES

Continued

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 8).
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 28).
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.

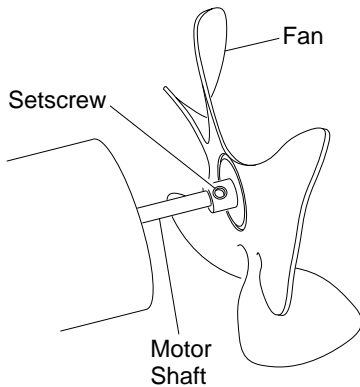


Figure 27 - Fan, Motor Shaft, and Setscrew Location

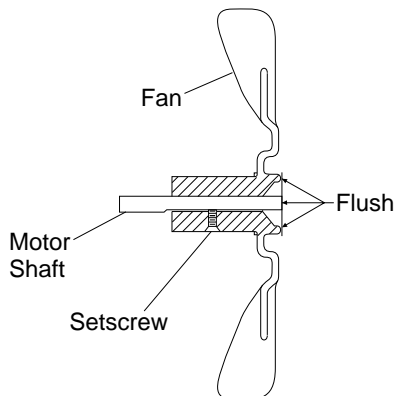


Figure 28 - Fan Cross Section

IGNITION CONTROL ASSEMBLY

WARNING: Unplug heater before servicing.

Remove Old Assembly

1. Using the 5/16" nut driver or socket wrench, remove the four side cover screws (see Figure 29).
2. Disconnect the nine wires from the ignition control assembly.
3. Using needle nose pliers, squeeze the tab on the printed circuit board support and lift up on the edge of the ignition control assembly (see Figure 30). Repeat this for the other four printed circuit board supports then remove the assembly.

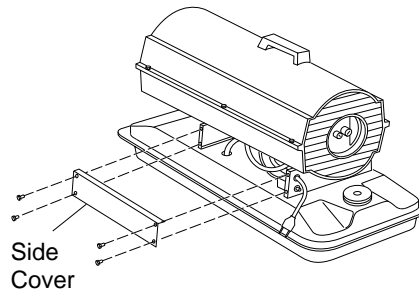


Figure 29 - Removing Cover

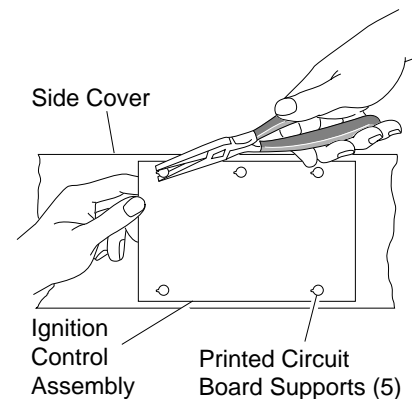


Figure 30 - Removing Circuit Board

Installing the New Assembly

CAUTION: Ignition control assembly contains electrostatic components. Handle the assembly by the edges of the printed circuit board. Do not touch any of the quick connect terminals or electronic components.

1. Align the five holes in the assembly with the five printed circuit board supports in the side cover.
2. Holding the assembly by the edges of the printed circuit board, apply downward pressure until all five tabs on the printed circuit board supports springlock into place. Pull up on assembly to verify this (see Figure 31).
3. Connect the nine wire leads to the ignition control assembly as shown in the wiring diagram on page 21.

CAUTION: Double check connections. Connecting ignition control assembly wrong could result in damage to the ignition control assembly and/or other components in the heater assembly.

4. Using the 5/16" nut driver or socket wrench reinstall side cover to heater. Tighten screws until snug. Do not over torque!

