Owner's Manual
Dragon Mobile Furnace

Model F507
DRI-EAZ PRODUCTS, INC.
15180 Josh Wilson Road, Burlington, WA 98233
Phone: 800-932-3030 Fax: 360-757-7950 *www.Dri-Eaz.com*

The Dragon Mobile Furnace is an indirect fired furnace providing heated air for water damage restoration, structural drying, construction, event shelters and other temporary heating applications.

READ AND SAVE THESE INSTRUCTIONS

Safety Information

Read this document carefully to learn how to properly operate and service your Dragon Mobile Furnace. This manual should be kept with the unit and remain with the Dragon for the life of the product.

⚠WARNING

WARNING! Do not alter or modify your Dragon in any way. Use only replacement parts authorized by Dri-Eaz Products, Inc. Modifications or use of unapproved parts could create a hazard and will void your warranty. Contact your authorized Dri-Eaz distributor for assistance.

WARNING! Failure to comply with the instructions and precautions provided in this Owner's Manual can result in death, serious bodily injury, and/or property loss or damage from hazards of fire, explosion, burn, asphyxiation, carbon monoxide poisoning, and/or electrical shock.

WARNING! Check the Dragon for proper air-to-fuel ratio at each location. Failure to adjust for altitude changes could cause injury, permanent damage to the unit and secondary damage when ducting into a structure. It may also void the Dri-Eaz warranty. Refer to "Adjusting for Altitude," p. 5, for instructions.

WARNING! Breathing Hazard. Fuel exhaust contains deadly carbon monoxide gas. Operate the Dragon only outdoors in open area. NEVER operate indoors or in enclosed spaces.

- Do not stand closer than 8 ft. (2 m) from the outlet of the heater. Do not lean or sit on the heater.
- Keep children and pets away.
- Make sure there is sufficient air circulation around the unit during operation.
- Only do repair and maintenance after the heater has cooled sufficiently and the heater is disconnected from the electric power.

WARNING! Fire and Explosion Hazard

- Burner produces sparks and flame and unit becomes hot during use. Hot surfaces can ignite fuel vapors.
- Keep away from flammable vapors, such as those from gasoline, paint thinner or solvents.
- Keep all flammable material away from the heater, including combustible dusts, such as coal dust or sawdust.
- Keep unit at least 8 ft. (2 m) away from any combustible material.
- Diesel fuel is flammable and can be explosive.
- Do not smoke while operating, servicing, or refueling the Dragon.
- Before refueling, turn the unit off, allow it to cool, and then unplug.

WARNING! Electric Shock Hazard

- Unit must be grounded. Use only with 3-hole grounded outlet.
- Never modify plug or use an adaptor. If an extension cord is needed, it must have a three-prong grounding plug and be rated for outdoor use.
- Never operate the Dragon in pooled or standing water. If electrical components become wet, allow them to dry before using.

OVERVIEW

Introduction

The Dragon Mobile Furnace is an indirect fired heater. This design keeps combustion air separate from heated air and allows the Dragon to heat air without adding any moisture, fumes or smoke. An electric fan directs heated air into the structure through ducting. The remote thermostat automatically cycles the Dragon on and off to maintain a preset temperature in the target area.

Principles of Use

The clean, dry heat from the Dragon helps reduce drying times while maintaining stable and comfortable temperatures. The Dragon is ideal for wide range of applications, including

- water damage restoration
- new construction drying
- unheated jobsites
- temporary event shelters
- workshops, storage rooms, and warehouses
- greenhouses and polyurethane tunnels for agriculture
- any situation calling for clean, dry temporary heat

For use in water damage restoration and new construction drying, the Dragon can increase drying efficiency. The added heat from the Dragon will increase the rate of evaporation by decreasing the relative humidity of the affected area. Raising the temperature of a drying area with the Dragon from 60° to 70°F can increase the evaporative potential of your existing drying system up to 45 percent.

For best results when using the Dragon for restoration, you should understand the basic principles of structural drying. You can learn these skills in an IICRC-certified Applied Structural Drying (ASD) course. To learn more about ASD courses, contact the Dri-Eaz Education Department at 800-932-3030.

Electrical requirements

The Dragon Mobile Furnace is designed to operate on a 115V/60 Hz electrical connection. The unit requires 10 amps. Make sure that the electrical outlet is a three prong type grounded outlet. When using with an extension cord, use only a grounded cord intended for outdoor use and rated to deliver enough power to the Dragon.

Run time and fuel type

The Dragon Mobile Furnace can operate for approximately 13.5 hours on the built-in tank, depending on conditions. Use of the the external fuel pickup can extend continuous operation up to 72 hours.

NOTE: The fuel lines must be adapted for use with the external fuel pickup. See “Modifiying the Dragon for use with the Fuel Pickup,” p. 7, for instructions.

The Dragon is designed to operate on no. 2 diesel. In cold weather, you may add kerosene to the diesel as described under “Cold temperature recommendations,” below.

WARNING: Failure to use diesel fuel or a diesel-kerosene mixture as specified could cause injury and permanent damage to the unit. It may also void the Dri-Eaz warranty.

