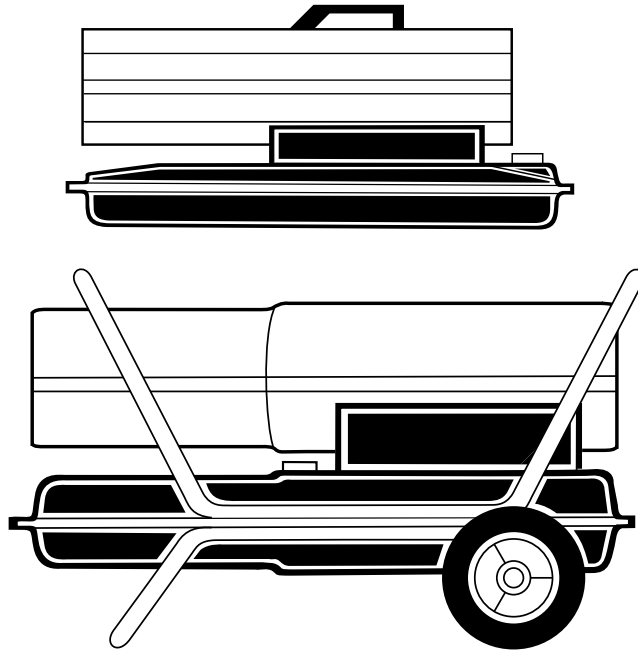


MASTER[®]

PORTABLE FORCED AIR HEATERS

OWNER'S MANUAL



Heater Sizes: 35,000 70,000 100,000 150,000 Btu/Hr
Models: B35CEL, B70CEL, B100CEL, and B150CEL

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.




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 30 kw (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

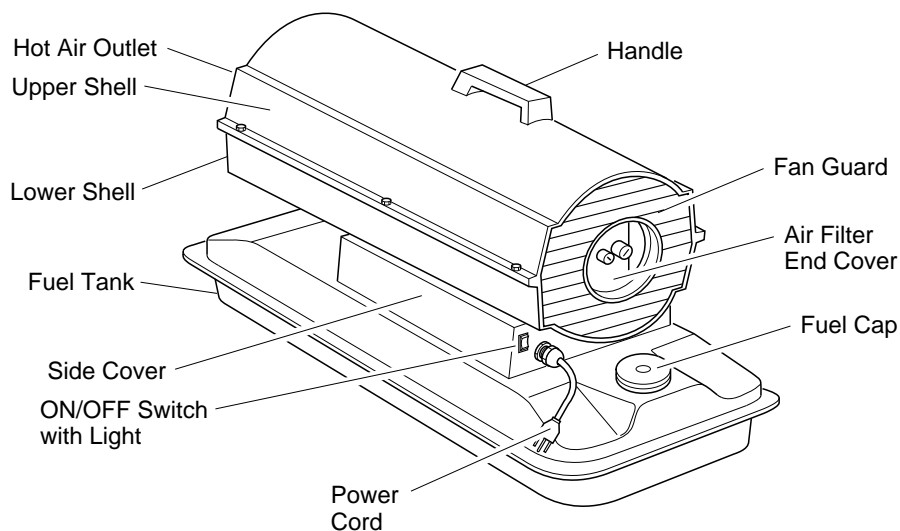


Figure 1 - B35CEL and B70CEL Models

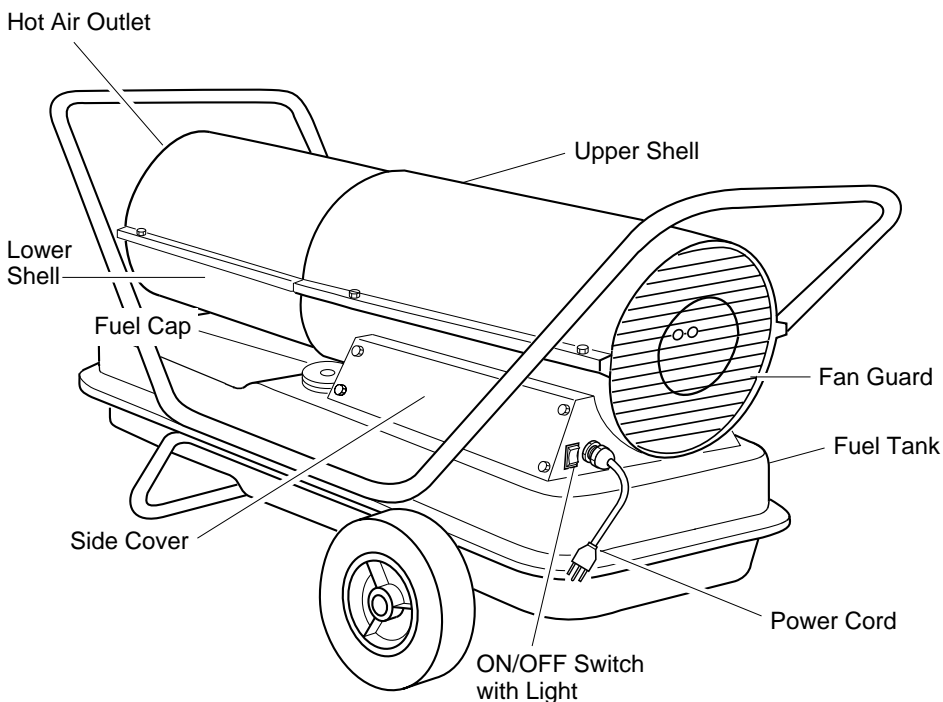


Figure 2 - B100CEL and B150CEL Models

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.

PORTABLE FORCED AIR HEATERS

ASSEMBLY

(FOR B100CEL AND B150CEL MODELS ONLY)

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.

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 30kw (100,000 Btu/Hr) rating. Provide extra fresh air if more heaters are being used.

Example: A 44kw (150,000 Btu/Hr) heater requires one of the following:

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

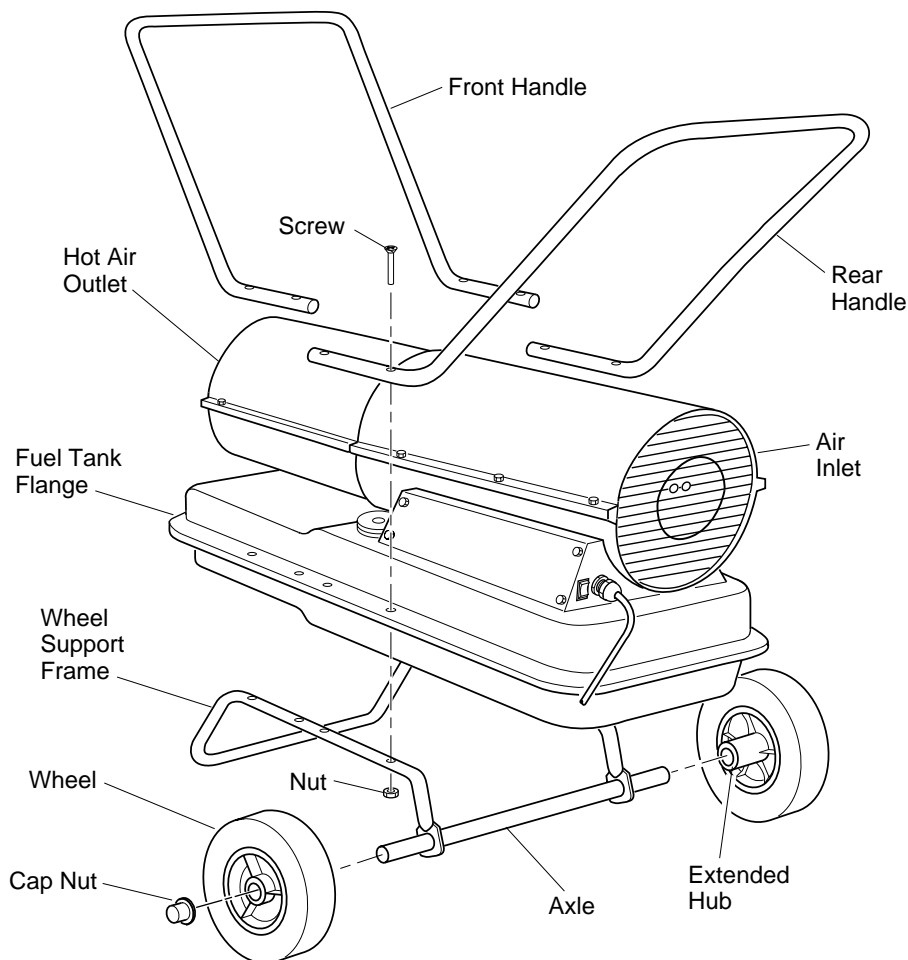


Figure 3 - Wheel and Handle Assembly

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 heater does not start, see *Troubleshooting* (page 7).

TO STOP HEATER

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*.