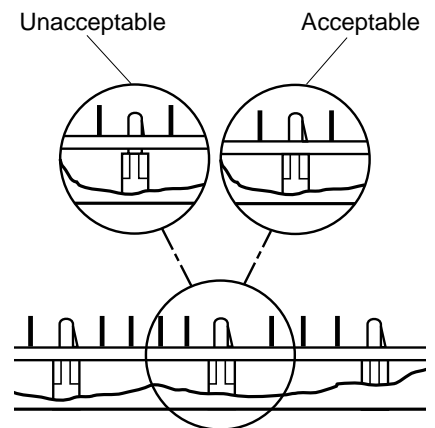
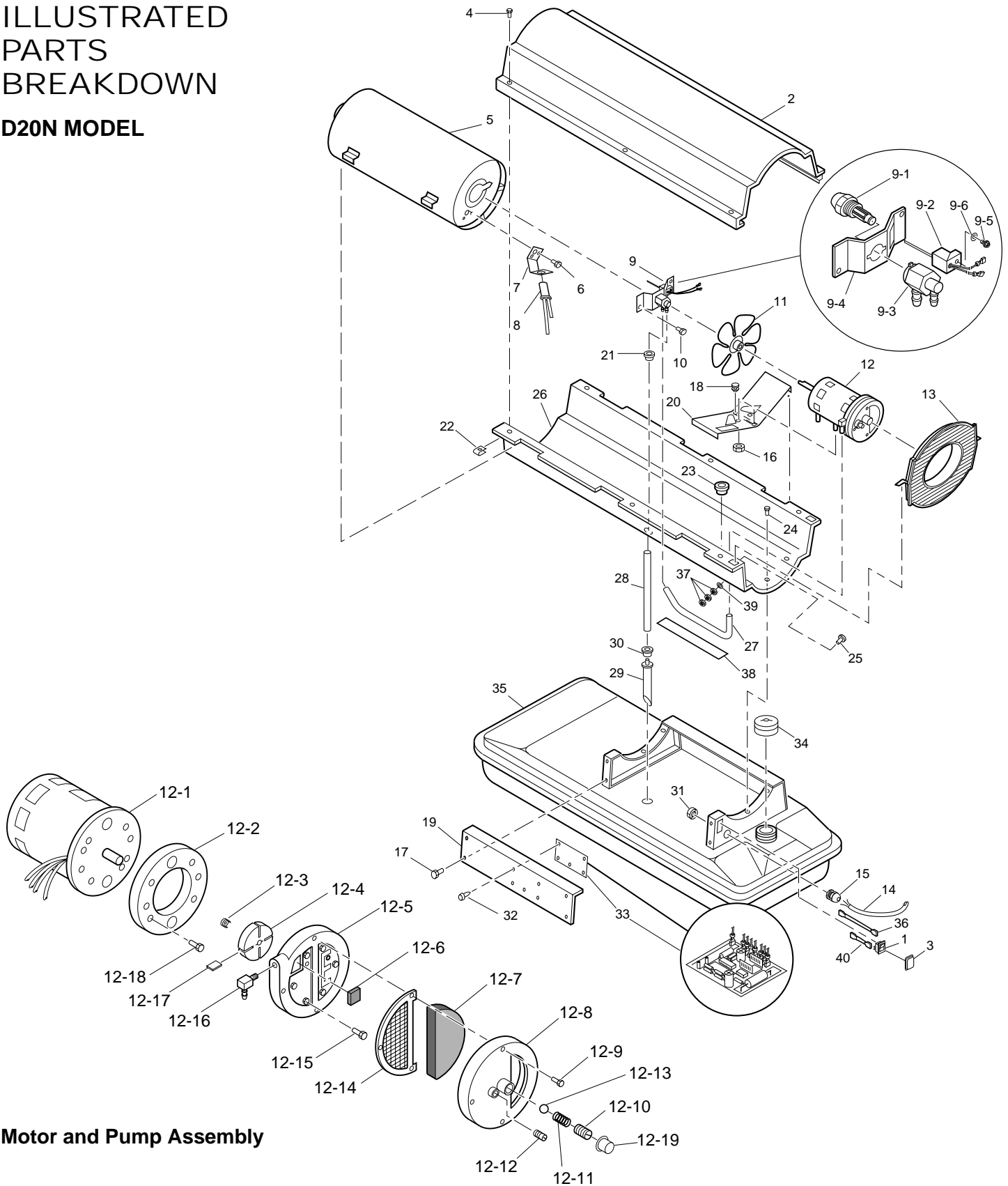


Figure 31 - Attaching Circuit Board to Tabs

D20N, D30N AND D44N MODELS PORTABLE FORCED AIR HEATERS

ILLUSTRATED PARTS BREAKDOWN

D20N MODEL



Motor and Pump Assembly

OWNER'S MANUAL

PARTS LIST

D20N 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.

