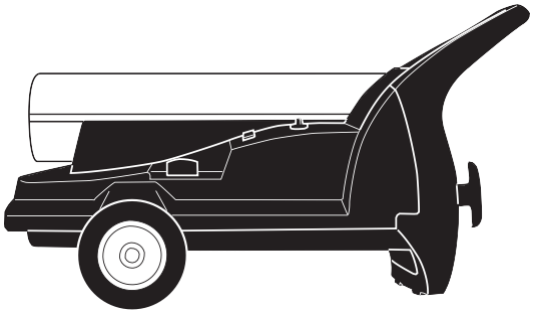
DESA™

INDOOR/OUTDOOR PRODUCTS

PORTABLE FORCED AIR HEATERS OWNER'S MANUAL



HEATER SIZES:
125,000, 170,000 AND 200,000 BTU/HR
KEROSENE/DIESEL HEATER WITH BUILT-IN THERMOSTAT

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.

TABLE OF CONTENTS

Fill In For Your Records

Model No. _____
(Located on side panel)

Serial No. _____
(Located on fuel tank)

Date of Purchase: _____

HSI SMART START TECHNOLOGY

LIMITED LIFETIME WARRANTY
GARANTIE À VIE LIMITÉE
GARANTÍA LIMITADA DE POR VIDA
LIMITÉE/LIMITADA

ARL®

Save this manual for future reference.
For more information, visit www.desatech.com

SAFETY INFORMATION

WARNING: This product contains and/or generates chemicals known to the State of California to cause cancer or birth defects or other reproductive harm.

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.

1. Use only kerosene, #1/#2 diesel/fuel oil, JET A or JP-8 fuels to avoid risk of fire or explosion. Never use gasoline, naphtha, paint thinners, alcohol or other highly flammable fuels.
2. 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 return- ing the heater to service.

e) At no time shall more than one day's sup- ply of heater fuel be stored inside a build- ing in the vicinity of the heater. Bulk fuel storage shall be outside the structure.

f) All fuel storage shall be located a mini- mum of 762 cm (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.

3. Use only the electrical voltage and frequency specified on model plate.
4. Heater must be grounded. Use only a properly grounded three-wire extension cord. Plug into grounded outlet only.
5. Use only in areas free of flammable vapors or high dust content.
6. Minimum clearance from any combustible materials: 8 feet (244 cm) from hot air outlet; 6 feet (183 cm) from top; and 4 feet (120 cm) from sides and inlet.
7. Locate heater on a stable and level surface while hot or operating or a fire may occur.
8. 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.
9. Keep children and animals away from heater at all times.
10. Never start heater when combustion chamber is hot or if fuel has accumulated in combustion chamber.
11. When used with thermostat, heater may start at anytime.
12. When heater is moved or stored, it must be in a level position or fuel spillage may occur.
13. Use heater only in accordance with local ordinances and codes.
14. Never use gasoline, crankcase drainings, naphtha, paint thinners, alcohol or other highly flammable fuels.
15. Never use heater where gasoline, paint thinner or other highly flammable vapors are present.
16. Never use heater in living or sleeping areas.
17. Never leave a heater plugged in without adult supervision if children or animals are likely to be present.

SAFETY INFORMATION
Continued

18. Never move, handle, refuel or service a hot, operating or plugged-in heater.
19. Never attach duct work to front or rear of heater.
20. Never attach heater to external fuel tank.
21. 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
    304.8 cm (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.
22. Unplug heater when not in use.
23. Never block air inlet (rear) or air outlet (front) of heater.
24. **Warning to New York City Residents**
    For Use Only At Construction Sites in accordance with applicable NYC codes under NYCFD certificate of approval #4803, #4899, #4908, #4909 or #4934.

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, #1/#2 diesel/fuel oil, JET A or JP-8 fuels to avoid risk of fire or explosion. Never use gasoline, oil drained from crankcases, naphtha, paint thinners, alcohol or other highly flammable fuels.

Use only kerosene, #1/#2 diesel/fuel oil, JET A or JP-8 fuels. Heavier fuels such as No. 2 fuel oil or No. 2 diesel fuel may also be used but will result in:

- noticeable odor
- additional fuel filter maintenance
- the need for nontoxic, anti-icer additives in very cold weather

Do not use fuels heavier than No. 2 grade or heavy oils such as oil drained from crankcases. These heavy oils will not ignite properly and will contaminate the heater.

IMPORTANT: Use a KEROSENE ONLY (blue) or DIESEL ONLY (yellow) storage container. Be sure storage container is clean. Foreign matter such as rust, dirt or water will cause the ignition control assembly to shut down heater. Foreign matter may also require heater's fuel system to be frequently cleaned.

