



## OWNER'S MANUAL

MODELS F50E, F110E & F150F

**IMPORTANT: READ AND UNDERSTAND THIS MANUAL BEFORE STARTING OR SERVICING. KEEP THIS MANUAL FOR FUTURE REFERENCE.**

### **WARNING**

Improper use of this heater can result in serious bodily injury due to hazards of fire or explosion, carbon monoxide poisoning, burn, and electrical shock.

- Use only kerosene or No. 1 fuel oil. **NEVER** use Gasoline, Naphtha, Paint thinners, Alcohol or other highly flammable fuels!
- Use only in areas free of flammable vapor or high dust content. **NEVER** use heater where Gasoline, Paint Thinner or other highly flammable vapors are present.
- Heater must be level while hot or operating, or a fire may occur.
- Make sure hot air outlet is at least eight (8) feet from combustible materials.
- **NEVER** use heater in living or sleeping areas.
- Use only in well ventilated areas. Provide ventilation of at least three (3) square feet for each 100,000 of BTU rating.
- When used with a thermostat, heater may start at anytime!
- Keep children away from heater at all times. **NEVER** leave a heater plugged in without adult supervision if children or animals are likely to be present.
- Use only with the electrical voltage and frequency specified on model plate.
- Use only a properly grounded three-wire extension cord.
- **DO NOT** move, handle, refuel or service a hot or operating heater.
- Use heater only in accordance with local ordinances and codes.
- **NEVER** attach duct work to front of heater.
- Store heater in a level position when filled or fuel leakage may occur.



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## UNPACKING

1. Remove all protective material which may have been applied to the heater for shipment.
2. Remove the heater from carton.
3. Check the heater for possible shipping damage. If any damage is found immediately notify the dealer from whom you purchased the heater.

## ASSEMBLY

(Does not apply to Model F50E)

Some models are equipped with wheels and handles. These items are removed from the unit and can be found in the shipping carton along with mounting hardware. The wheels, axle and mounting hardware are in a plastic package. The following items should be included:

1. Heater body
2. One front handle
3. One rear handle
4. One wheel support frame
5. One axle
6. Two wheels
7. Eight screws, #10-24 x 1-3/4 in.
8. Eight nuts #10-24
9. Two cap nuts
10. One fuel cap

### TOOLS REQUIRED

Medium Phillips screwdriver, 3/8" open or adjustable wrench and hammer.

**CAUTION:** Do not tighten nuts until step 5.

(Refer to illustration on page 13)

1. Slide the axle (6) through the wheel support frame (3). Install the wheels (7) on the axle.  
**IMPORTANT:** The extended hub of the wheel should

be positioned toward the wheels support frame. Position the cap nuts (8) on the axle ends and gently tap with a hammer to secure.

2. Position the heater on the wheel support frame assembly with the combustion chamber end over the wheels.
3. Use four screws (4) and nuts (5) to attach the front handle to the top of the tank flange. The screws will go through the front handle, the tank flange and the wheel support frame. Install the nuts fingertight only.
4. Using four screws (4) and nuts (5) install the rear handle (1) as outlined in Step 3.
5. Tighten all nuts.
6. Remove tape from the fuel filler neck and install the fuel cap.

## OPERATION

**WARNING:** Use only a properly grounded three-wire extension cord. A cord with proper capacity rating is needed to assure 120 volt operation.

- Distances up to 50 feet use 18 AWG.
- Distances up to 100 feet use 16 AWG.
- Distances up to 200 feet use 14 AWG.

**WARNING:** Use only in well ventilated areas. See chart below.

### FRESH AIR OPENING REQUIREMENTS

**NOTE:** If more than one heater is being used provide additional fresh air.

HEATER SIZE	SQUARE FEET OPENING
50,000 BTU	1.5
100,000 BTU	3.0
150,000 BTU	4.5

Example: A 50,000 BTU heater will require a two car garage door raised two inches or a single garage door raised four inches. A window can also be used for ventilation. The 50,000 BTU heater requires at least two thirty-inch windows raised 3.5 inches.

### FUELS

**WARNING:** Use only kerosene or #1 fuel oil to avoid risk of fire or explosion.

**NEVER** use gasoline, naphtha, paint thinners, alcohol or other highly flammable fuels.

1. Use of No. 2 fuel oil or No. 2 diesel oil may result in:
  - a) More frequent clogging of fuel filters and nozzles
  - b) The formation of carbon on the spark plug.
2. Do not allow spark plug to get a carbon buildup on the electrodes. Carbon deposits can cause interrupted starting and raw fuel emission from the heater.

### FUEL SOURCE

Fuels can be purchased at your local gasoline service station or look in the telephone directory under "kerosene" to find another source.