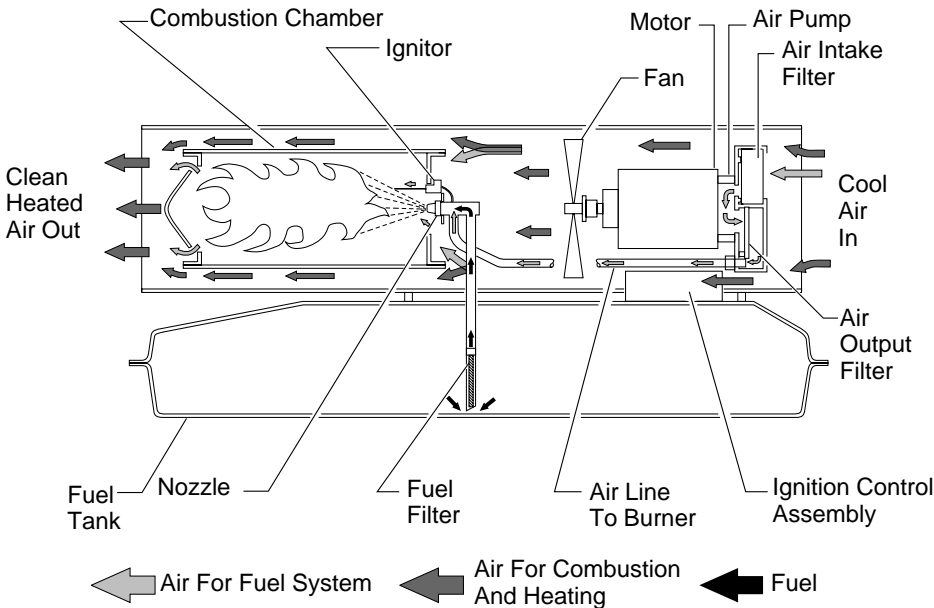


Figure 4 - Cross Section Operational View

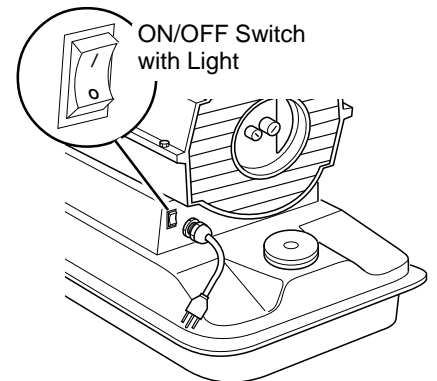


Figure 5 - ON/OFF Switch, B35CEL and B70CEL Models

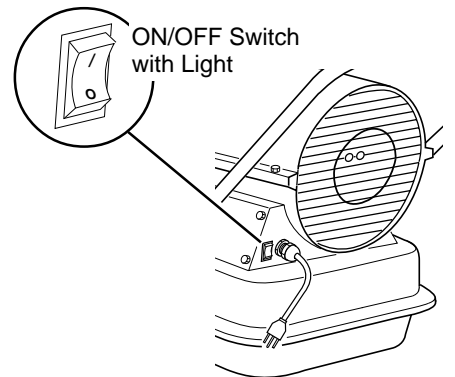


Figure 6 - ON/OFF Switch, B100CEL and B150CEL Models

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.

PREVENTATIVE MAINTENANCE SCHEDULE

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.

TROUBLESHOOTING

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

HEATER WITH FUSED OR NON-FUSED IGNITION CONTROL ASSEMBLY

FAULT CONDITION	POSSIBLE CAUSE	REMEDY
Motor does not start five seconds after heater is plugged in (ON/OFF switch light remains on)	1. Bad electrical connection between motor and ignition control assembly or ignition control assembly and power cord	1. Check all electrical connections. See <i>Wiring Diagram</i> , page 23
	2. Binding pump rotor	2. If fan does not turn freely, see <i>Pump Rotor</i> , page 12
	3. Defective ignition control assembly	3. Replace ignition control assembly
	4. Defective motor	4. Replace motor

⚠ WARNING: High voltage!

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 237. Replace ignitor, see page 98. Replace ignition control assembly
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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
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 **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 238. Replace photocell9. Replace ignition control assembly
--	--	---

HEATER WITH NON-FUSED IGNITION CONTROL ASSEMBLY ONLY

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	POSSIBLE CAUSE	REMEDY
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 233. 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!**

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.

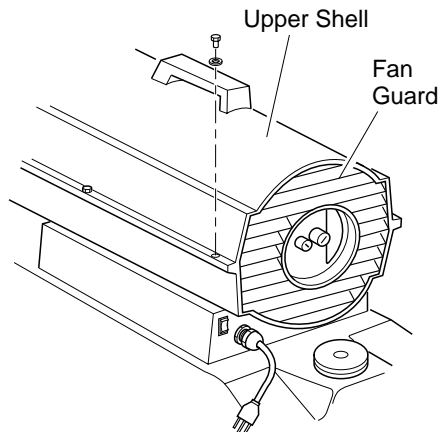


Figure 7 - Upper Shell Removal, B35CEL and B70CEL Models

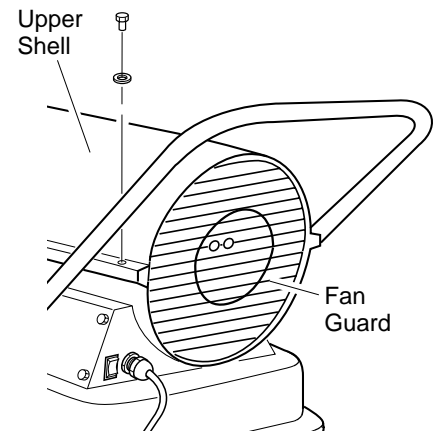


Figure 8 - Upper Shell Removal, B100CEL and B150CEL Models

FUEL FILTER (B35CEL and B70CEL 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.

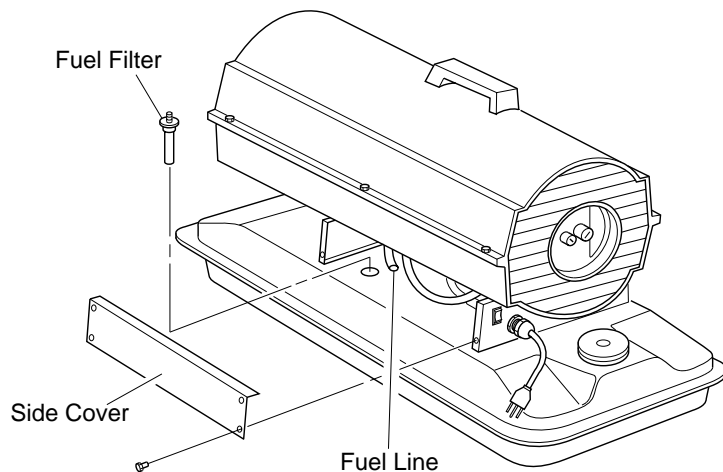


Figure 9 - Fuel Filter Removal, B35CEL and B70CEL Models

FUEL FILTER (B100CEL and B150CEL 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.

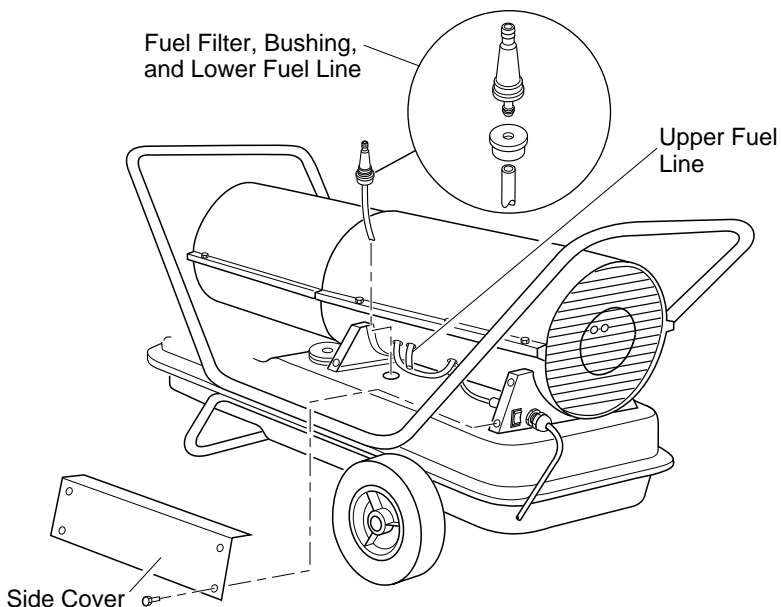


Figure 10 - Fuel Filter Removal, B100CEL and B150CEL Models

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 (yellow) 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).

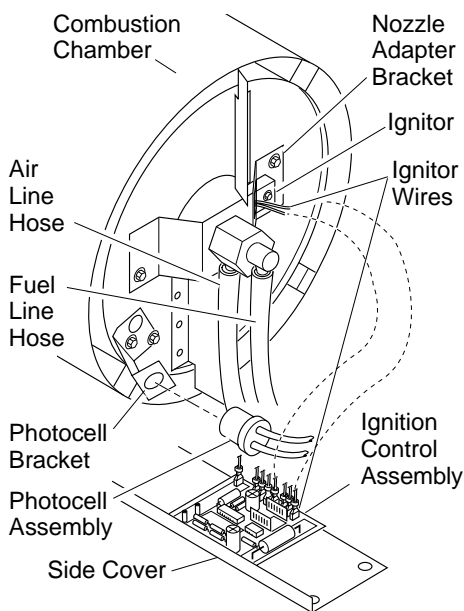


Figure 11 - Disconnecting Ignitor Wires from Ignition Control Assembly

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 .90 to 1.69 N-m (8 to 15 in-lbs) Do not over torque.