PRODUCT IDENTIFICATION

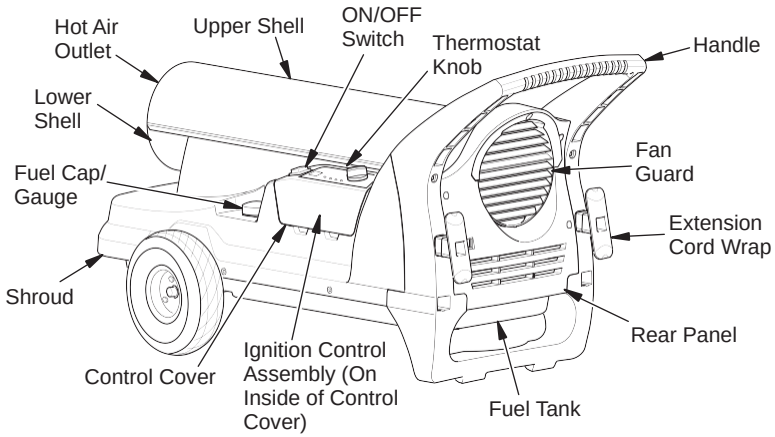


Figure 1 - 125T, 170T and 200T Models

THEORY OF OPERATION

The Fuel System: The air pump forces air through the air line. The air is then pushed through the nozzle. This air causes fuel to be lifted 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.

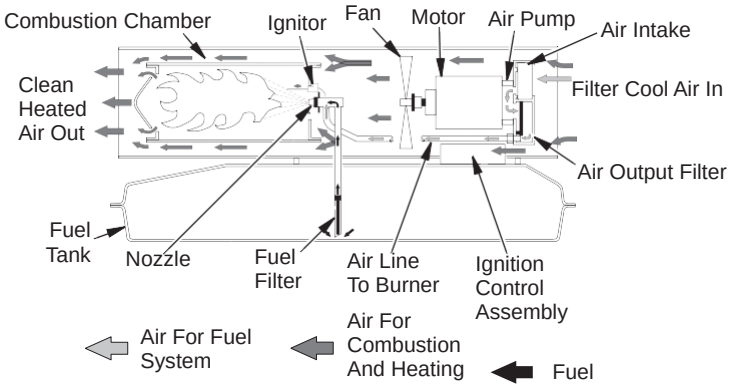


Figure 2 - Cross Section Operational View

VENTILATION

⚠ WARNING: Provide a fresh air opening of at least three square feet (2,800 square cm) for each 100,000 BTU/HR rating. Provide extra fresh air if more heaters are being used. The minimum ventilation requirements must be followed to avoid risks associated with carbon monoxide poisoning. Make certain these requirements are met prior to operating heater.

Example: A 58.6 kw (200,000 Btu/Hr) heater requires one of the following:

- a two-car garage door [4.88 meter (16 feet) opening] raised 12.7 cm (5 inches)
- a single-car garage door [2.74 meter (9 feet) opening] raised 20.3 cm (8 inches)
- two, 76.2 cm (30 inch) windows raised 38.1 cm (15 inches)

ASSEMBLY

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

Tools Needed

- Medium Phillips Screwdriver
- Rubber Mallet/Hammer
- Flat Blade Screwdriver

1. Slide axle through holes in shroud. Install washers, wheel spacers and wheels on axle as shown in Figure 3, page 5.
   IMPORTANT: When installing wheels, point extended hub of wheels toward shroud (see Figure 3, page 5).
2. Place cap nuts on axle ends. Gently tap with hammer to secure.
3. Install extension cord wraps into handle.
4. Slide handle onto shroud leaving a one inch gap between parts.
5. Place washers onto screws and insert screws into holes in handles.
6. Visually confirm that all six screws are threaded into the shroud. Push the handle completely into the shroud.
7. Tighten all screws.

ASSEMBLY
Continued

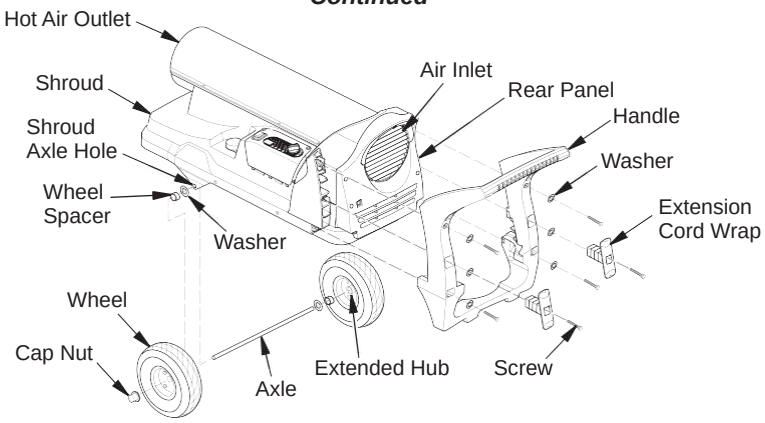


Figure 3 - Wheel and Handle Assembly

OPERATION

IMPORTANT: Review and understand the warnings in the *Safety Information* section, page 2. They are needed to safely operate this heater. Follow all local ordinances and codes when using this heater.