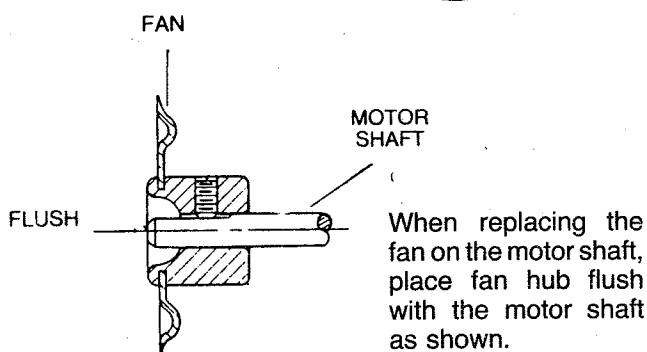
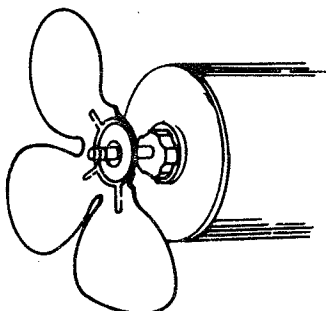
## MAINTENANCE

**⚠ WARNING:** Always unplug heater before servicing

**⚠ CAUTION:** When removing motor from the heater, always remove the fan first. The weight of the motor resting on the fan could damage fan pitch.

### FAN BLADES

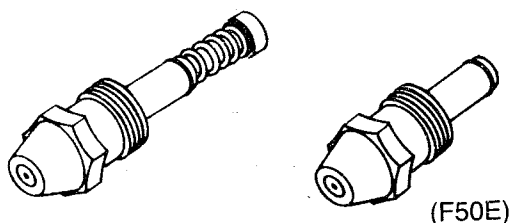
Clean after every 500 hours of operation or as necessary. Use a soft cloth moistened with kerosene or solvent, then dry thoroughly.



### NOZZLE

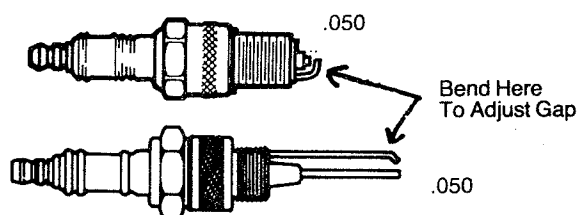
Clean at least once during heating season. Remove burner head. Use a socket wrench only to remove nozzle. Blow through the face (outlet) end ONLY.

**⚠ CAUTION:** Protect nozzle face from damage while out of the heater.



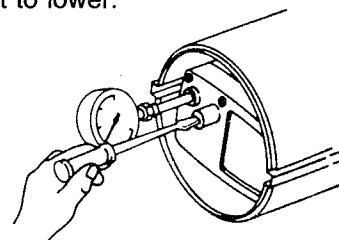
### SPARK PLUG

After every 300 hours of operation, clean and adjust spark plug electrodes. Adjust gap or replace spark plug as required.



## ADJUSTMENT OF PUMP PRESSURE

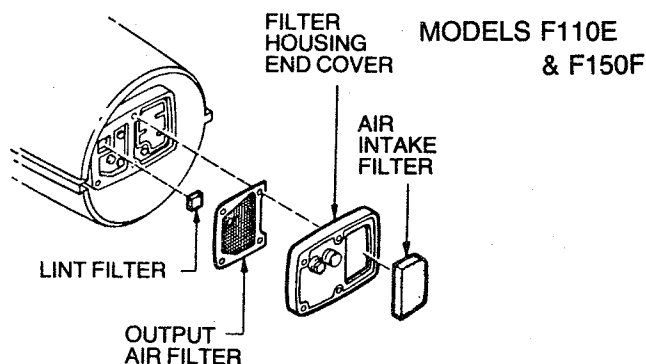
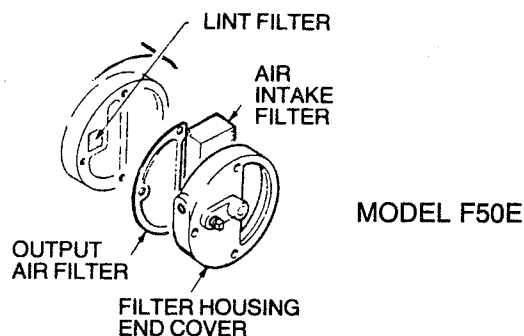
1. Remove the plug from the air filter housing and install the pressure gauge. (HA1180)
2. To adjust the pump pressure, turn the pressure relief valve in to raise, out to lower. See Specifications for correct pressure.
3. After adjustment, remove the gauge and replace the plug.



## AIR FILTERS

Check frequently for dust film. To clean, remove the filter from housing, wash with mild detergent and dry thoroughly before replacing. Replace once each season.

**⚠ CAUTION:** Do not oil the filter elements.



## STORAGE

**⚠ WARNING:** Always unplug heater before servicing.

**⚠ CAUTION:** Store heater in a dry location, free of corrosive fumes and dust.

## FUEL TANK

Drain all Fuel from tank. Clean and flush tank before storing.