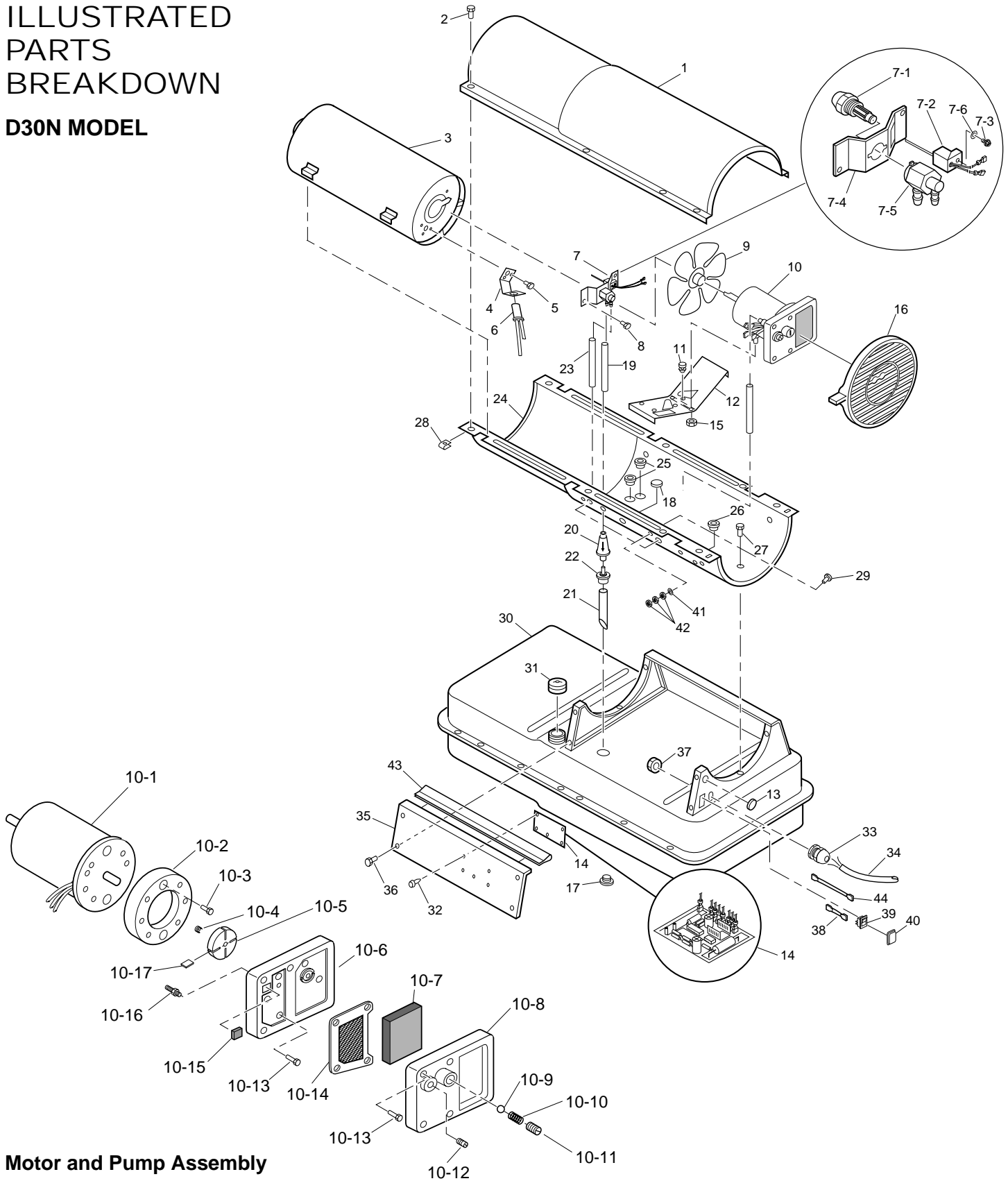
KEY NO.	PART NUMBER	DESCRIPTION	QTY.	KEY NO.	PART NUMBER	DESCRIPTION	QTY.
1	105793-01	ON/OFF Switch	1	12-19	105780-01	Plastic Cap	1
2	098511-264	Upper Shell	1	13	M51105-01	Fan Guard	1
3	079919-01	Switch Cover	1	14	079673-07	Power Cord	1
4	102432-01	Screw/Lockwasher, 1/2"	6	15	M50400	Strain Relief Bushing	1
5	098512-64	Combustion Chamber	1	16	NTC-4C	Hex Lock Nut, 1/4-20	2
6	M10908-2	Screw, #6-32 x 3/8"	2	17	102431-01	Screw/Lockwasher, 1/2"	4
7	103154-03	Photocell Bracket	1	18	M50631	Rubber Bumper	2
8	M16656-24	Photocell Assembly	1	19	097461-03AA	Side Cover	1
9	***	Burner Strap Assembly	1	20	101205-01	Motor Bracket	1
9-1	100735-25	Nozzle Assembly	1	21	M30865-02	Bushing	1
9-2	102548-05	Ignitor Kit	1	22	M11271-8	Clip Nut	6
9-3	104056-01	Nozzle Adapter	1	23	M50104-02	Bushing	1
9-4	102336-01	Nozzle Adapter Bracket	1	24	102431-01	Screw/Lockwasher, 1/2"	6
9-5	M10908-75	Screw, #6-32 x 7/8"	1	25	RF3-5B	Screw, #10-32 x 5/8"	1
9-6	103347-01	Belleville Washer	1	26	098511-235	Lower Shell	1
10	102431-01	Screw/Lockwasher, 1/2"	2	27	M50814-06	Rubber Airline	1
11	103684-01	Fan	1	28	M29652-05	Fuel Line	1
12	***	Motor and Pump Assembly	1	29	M50876-05	Fuel Filter with bushing	1
12-1	102001-23	Motor (230V/50 Hz)	1	30	M10990-3	Rubber Bushing	1
12-2	079975-02	Pump Body	1	31	102861-01	Nylon Locknut	1
12-3	M22009	Insert	1	32	102349-01	PCB Support	5
12-4	M22456-1	Rotor	1	33	104068-04	Ignition Control Assembly	1
12-5	M29608	Pump End Cover	1	34	097702-01	Fuel Cap (Includes Gasket)	1
12-6	M29632	Lint Filter	1	35	098513-102	Fuel Tank	1
12-7	M29633	Intake Filter	1	36	079010-40	Wire Assembly (White)	1
12-8	M29609	Filter End Cover	1	37	NPF-3B	Nut, #10-32	3
12-9	M12461-31	Screw, #10-32 x 1"	3	38	097785-01	Vinyl Foam Gasket	1
12-10	M27694	Adjusting Screw	1	39	WLE-3	Lockwasher, #10	1
12-11	M10993-1	Pressure Relief Spring	1	40	079010-39	Wire Assembly (Brown)	1
12-12	M22997	Plug	1	PARTS AVAILABLE - NOT SHOWN			
12-13	M8940	Steel Ball, 1/4" Diameter	1		HA2210	Filler Neck Screen	1
12-14	M29612-01	Output Filter	1		103814-01	Wire Tie	1
12-15	M12461-31	Screw #10-32 x 1"	6		103238-01	Tradename Decal	2
12-16	103676-01	Nylon Elbow, 90°	1		105852-01	Decal Package	1
12-17	M8643	Blade	4				
12-18	FHPF3-5C	Screw, #10-32 x 5/8"	2				