TO START HEATER

1. Follow all ventilation and safety information.
2. Locate heater to provide maximum circulation of the heated air. Follow all location requirements noted in *Safety Information*, page 2.
3. Fill fuel tank with fuel. Use only kerosene, #1/#2 diesel/fuel oil, JET A or JP-8 fuels to avoid risk of fire or explosion. Never use gasoline, naphtha, paint thinners, alcohol or other flammable fuels.
4. Attach fuel cap/gauge.
5. Plug heater's power cord into approved, grounded, three-wire extension cord. Extension cord must be at least six feet (1.8 meters) long.

   Extension Cord Size Requirement

   6 to 10 feet (1.8 to 3 meters) long, use 18 AWG (0.75 mm^2) rated cord

   11 to 100 feet (3.3 to 30.5 meters) long, use 16 AWG (1.0 mm^2) rated cord

   101 to 200 feet (30.8 to 61 meters) long, use 14 AWG (1.5 mm^2) rated cord
6. Plug extension cord into standard 120 volt/60 hertz, 3-prong grounded outlet.
7. Turn thermostat knob to the right (clockwise) to the warmest position.
8. Push ON/OFF switch to the ON (|) position. Light will come on. *Note:* Ignitor will preheat for five seconds, then heater will start.
9. After heater is running, adjust thermostat knob to the desired setting. *Note:* A cold heater may affect the thermostat setting. This thermostat is a general-heating control. It is not intended for precise temperature control. Adjust thermostat until heater cycles at the desired setting.

TO STOP HEATER

1. Push ON/OFF switch to the OFF (O) position.
2. Unplug heater.

TO RESET HEATER

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

OPERATION
Continued

RL, RE AND PKHD SERIES MODELS ONLY

Temperature Display

These models are equipped with a digital temperature display. The temperature being shown represents the air nearest to the control cover. The temperature of the air in surrounding areas may be much different from the temperature being displayed. The display may show [- -] when the thermostat control or temperature sensor are disconnected from the ignition control or if they are or damaged. If this occurs, the safety control will continue to operate as before, however, the unit will not cycle off during operation. See Figure 4.

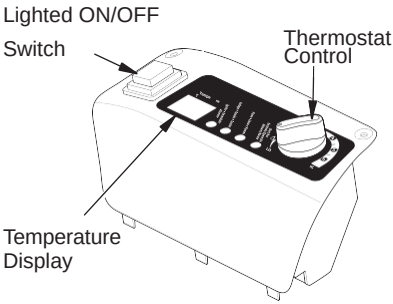


Figure 4 - Control Cover with Temperature Display

LED Indicator Lights

These models are equipped with LED lights in order to help monitor your heater and to help diagnose any potential problems associated with your heater. Make sure you have read all of the instructions and see *Troubleshooting*, page 8, before attempting to rectify any problems with your heater.

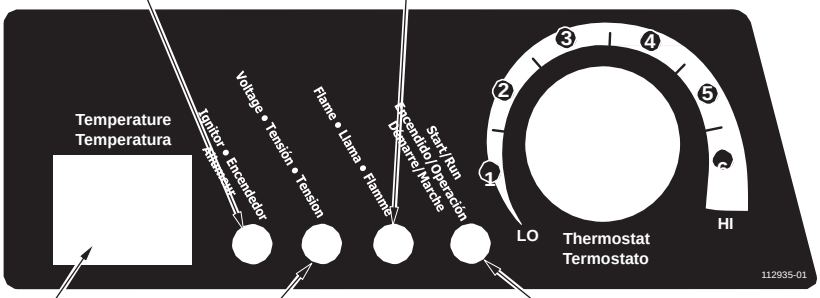
⚠ WARNING: Never service heater while it is plugged in, operating or hot. Severe burns and electrical shock can occur.

LOGIC ENHANCED IGNITION

These models have an electronically controlled ignition system that is able to detect problems during startup and is able to apply an automatic "choke" to increase the likelihood of ignition. If the heater does not ignite within the first second the motor will slow down momentarily. If your heater does not light after the first "choke" it will repeat once. If the heater does not ignite after the second "choke" it will shutdown and remain in shutdown mode until the unit is reset. Please refer to *Troubleshooting*, page 8 in order to properly diagnose the problem.

Ignitor - indicates a problem with the ignitor and can be caused by a damaged or broken ignitor or an ignitor that is wired incorrectly.

Flame - will illuminate after heater is shut down due to problems associated with the flame or the photocell that monitors the flame.