## AIR FILTERS

Remove and clean, or replace filters if necessary.

## SPARK PLUG

Clean and adjust spark plug, or replace if necessary

## TROUBLESHOOTING CHART

SYMPTOMS	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Motor does not start; thermostat (if used) is set to call for heat.	<b>Electrical Troubles</b>	
	1. No power or low voltage at heater	1a. Be sure power is reaching heater; check condition of heater cord. Repair or replace as needed.
		b. Use extension cord with wires heavy enough to carry the electrical load of the heater.
		c. Be sure voltage at outlet is same as shown on heater instruction plate.
	2. Damaged motor or motor start relay.	2. Check motor and relay; replace if damaged.
	3. Thermostat damaged (if used)	3. This is not a serviceable part; replace.
	<b>Mechanical Troubles</b>	
	1. Fan obstructed by mechanical damage or dirt	1a. Check for bent outer shell.
		b. Check for damaged fan; replace if damaged.
		c. Check for damaged motor mount.
		d. Check for tight pump.
Heater will not ignite, but motor runs for a short time.	<b>Fuel System Troubles</b>	
	1. Fuel tank empty	1. Add fuel to tank.
	2. Water in fuel	2. Check for water in tank: clean tank and fuel filter if water is found. (Water in the tank will form globules in the bottom which you can see.)
	3. Wrong fuel	3. Add fresh, clean fuel to tank.
	4. Fuel filter clogged	4. Remove and wash in clean fuel. Blow dry and replace.
	5. Nozzle plugged or damaged	5a. Clean by blowing compressed air through nozzle from outlet end of nozzle.
		b. Replace nozzle if cleaning does not solve the problem.
	6. Very low temperature may cause fuel to thicken and not flow.	6. Use a non toxic anti-icer such as "Heet," "Methanol Alcohol" or "Frostex."
	7. Dirty air filters	7. Be sure air filters are clean.
	8. Air leak at fuel filter	8. Check fuel filter for air leaks and for tightness of fit where it is connected to fuel line.
	<b>Ignition Troubles</b>	
	 <b>WARNING: DISCONNECT HEATER CORD!</b>	
	1. Spark plug wire disconnected from plug or from terminal of transformer	1. Check at plug and transformer to be sure wire is tight at both ends.
	2. Damaged spark plug. (Wrong gap, plug wet with fuel or electrodes carboned, or plug damage.)	2a. Gap between electrodes should be 0.050". Adjust electrode gap.
		b. Inspect plug for worn or eroded electrodes.
		c. Replace a damaged spark plug.
	 <b>WARNING: HIGH VOLTAGE</b>	
	3. Damaged transformer	3. Disconnect spark plug wire from transformer, and check transformer for spark: replace if no spark can be obtained.
	<b>Improper Fuel-Air Mixture (Not enough fuel)</b>	
	1. Heater running out of fuel; water condensation in fuel tank; wrong fuel.	1a. Shut heater off: check fuel tank. If you see globules of water in the bottom, drain and flush the tank and filter with clean fuel.
		b. Refill with fresh, clean fuel.