*** Not available as an assembly; order parts separately

D20N, D30N AND D44N MODELS PORTABLE FORCED AIR HEATERS

ILLUSTRATED PARTS BREAKDOWN

D30N MODEL



Motor and Pump Assembly

OWNER'S MANUAL

PARTS LIST

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.

D30N MODEL

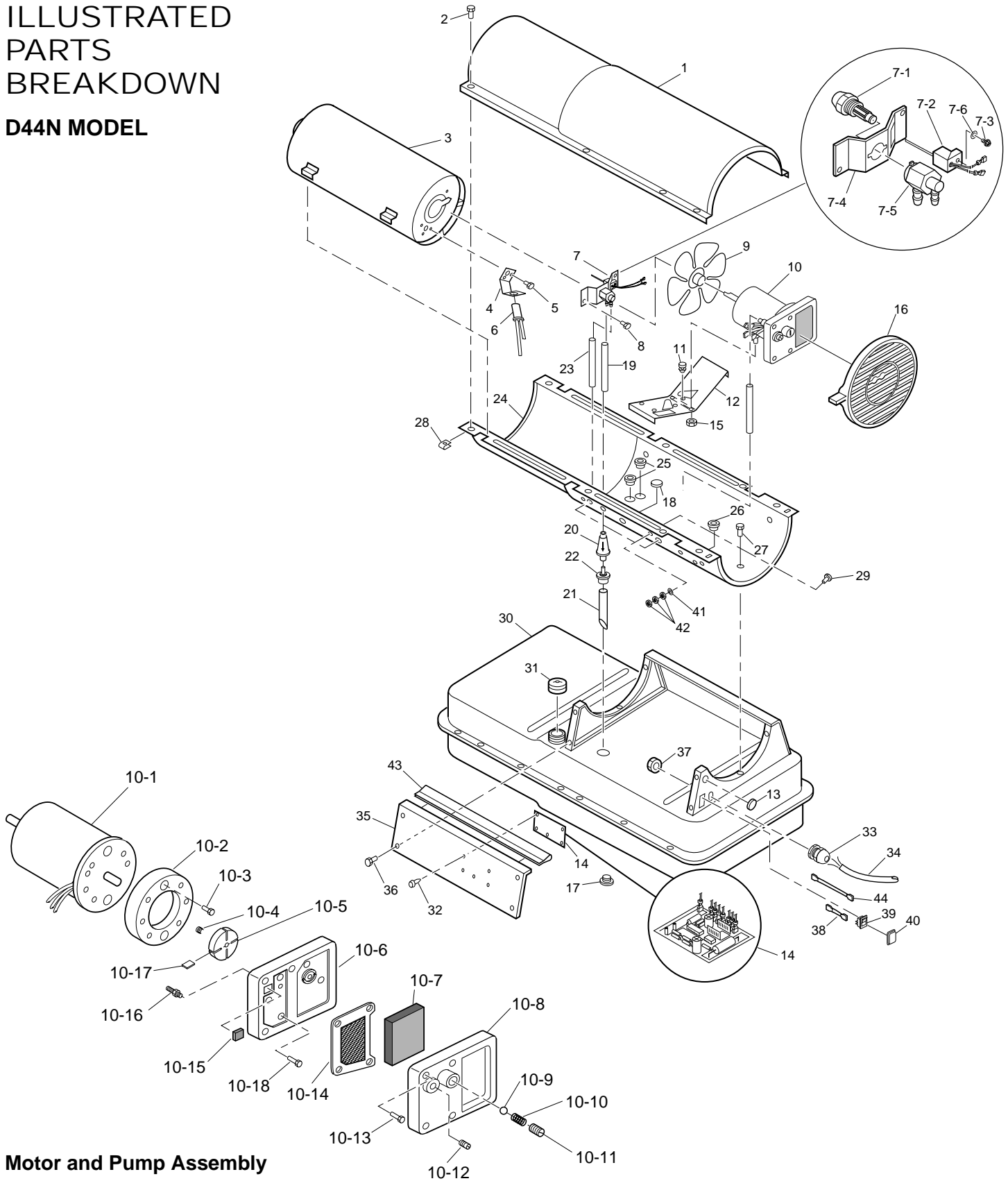
KEY NO.	PART NUMBER	DESCRIPTION	QTY.	KEY NO.	PART NUMBER	DESCRIPTION	QTY.
1	098511-138	Upper Shell	1	15	NTC-4C	Hex Lock Nut, 1/4-20	2
2	102432-01	Screw/Lockwasher, 1/2"	8	16	M51114-01	Fan Guard	1
3	098512-65	Combustion Chamber	1	17	M27417	Drain Plug (Includes "o" Ring)	1
4	103971-01	Photocell Bracket	1	18	099213-01	Button Plug	1
5	M10908-2	Screw, #6-32 x 3/8"	2	19	M51345-06	Fuel Line	1
6	M16656-24	Photocell Assembly	1	20	099743-01	Fuel Filter	1
7	***	Burner Strap Assembly	1	21	M51151-01	Fuel Line Tube	1
7-1	100735-23	Nozzle Assembly	1	22	M10990-3	Rubber Bushing	1
7-2	102548-05	Ignitor Kit	1	23	M50814-03	Airline	1
7-3	M10908-75	Screw, #6-32 x 7/8"	1	24	098511-236	Lower Shell	1
7-4	102336-01	Nozzle Adapter Bracket	1	25	M50104-03	Bushing	2
7-5	104054-01	Nozzle Adapter	1	26	M50104-01	Bushing	1
7-6	103347-01	Belleville Washer	1	27	102431-01	Screw/Lockwasher, 1/2"	6
8	102431-01	Screw/Lockwasher, 1/2"	2	28	M11271-8	Clip Nut	8
9	102042-01	Fan	1	29	RF3-5B	Screw, #10-32 x 5/8"	1