Temperature Display

Voltage - monitors line voltage during normal operation and indicates improper line voltage. If line voltage falls below 108V or above 132V the heater will shut down.

Start/Run - blinks during "preheat" for 10-15 seconds before ignition and will stay on during normal operation.

Figure 5 - LED Indicator Lights

OPERATION WITH PORTABLE GENERATOR

⚠ WARNING: Before operating heater or any appliance from a portable generator, verify that generator has been properly connected to earth ground. Improper grounding or failure to ground generator can result in electrocution if a ground fault occurs. Refer to owner's manual supplied by generator manufacturer for proper grounding procedures.

The operating voltage range of the heater is 108 to 132 Volts (120 Volts +/- 10%). Prior to plugging heater into generator the output voltage should be verified (if generator is equipped with the automatic idle feature, the output voltage should be measured with the generator running at full speed). If the voltage does not measure in this range the heater should not be plugged into the generator.

Refer to *Operation*, page 5, for starting, stopping and resetting heater procedures.

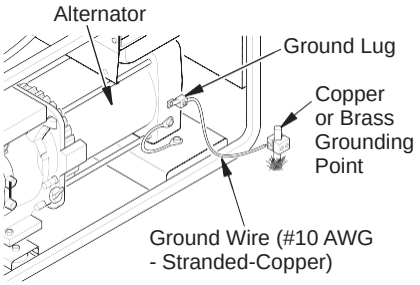


Figure 6 - Typical Generator Grounding Method (Generator construction may vary from that shown)

STORING, TRANSPORTING OR SHIPPING

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

1. Remove drain plug from bottom side of fuel tank and drain all fuel.
2. Replace drain plug.
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. 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

⚠ 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 *Storing, Transporting, or Shipping*, page 7
Air output and lint filters	Replace every 500 hours of operation or once a year	See *Air Output, Air Intake and Lint Filters*, page 10
Air intake filter	Wash and dry with soap and water every 500 hours of operation or as needed	See *Air Output, Air Intake and Lint Filters*, page 10
Fuel filter	Clean twice a heating season or as needed	See *Fuel Filter*, page 11
Ignitor	No maintenance required	
Fan blades	Clean every season or as needed	See *Fan*, page 10
Motor	Not required/permanently lubricated	

TROUBLESHOOTING

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

FAULT CONDITION	POSSIBLE CAUSE	REMEDY
Motor does not start five seconds after heater is plugged in INDICATOR LIGHT • Ignitor	1. No power to heater	1. Check circuit breaker in electrical panel
	2. ON/OFF switch not in the ON (|) position	2. Verify the ON/OFF switch is in ON (|) position and light is on
	3. Thermostat setting is too low	3. Turn thermostat knob to a higher setting
	⚠ WARNING: High voltage!	
	4. Bad electrical connection between motor and ignition control assembly or ignition control assembly and power cord	4. Check all electrical connections. See *Wiring Diagrams*, page 16
	5. Binding pump rotor	5. If fan does not turn freely, see *Pump Rotor*, page 14
	6. Blown fuse on ignition control assembly	6. See *Ignition Control Assembly*, page 14
	7. Defective ignition control assembly	7. Replace ignition control assembly
	8. Defective motor	8. Replace motor

TROUBLESHOOTING

Continued

FAULT CONDITION	POSSIBLE CAUSE	REMEDY
Motor starts and runs but heater does not ignite		
INDICATOR LIGHT	1. No fuel in tank	1. Fill tank with kerosene
• Flame	2. Pump pressure incorrect	2. See *Pump Pressure Adjustment,* page 10
	3. Dirty fuel filter	3. See *Fuel Filter,* page 11
	4. Obstruction in nozzle	4. See *Nozzle Assembly,* page 12
	5. Water in fuel tank	5. Drain and flush fuel tank with clean kerosene. See *Storing, Transporting or Shipping,* page 7
	⚠ WARNING: High voltage!	
• Ignitor	6. Bad electrical connection between ignitor and ignition control assembly	6. Check electrical connections. See *Wiring Diagrams,* page 16
	7. Defective ignitor	7. Replace ignitor, see page 11
	8. Defective ignition control assembly	8. Replace ignition control assembly
• Voltage	9. Line voltage is below 108V or above 132v	9. Check for proper line voltage
Heater ignites but ignition control assembly shuts heater off after a short period of time		
INDICATOR LIGHT	1. Pump pressure incorrect	1. See *Pump Pressure Adjustment,* page 10
• Flame	2. Dirty air intake, air output and/or lint filter	2. See *Air Output, Air Intake and Lint Filters,* page 10
	3. Dirty fuel filter	3. See *Fuel Filter,* page 11
	4. Obstruction in nozzle	4. See *Nozzle Assembly,* page 12
	5. Photocell assembly not properly installed (not seeing the flame)	5. Make sure photocell boot is properly seated in bracket
	6. Dirty photocell lens	6. Clean photocell lens
	⚠ WARNING: High voltage!	
• Voltage	7. Bad electrical connection between photocell and ignition control assembly	7. Check electrical connections. See *Wiring Diagrams,* page 16
	8. Defective photocell	8. Replace photocell
	9. Defective ignition control assembly	9. Replace ignition control assembly
	10. Line voltage is below 108V or above 132v	10.Check for proper line voltage. Disconnect power equipment that may be used on same line