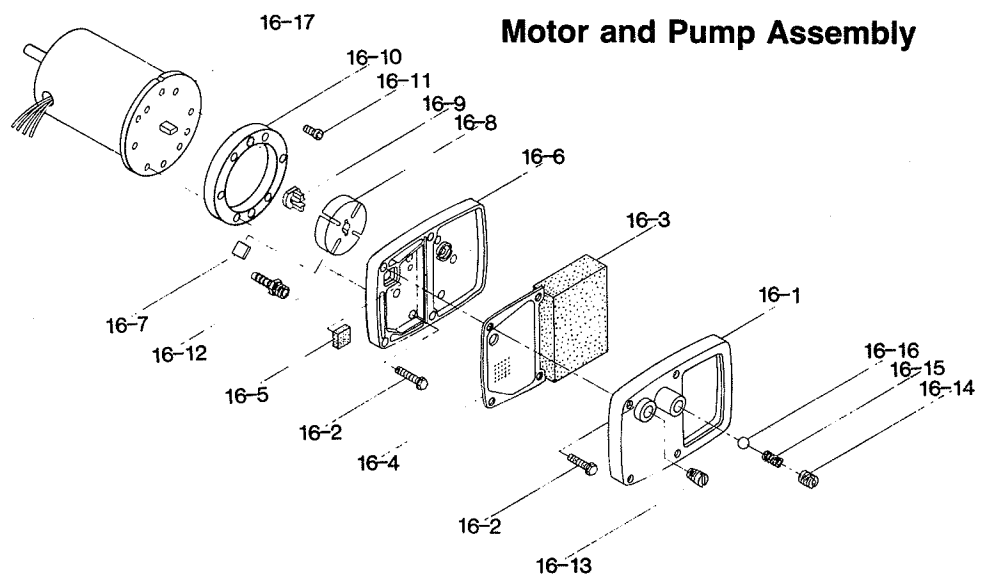
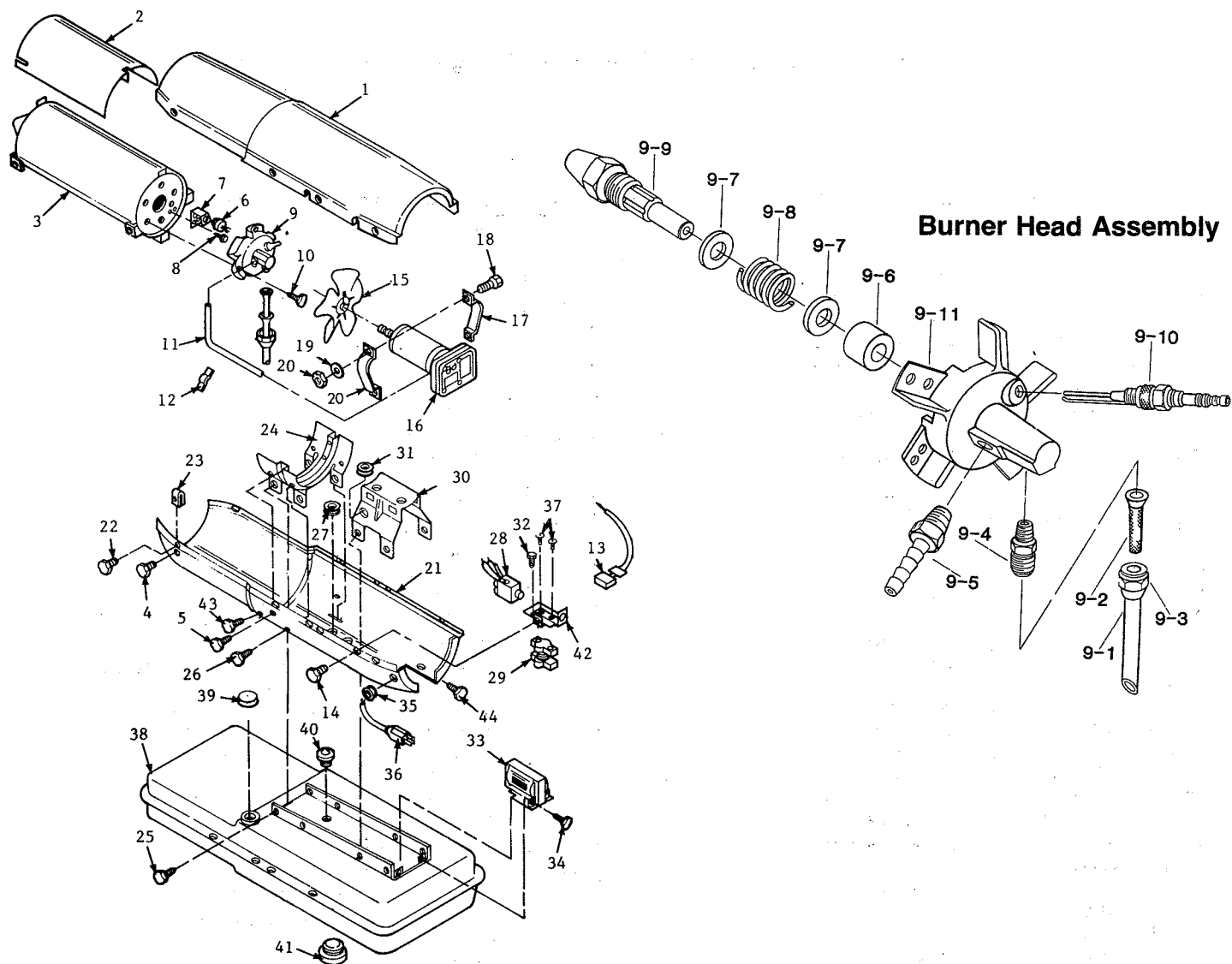
## TROUBLESHOOTING CHART (Continued)