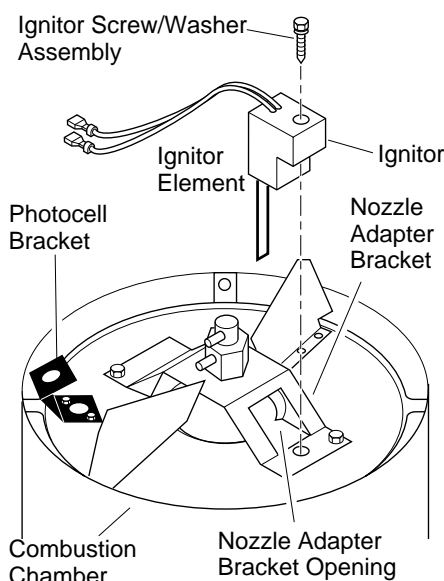


Figure 12 - Ignitor Replacement

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 either Figure 17, 18, or 19, page 11.
15. Replace fan (see page 13).
16. Replace fan guard and upper shell (see page 8).

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 4109.427).
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.

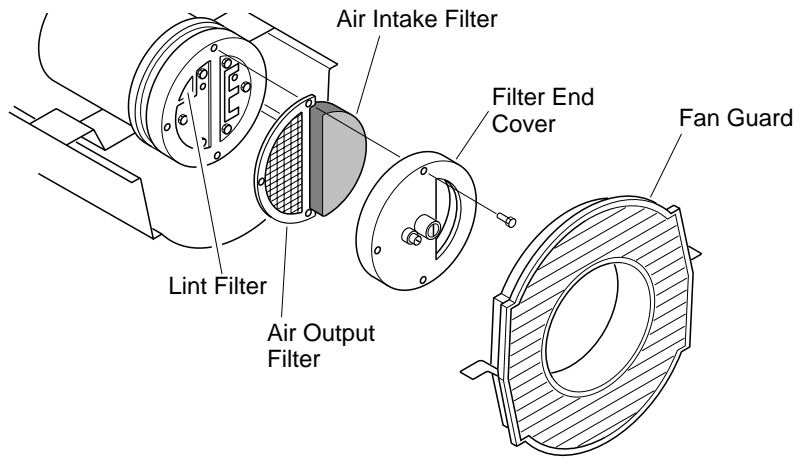


Figure 13 - Air Output, Air Intake, and Lint Filters, B35CEL and B70CEL Models

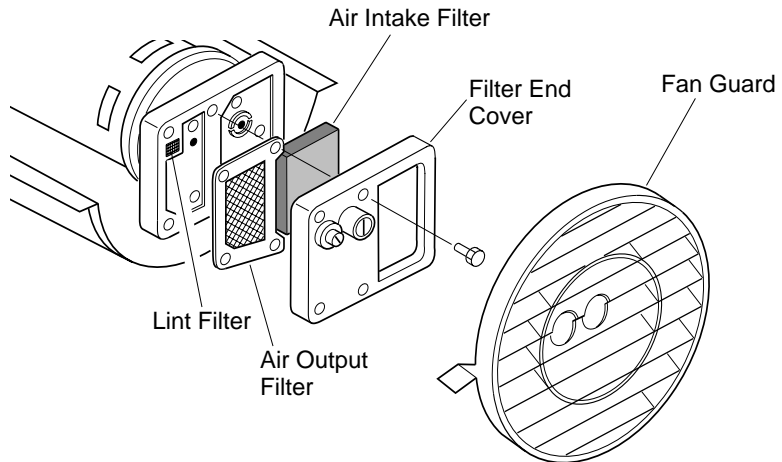


Figure 14 - Air Output, Air Intake, and Lint Filters, B100CEL and B150CEL Models

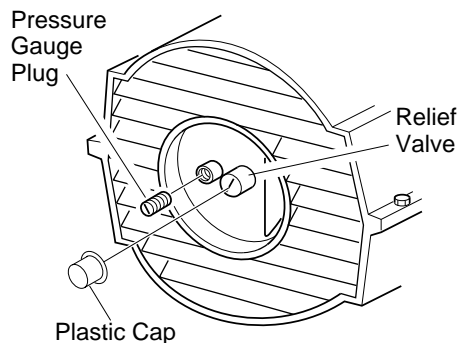


Figure 15 - Pressure Gauge Plug Removal (B35CEL and B70CEL Models Shown)

Model	Pump Pressure (Bar/PSI)
B35CEL	0.200/2.9
B70CEL	0.338/4.9
B100CEL	0.338/4.9
B150CEL	0.380/5.5

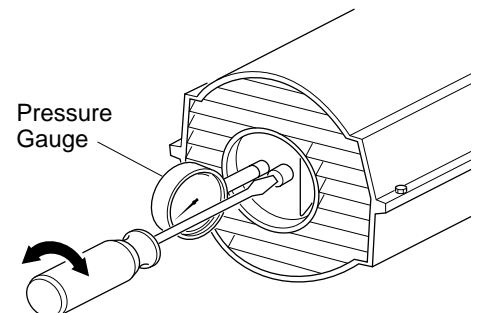


Figure 16 - Adjusting Pump Pressure

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 4.5 to 5.1 N-m (40 to 45 in-lbs). 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).

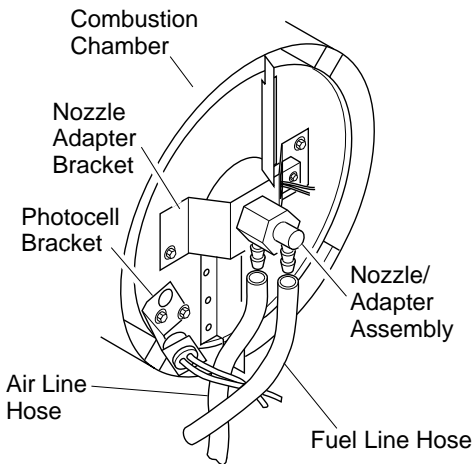


Figure 17 - Removing Air and Fuel Line Hoses (B35CEL and B70CEL Models Only)

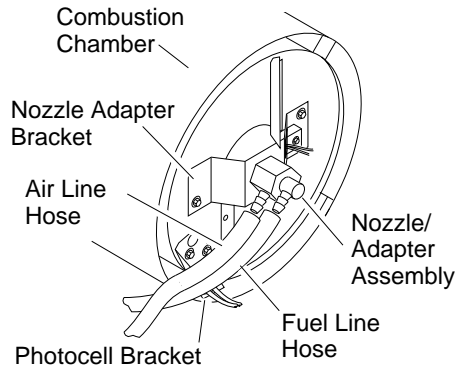


Figure 18 - Removing Air and Fuel Line Hoses (B100CEL Model Only)

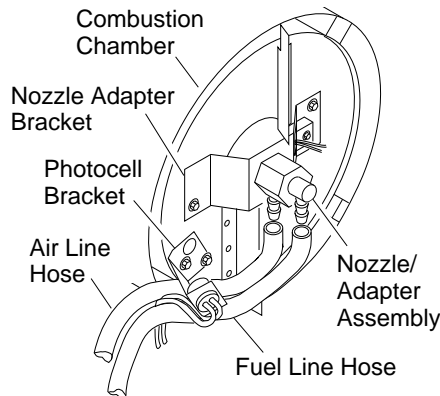


Figure 19 - Removing Air and Fuel Line Hoses (B150CEL Model Only)

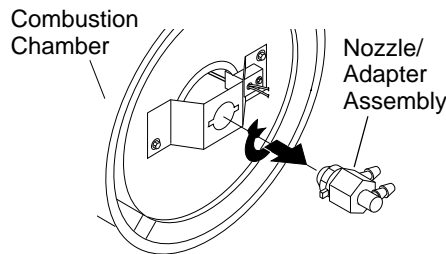


Figure 20 - Removing Nozzle/Adapter Assembly

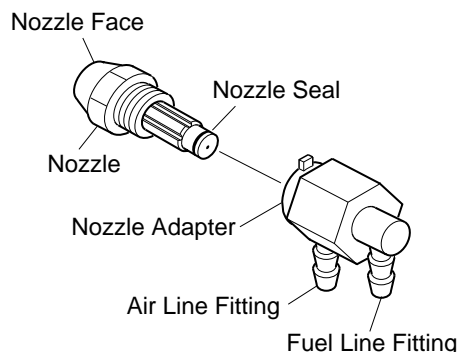


Figure 21 - Nozzle and Nozzle Adapter

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).

For B35CEL and B70CEL model heaters, route air and fuel lines approximately as shown in Figure 17.

Note: Hoses are not to be touching photocell bracket.

For B100CEL model heater, route air and fuel lines approximately as shown in Figure 18.

Note: Hoses are not to be touching photocell bracket.

For B150CEL model heater, route air and fuel lines approximately as shown in 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).

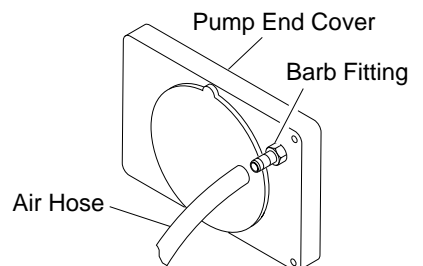


Figure 22 - Air Hose to Barb Fitting

Continued

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).

