



ENGINE PREHEATER

Operating Instructions and Parts Manual

For Models:

LT 2-12 MH-300	LT 2-12 MH-310
LT 2-12 MH-200	LT 2-12 MH-210
H-175-300	H-175-200



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CAUTION:

You must read and fully understand the information in this booklet before operating your heater. Read all operating instructions before attempting to use your heater.

CONGRATULATIONS, you now own one of the safest and most portable heaters available. Your Red Dragon heater was designed for, and has been proven in, the extremes of Alaska. It will operate in temperatures below minus 20 degrees F and has safety and convenience features as standard equipment that other heaters of this type do not offer even as an option.

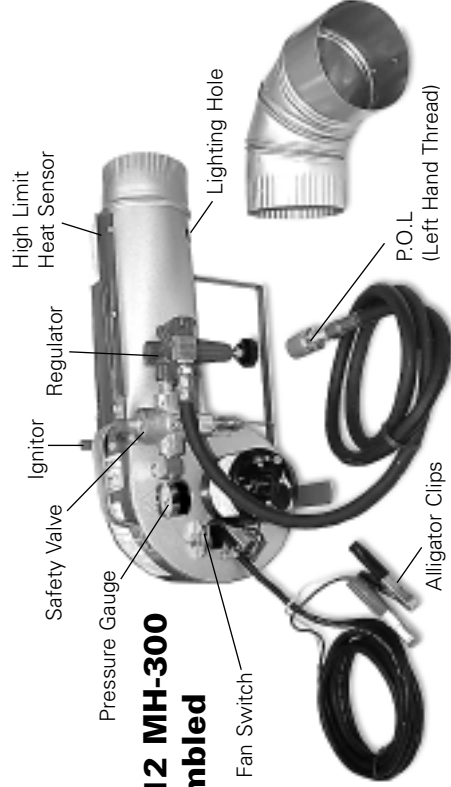
We at Flame Engineering are proud of this heater and will be happy to assist you with any questions you might have. With a minimum amount of care, your Red Dragon portable heater will last for many years providing clean and economical heat. It is a highly efficient, direct fired heater producing very little, if any, odor. It does, however, burn large quantities of oxygen and, therefore, should not be used in a tightly sealed area. Adequate ventilation should always be provided when using this or any other unvented heater. Use care and never operate the heater in the presence of flammable materials.

Follow the procedures listed in this booklet for safe and efficient use of your Red Dragon engine preheater.

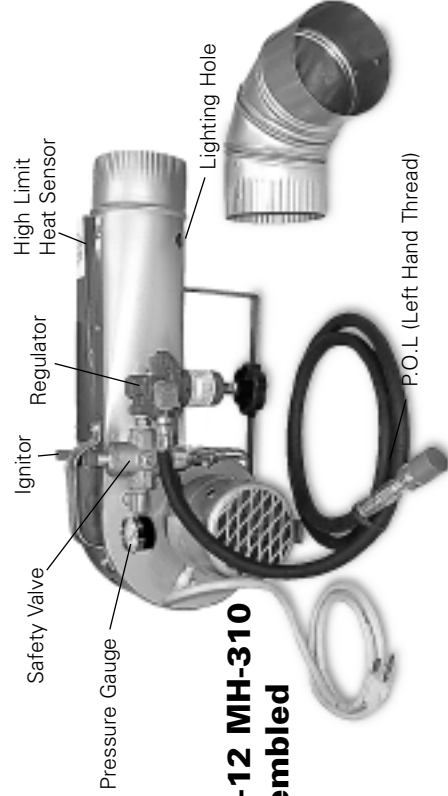
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LT 2-12 MH-300 Assembled



LT 2-12 MH-310 Assembled



PREPARING THE RED DRAGON HEATER FOR OPERATION:

1. **Check fuel container (LP-gas cylinder) for fuel.** See page 11 for a simple procedure to determine the amount of fuel in an LP-cylinder. As a general guide, approximately one-half gallon of fuel is required for each hour of preheating.
2. **Attach heater fuel supply hose to LP-gas cylinder with P.O.L. fitting supplied.** This is a left handed fitting. Be sure to tighten this fitting securely.
DO NOT USE THREAD SEALANT.
3. **Open fuel cylinder valve SLOWLY.** The P.O.L. fitting contains an excess flow check valve which automatically limits the flow of fuel if a sudden surge occurs. Immediately check all connections, including those on the heater for leaks. Use only soapy water or commercial leak detection fluid. **DO NOT USE A MATCH OR ANY OTHER OPEN FLAME.** Correct any leaks and re-check with soapy water.
4. **Connect motor leads to appropriate electrical source (12 volt D.C. or 115 volt A.C.).** You may now proceed with light up of heater.