SYMPTOMS	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Heater burns, but puffs of smoke can be seen; heater will not burn steady; heater burns with odor; heater smokes continuously. (Continued)	<ol style="list-style-type: none"> <li>2. Dirty air filters causing reduced air flow through nozzle, resulting in low fuel flow</li> <li>3. Fuel filter loose, dirty, or connection loose</li> <li>4. Dirty nozzle</li> <li>5. Fan blade</li> <li>6. Loose air output line connections between filter housing and burner.</li> <li>7. Rubber sleeve on shank of nozzle is leaking. (Remote possibility).</li> </ol>	<ol style="list-style-type: none"> <li>2. Remove and clean the air filters. Be sure air intake is not blocked.</li> <li>3a. Remove and wash fuel filter in clean fuel.</li> <li>b. Check condition of connection between fuel line and burner.</li> <li>c. Replace with new fuel line.</li> <li>4a. Remove and clean the burner head.</li> <li>b. Blow compressed air through nozzle from outlet end.</li> <li>c. Never use a drill, wire or other tool to open a nozzle passage.</li> <li>5. Check for excessive dirt accumulation on fan blade which could be causing motor to slow down.</li> <li>6. Be sure connections are tight.</li> <li>7. If heater puffs intermittently, replace the rubber sleeve. (Handle parts carefully to prevent damage; assemble them carefully to preserve airtightness.)</li> </ol>
<b>Improper Fuel-Air Mixture (Too much fuel, or not enough air for amount of fuel being supplied)</b>		
Flames come from front of heater.	<ol style="list-style-type: none"> <li>1. Dirty fan</li> <li>2. Air passageway through heater blocked by dirt or trash</li> <li>3. Fan loose or improperly located on shaft</li> <li>4. Bent or damaged fan</li> <li>5. High pump pressure</li> <li>6. Air intake blocked</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean the fan.</li> <li>2. Be sure the air passageway through the heater is clean. Keep the heater clean.</li> <li>3. Check fan; correct if not right.</li> <li>4. Replace. Do not attempt repair of fan.</li> <li>5. Check and adjust pressure.</li> <li>6. Check filters.</li> </ol>
<b>Electrical System Troubles</b>		
Heater cycles intermittently.	<ol style="list-style-type: none"> <li>1. Thermostat (if used) set too low</li> <li>2. Damaged thermostat (if used)</li> <li>3. Low voltage causing tripout of safety control</li> <li>4. Damaged electrical supply or damaged connections</li> </ol>	<ol style="list-style-type: none"> <li>1. Set thermostat to a higher temperature for more even operation.</li> <li>2. Replace a damaged thermostat.</li> <li>3. Check power line voltage. Use extension cord with proper size wire.</li> <li>4a. Be sure extension cord and heater service cord are in good condition, without intermittent open circuits.</li> <li>b. Check mechanical and electrical soundness of all wiring connections in the heater and service cord.</li> </ol>
Heater ignites, but button of safety control pops out anyway.	<ol style="list-style-type: none"> <li>1. Damaged photocell</li> <li>2. Damaged safety control</li> <li>3. Damaged electrical connections in circuit through cell and control</li> </ol>	<ol style="list-style-type: none"> <li>1. Check to see if glass face of cell is so dirty it can't "see" the flame; clean glass if dirty. Replace with a cell that is known to be good.</li> <li>2. Replace with a control that is known to be good.</li> <li>3. Be sure all solder joints and wiring connections are secure. Check wiring diagram.</li> </ol>
Safety control fails to trip when a no-flame condition exists.	<ol style="list-style-type: none"> <li>1. Damaged safety control</li> <li>2. Control dirty or damaged</li> </ol>	<ol style="list-style-type: none"> <li>1a. Replace with a safety that is known to be good.</li> <li>b. Replace with a new safety control</li> <li>2. Replace damaged control with one that is known to be good.</li> </ol>

## Replacement Parts List for Heater Model F110E

KEY NO.	PART NUMBER	PART DESCRIPTION	QTY	KEY NO.	PART NUMBER	PART DESCRIPTION	QTY
1	M51072-01AD	Upper Shell	1	11	M50631	Rubber Bumper	2
2	M15823-27	Screw (10-16 x 1/2)	6	12	M51074-01	Motor Mounting Bracket	1
3	M51075-01	Combustion Chamber Assembly	1	13	M11084-3	Screw (12-14 x 1/2)	4
4	M16660	Bracket, Photocell	1	14	NTC-4C	Hex Lock Nut	2
5	M10908-2	Screw (6-32 x 3/8)	2	15	M51114-01	Fan Guard	1
6	M16656-10	Photocell Assembly	1	16	M50570-04	Transformer	1
7		Burner Head Assembly	1	17	M11084-27	Screw (10-16 x 1/2)	2
7-1	M51120-01	Nozzle	1	18	M51345-01	Fuel Line	1
7-2	M10659-1	Washer, Nozzle	2	19	M51150-01	Fuel Filter	1
7-3	M10809-1	Spring, Nozzle	1	20	M51151-01	Fuel Line Tube	1
7-4	M8882	Sleeve, Nozzle	1	21	M10990-3	Rubber Bushing	1
7-5	M50924-03	Body, Burner Head	1	22	M50814-06	Airline	1
7-6	M50820-02	Fitting, Barb	2	23	M51073-01AD	Lower Shell	1
7-7	M10962-2	Spark Plug	1	24	M30865-02	Bushing	1
8	M11084-27	Screw (10-16 x 1/2)	3	25	M30865-02	Bushing	1
9	M51153-01	Fan	1	26	M30865-02	Bushing	1
10		Motor and Pump Assembly	1	27	M50104-02	Bushing	1
10-1	M51131-01	Motor	1	28	M11084-3	Screw (12-14 x 1/2)	6
10-2	M8645	Pump Body	1	29	M11271-8	Clip Nut	6
10-3	FHPF3-4C	Screw (10-32 x 1/2)	2	30	M15823-37	Screw (Grounding, 8-18 x 1/4)	1
10-4	M22009	Insert, Rotor	1	31	M51115-01AK	Fuel Tank	1
10-5	M22456-1	Rotor, Pump	1	32	M51027-06	Cap, Fuel (Includes gasket)	1
10-6	M50545	Cover, Pump End	1	33	M51122-01	Support, Circuit Board	3
10-7	M12179	Filter, Intake	1	34	M50671-02	Control, Flame Out	1
10-8	M16545	Cover, End Filter	1	35	M51157-01	Nut Hex 12mm	1
10-9	M8940	Ball, Steel 1/4 Dia.	1	36	M11142-1	Bushing, Strain Relief	1
10-10	M10993-1	Spring, Relief	1	37	M10813-84	Cord, Power	1
10-11	M27694	Screw, Adjusting	1	38	M51077-01AK	Cover, Side	1
10-12	M22997	Plug	1	<b>PARTS AVAILABLE - NOT SHOWN</b>			
10-13	M12461-31	Screw (10-32 x 1)	10	M29936	Decal, Tradename		
10-14	M12244-1	Filter, Output	1	M51138-07	Decal, Wiring		
10-15	M11637	Filter, Lint	1	M51146-04	Decal, General Information		
10-16	M50820-02	Fitting, Barb	1				
10-17	M8643	Blade	4				