10	***	Motor and Pump Assembly	1	30	098513-91	Fuel Tank	1
10-1	102001-24	Motor	1	31	097702-01	Fuel Cap (Includes Gasket)	1
10-2	079975-02	Pump Body	1	32	102349-01	P.C. Board Support	5
10-3	FHPF3-5C	Screw, #10-32 x 5/8"	2	33	M50400	Strain Relief Bushing	1
10-4	M22009	Rotor Insert	1	34	079673-07	Power Cord	1
10-5	M22456-1	Pump Rotor	1	35	M51077-09AA	Side Cover	1
10-6	M50545	Pump End Cover	1	36	102431-01	Screw/Lockwasher, 1/2"	4
10-7	M12179	Intake Filter	1	37	102861-01	Nylon Locknut	1
10-8	M16545	Filter End Cover	1	38	079010-39	Wire Assembly (Brown)	1
10-9	M8940	Steel Ball, 1/4" Diameter	1	39	105793-01	ON/OFF Switch	1
10-10	M10993-1	Relief Spring	1	40	079919-01	Switch Cover	1
10-11	M27694	Adjusting Screw	1	41	WLE-3	Lockwasher, #10	1
10-12	M22997	Plug	1	42	NPF-3B	Nut, #10-32	3
10-13	M12461-31	Screw, #10-32 x 1"	10	43	097468-01	Edge Liner	1
10-14	M12244-1	Output Filter	1	44	079010-40	Wire Assembly (White)	1
10-15	M11637	Lint Filter	1	PARTS AVAILABLE - NOT SHOWN			
10-16	M50820-02	Barb Fitting	1		HA2210	Filler Neck Screen	1
10-17	M8643	Blade	4		103814-01	Wire Tie	1
11	M50631	Rubber Bumper	2		103238-01	Tradename Decal	2
12	101206-01	Motor Mounting Bracket	1		105852-02	Decal Package	1
13	101695-01	Button Plug	1				
14	104068-04	Ignition Control Assembly	1				