SERVICE PROCEDURES

⚠ WARNING: To avoid risk of burn and electrical shock, never attempt to service heater while it is plugged in, operating or hot.

UPPER SHELL REMOVAL

1. Remove screws along each side of heater using phillips screwdriver. These screws attach upper and lower shells together. See Figure 7.
2. Lift upper shell off.
3. Remove fan guard.

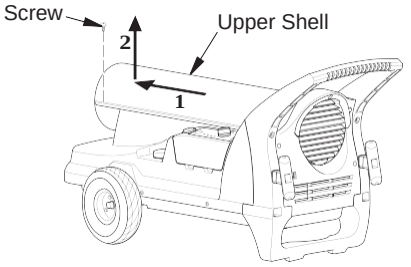


Figure 7 - Upper Shell Removal

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 (see Figure 8).

1. Remove upper shell (see Figure 7).
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 9).
7. Place setscrew on flat of shaft. Tighten setscrew firmly (40-50 inch-pounds/4.5-5.6 n-m).
8. Replace upper shell.

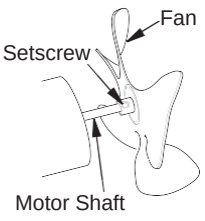


Figure 8 - Fan, Motor Shaft and Setscrew Location

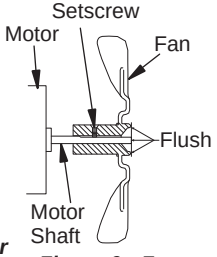


Figure 9 - Fan Cross Section

AIR OUTPUT, AIR INTAKE AND LINT FILTERS

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

IMPORTANT: Do not oil filters.

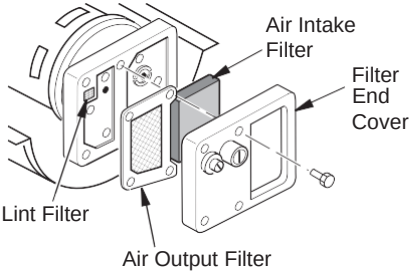


Figure 10 - Air Output, Air Intake and Lint Filters

PUMP PRESSURE ADJUSTMENT

1. Remove fan guard using medium phillips screwdriver.
2. Remove pressure gauge plug from filter end cover (see Figure 11).
3. Install accessory pressure gauge (part number HA1180).
4. Start heater (see *Operation*, page 5). Allow motor to reach full speed.

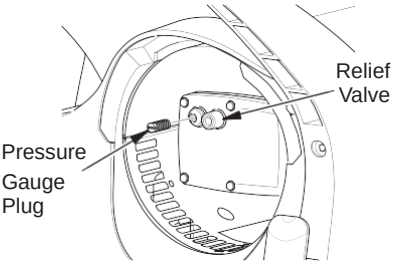


Figure 11 - Pressure Gauge Plug Removal

SERVICE PROCEDURES
Continued

5. Adjust pressure. Turn relief valve to right to increase pressure. Turn relief valve to left to decrease pressure. See specifications below for correct pressure (see Figure 12).
6. Remove pressure gauge. Replace pressure gauge plug in filter end cover.

Model	Pump Pressure
125T	6.0 PSI
170T	6.0 PSI
200T	6.2 PSI

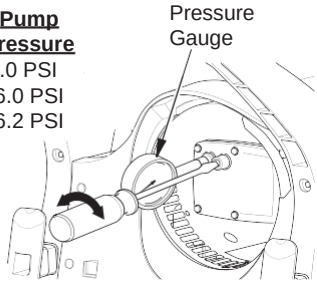
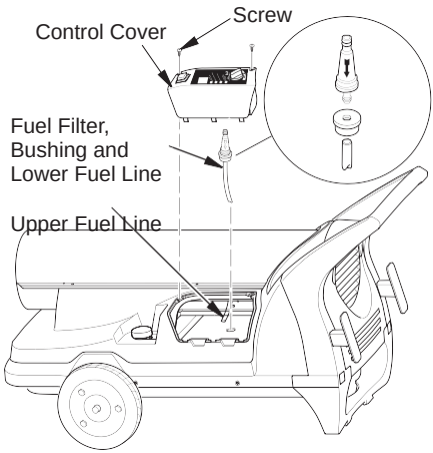


Figure 12 - Adjusting Pump Pressure

FUEL FILTER

1. Unplug heater.
2. Remove control cover screws using medium phillips screwdriver.
3. Remove control cover.
4. Pull upper fuel line off fuel filter neck (see Figure 13).
5. Carefully pry bushing, fuel filter and lower fuel line out of fuel tank (see Figure 13).
6. Wash fuel filter with clean fuel and replace in tank.
7. Attach upper fuel line to fuel filter neck.
8. Replace control cover.