Note: Rotate rotor one full turn to ensure 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 10).

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

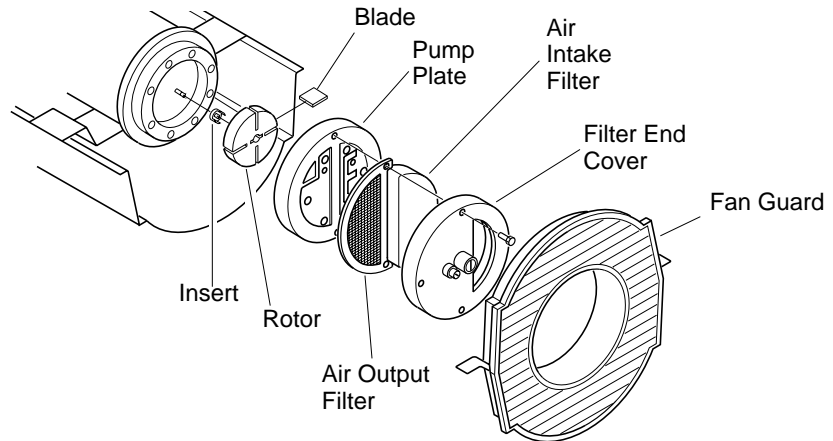


Figure 23 - Rotor Location, B35CEL and B70CEL Models

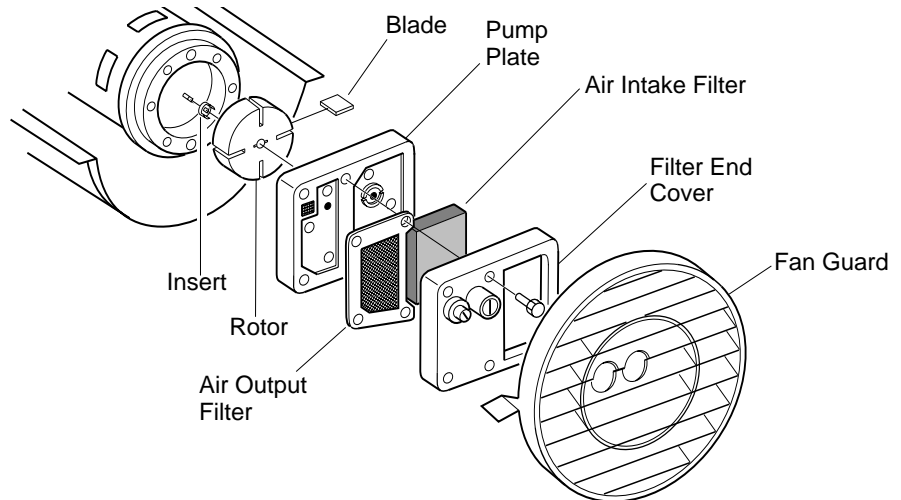


Figure 24 - Rotor Location, B100CEL and B150CEL Models

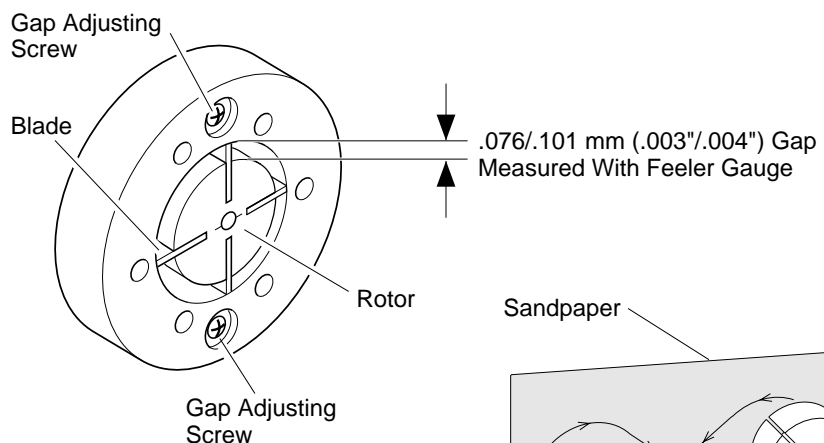


Figure 25 - Gap Adjusting Screw Locations

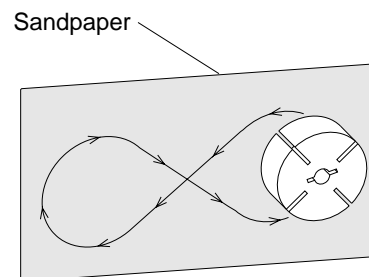


Figure 26 - Sanding Rotor

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 4.5 to 5.6 N-m (40 to 50 in-lbs).
8. Replace fan guard and upper shell.

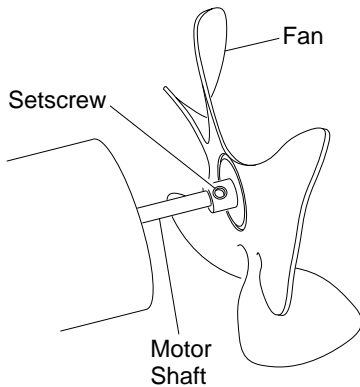


Figure 27 - Fan, Motor Shaft, and Setscrew Location

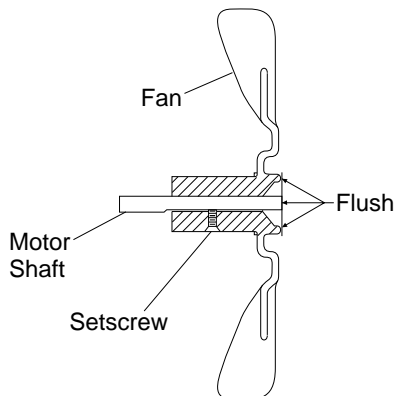


Figure 28 - Fan Cross Section

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.

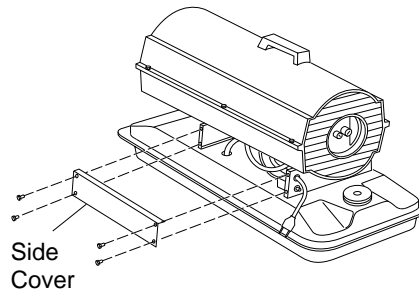


Figure 29 - Removing Cover

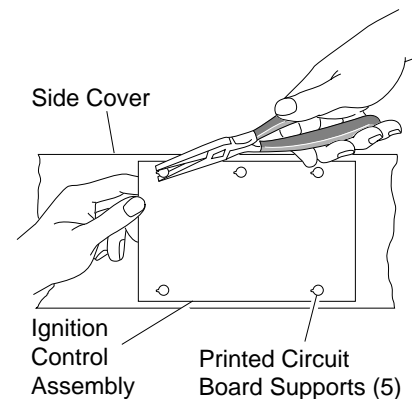


Figure 30 - Removing Circuit Board

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 23.

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!

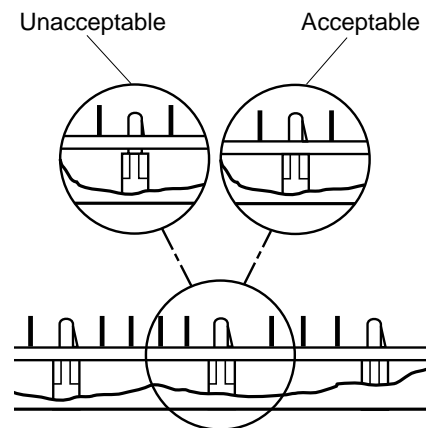
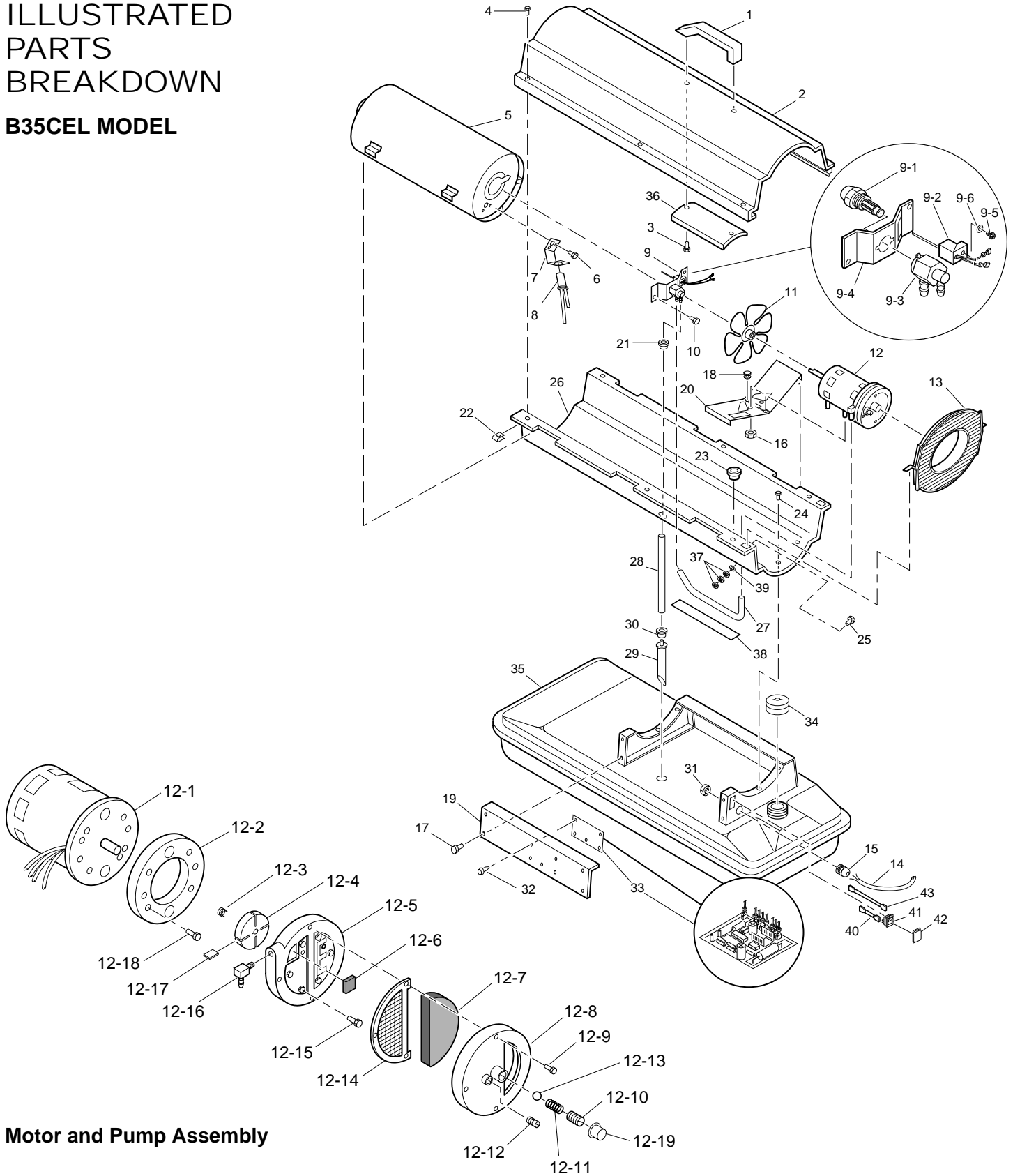