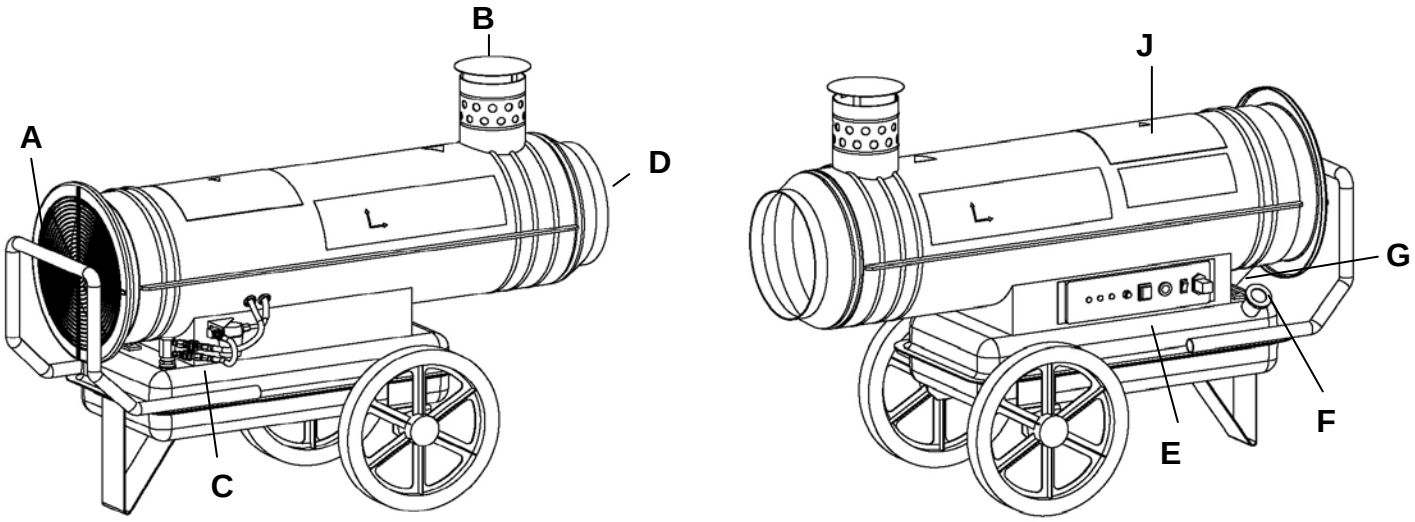
For best results, purchase fresh fuel from a reliable fuel oil distributor. Keep the Dragon fuel tank full to help prevent the formation of condensation inside the tank. When not using the Dragon for extended periods of time, consider the addition of a diesel fuel stabilizer to the fuel, available at most automobile parts stores.

Cold temperature recommendations

In temperatures below 23°F (−5°C), diesel tends to thicken and may block the fuel filters. To improve fuel flow characteristics in cold temperatures, a mixture containing up to 15% kerosene may be used. The Dragon may be operated with higher percentages of kerosene up to 100% kerosene, but may require special adjustments. Contact Dri-Eaz Service at 800-932-3030 for instructions.

To adjust for proper combustion and for use at high altitudes, see “Adjusting for Altitude,” p. 5.

Figure 1: Parts Identification



KEY

A. Air intake
B. Furnace exhaust flue
C. Fuel filter and fuel line connectors
D. Heated air outlet with 12 in. duct mounting ring
E. Control Panel
F. Fuel fill and cap
G. Fuel level indicator
H. Fuel tank drain plug (not shown)
J. Heater access panel

OPERATING THE DRAGON

Before First Use

Some assembly is required before using the Dragon. See “Assembly Instructions,” p. 8.

Use of the Dragon with an external fuel tank (sold separately) can significantly extend the run time. Converting the Dragon for use with an external tank requires a one-time modification of the external fuel line connections. See “Modifying the Dragon for use with the External Fuel Pick-up,” p. 7 for instructions.

Choosing a location

WARNING! Use the Dragon outdoors only. Place the unit on a level, stable surface. Be sure to chock the trailer wheels securely to prevent the unit from rolling. Choose a location away from high-traffic areas, children and pets, and ensure there are no obstructions to the air intake.

CAUTION: Keep air intake vents clean and clear of any obstruction. Avoid setting up unit in a location where the intake could be blocked or restricted. Blocking the air intake will cause the unit to produce sooty exhaust, potentially damaging the unit and the structure being heated.

NOTICE: Install and operate the Dragon in accordance with all local and regional regulations. In Canada, refer to CSA B139 and CSA B140-1962.

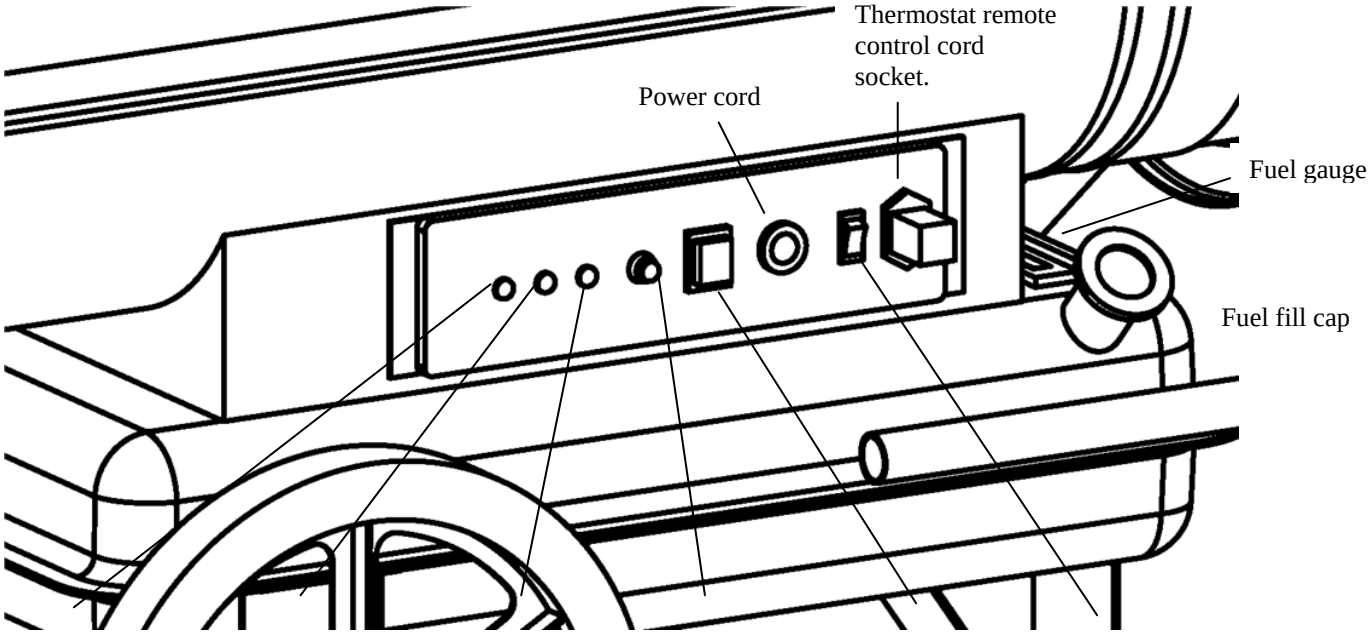
Fill the fuel tank

The Dragon is shipped with the fuel tank empty. Before operating, fill the tank with no. 2 diesel or fuel oil. In cold conditions, a diesel-kerosene mixture as described on p. 2 may be used. The tank has a 13.5 gal. (51 L) maximum capacity. Do not overfill.