⚠ WARNING: HIGH VOLTAGE

WARNING: To avoid risk of burn and electrical shock, never attempt to service heater while it is plugged in, operating or hot.

IGNITOR

1. Remove upper shell (See *Upper Shell Removal*, page 10).
2. Remove fan (see page 10).
3. Remove 2 control cover screws with a phillips screwdriver. Remove control cover (see Figure 13).
4. Disconnect ignitor wires from ignition control assembly (see Figure 14). 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 14).
6. Remove combustion chamber. Stand combustion chamber on end with nozzle adapter bracket on top (see Figure 15, page 12).
7. Remove ignitor screw with a 1/4" nut driver for models using ignitor HA1000 or 5/16" nut driver for models using ignitor HA1100. Carefully remove ignitor from nozzle adapter bracket.
8. Carefully remove replacement ignitor from styrofoam packing.

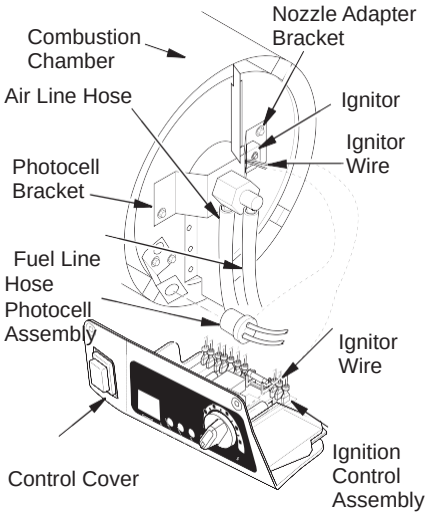


Figure 13 - Fuel Filter Removal

Figure 14 - Disconnecting Ignitor Wires from Ignition Control Assembly (170T Model Shown)

SERVICE PROCEDURES
Continued

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

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 for models using ignitor HA1000 (see Figure 15) or 5/16" nut driver for models using HA1100 ignitor (see Figure 16). Torque .90 to 1.69 N-m (8 to 15 in-lbs) Do not over torque.
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 (see Figure 14, page 11).
12. Replace control cover (see Figure 13, page 11).
13. Connect and route fuel line hose and air line hose to nozzle adapter assembly. See *Fuel and Air Line Replacement and Proper Routing*, page 13.
14. Replace photocell in photocell bracket. Route wires as shown in Figure 17.
15. Replace fan (see page 10).
16. Replace upper shell (see page 10).

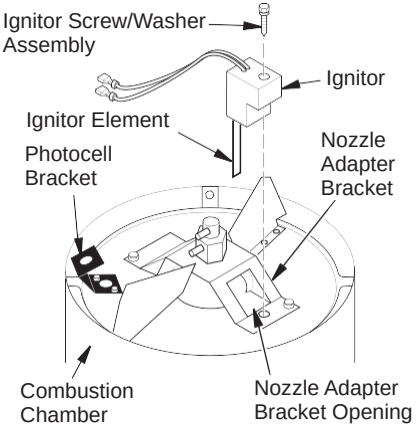


Figure 15 - Ignitor HA1000 Replacement

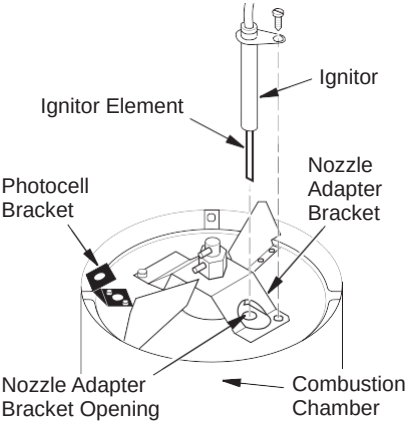


Figure 16 - Ignitor HA1100 Replacement

NOZZLE ASSEMBLY

125T and 170T Models Only

1. Remove upper shell (see *Upper Shell Removal*, page 10).
2. Remove fan (see *Fan*, page 10).
3. Remove fuel and air line hoses from nozzle assembly (see Figure 17).
4. Turn nozzle assembly 1/4 turn to left and pull toward motor to remove (see Figure 18).