Figure 31 - Attaching Circuit Board to Tabs

PORTABLE FORCED AIR HEATERS

ILLUSTRATED PARTS BREAKDOWN

B35CEL MODEL



Motor and Pump Assembly

OWNER'S MANUAL

PARTS LIST

B35CEL 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.

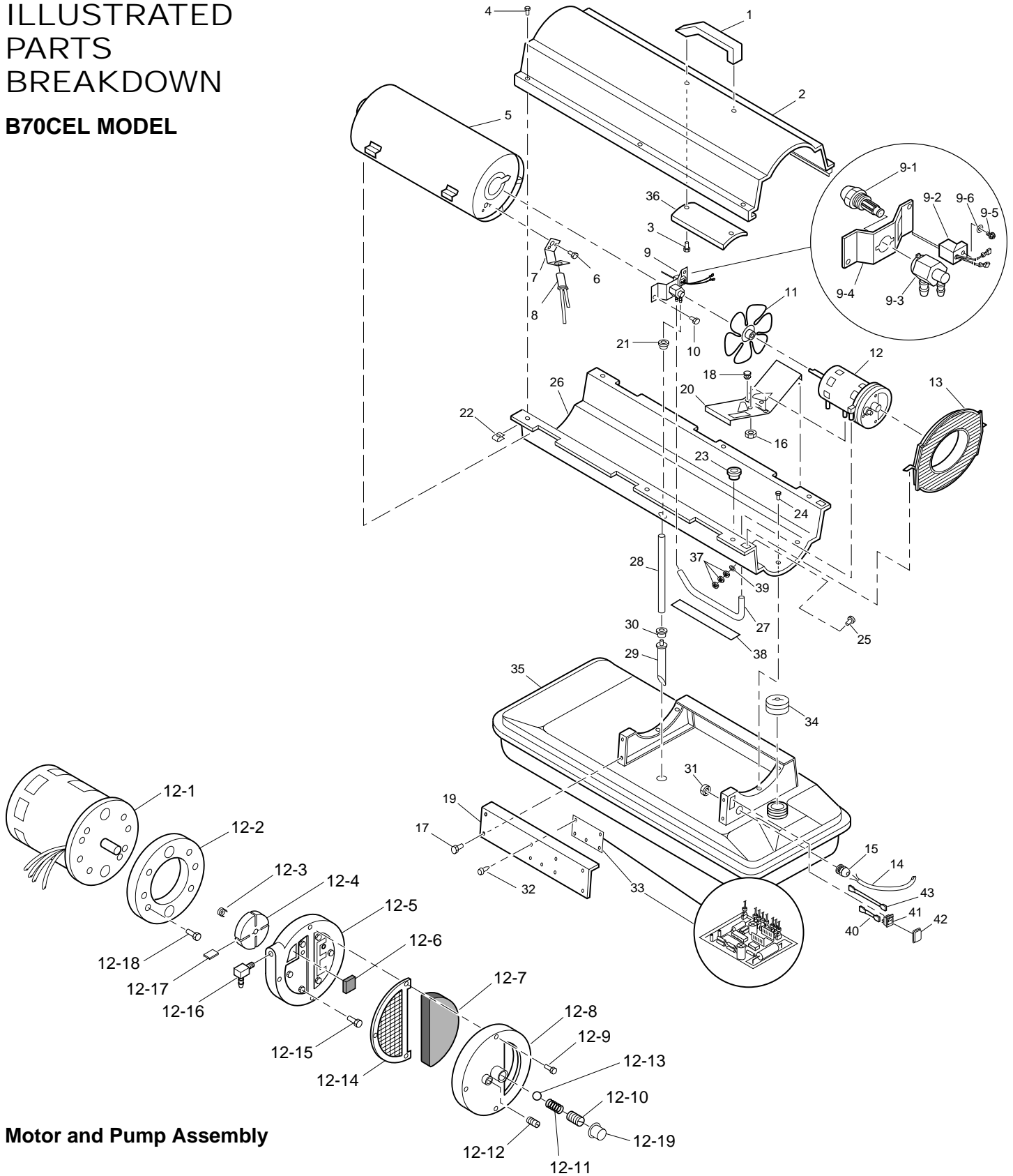
KEY NO.	PART NUMBER	DESCRIPTION	QTY.	KEY NO.	PART NUMBER	DESCRIPTION	QTY.
1	4110.130	Handle	1	14	4110.038	Power Cord	1
2	4103.842	Upper Shell	1	15	4150.528	Strain Relief Bushing	1
3	4160.602	Screw	2	16	4108.486	Hex Lock Nut, 1/4-20	2
4	4109.590	Screw/Lockwasher	6	17	4110.124	Screw/Lockwasher, 1/2"	4
5	4100.638	Combustion Chamber	1	18	4150.553	Rubber Bumper	2
6	4103.529	Screw, #6-32 x 3/8"	2	19	4100.635	Side Cover	1
7	4100.657	Photocell Bracket	1	20	4110.187	Motor Bracket	1
8	4103.590	Photocell Assembly	1	21	4101.151	Bushing	1
9	**	Burner Strap Assembly	1	22	4104.170	Clip Nut	6
9-1	4100.648	Nozzle Assembly	1	23	4101.152	Bushing	1
9-2	4110.132	Ignitor Kit	1	24	4110.124	Screw/Lockwasher, 1/2"	6
9-3	4100.664	Nozzle Adapter	1	25	4110.133	Screw	1
9-4	4109.560	Nozzle Adapter Bracket	1	26	4100.636	Lower Shell	1
9-5	4100.669	Screw, #6-32 x 7/8"	1	27	4104.147	Rubber Airline	1
9-6	4100.660	Belleville Washer	1	28	4109.567	Fuel Line	1
10	4110.124	Screw/Lockwasher	2	29	4110.135	Fuel Filter	1
11	4100.662	Fan	1	30	4100.541	Rubber Bushing	1
12	**	Motor and Pump Assembly	1	31	4100.656	Nylon Locknut	1
12-1	4106.098	Motor	1	32	4100.654	PCB Support	5
12-2	4101.532	Pump Body	1	33	4110.142	Ignition Control Assembly	1
12-3	4108.635	Insert	1	34	4103.891	Fuel Cap (Includes Gasket)	1
12-4	4103.441	Rotor	1	35	4110.136	Fuel Tank	1
12-5	4109.724	Pump End Cover	1	36	4100.671	Shell Heat-Shield	1
12-6	4109.736	Lint Filter	1	37	4110.134	Nut	3
12-7	4109.690	Intake Filter	1	38	4110.075	Vinyl Foam Gasket	1
12-8	4109.674	Filter End Cover	1	39	4100.527	Lockwasher	1
12-9	4108.528	Screw, #10-32 x 1"	3	40	4110.036	Wire Assembly (Brown)	1
12-10	4102.133	Adjusting Screw	1	41	4100.667	ON/OFF Switch	1
12-11	4102.141	Pressure Relief Spring	1	42	4104.336	Switch Cover	1
12-12	4102.125	Plug	1	43	4110.037	Wire Assembly (White)	1
12-13	4108.379	Steel Ball, 1/4" Diameter	1	PARTS AVAILABLE - NOT SHOWN			
12-14	4109.708	Output Filter	1				
12-15	4108.536	Screw #10-32 x 1 1/8"	6		4105.292	Filler Neck Screen	1
12-16	4100.661	Nylon Elbow, 90°	1		4110.049	Wire Tie	1
12-17	4101.666	Blade	4		4110.138	Tradename Decal	2
12-18	4108.590	Screw, #10-32 x 3/4"	2		4110.139	Decal Package	1
12-19	4100.666	Plastic Cap	1		4110.137	Ignition Control Assembly Fuse	1
13	4103.685	Fan Guard	1				

** Not available as an assembly; order parts separately

PORTABLE FORCED AIR HEATERS

ILLUSTRATED PARTS BREAKDOWN

B70CEL MODEL



Motor and Pump Assembly

OWNER'S MANUAL

PARTS LIST

B70CEL 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.