CAUTION: Do not put gasoline, motor oil, or any other product in the fuel tank.

CAUTION: Do not fill the tank while the unit is operating.

Figure 2: Dragon Controls



FAILURE	OVERHEAT	WORKING	RESET	POWER	START
Red light indicates system fault. See Troubleshooting, p. 7.	Amber light indicates an excessive internal temp. Fan will run until unit is cool. See Trouble-shooting, p. 7.	Green light indicates normal operation. See Troubleshooting, p. 7.	Press to restart after system failure.	Provides power to unit.	Press to start burner.

Attaching ducting to the Dragon

The Dragon is supplied with one 25 ft. length of 12 in. diameter (7.6 m × 30 cm) high-temperature ducting. This ducting is used to direct the heat produced by the Dragon into the structure. To attach the ducting to the Dragon, locate the end of the ducting with the sewn-in cuff and buckle. Attach the ducting to the hot air outlet (Fig. 1) and secure it with the quick-connect duct clamp.

NOTE: If the duct clamp is too tight or too loose, adjust the clamping force of the quick-connect duct clamp by turning the clamp screw with a small screwdriver.

Place the other end of the ducting into a suitable inlet in the structure. For best air flow rates avoid tight bends in the ducting.

Securing ducting to the structure

In most drying situations you will need to attach the end of the ducting to an opening in the structure such as a basement window or crawlspace vent block. Since each structure is unique, you will usually need to build an adapter to fit the specific opening.

Operating the Dragon

Inspecting before operation

WARNING! Before starting the Dragon:

- Check for any fuel leaks around the fuel tank or fuel lines.
- Check for nearby hazards like combustible materials or flammable vapor sources.
- Check the power cord for damage.

Correct these and any other safety hazards before starting the Dragon.

Starting the Dragon

1. Check the fuel tank. If needed, add diesel fuel to the fuel tank. Do not overfill. See “Fuel Type,” p. 2, for recommended fuels.
2. With the ducting secured to the hot air outlet, plug the power cord into a suitable 115V outlet.
3. If you are using the remote thermostat, place the thermostat sensor in the target area. See “Using the Remote Thermostat” for instructions. To prevent overheating of the drying environment, we recommend using the thermostat at all times.

4. Press the Power switch to the on position.
5. Press the Start switch to the on position.
The unit will begin operation.

CAUTION. Monitor the settings on the Dragon and conditions in the structure at least once a day during operation.

Controlling the temperature

The Dragon is supplied with a remote thermostat that can be used to control the temperature in the target area. To use the Dragon in thermostat mode, first plug the thermostat cord into the socket in the control panel (Fig. 2). Then set the desired temperature on the thermostat control for a maximum of 100°F (38°C) and place the control in the target area.

To prevent overheating of the drying environment, we recommend using the thermostat at all times.

Shutting the Dragon Off

First, switch the START button to the "Off" position. If the unit is still warm, the fan will run for approximately 1½ minutes to cool down the unit. When the fan turns off, turn the POWER to the "Off" position.

CAUTION: Do not unplug the unit or otherwise turn off the power until the fan stops operating. Failure to let the unit complete the cooling cycle could damage the heat exchanger and will not be covered under warranty.

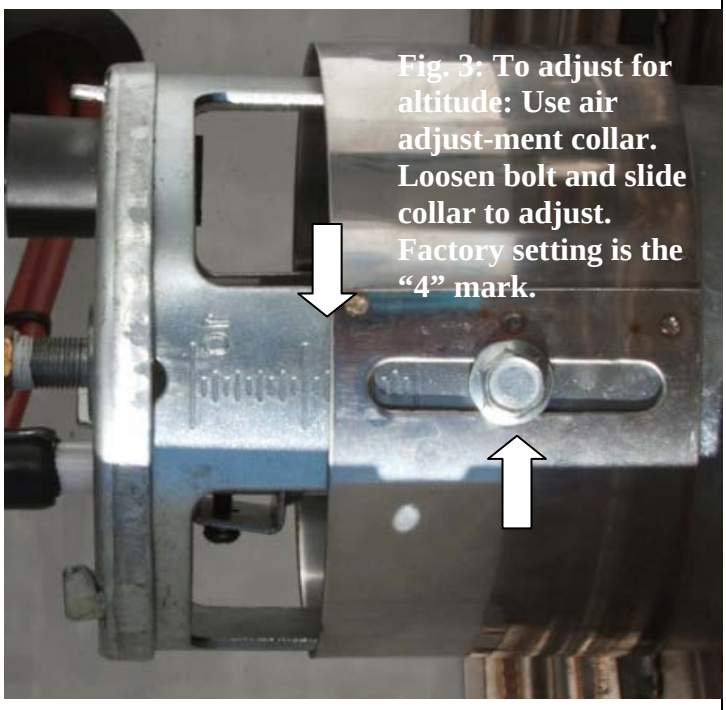


Fig. 3: To adjust for altitude: Use air adjust-ment collar. Loosen bolt and slide collar to adjust. Factory setting is the "4" mark.

Special Instructions

Adjusting for Altitude

The combustion air intake control for the furnace is factory set for operation at sea level. To assure proper operation and maximum performance at higher altitudes, it may be necessary to adjust the combustion air/fuel mixture.