RED DRAGON HEATER LIGHT-UP PROCEDURE:

NOTE: *Do not attempt heater light up until all safety checks have been completed.*

1. Depress safety valve button. Adjust regulator until a small amount of gas is heard escaping. Release button. Gas should stop immediately.
2. Start fan motor by activating the fan switch or by plugging in AC cord on LT 2-12 MH-210 or LT 2-12 MH-310. Make sure blower is operating.

*******Fan Must Be Running Before Igniting*******

3. Depress safety valve button and hold down.

4. **Press ignitor plunger and repeat until ignition occurs.** Continue to hold red safety valve button down for 15 seconds. You may then release red button and burner should continue to burn. If the burner goes out, depress safety valve button and again depress ignitor plunger several times or until reignition occurs.

Hold red safety valve button down until thermocouple activates and holds valve open.

5. **Adjust regulator to obtain desired amount of heat.**

CAUTION: Do not leave the unit running while unattended.

Continue to monitor the operation of the heater while it is in use. If the fan should stop or if the unit becomes overheated, shut off fuel container valve immediately and correct the malfunction. The 300 series heaters are equipped with high limit controls which stop fuel flow if overheat conditions are present.

RED DRAGON HEATER SHUT-DOWN PROCEDURE:

- 1. Turn Regulator pressure down so that you hear just a low roar from preheater (10 – 20 PSI).**
- 2. Turn Propane tank valve off and let the gas burn out of the hose.**
- 3. Turn Regulator pressure down for storage.**

GENERAL SAFETY TIPS AND SUGGESTIONS:

1. Always check fuel connections with soapy water or commercial leak detector. NEVER use a match or other open flame.
2. If you have questions or problems contact your supplier or Flame Engineering. When in doubt, make sure.
3. Fan, motor, motor mounting plate, switch and power cord may be removed as an assembly.
4. If unit overheats or blower stops for any reason shut off fuel at the fuel cylinder.
5. Always shut fuel off at fuel cylinder when unit is stopped.
6. Never store fuel cylinders inside buildings.
7. Always store fuel cylinders in their proper upright position.
8. Have qualified service personnel perform service work on your Red Dragon heater. Consult the “return for repair” procedure on page 10.
9. Never operate your Red Dragon heater unattended.
10. Never operate your Red Dragon heater without proper ventilation.
11. The maximum suggested operating pressure is 25 psig. for all models. Never operate your Red Dragon heater at higher than the suggested pressure.
12. Always use the shortest and straightest run of ducting possible. This improves the efficiency of the heater and saves fuel.
13. Always cover the P.O.L. fitting when uncoupled from fuel cylinder to eliminate debris from entering hose.
14. Never carry any LP-gas aboard a passenger carrying aircraft.

ELECTRICAL SYSTEM TROUBLE SHOOTING GUIDE:

Blower not working properly.

CHECK POSSIBLE PROBLEMS SOLUTION

1. Alligator clips not attached to power source (12 volt model).	Attach clips to 12 volt battery (either alligator clip may be attached to positive terminal).
2. Battery discharged (12 volt model).	Recharge or replace battery.
3. No electrical power available at receptacle (115 volt AC model).	Check breaker or fuse.
4. Power cord defective (broken wire).	Replace power cord.
5. Switch in “OFF” position.	Move switch to “ON” position.
6. Switch inoperative.	Replace switch.
7. Motor inoperative.	Replace motor.
8. Blower wheel jammed.	Remove inlet guard and free blower wheel – bent blower must be replaced.
9. Blower wheel loose from motor shaft.	Secure blower wheel to motor shaft.

FUEL SYSTEM TROUBLE SHOOTING GUIDE:

Low or No Heat Output.