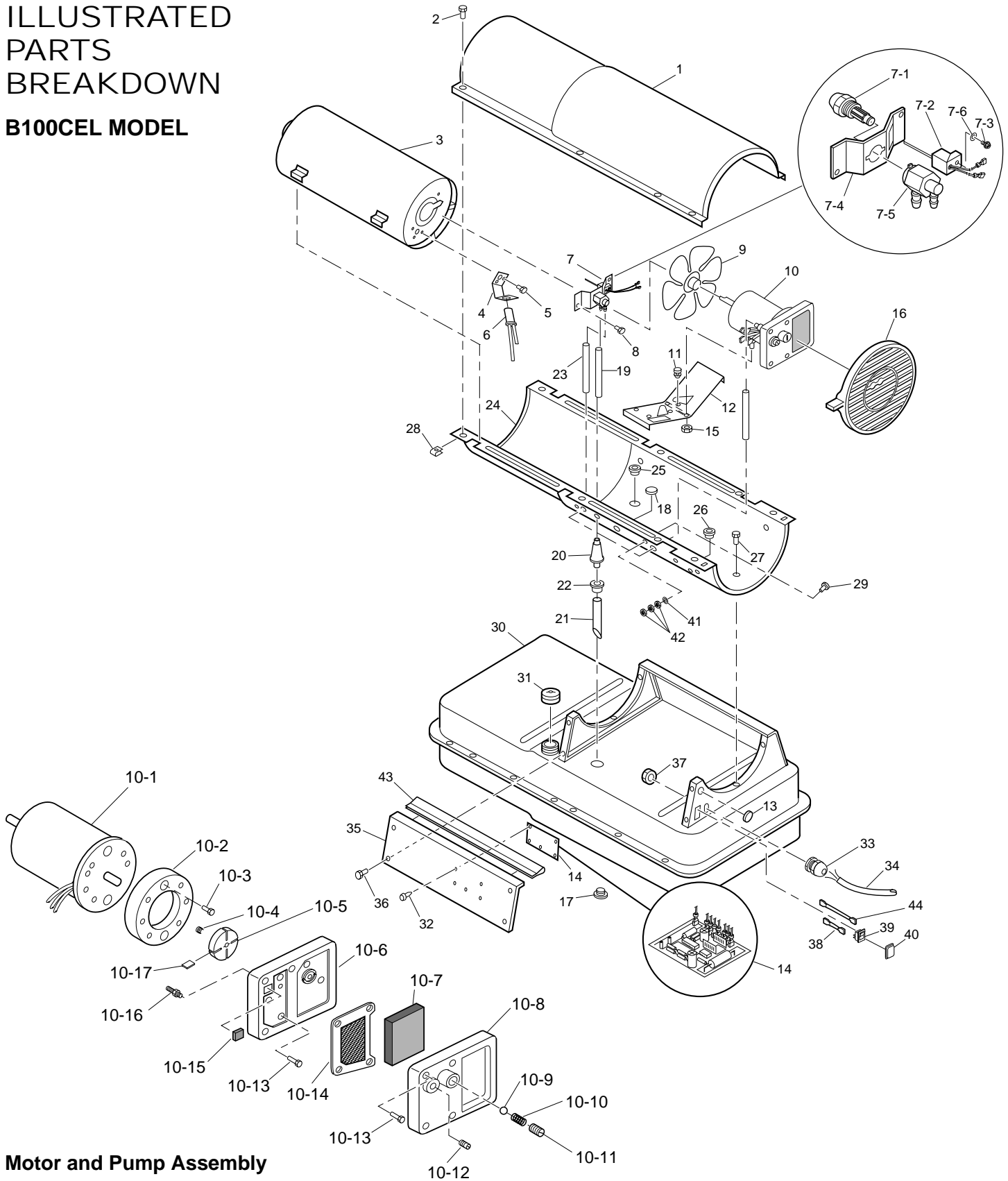
KEY NO.	PART NUMBER	DESCRIPTION	QTY.	KEY NO.	PART NUMBER	DESCRIPTION	QTY.
1	4110.130	Handle	1	14	4110.038	Power Cord	1
2	4103.842	Upper Shell	1	15	4150.528	Strain Relief Bushing	1
3	4160.602	Screw	2	16	4108.486	Hex Lock Nut, 1/4-20	2
4	4109.590	Screw/Lockwasher	6	17	4110.124	Screw/Lockwasher, 1/2"	4
5	4100.639	Combustion Chamber	1	18	4150.553	Rubber Bumper	2
6	4103.529	Screw, #6-32 x 3/8"	2	19	4100.635	Side Cover	1
7	4100.657	Photocell Bracket	1	20	4110.187	Motor Bracket	1
8	4103.590	Photocell Assembly	1	21	4101.151	Bushing	1
9	**	Burner Strap Assembly	1	22	4104.170	Clip Nut	6
9-1	4100.647	Nozzle Assembly	1	23	4101.152	Bushing	1
9-2	4110.132	Ignitor Kit	1	24	4110.124	Screw/Lockwasher, 1/2"	6
9-3	4100.664	Nozzle Adapter	1	25	4110.133	Screw	1
9-4	4109.560	Nozzle Adapter Bracket	1	26	4100.636	Lower Shell	1
9-5	4100.669	Screw, #6-32 x 7/8"	1	27	4104.147	Rubber Airline	1
9-6	4100.660	Belleville Washer	1	28	4109.567	Fuel Line	1
10	4110.124	Screw/Lockwasher	2	29	4103.875	Fuel Filter	1
11	4100.662	Fan	1	30	4100.541	Rubber Bushing	1
12	**	Motor and Pump Assembly	1	31	4100.656	Nylon Locknut	1
12-1	4100.651	Motor	1	32	4100.654	PCB Support	5
12-2	4101.317	Pump Body	1	33	4110.142	Ignition Control Assembly	1
12-3	4108.635	Insert	1	34	4103.891	Fuel Cap (Includes Gasket)	1
12-4	4108.627	Rotor	1	35	4110.140	Fuel Tank	1
12-5	4109.724	Pump End Cover	1	36	4100.671	Shell Heat-Shield	1
12-6	4109.736	Lint Filter	1	37	4110.134	Nut	3
12-7	4109.690	Intake Filter	1	38	4110.075	Vinyl Foam Gasket	1
12-8	4109.674	Filter End Cover	1	39	4100.527	Lockwasher	1
12-9	4108.528	Screw, #10-32 x 1"	3	40	4110.036	Wire Assembly (Brown)	1
12-10	4102.133	Adjusting Screw	1	41	4100.667	ON/OFF Switch	1
12-11	4102.141	Pressure Relief Spring	1	42	4104.336	Switch Cover	1
12-12	4102.125	Plug	1	43	4110.037	Wire Assembly (White)	1
12-13	4108.379	Steel Ball, 1/4" Diameter	1	PARTS AVAILABLE - NOT SHOWN			
12-14	4109.708	Output Filter	1				
12-15	4108.528	Screw #10-32 x 1"	6		4105.292	Filler Neck Screen	1
12-16	4100.661	Nylon Elbow, 90°	1		4110.049	Wire Tie	1
12-17	4101.200	Blade	4		4110.138	Tradename Decal	2
12-18	4108.588	Screw, #10-32 x 5/8"	2		4110.141	Decal Package	1
12-19	4100.666	Plastic Cap	1		4110.137	Ignition Control Assembly Fuse	1
13	4103.685	Fan Guard	1				

** Not available as an assembly; order parts separately

PORTABLE FORCED AIR HEATERS

ILLUSTRATED PARTS BREAKDOWN

B100CEL 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.