The best guide to proper air/fuel mixture is exhaust color. The Dragon exhaust should always be clear. Black or white smoke indicates an improper air/fuel mixture:

a) If the exhaust is *clear*, no adjustment is needed.
b) If the smoke is *dark* or *black*, there is not enough air in the mixture.
c) If the smoke is *white*, there is too much air and not enough fuel in the mixture, or there is water in the fuel.

If the smoke color is either *black* or *white*, follow these steps to adjust the air/fuel ratio.

1. Open the access cover by removing the screws. Lift cover and set aside. The hood is hinged on one side.
2. The AIR ADJUSTMENT COLLAR is located on the burner assembly. The factory setting is 4. See Fig. 3.
3. Loosen the adjustment nut and slide the collar in the appropriate direction:
   a) A *lower* number *corrects for black smoke* (allows more air into the combustion chamber);
   b) A *higher* number *corrects for white smoke* (allows less air into the combustion chamber).
4. Tighten the shutter adjustment screw, replace the hood, secure hood with the sheet metal screws. Restart the unit and check for proper operation.

WARNING: Replace access cover to test after each adjustment. Do not operate the unit without the hood securely in place as serious injury could result.

NOTE: If the exhaust remains white even when adjusted to the 10 mark, there is probably water in the fuel. You may need to replace the fuel filter and/or clean the fuel tank (p. 6).

Always adjust the Dragon so that it produces clear exhaust.

Thermal overload protection

The remote thermostat provided with the Dragon is factory set to limit the maximum room temperature to 100°F (38°C). We recommend that you always use the thermostat, as this can help to prevent overheating of and possible damage to the drying environment.

For additional safety, the Dragon is fitted with an internal high temperature limit switch. If the heat exchanger reaches 356°F (180°C), the limit switch will shut down the Dragon and the OVERHEAT light will glow amber (Fig. 2). In this case, the burner will automatically turn off

and the fan will continue to run until the unit cools. The Dragon will not operate until the OVERHEAT light goes out and the RESET switch is pressed.

To restart the Dragon after **a thermal overload fault shutoff, press in the red RESET button** (Fig. 2). The Dragon may now be started. See "Starting the Dragon," p. 4.

If the unit will not start after pressing the RESET button, contact the Dri-Eaz Service Department at 800-932-3030 for assistance.

NOTE: The most common cause of thermal overload is restricted airflow. To help prevent thermal overload, you should

- Make ducting runs as straight and short as possible
- Keep the ducting free of debris and unobstructed
- Keep the air intake grill unobstructed

Restarting after running out of fuel

If the Dragon runs out of fuel, a fuel cutoff sensor will automatically shut the heater off and the red FAILURE light (Fig. 2) will glow. The fan may continue to cycle on and off until cooling is completed.

Refuel the Dragon, switch on POWER and press START. It may require several tries until sufficient fuel is drawn through the fuel line.

Tip: If the unit will not restart after several attempts, contact Dri-Eaz Service at 800-932-3030.

NOTICE: You should continue to physically check the Dragon at least once a day during operation. Observe the exhaust smoke to ensure that it is clear. If the exhaust is not clear, see "Adjusting for proper combustion," p. 5, for instructions.

NOTICE: Always use clean, fresh fuel and a trusted fuel source to help prevent problems with fuel contamination. Be sure to replace the fuel tank cap to prevent moisture and other contaminants from getting into the fuel.

MAINTENANCE

Recommended Maintenance Intervals

NOTICE: Always turn unit off and unplug before performing any maintenance.

The following maintenance tasks should be performed once a year.

1. Cleaning the fuel tank.

The fuel tank should be cleaned once a year. To clean the tank, follow these steps:

a. Place an appropriate container beneath the fuel drain plug to catch any fuel.
b. Remove the fuel drain plug with a wrench.
c. Allow the tank to drain completely.
d. Replace the fuel drain plug.
e. Dispose of waste fuel in accordance with local regulations.

WARNING! Diesel **fuel and diesel/kerosene mixtures are flammable and potentially explosive. Always turn off and unplug the Dragon before draining the fuel tank. Do not smoke while draining fuel. Keep away from open flame.**

2. Replace the fuel filter

Replace the fuel filter once a year. Replacement fuel filters may be purchased from Dri-Eaz, 800-932-3030. The filter is a spin-on type and is located inside the right side cabinet behind the control panel. Have rags or paper towels on hand to clean up any spills, and dispose of the filter and waste fuel according to local regulations.

3. Servicing the burner.

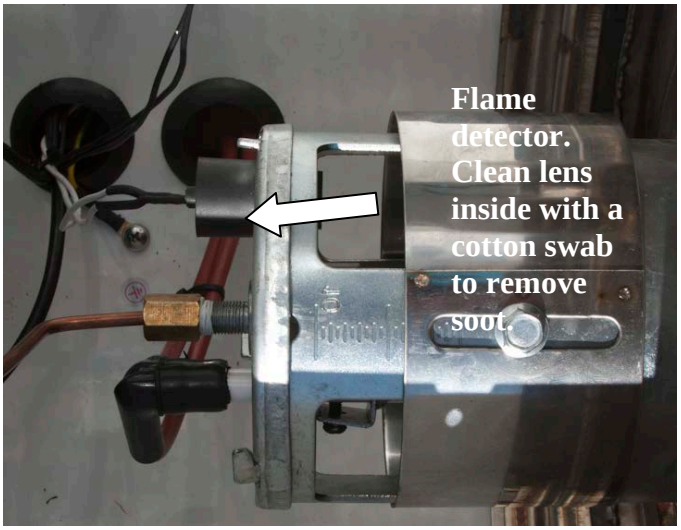
To ensure proper operation, service of the burner should be conducted by a qualified HVAC technician once a year or at the beginning of the heating season in your area.

4. Servicing the heat exchanger

In time, soot may accumulate in the the heat exchanger. To ensure proper operation, this component should be inspected once a year and cleaned if necessary by a qualified HVAC technician. Contact your local distributor or the Dri-Eaz Service Department at 800-932-3030 for the location of a service center near you.