Figure 3 - Replacement Parts Illustration for Heater Model F150F



## Replacement Parts List for Heater Model F150F

KEY NO.	PART NUMBER	PART DESCRIPTION	QTY	KEY NO.	PART NUMBER	PART DESCRIPTION	QTY
1	M17014AD	Shell, Upper	1	16-15	M10993-1	Spring, Relief	1
2	M16679	Deflector, Heat	1	16-16	M8940	Ball, 1/4 dia.	1
3	M16887-6	Chamber, Combustion, Assembly	1	16-17	M51159-01	Motor, w/relay	1
4	M11084-27	Screw, Hex Hd., 10-16 x 1/2	2	17	M16661	Clamp, Motor	4
5	M11084-29	Screw, 10-16 x 3/4	2	18	M51043-01	Screw, Motor Clamp, 1/4-20 x 1 1/2	2
6	M16656-4	Photocell Assembly	1	19	WLM-4C	Lockwasher 1/4 in.	2
7	M16660	Bracket, Photocell	1	20	NPC-4C	Nut, Hex 1/4-20	2
8	M10908-2	Screw, Hex Hd., 6-32 x 3/8	2	21	M16810AD	Shell, Lower	1
9		Burner Head Assembly	1	22	M11084-27	Screw, Hex Hd., 10-16 x 1/2	6
9-1	M16790-12	Fuel Line	1	23	M11271-6	Nut, Clip	6
9-2	M19630	Filter, Screen Fuel	1	24	M12828	Bracket, Shell Support	1
9-3	M50660-05	Nut, Flare	1	25	M11084-27	Screw, Hex Hd., 10-16 x 1/2	8
9-4	079685-01	Connector, Male	1	26	M11084-29	Screw, #10-16 x 3/4	2
9-5	M50817-01	Fitting, Barb	1	27	1000576	Grommet Leads Thru Lower Shell	2
9-6	M8882	Seal, Nozzle	1	28	M50671-01	Control, Safety	1
9-7	M10659-1	Washer, Nozzle	2	29	M12462-17	Relay, Motor Start	1
9-8	M10809-1	Spring, Nozzle	1	30	M16645	Bracket, Motor Support	1
9-9	M18022	Nozzle, 1.1 GPH	1	31	1000577	Grommet	1
9-10	M10962-2	Spark Plug	1	32	M11084-27	Screw, #10-16 x 1/2 (Grounding)	1
9-11	M50924-01	Body, Burner Head	1	33	M16697-02	Transformer	1
10	M11084-27	Screw, Hex Hd., 10-16 x 1/2	3	34	11084-27	Screw #10-16 x 1/2	2
11	M50814-03	Airline, Tubing	1	35	M11143-1	Bushing, Strain Relief	1
12	M50873-01	Clip, Airline	2	36	M10813-86	Cord, Power	1
13	M16841-16	Wire Assembly (red)	2	37	M12461-13	Screw, Rd. Hd., 8-32 x 1/4	2
14	M11084-27	Screw, #10-16 x 1/2	1	38	M51090-15	Tank, Fuel	1
15	M17058	Fan	1	39	M51027-06	Cap, Fuel	1
16		Motor & Pump Assembly	1	40	M10990-3	Bushing, Rubber, Fuel Line Into Fuel Tank	1
16-1	M16545	Cover, End Filter	1	41	M27417	Plug, Drain, Includes "O" Ring	1
16-2	M12461-31	Screw, #10-32 x 1	10	42	M25296-1	Bracket, Relay	1
16-3	M12179	Filter, Intake	1	43	M11084-27	Screw, #10-16 x 1/2	2
16-4	M12244-1	Filter, Output	1	44	M11084-27	Screw, #10-16 x 1/2	2
16-5	M11637	Filter, Lint	1				
16-6	M50545	Cover, End Pump	1				
16-7	M8643	Blade	4				
16-8	M22456-1	Rotor Pump	1				
16-9	M22009	Insert, Rotor	1				
16-10	M8645	Body, Pump	1				
16-11	FHPF3-4C	Screw, #10-32 x 1/2	2				
16-12	M50817-01	Fitting, Barb	1				
16-13	M22997	Plug	1				
16-14	M27694	Screw, Adjusting	1				