*** Not available as an assembly; order parts separately

D20N, D30N AND D44N MODELS PORTABLE FORCED AIR HEATERS

ILLUSTRATED PARTS BREAKDOWN

D44N MODEL



Motor and Pump Assembly

OWNER'S MANUAL

PARTS LIST

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.

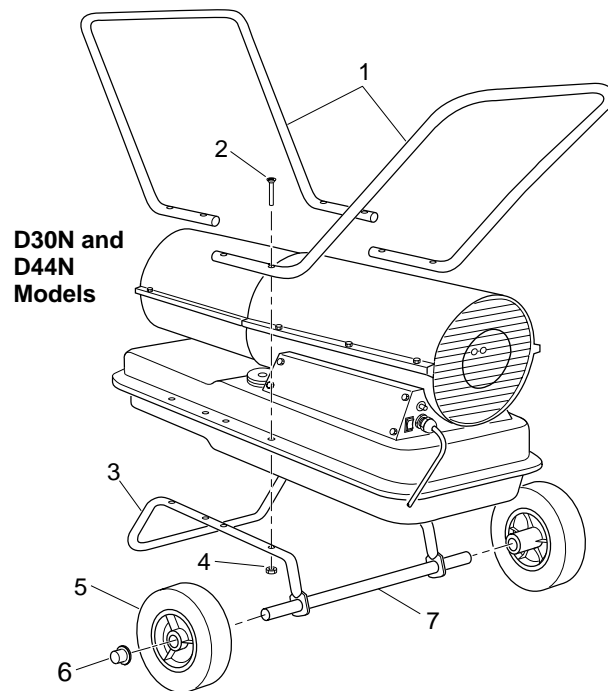
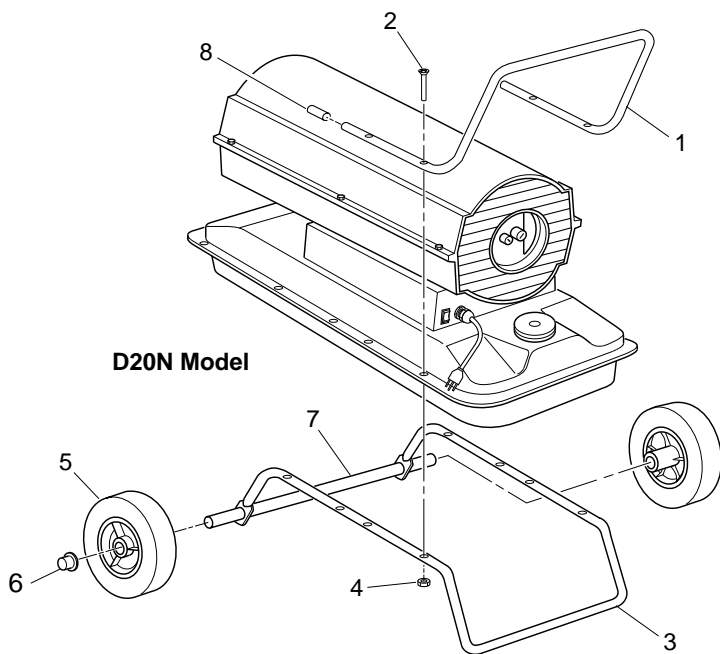
D44N Model