5. Cleaning the flame detector

The burner is equipped with a flame detector designed to ensure the burner is operating properly. In time, this sensor can become obscured by accumulated soot deposits and will no longer operate properly. When this happens, the unit will produce a FAILURE red light and turn itself off. To clean the sensor, remove the cover, and carefully work the rubber sensor boot free from the burner. The sensor lens may be cleaned with a cotton swab. Replace the sensor boot and the cover.



6. Clean fuel tank interior
In time, moisture, debris and other impurities may accumulate in the on-board fuel tank. If these are not removed, they can be drawn up into the burner and damage the unit. To clean the tank, follow these steps. 1) Place a drain pan under the fuel drain plug. Remove the plug and allow the contents to drain out. 2) Replace the fuel drain plug and add a quart of kerosene to the tank. Tilt unit back and forth a few times to help dissolve and suspend any debris that may have accumulated on the bottom of the tank. Drain out the kerosene and replace the cap. The unit may now be refueled.

Dispose of contaminated fuel according to state and local regulations.

7. Cleaning the external housing
To clean the exterior of the Dragon housing, use a cleaner with a degreasing agent such as ProRestore's Degrease-All (ProRestore part no. 161252000).

Service

For parts and service call your local distributor or the Dri-Eaz Service Department at 800-932-3030 or 360-757-7776. Copies of the Dragon manual and related information are available at *www.Dri-Eaz.com.* Go to *warranty.Dri-Eaz.com* to register your purchase.

SPECIFICATIONS

Model	Dragon Mobile Furnace F507
Dimensions (W × H × L)	23 × 40 × 55 in. 58 × 102 ×140 cm
Use weight	142 lb. | 64 kg dry 241 lb. | 109 kg full tank
Power	115V, 60 Hz, 5.3 amps
Fuel consumption	1.2 gal/hr | 4.5 L/hr
Fuel type	Diesel fuel oil #2 Kerosene
Fuel tank capacity (on-board)	13.5 gal. | 51.1 L
Rated heat output	130,000 BTU/hr
Process air output	900 CFM | 1530 CMH
Temp. Increase	+144°F | +80°C
Ducting	12 in. × 25 ft. 30 cm × 7.6 m

Specifications are subject to change without notice. Some values may be approximate.

Accessories Included

1 25 ft. section of 12 in. (7.6 m × 30 cm) high-temperature ducting. One end is fitted with a cuff and integrated belt and buckle.
1 Remote thermostat with 40 ft. (12 m) extension cord.
1 Owner's Manual (07-01810A)
1 Pickup fuel line assembly with threaded tank fitting (external tank not included)
1 Fuel line conversion kit

SYSTEM INDICATOR TROUBLESHOOTING

INDICATOR	ISSUE	SOLUTION
FAILURE red light	Flame detector fault. Fuel depleted. Fuel filter full. Air in fuel lines at startup.	Clean flame detector. See p. 6. Refuel. Replace fuel filter. See p. 6. Wait 15 seconds and repeat starting sequence. See p. 4.
OVERHEAT amber light	Unit has overheated. Burner is off. Fan may be operating.	Ensure adequate airflow through unit. Ensure ducting is not kinked or collapsed. Ensure ducting does not exceed 25 ft. (7.6 m) in length. NOTE: Fan will continue to run until unit is cool.
WORKING green light	Normal operation.	Unit is operating normally. No action is required.

If the solutions described here do not resolve the problem or the issue you are experiencing is not listed here, call your local distributor or contact our Service Department toll-free at 800-932-3030 for further assistance.

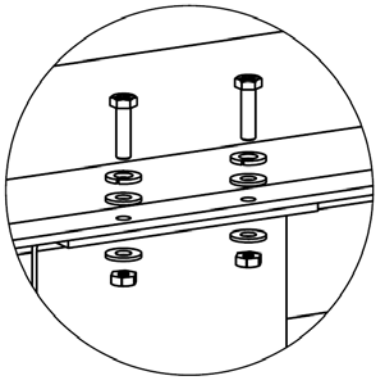
BEFORE FIRST USE: Assembly Instructions

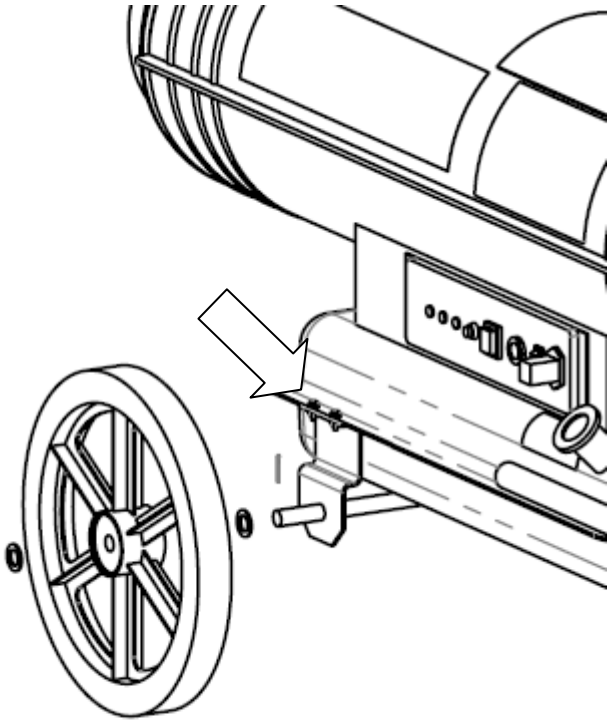
The Dragon requires some assembly before use. Follow these instructions.