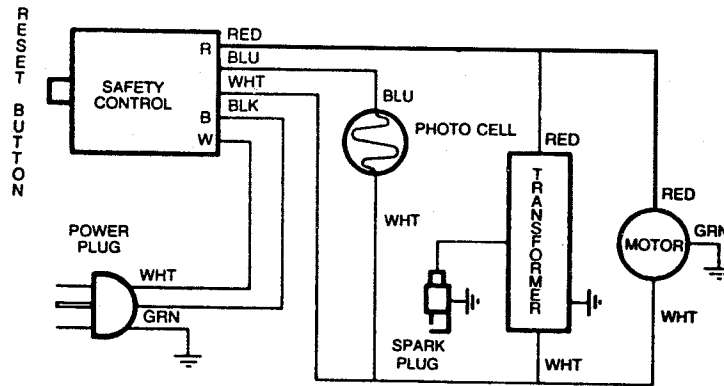
### PARTS AVAILABLE - NOT SHOWN

M51138-04	Decal, Wiring Diagram	
079698-01	Decal, General Information	
M29936	Decal, Tradename	
M13942-7	Connector, Wire (Blue Wires)	1
M13942-5	Connector, Wire (Red Wires)	1
M13942-6	Connector, Wire (White Wires)	1

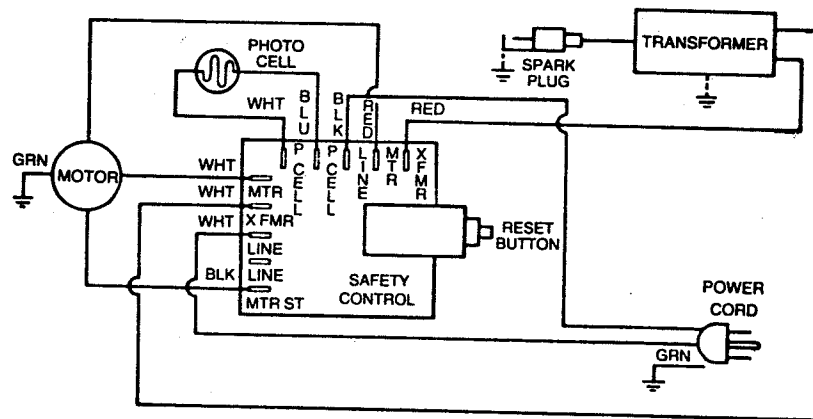


# WIRING DIAGRAMS

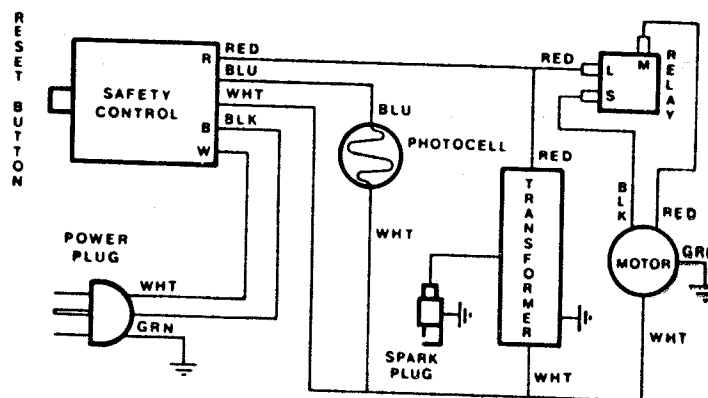
MODEL F50E



MODEL F110E

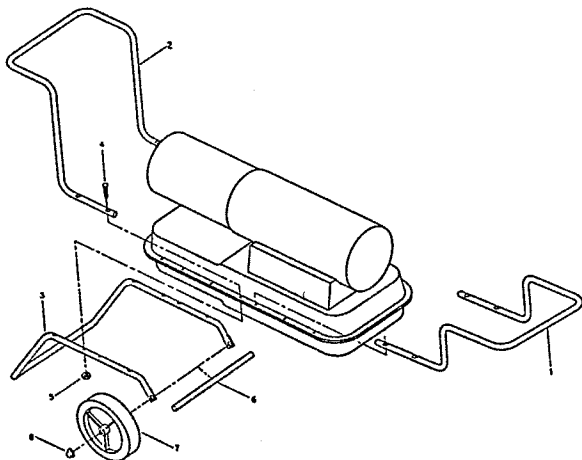


MODEL F150F

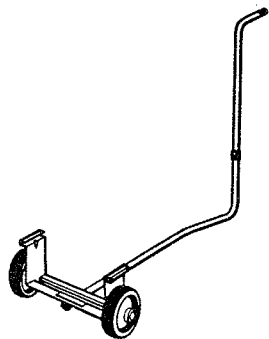


## KNIPCO Models F110E & F150F P/N Listing - Wheel/Handle Assembly

REF NO.		F110E	QTY	F150F	QTY
1	Rear Handle	M13830-3	1	M14243-3	1
2	Front Handle	M51333-01	1	M14244-3	1
3	Support Frame	M12342-3	1	M12831-3	1
4	Screw, #10-24 x 1 3/4	M12345-33	8	M12345-33	8
5	Torque lock nut, #10-24	NTC-3C	8	NTC-3C	8
6	Axle	M51015-01	1	M16801-2	1
7	Wheel	M19294	2	M19294	2
8	Cap nut	M28526	2	M28526	2

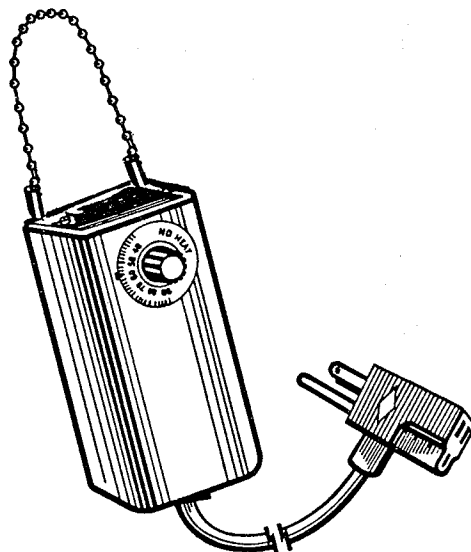


### ACCESSORIES



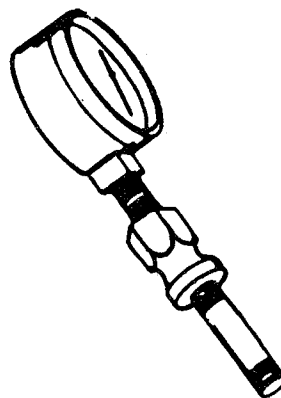
#### WHEELS AND HANDLE KIT - HA1206

For model F50E. Makes heater even more portable and convenient. Easy to assemble, install.



#### THERMOSTAT KIT - HA1200

For all models. Keeps your building at the temperature you select day and night.



#### AIR GAUGE KIT - HA1180

For all models. Special tool to check air pressure.

# WARRANTY AND REPAIR SERVICE

## LIMITED WARRANTY

DESA International warrants this product and any parts thereof, to be free from defects in materials and workmanship for six (6) months from the date of first purchase when operated and maintained in accordance with instructions. This warranty is extended only to the original retail purchaser, when proof of purchase is provided.

This warranty covers only the cost of parts and labor required to restore the product to proper operating condition. Transportation and incidental costs associated with warranty repairs are not reimbursable under this warranty.