PROBLEM

SOLUTION

1. Burner orifice obstructed.	Clean orifice with a 1/32" drill or orifice cleaner provided. A serious obstruction may require the removal and disassembly of the burner assembly. It may be advisable to have this service done by your supplier or a qualified LP-gas service man. Contact the factory for further information.
2. Lack of adequate fuel.	A. Open fuel cylinder valve. B. Fill fuel cylinder. C. Excess flow P.O.L., located at the end of the fuel supply hose, may be activated. To correct this condition, close cylinder valve, wait 5 to 10 seconds and reopen SLOWLY .
3. Regulator in low or off position.	Open Regulator. Remember this regulator works opposite of a valve. Turning the knob to the right, increases the flow.
4. Hose obstructed.	Clear hose by back flushing with air or replace hose assembly.
5. Burner goes out when red button is released.	Thermocouple connection at bottom of safety valve is loose or dirty. This is an electrical connection and contacts must be clean. Thermocouple defective and must be replaced. This is a standard 1/2" thermocouple and may be obtained at most plumbing and heating supply stores. Safety valve may be inoperative and may have to be replaced. Be sure to replace safety valve with a unit suitable for use the LP-gas at a pressure up to 25 P.S.I. Contact manufacturer for additional information. Note: After the heater has sat unused for an extended period of time, the red override button may be difficult to push the first time it is activated.

H-175 Self-Contained Heater & H-125 Dolly & Brackets ASSEMBLY INSTRUCTIONS:

1. Refer to Diagram A for dolly assembly.
2. Place fuel cylinder on dolly and secure with nylon straps.
3. Position battery carrier so it clears the fuel cylinder guard ring. The size of fuel cylinder in use will determine the proper position of the carrier. Adjust the carrier to the lowest position possible which still allows it to clear the cylinder. Tighten bolts securely.
4. Mount plastic battery box on battery bracket with bolts provided. Make sure nylon strap is in place under plastic case before attaching case to bracket. (This strap secures battery case lid). Mount heater bracket above battery bracket with bolts provided.

5. The heater is mounted by placing the base in between top and bottom holders and rotating the heater counterclockwise until it is engaged. Secure heater with cotter pin provided.

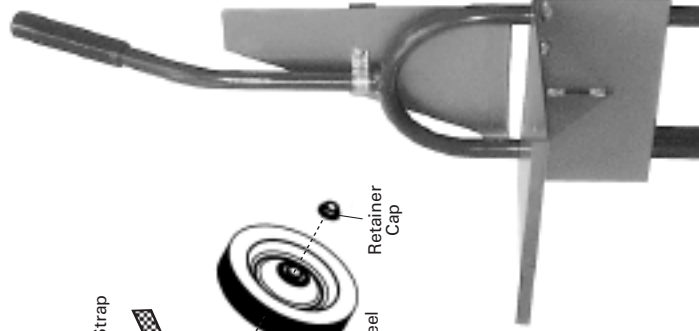
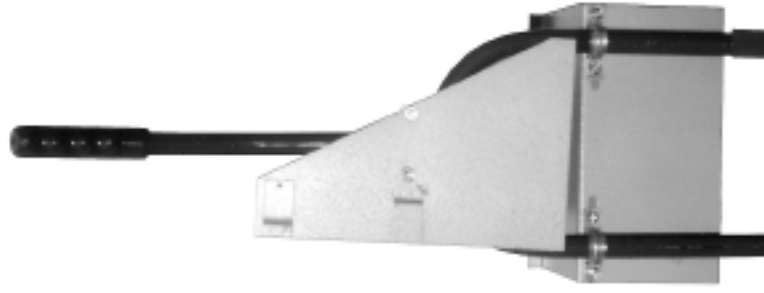
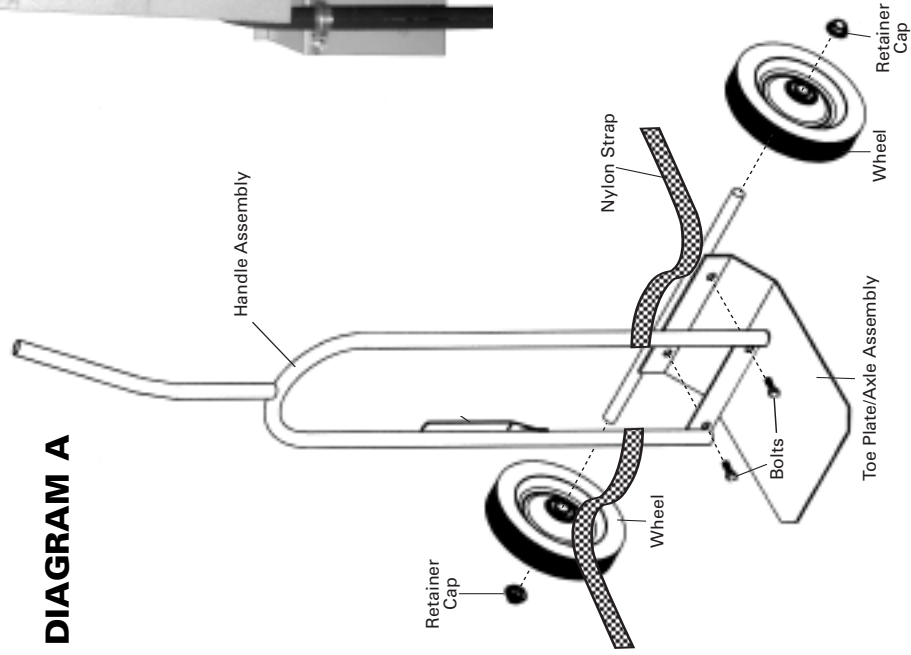
6. Tighten all fuel connections and check with soapy water as described on page 2 of this manual. Follow all safety precautions. **DO NOT LEAVE THE HEATER RUNNING WHILE UNATTENDED.**