Tools and supplies required:

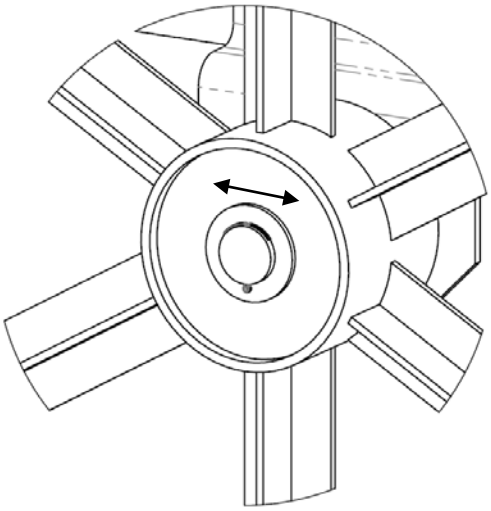
Wrenches

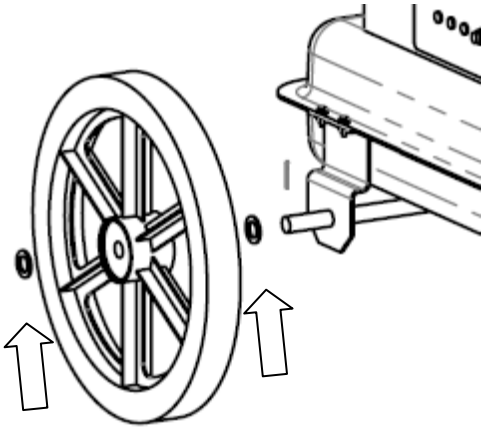
Wheel base, axle, and wheel installation.
Attach the wheel base assembly to both sides of the tank using the fasteners provided.



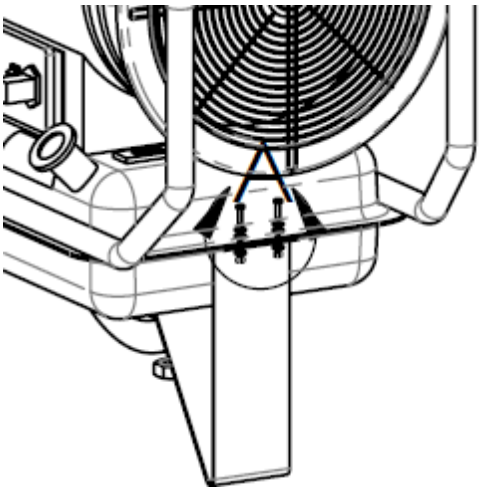


Install both wheels. Place a washer on either side of the wheel hub and secure the wheel with the cotter pin. Bend tips of cotter pin around axle as shown below to secure it the wheel. Follow this procedure for both wheels.

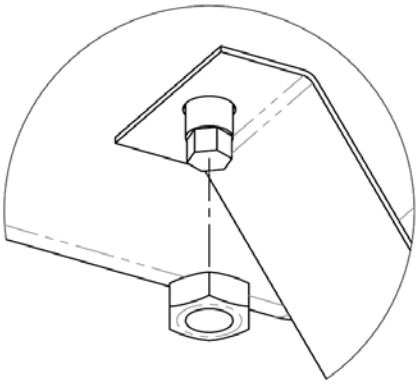


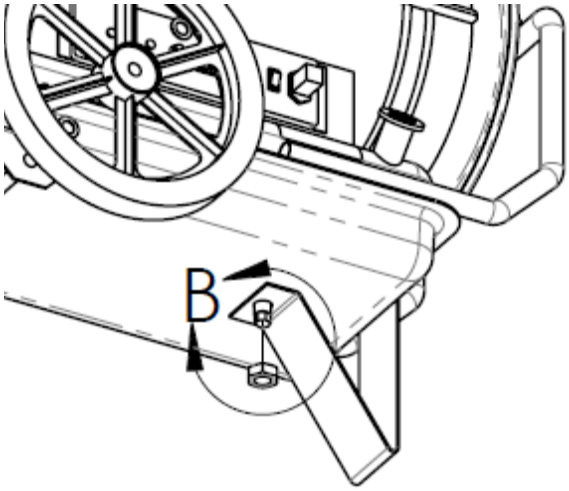


Install rear stand. First, attach top of stand to the back edge of the tank using the fasteners provided.



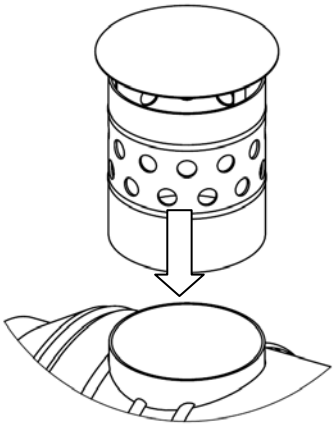
Secure the front of the stand over the fuel drain plug with the nut provided.

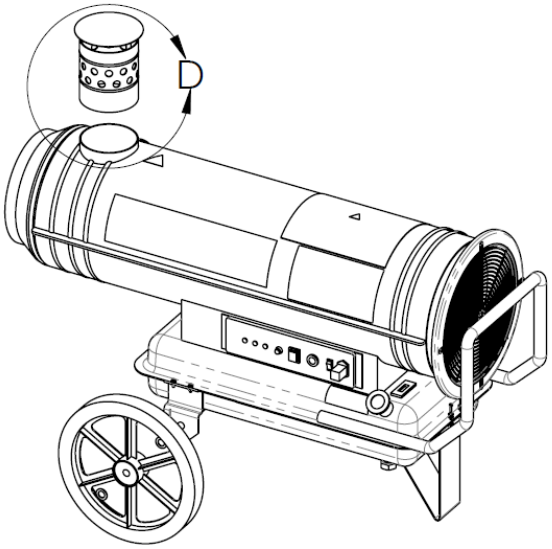




Exhaust flue installation

Slide flue down over exhaust flange as shown.





Ensure all fasteners are properly tightened and secure. The Dragon is now ready for use.

Modifying the Dragon for use with the External Fuel Pick-up

Use of the Dragon with the external fuel pickup provided can significantly extend the run time. Converting the Dragon for use with the pickup requires a one-time modification of the external fuel line connections. Follow these instructions carefully.