KEY NO.	PART NUMBER	DESCRIPTION	QTY.	KEY NO.	PART NUMBER	DESCRIPTION	QTY.
1	098511-138	Upper Shell	1	14	104068-04	Ignition Control Assembly	1
2	102432-01	Screw/Lockwasher, 1/2"	8	15	NTC-4C	Hex Lock Nut, 1/4-20	2
3	098512-66	Combustion Chamber	1	16	M51114-01	Fan Guard	1
4	103154-05	Photocell Bracket	1	17	M27417	Drain Plug (Includes "o" Ring)	1
5	M10908-2	Screw, #6-32 x 3/8"	2	18	099213-01	Button Plug	1
6	M16656-24	Photocell Assembly	1	19	M51345-06	Fuel Line	1
7	***	Burner Strap Assembly	1	20	099743-01	Fuel Filter	1
7-1	100735-24	Nozzle Assembly	1	21	M51151-02	Fuel Line Tube	1
7-2	102548-05	Ignitor Kit	1	22	M10990-3	Rubber Bushing	1
7-3	M10908-75	Screw, #6-32 x 7/8"	1	23	M50814-03	Airline	1
7-4	102336-01	Nozzle Adapter Bracket	1	24	098511-236	Lower Shell	1
7-5	104054-01	Nozzle Adapter	1	25	M50104-03	Bushing	2
7-6	103347-01	Belleville Washer	1	26	M50104-01	Bushing	1
8	102431-01	Screw/Lockwasher, 1/2"	2	27	102431-01	Screw/Lockwasher, 1/2"	6
9	102042-01	Fan	1	28	M11271-8	Clip Nut	8
10	***	Motor and Pump Assembly	1	29	RF3-5B	Screw, #10-32 x 5/8"	1
10-1	102001-24	Motor	1	30	098513-92	Fuel Tank	1
10-2	079975-03	Pump Body	1	31	097702-01	Fuel Cap (Includes Gasket)	1
10-3	FHPF3-6C	Screw, #10-32 x 3/4"	2	32	102349-01	P.C. Board Support	5
10-4	M22009	Rotor Insert	1	33	M50400	Strain Relief Bushing	1
10-5	M22456-2	Pump Rotor	1	34	079673-07	Power Cord	1
10-6	M50545	Pump End Cover	1	35	M51077-09AA	Side Cover	1
10-7	M12179	Intake Filter	1	36	102431-01	Screw/Lockwasher, 1/2"	4
10-8	M16545	Filter End Cover	1	37	102861-01	Nylon Locknut	1
10-9	M8940	Steel Ball, 1/4" Diameter	1	38	079010-39	Wire Assembly (Brown)	1
10-10	M10993-1	Relief Spring	1	39	105793-01	ON/OFF Switch	1
10-11	M27694	Adjusting Screw	1	40	079919-01	Switch Cover	1
10-12	M22997	Plug	1	41	WLE-3	Lockwasher, #10	1
10-13	M12461-31	Screw, #10-32 x 1"	4	42	NPF-3B	Nut, #10-32	3
10-14	M12244-1	Output Filter	1	43	097468-01	Edge Liner	1
10-15	M11637	Lint Filter	1	44	079010-40	Wire Assembly (White)	1
10-16	M50820-02	Barb Fitting	1	PARTS AVAILABLE - NOT SHOWN			
10-17	M8643-2	Blade	4		HA2210	Filler Neck Screen	1
10-18	M12461-32	Screw, #10-32 x 1 1/8"	6		103814-01	Wire Tie	1
11	M50631	Rubber Bumper	2		103238-02	Tradename Decal	2
12	101206-01	Motor Mounting Bracket	1		105852-03	Decal Package	1
13	101695-01	Button Plug	1				

*** Not available as an assembly; order parts separately

D20N, D30N AND D44N MODELS PORTABLE FORCED AIR HEATERS

WHEELS AND HANDLES



KEY NO.	PART NUMBER	PART DESCRIPTION	D20N QTY.	D30N QTY.	D44N QTY.	
1	HA2203	Handles	—	2	—	
	HA2204	Handles	—	—	2	
	097198-02	Handles	1	—	—	
2	M12345-33	Screw, #10-24 x 1 3/4"	4	8	8	
	3	M12342-3	Wheel Support Frame	—	1	—
		M12831-3	Wheel Support Frame	—	—	1
097197-02		Wheel Support Frame	1	—	—	
4	NTC-3C	Hex Nut, #10-24	4	8	8	
	107426-01	Wheel (Qty 2)	1	1	1	
6	M28526	Cap Nut	2	2	2	
	7	M51015-01	Axle	—	1	—
		M16801-2	Axle	—	—	1
M51015-04		Axle	1	—	—	
8	078978-02	Sleeve Cap	2	—	—	

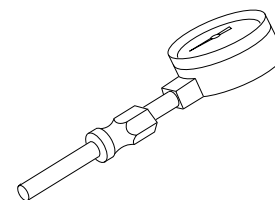
OWNER'S MANUAL

SPECIFICATIONS

Output Rating (Btu/Hr)	70,000	110,000	150,000
Fuel	Use Only Kerosene or No. 1 Fuel Oil		
Fuel Tank Capacity (U.S. Gal./Liters)	5.0/18.9	9.0/34	13.5/51.1
Fuel Consumption (Gal. Per Hr./Liters Per Hr.)	.52/1.97	.79/3.0	1.1/4.1
Electric Requirements	230 V/50 Hz (Same All Models)		
Amperage (Normal Run)	1.0	1.2	1.2
Hot Air Output (CFM/CMM)	225/6.4	425/12	500/14.2
RPM	2850	2850	2850