7. A hose clamp is provided to secure FT 4-6 ducting to heater (elbow).

H-175-300 Assembled



DIAGRAM A



RED DRAGON PREHEATER PARTS LIST:

Note	Reference Letter	Description	Part Number
	A	Inlet ring & fan guard	M 3001
	B	Fan Housing	M 3002
	C	Blower wheel	M 3003
+	D	Motor mounting plate/12 volt motor	M 3004
*	E	Motor mounting plate/115 volt motor	M 3005
+	F	Motor, 12 volt D.C. 4-6 amp draw	M 3006
*	G	Motor, 115 volt A.C. 1-2 amp draw	M 3007
+	H	Switch	M 3008
+	I	Power cord w/alligator clips & covers	M 3009
	J	Control Assembly, complete	M 3010
	J1	Pressure Gauge	G-23
	J2	Safety Control	H 19 H
	J3	Regulator	567 RC
	K	Thermocouple	M 3012
	L	Fuel supply hose w/ POL	M 3013
	M	Fuel pipe assembly	M 3014
	N	Torch Assembly	LT 2-12 H
	O	Attachment screw & spacer	M 3015
	P	Transition	M 3016
	Q	Base & Transition Support	M 3017
	R	Carrying handle	M 3018
	S	Operators Manual	M 3019
	T	Ignitor	Model 21
	U	Adjustable elbow	M 3021
•	V	Thermocouple junction block	M 3025
•	W	170° high limit control w/leads	M 3026
•	X	High limit control shield	M 3027

+ Used on all 12 volt D.C. models

* Used on all 115 volt A.C. models

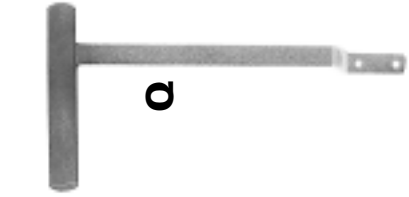
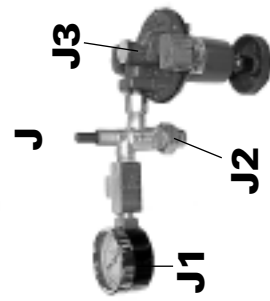
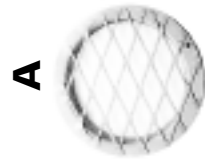
LT 2-12 MH-200

LT 2-12 MH-300

H-175-300

• Used on LT 2-12 MH-300

LT 2-12 MH-310



PURCHASE INFORMATION:

Please fill out the following form and keep this manual with your preheater at all times.

Model No.: _____

Date of Purchase: _____

Place of Purchase: _____

Dealer Phone No.: _____

RETURNING YOUR PREHEATER TO FACTORY FOR REPAIRS:

If repairs cannot be obtained from the above dealer or if you want your heater updated, you may return your unit, prepaid, to the factory.