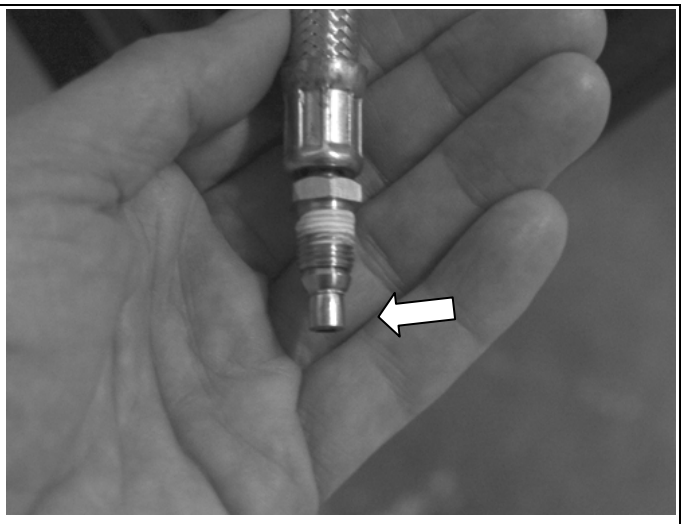
Tools and supplies required:

- Wrenches
- Small tube cutter
- Rags or paper towels
- Pipe thread sealant or Teflon® tape

Dissassembly and preparing fittings

1. Remove fuel lines from fuel tank fitting.
2. Re-route return line outside of fuel filter bracket
3. Remove the existing fuel tank fitting from the tank. Slide fitting off of fuel pickup tube and discard fitting.
4. Using a tube cutter, cut off metal pickup tube approximately ½ in. below the brass compression sleeve as shown.
5. Disconnect the fuel pick-up line from the filter adapter.
6. Disconnect the filter adapter from the filter (filter may hang free at this point).
7. Retain the filter adapter for later use.

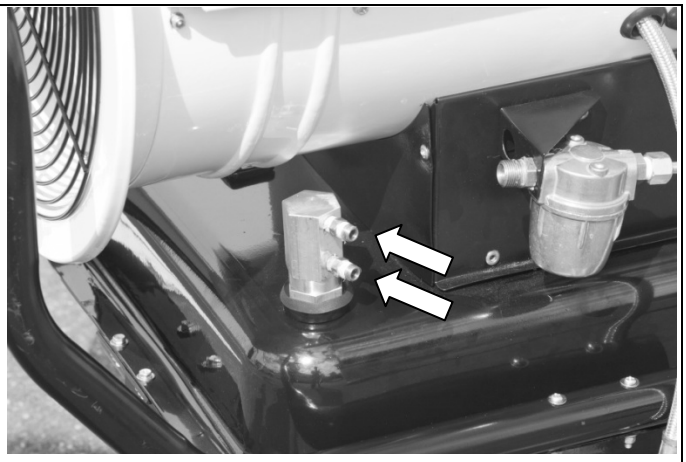
Prepare threaded fittings. To ensure a proper seal, use a liquid thread sealant or Teflon tape on all pipe thread fittings. Leave the first two threads dry in order to ensure a tight seal.



Attach new fuel tank pickup assembly to tank using supplied grommet and jam nut. Orient the assembly as shown in the next frame, and use the jam nut to hold the assembly in place. Ensure that the assembly is tightened firmly over the foam seal.

Modifying fuel tank attachment fittings

Attach the two nipples to the hexagonal fuel tank fitting

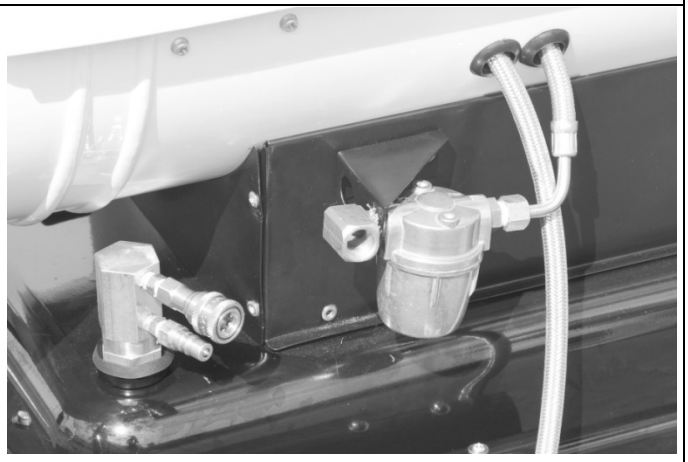


Attach a quick-disconnect socket to the top nipple.
Attach a quick-disconnect plug to the bottom nipple.

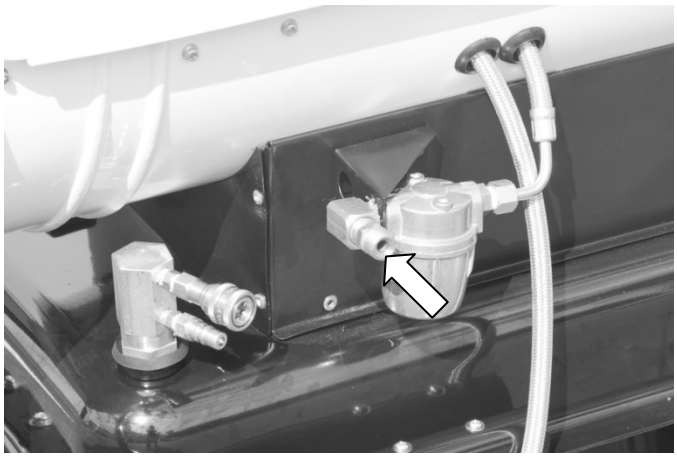
Attach an adapter to each of the fuel line ends and tighten. Ensure that the compression fittings have bottomed out inside the adapter.

Attach a quick-disconnect plug to the adapter on the end of the return line. Attach a quick-disconnect socket to the adapter on the end of the fuel pick-up line.