B100CEL Model

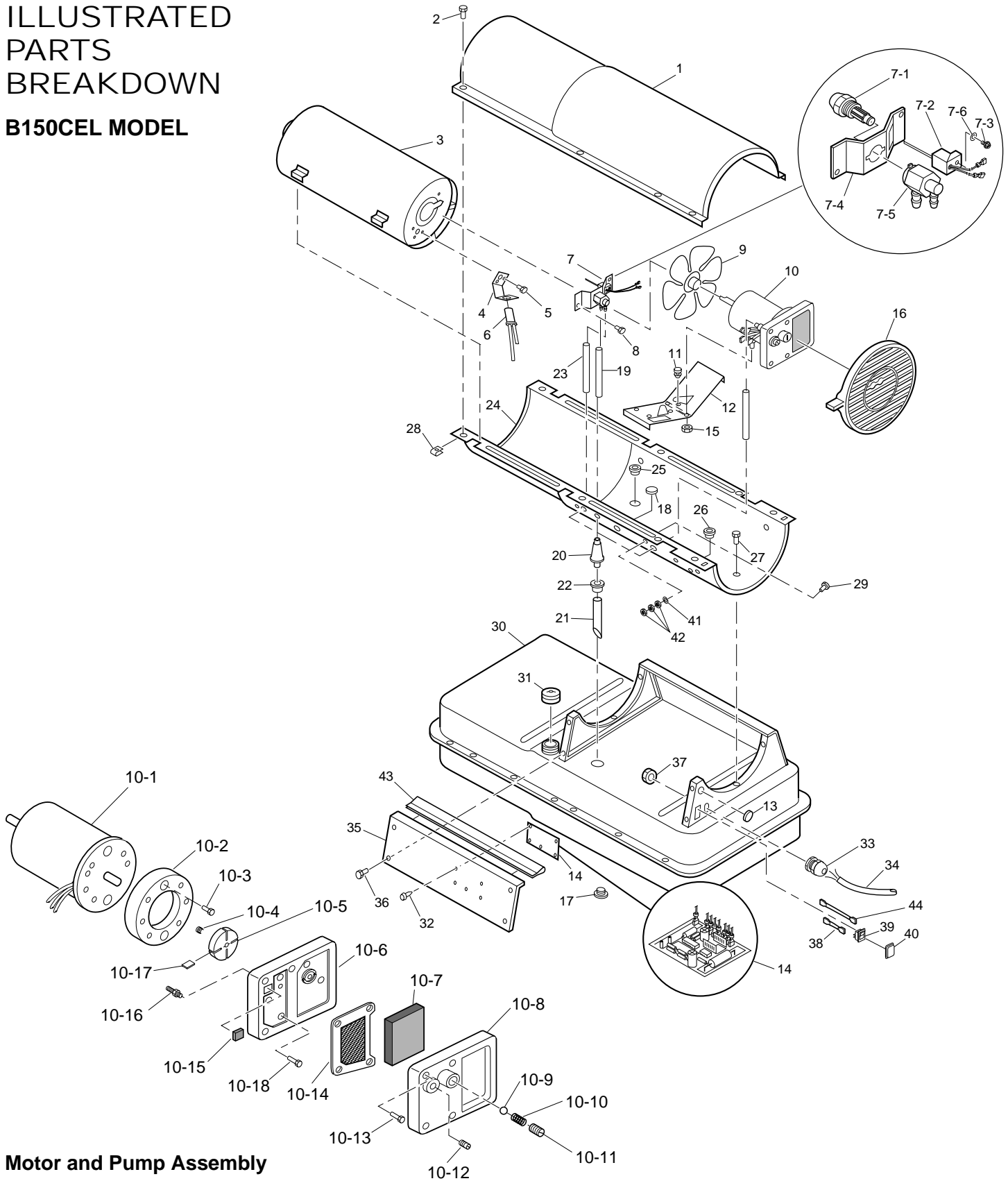
KEY NO.	PART NUMBER	DESCRIPTION	QTY.	KEY NO.	PART NUMBER	DESCRIPTION	QTY.
1	4104.006	Upper Shell	1	15	4108.486	Hex Lock Nut, 1/4-20	2
2	4109.590	Screw/Lockwasher, 1/2"	8	16	4103.659	Fan Guard	1
3	4100.640	Combustion Chamber	1	17	4100.632	Drain Plug (Includes "o" Ring)	1
4	4100.658	Photocell Bracket	1	18	4110.070	Button Plug	1
5	4103.529	Screw	2	19	4110.032	Fuel Line	1
6	4103.590	Photocell Assembly	1	20	4100.630	Fuel Filter	1
7	**	Burner Strap Assembly	1	21	4110.147	Fuel Line Tube	1
7-1	4100.645	Nozzle Assembly	1	22	4100.541	Rubber Bushing	1
7-2	4110.132	Ignitor Kit	1	23	4110.147	Airline	1
7-3	4100.669	Screw, #6-32 x 7/8"	1	24	4100.637	Lower Shell	1
7-4	4109.560	Nozzle Adapter Bracket	1	25	4101.112	Bushing	1
7-5	4100.663	Nozzle Adapter	1	26	4101.232	Bushing	1
7-6	4100.660	Belleville Washer	1	27	4110.124	Screw/Lockwasher, 1/2"	6
8	4110.124	Screw/Lockwasher, 1/2"	2	28	4104.170	Clip Nut	8
9	4105.062	Fan	1	29	4110.133	Screw,	1
10	**	Motor and Pump Assembly	1	30	4110.149	Fuel Tank	1
10-1	4100.652	Motor	1	31	4103.891	Fuel Cap (Includes Gasket)	1
10-2	4101.317	Pump Body	1	32	4100.654	P.C. Board Support	5
10-3	4108.588	Screw, #10-32 x 5/8"	2	33	4150.528	Strain Relief Bushing	1
10-4	4108.635	Rotor Insert	1	34	4110.038	Power Cord	1
10-5	4108.627	Pump Rotor	1	35	4100.670	Side Cover	1
10-6	4101.325	Pump End Cover	1	36	4110.124	Screw/Lockwasher, 1/2"	4
10-7	4101.358	Intake Filter	1	37	4100.656	Nylon Locknut	1
10-8	4108.643	Filter End Cover	1	38	4110.036	Wire Assembly (Brown)	1
10-9	4108.379	Steel Ball, 1/4" Diameter	1	39	4100.667	ON/OFF Switch	1
10-10	4102.141	Relief Spring	1	40	4104.336	Switch Cover	1
10-11	4102.133	Adjusting Screw	1	41	4100.527	Lockwasher, #10	1
10-12	4102.125	Plug	1	42	4110.134	Nut	3
10-13	4108.528	Screw, #10-32 x 1"	10	43	4103.850	Edge Liner	1
10-14	4101.341	Output Filter	1	44	4110.037	Wire Assembly (White)	1
10-15	4101.333	Lint Filter	1	PARTS AVAILABLE - NOT SHOWN			
10-16	4104.118	Barb Fitting	1		4105.292	Filler Neck Screen	1
10-17	4101.200	Blade	4		4110.049	Wire Tie	1
11	4150.553	Rubber Bumper	2		4110.138	Tradename Decal	2
12	4110.186	Motor Mounting Bracket	2		4110.146	Decal Package	1
12	4100.649	Button Plug	1		4110.137	Ignition Control Assembly Fuse	1
14	4110.142	Igniton Control Assymby	1				

** Not available as an assembly; order parts separately

PORTABLE FORCED AIR HEATERS

ILLUSTRATED PARTS BREAKDOWN

B150CEL 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.

B150CEL Model

KEY NO.	PART NUMBER	DESCRIPTION	QTY.	KEY NO.	PART NUMBER	DESCRIPTION	QTY.
1	4104.006	Upper Shell	1	15	4108.486	Hex Lock Nut, 1/4-20	2
2	4109.590	Screw/Lockwasher, 1/2"	8	16	4103.659	Fan Guard	1
3	4100.641	Combustion Chamber	1	17	4100.632	Drain Plug (Includes "o" Ring)	1
4	4100.659	Photocell Bracket	1	18	4110.070	Button Plug	1
5	4103.529	Screw	2	19	4110.032	Fuel Line	1
6	4103.590	Photocell Assembly	1	20	4100.630	Fuel Filter	1
7	**	Burner Strap Assembly	1	21	4110.147	Fuel Line Tube	1
7-1	4100.646	Nozzle Assembly	1	22	4100.541	Rubber Bushing	1
7-2	4110.132	Ignitor Kit	1	23	4110.147	Airline	1
7-3	4100.669	Screw, #6-32 x 7/8"	1	24	4100.637	Lower Shell	1
7-4	4109.560	Nozzle Adapter Bracket	1	25	4101.112	Bushing	1
7-5	4100.663	Nozzle Adapter	1	26	4101.232	Bushing	1
7-6	4100.660	Belleville Washer	1	27	4110.124	Screw/Lockwasher, 1/2"	6
8	4110.124	Screw/Lockwasher, 1/2"	2	28	4104.170	Clip Nut	8
9	4105.062	Fan	1	29	4110.133	Screw,	1
10	**	Motor and Pump Assembly	1	30	4110.149	Fuel Tank	1
10-1	4100.652	Motor	1	31	4103.891	Fuel Cap (Includes Gasket)	1
10-2	4101.532	Pump Body	1	32	4100.654	P.C. Board Support	5
10-3	4108.590	Screw, #10-32 x 3/4"	2	33	4150.528	Strain Relief Bushing	1
10-4	4108.635	Rotor Insert	1	34	4110.038	Power Cord	1
10-5	4103.441	Pump Rotor	1	35	4100.670	Side Cover	1
10-6	4101.325	Pump End Cover	1	36	4110.124	Screw/Lockwasher, 1/2"	4
10-7	4101.358	Intake Filter	1	37	4100.656	Nylon Locknut	1
10-8	4108.643	Filter End Cover	1	38	4110.036	Wire Assembly (Brown)	1
10-9	4108.379	Steel Ball, 1/4" Diameter	1	39	4100.667	ON/OFF Switch	1
10-10	4102.141	Relief Spring	1	40	4104.336	Switch Cover	1
10-11	4102.133	Adjusting Screw	1	41	4100.527	Lockwasher, #10	1
10-12	4102.125	Plug	1	42	4110.134	Nut	3
10-13	4108.528	Screw, #10-32 x 1"	4	43	4103.850	Edge Liner	1
10-14	4101.341	Output Filter	1	44	4110.037	Wire Assembly (White)	1
10-15	4101.333	Lint Filter	1	PARTS AVAILABLE - NOT SHOWN			
10-16	4104.118	Barb Fitting	1		4105.292	Filler Neck Screen	1
10-17	4101.666	Blade	4		4110.049	Wire Tie	1
10-18	4108.536	Screw, #10-32 x 1 1/8"	6		4110.138	Tradename Decal	2
11	4150.553	Rubber Bumper	2		4110.145	Decal Package	1
12	4110.186	Motor Mounting Bracket	1		4110.137	Ignition Control Assembly Fuse	1
13	4100.649	Button Plug	1				
14	4110.142	Ignition Control Assembly	1				