Summer Preheater Refurbishing Offer:

Return your Red Dragon Engine Preheater during the months of June, July or August for a complete checkup. Please include a note describing what you would like done and also your complete name and address for returning your heater to you. **Note: If you would like to have a Red Dragon High Limit Heat Sensor Safety Control Kit installed on your LT 2-12 MH-200 or LT 2-12 MH-210 please specify.**

FREE LABOR!

We will completely refurbish it to original specs – paint and all. It will look like a brand new unit. *You pay only for freight and replacement parts.*

Return Your Preheater Prepaid To:
Flame Engineering, Inc.
West Highway 4
LaCrosse, Kansas 67548

HOW TO DETERMINE THE AMOUNT OF FUEL IN AN LP-GAS CYLINDER:

1. Weigh cylinder to determine total weight.
2. Locate tare weight (T.W.) stamped on cylinder collar.
3. Subtract tare weight from total weight.
4. Divide the result from step 3 by: 4.24 for propane*; 4.81 for butane*. The resulting figure is the number of gallons of fuel in the cylinder.

* AT 60° F.

SPECIFICATIONS FOR ALL PREHEATER MODELS:

- 49,000 BTU/hr
- Blower Fans are rated at 320 cubic feet per minute
- Motor pulls 4 amps from battery (12 volt D.C. Models)
 - Uses approximately 1/2 gallon of fuel per hour
- Preheats engines in approximately 15 minutes at 0° F
 - Designed to burn liquid or vapor propane
- Dimensions: Approximately 8" wide x 9" high x 19" long
 - Each preheater is tested before leaving the factory

OPTIONAL EQUIPMENT FOR RED DRAGON PREHEATERS:

Heavy Duty Ducting

This heavy duty ducting is perfect for Red Dragon Engine Preheaters and compresses to about 1/4 of normal length. Working temperature from -65° to 300° F.



Part #	Description	Wt Each
FT 4-12 HD	12' Heavy Duty Ducting	4.8 lbs
FT 4-6 HD	6' Heavy Duty Ducting	2.6 lbs

Preheater Carrying Case

This hard shell carrying case is designed to accommodate any Red Dragon, 12 Volt D.C. model.



Part #	Description	Wt Each
C-921	Hard Shell Preheater Carrying Case	6.0 lbs

Preheater Carrying Case

This soft shell carrying case is designed to accommodate any Red Dragon, 115 Volt A.C. model.



Part #	Description	Wt Each
C-923	Soft Shell Preheater Carrying Case	1.8 lbs

Disposable Cylinder Adaptor

This fitting allows use of disposable cylinders with Red Dragon Preheaters. Connects to the P.O.L. fitting on the fuel inlet of the preheater. Available with or without a shut-off valve.



A-76150

Part #	Description	Wt Ea.
A-76150	Disposable Cylinder Adaptor w/shut off valve	0.5 lbs
A-73160	Disposable Cylinder Adaptor without valve	0.35 lbs
A-8412	Electrical Plug	0.1 lbs

Electrical Plug

A handy accessory for obtaining 12 volts for any Red Dragon Preheater using D.C. power. Eliminates opening the cowling or searching for a power source. Plugs into the aircraft or vehicle cigarette lighter receptacle. Also use for charging the battery.



A-8412

OTHER GREAT RED DRAGON EQUIPMENT:

RED DRAGON PROPANE TORCH KITS

Flame Engineering, Inc. manufactures a complete line of torch kits ranging from 50,000 BTU to 2,000,000 BTU. Many models are CSA Certified for the United States and Canada.

VT 3-30 C



Perfect For:

- Melting Snow & Ice • Thawing Pipes
- Flaming Weeds • Heating Metal
- Burning Off Unwanted Vegetation
- Starting Campfires & Charcoal
- Heating Tar & Asphalt
- Burning Brush & Stumps
- MUCH MORE!

HT 1 1/2-10 CR



JET 410 C



RED DRAGON PORTABLE PROPANE HEATERS

Flame Engineering, Inc. also manufactures a complete line of portable construction heaters – perfect for temporary heating of warehouses, buildings under construction, garages, shop areas, machine sheds and remodel areas. Four great models to choose from. Three models are CSA Certified for the United States and Canada.

AG-215



AG-85



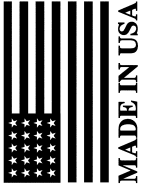
AG-235



CH-220



*Thank you for purchasing a Red Dragon Engine Preheater.
You are encouraged to contact us if you have questions
or need assistance.*



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