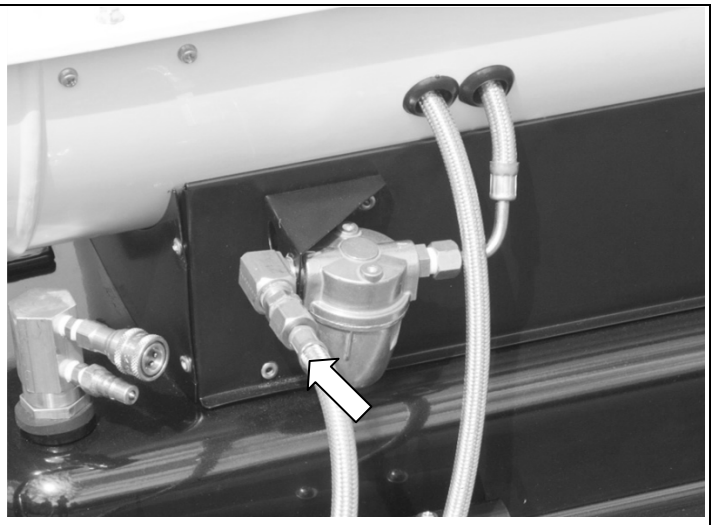
Attach a 90° fitting thru the filter bracket into the filter. Rotate the fitting so that it points directly out from the heater as shown:



Attach the filter adapter (removed in the first step) to the 90° fitting.



Reattach the fuel pick-up line to the filter adapter, ensuring that the compression fitting is bottomed out inside the adapter.



Connect the quick-disconnect socket and plug ends together.

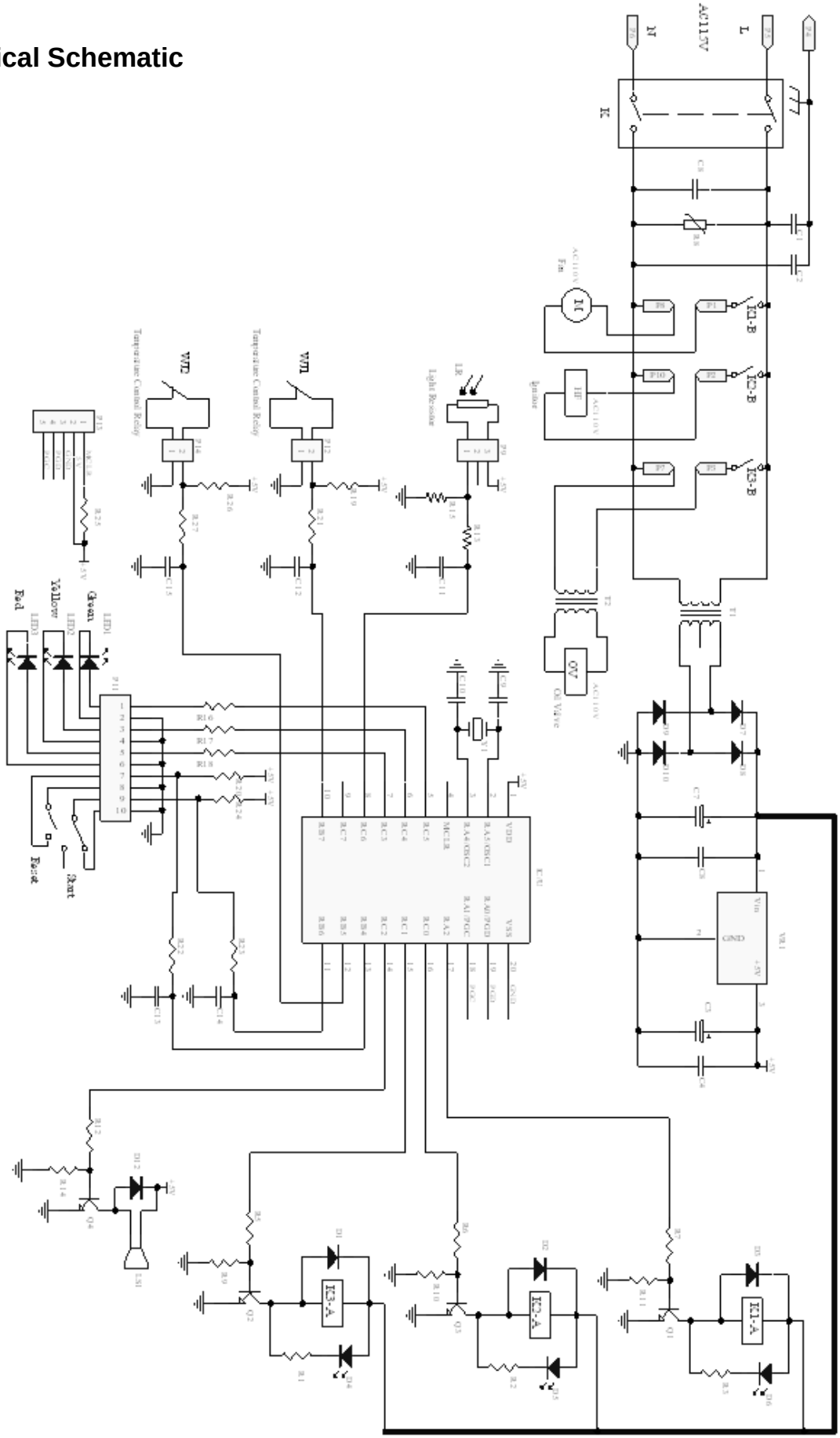
External fuel tank pickup setup.
The pickup fuel line assembly (provided) must be installed in an external fuel tank (not supplied) before use.

1. Remove the pickup tank cover.
2. Screw in the pickup tank cover/hose assembly and tighten.

The conversion is now complete.

To use the unit with the fuel pickup, simply disconnect the two fuel lines from the onboard tank and attach them to the pickup fuel lines.

Fig. 4: Electrical Schematic



PURCHASE / COMPRA / ACHAT

Purchase date / Fecha de compra / Date d'achat : _____

Serial number / Número de serie / Numéro de série : _____

Distributor / Distribuidor / Distributeur : _____ Tel. / Tel. / Tél. : _____

MAINTENANCE / MANTENIMIENTO / MAINTENANCE

DATE FECHA DATE	SERVICE PERFORMED SERVICIO PROPORCIONADO MAINTENANCE EFFECTUÉE	PERFORMED BY PROPORCIONADO POR EFFECTUÉE PAR