Warranty service is available only through authorized dealers and service centers.

This warranty does not cover commercial or rental usage; defects resulting from misuse, abuse, negligence, accidents, lack of proper maintenance, normal wear, alteration, modification, tampering, contaminated fuels, repair using improper parts, or repair by anyone other than an authorized dealer or service center. Routine maintenance is the responsibility of the owner.

THIS EXPRESS WARRANTY IS GIVEN IN LIEU OF ANY OTHER WARRANTY EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

DESA International assumes no responsibility for indirect, incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so these limitations or exclusions may not apply to you. This Limited Warranty gives you specific legal rights and you may also have other rights which vary from state to state.

## WARRANTY AND REPAIR SERVICE

Should your heater require service, return it with proof of purchase to your nearest Authorized Service Center. If inspection shows that the repairs required were caused by defective materials or workmanship, we will repair or replace it without charge. Repairs not covered by the warranty will be charged for at regular repair list prices. When writing for information regarding your heater, be sure to include the Model Number and Serial Number as shown on the identification plate. A service manual is available by sending a check for \$3.25 payable to DESA International, P.O. Box 719, Bowling Green, KY 42102-0719, ATTN: Customer Service Department. Each Service Center is independently owned and operated.

We reserve the right to amend these specifications at any time without notice.

## KEEP THIS WARRANTY

Model No. \_\_\_\_\_

Serial No. \_\_\_\_\_

Date of Purchase \_\_\_\_\_

(To be filled in by purchaser)

# DESA

## INTERNATIONAL

**Corporate Headquarters**  
P.O. Box 719  
2701 Industrial Drive  
Bowling Green, KY 42101