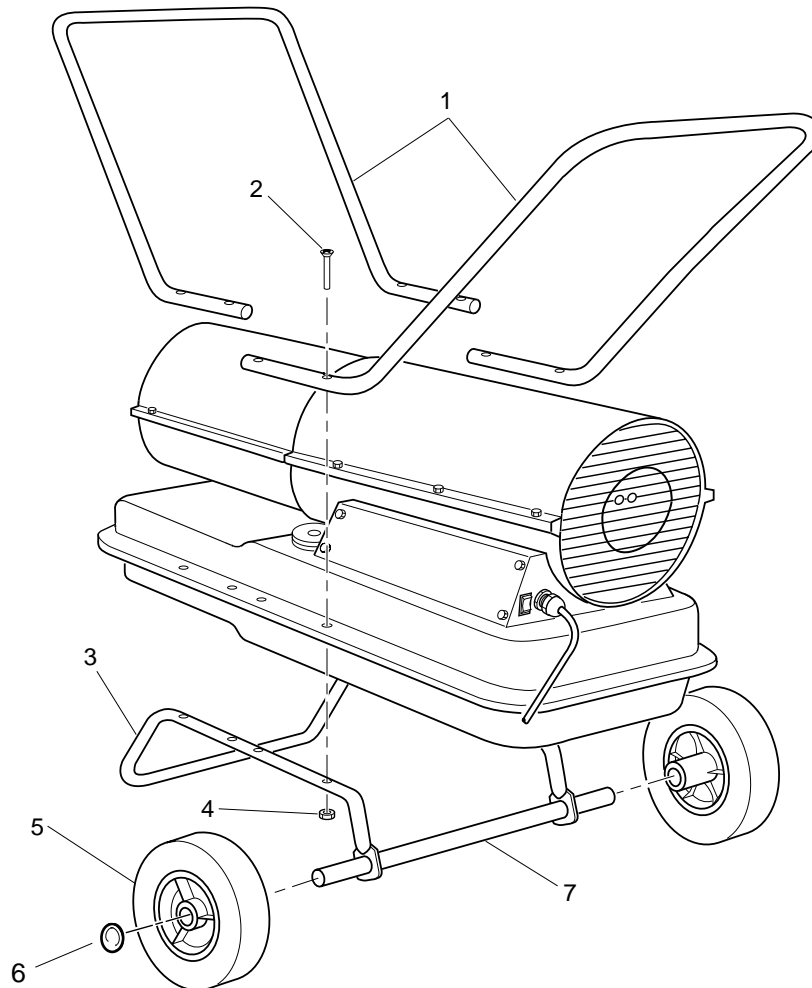
** Not available as an assembly; order parts separately

PORTABLE FORCED AIR HEATERS

WHEELS AND HANDLES

B100CEL AND B150CEL MODELS

KEY NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	4110.077	Handles	2
2	4110.144	Screw	8
3	4110.078	Wheel Support Frame	1
4	4110.143	Hex Nut,	8
5	4110.084	Wheel (2)	1
6	4110.085	Cap Nut	2
7	4110.078	Axle	1

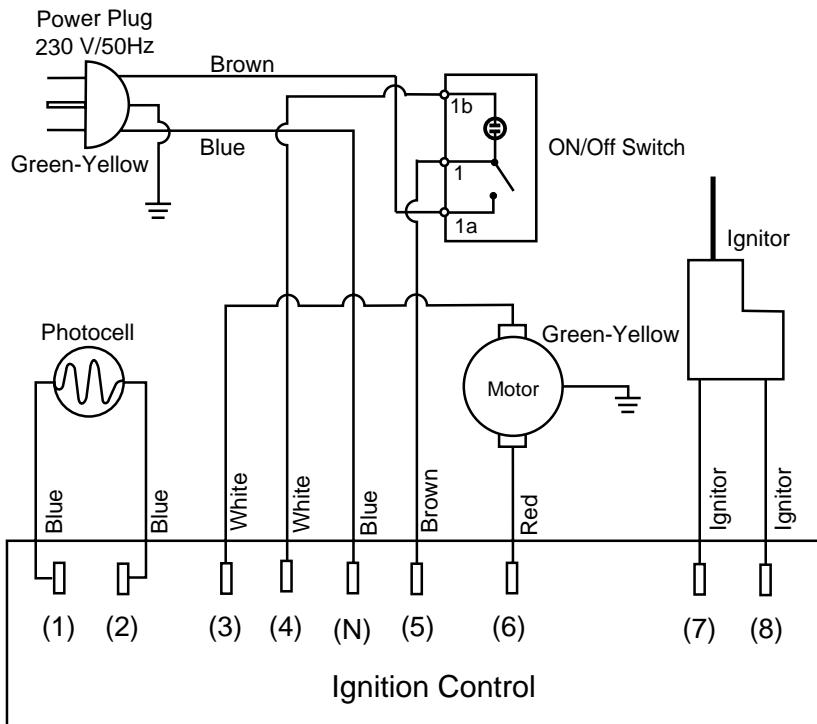


OWNER'S MANUAL

SPECIFICATIONS

Output Rating (kw/Btu/Hr)	10 (35,000)	20 (70,000)	30 (100,000)	44 (150,000)
Fuel	Use Only Kerosene or No. 1 Fuel Oil			
Fuel Tank Capacity (Liters/U.S. Gal.)	15.1/4.0	18.9/5.0	43.5/11.5	43.5/11.5
Fuel Consumption (Liters Per Hr./Gal. Per Hr.)	1.1/.28	1.97/.52	3.0/.79	4.1/1.1
Electric Requirements	230 V/50 Hz (Same All Models)			
Amperage (Normal Run)	.8	1.0	1.2	1.2
Hot Air Output (CMM/CFM)	4/140	6.4/225	12/425	14.2/500
RPM	1425	2850	2850	2850

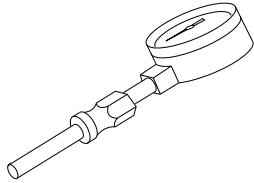
WIRING DIAGRAM



PORTABLE FORCED AIR HEATERS

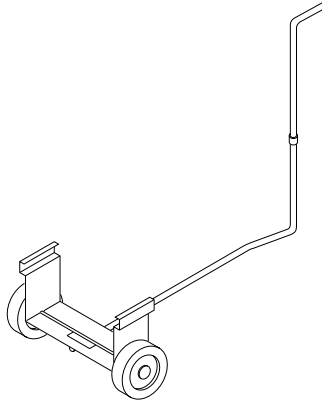
ACCESSORIES

Purchase accessories from your local dealer.



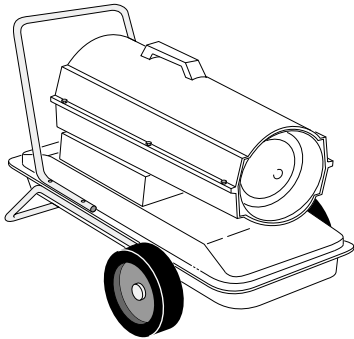
AIR GAUGE KIT - 4109.427

For all models. Special tool to check pump pressure.



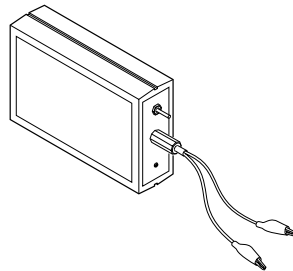
STANDARD WHEELS AND HANDLE KIT - 4103.930

Makes heater even more portable and convenient. Easy to assemble. For B35CEL and B70CEL models.



HEAVY DUTY WHEELS AND HANDLE KIT - 4103.925

For heavy duty applications. Makes your heater even more portable and convenient. For B35CEL and B70CEL models.



IGNITION CONTROL ASSEMBLY/PHOTOCELL TESTER - 4106.058

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

EC CONFORMITY DECLARATION

EC CONFORMITY DECLARATION

**DESA Europe B.V.
Innsbruckweg 144, 3047 AH
Postbus 11158
3004 ED Rotterdam
Holland**

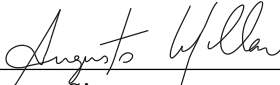
**Kerosene Portable Forced Air Heaters
Model Numbers: B35CEL, B70CEL, B100CEL, B150CEL**

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>	DESA Europe B.V.
<u>Name</u>	Augusto Millan
<u>Title</u>	Managing Director

23/05/02 — Rotterdam, Netherlands
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.