ACCESSORIES

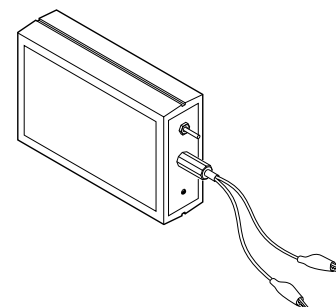
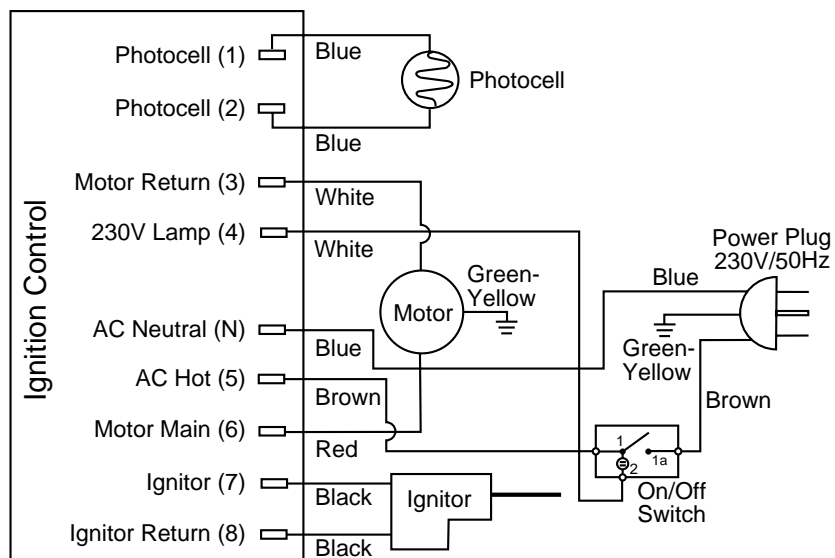
Purchase accessories from your local dealer.



AIR GAUGE KIT - HA1180

For all models. Special tool to check pump pressure.

WIRING DIAGRAM



IGNITION CONTROL ASSEMBLY/PHOTOCELL TESTER - HA1170

Special tool used to test the ignition control assembly and photocell.

D20N, D30N AND D44N MODELS PORTABLE FORCED AIR HEATERS

EC CONFORMITY DECLARATION

EC CONFORMITY DECLARATION

**DESA Europe B.V.
Innsbruckweg 144, 3047 AH
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: D20N, D30N, and D44N**

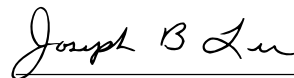
It is declared that these models conform to the Machinery Directive 98/37/EC, including 91/368/EEC and the Low Voltage Directive 73/23/EEC. It is further declared that these models conform to the EMC Directive 89/336/EEC, amended by 92/31/EEC and including EN50081-1 and EN50082-1.

We declare that the models noted are in conformity.

<u>Company</u>	<u>DESA International, Inc.</u>
<u>Name</u>	<u>Joseph B. Lee</u>
<u>Title</u>	<u>Vice President, Heating Products Engineering</u>

07/25/2000 — Bowling Green, KY

Date and Place



Signature

WARRANTY INFORMATION

CERTIFICATE OF GENERAL EQUIPMENT - LIMITED ONE YEAR WARRANTY

DESA International warrants new Products sold by it to be free from defects in material or workmanship for a period of one year after date of delivery to the first user and subject to the following conditions:

DESA International's obligation and liability under this Warranty is expressly limited to repairing or replacing at DESA International's option, any parts which appear to DESA International 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 DESA International 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. DESA INTERNATIONAL MAKES NO OTHER EXPRESS WARRANTY. TO THE EXTENT PERMITTED BY LAW DESA INTERNATIONAL MAKES NO IMPLIED WARRANTY AND MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PUR-

POSE. 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. DESA International's obligation under this limited Warranty shall not include any liability for direct, indirect, incidental, or consequential damage or delay. If requested by DESA International, Products or parts for which a warranty claim is made are to be returned transportation prepaid by user to the factory. Any improper use, including operation after discovery of defective or worn parts, operation beyond capacity, substitution of parts not approved by DESA International, or any alteration or repair by others in such manner as in DESA International'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 DESA INTERNATIONAL 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.

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

DESA

INTERNATIONAL

Corporate Headquarters

2701 Industrial Drive

P.O. Box 90004

Bowling Green, Kentucky 42102-9004

U.S.A.



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NOT A UPC