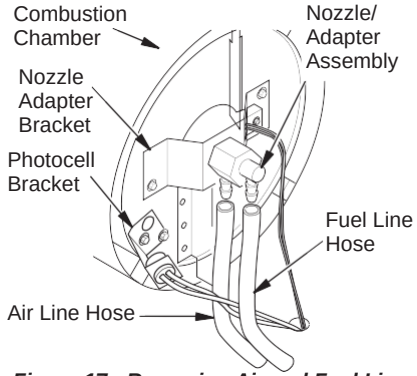


Figure 17 - Removing Air and Fuel Line Hoses (125T and 170T Models Only)

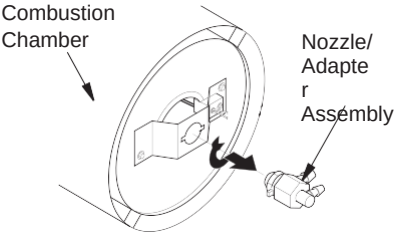


Figure 18 - Removing Nozzle/Adapter

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 19).
7. Blow compressed air through face of nozzle. This will free any dirt in nozzle area.
8. Inspect nozzle sleeve 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 19).
10. Attach nozzle assembly to nozzle adapter bracket (see Figure 18, page 12).
11. Attach fuel and airline hoses to nozzle assembly. See *Fuel and Airline Replacement and Proper Routing*.
12. Replace fan (see *Fan*, page 10).
13. Replace upper shell (see *Upper Shell Removal*, page 10).

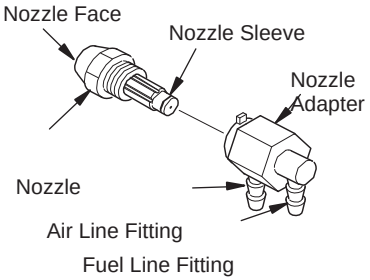


Figure 19 - Nozzle and Nozzle Adapter

200T Model Only

1. Remove combustion chamber and ignitor by following steps 1 through 7 under *Ignitor*, page 11.
2. Carefully place the ignitor in a safe location.
3. Remove two nozzle adapter bracket screws (see Figure 20).
4. Place hex-shaped aluminum nozzle adapter into vise (do not overtighten).
5. Carefully remove nozzle from nozzle adapter using 5/8" socket wrench (see Figure 21).
6. Blow compressed air through face of nozzle. This will remove any debris in nozzle.
7. Inspect nozzle seal for damage.
8. Replace nozzle into nozzle adapter until nozzle seats. Tighten 80-110 inch-pounds.
9. Attach nozzle adapter bracket to combustion chamber with two screws removed in step 3.

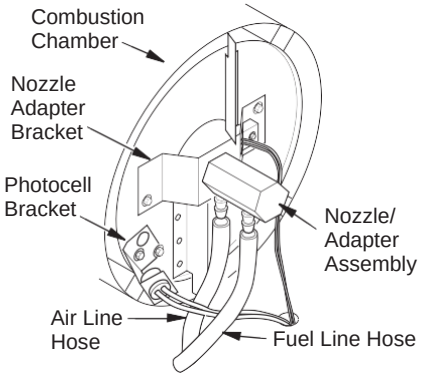
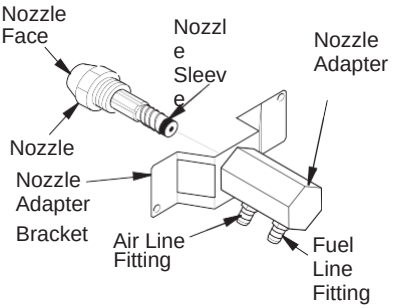


Figure 20 - Removing Air and Fuel Line Hoses (200T Model Only)



10. Repeat steps 9 through 16 under *Ignitor*, page 11.

Figure 21 - Nozzle and Nozzle Adapter

FUEL AND AIR LINE REPLACEMENT AND PROPER ROUTING

1. Remove upper shell (see *Upper Shell Re- moval*, page 10).
2. Remove control cover screws using phillips screwdriver (see Figure 13, page 11).
3. Remove control 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, page 12 or Figure 20 according to model) and from fuel filter (see *Fuel Filter*, page 11). If air line hose is damaged, disconnect from nozzle adapter (see Figure 17, page 12 or Figure 20 according to model and from barb fitting on pump end cover (see Figure 22, page 14).
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, page 14) and the other end to nozzle adapter (see Figure 17, page 12 or Figure 20 according to model). Attach one end of fuel line hose to fuel filter (see *Fuel Filter*, page 11) and the other end to nozzle adapter (see Figure 17, page 12 or Figure 20 according to model).

SERVICE PROCEDURES
Continued

Note: Route hoses as shown in Figure 17, page 12 or Figure 20 according to model. Hoses are not to touch photocell bracket.

6. Replace control cover.
7. Replace upper shell (see *Upper Shell Removal*, page 10).

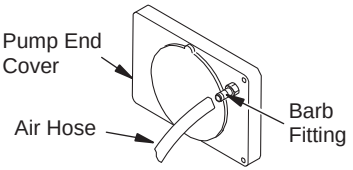


Figure 22 - Air Hose to Barb Fitting

PUMP ROTOR (Procedure if Rotor is Binding)

1. Remove upper shell (see *Upper Shell Removal*, page 10).
2. Remove fan guard.
3. Remove filter end cover screws using 5/16" nut driver (see Figure 23).
4. Remove filter end cover and air filters.
5. Remove pump plate screws using 5/16" nut-driver.
6. Remove pump plate.
7. Remove rotor, insert and blades (see Figure 23).
8. Check for debris in pump. If debris is found, blow out with compressed air.
9. Install insert and rotor.
10. Check gap on rotor. Adjust to .076/.101 mm (.003"/.004") if needed (see Figure 24).
    Note: Rotate rotor one full turn to ensure the gap is .076/.101 mm (.003"/.004") at tightest position. Adjust if needed.
11. Install blades, pump plate, air filters and filter end cover.
12. Replace fan guard and upper shell (see *Upper Shell Removal*, page 10).
13. Adjust pump pressure (see *Pump Pressure Adjustment*, page 10).

    Note: If rotor is still binding, proceed as follows.
14. Perform steps 1 through 6.
15. Place fine grade sandpaper (600 grit) on flat surface. Sand rotor lightly in "figure 8" motion four times (see Figure 25).
16. Reinstall insert and rotor.
17. Perform steps 10 through 12.

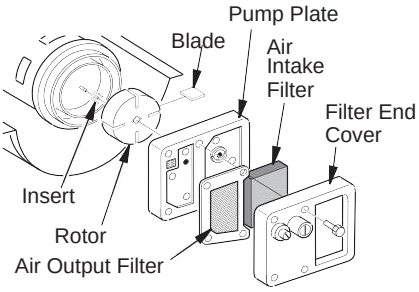


Figure 23 - Rotor Location

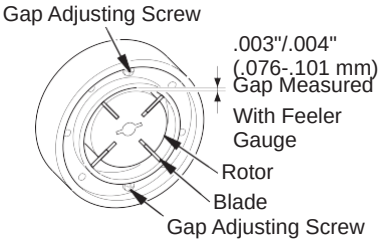


Figure 24 - Gap Adjusting Screw Locations

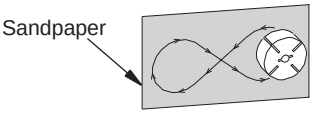


Figure 25 - Sanding Rotor

IGNITION CONTROL ASSEMBLY

⚠ WARNING: High voltage!

1. Unplug heater.
2. Remove control cover screws (2) using phillips screwdriver to expose ignition control assembly (see Figure 11, page 10).
3. Remove fuse from fuse holder.
4. Replace with new fuse (DESA Heating Prod- ucts part number 113752-01). Do not substitute a fuse with a higher current rating. Use an equivalent 6.3 amp time lag, 5 x 20 mm fuse.
5. Replace control cover (see Figure 11, page 10).

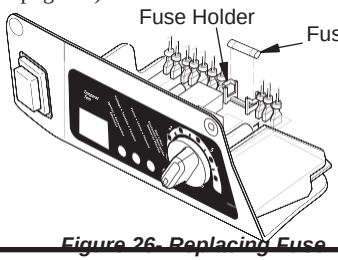


Figure 26- Replacing Fuse

SPECIFICATIONS

Model Size	125T	170T	200T
Output Rating (Btu/Hr)	125,000	170,000	200,000
Fuel	Use only kerosene, #1/#2 diesel/fuel oil, JET A or JP-8 fuels*		
Fuel Tank Capacity (U.S. Gal./Liters)	13.5/51	13.5/51	13.5/51
Fuel Consumption (Gal. Per Hr/Liters Per Hr)	.90/3.41	1.25/4.73	1.4/5.3
Pump Pressure (psi)	6.0	6.0	6.2
Electric Requirements	120 V/60 HZ	120 V/60 HZ	120 V/60 HZ
Amperage (Normal Run)	3.6	3.6	3.6
Maximum Motor Speed (RPM)	3400	3400	3400
Hot Air Output (CFM)	520	580	600
Motor Horsepower	1/5	1/5	1/4
Shipping Weight (Approximate Pounds/Kilograms)	81/36.74	82/37.2	87/39.46
Heater Weight without Fuel	73/33.11	74/33.57	
Pounds/Kilograms)	79/35.86 (Approximate		

* Use of #2 diesel/fuel oil will result in noticeable odor and could require additional fuel filter maintenance. Use in extreme cold temperatures may require nontoxic anti-icer additive