



Waste Oil Fired Burner

Installation, operation and service instructions
120v Manual

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IMPORTANT INFORMATION

Waste oil contains various unknown materials and may also contain random amounts of gasoline or other volatile fuels. Specific safety and handling precautions should be considered when cleaning, maintaining and operating waste oil heaters.

It is recommended to use a filter or some kind of strainer when pouring waste oils into the storage tank(s). This will increase chances of catching any particulates prior to the pump filter(s) to insure a cleaner fuel source.

WARNING:

Waste oil heaters should not be used in any hazardous areas that may contain flammable or volatile vapors or even combustible dusts. It is not recommended to use a waste oil heater in any areas that may have chlorinated or similar chemical vapors. This will cause deterioration & corrosion of the metals the equipment is constructed of (this would void the warranty). Antifreeze does not burn and will interrupt the performance of the unit and potentially shut down completely until re-primed and restarted. If too much antifreeze is present just like water, the unit will not fire. Do not expose units to water, moisture or rain. This is an inside unit, not designed for outdoor use.

Oils and different Viscosities that can be burnt, but not limited to:

*Used Motor Oils *Transmission Fluid *Hydraulic Fluids *Diesel Fuels

Do not use old contaminated oils or fuels and keep in mind underground tanks and outdoor oil storage could have unknown amounts of water and moisture, outside barrels will leak water and moistures through the bung hole.

IMPORTANT:

The instructions and information within this manual are provided to remind you of any warnings and to assure you have properly and successfully setup the equipment purchased. The information is also intended to help the end user/installer be aware of the operations and service required for optimal performance. These heaters are recommended for primary or an auxiliary source of heat but are not recommended for use as the sole source of heat in case of any expected or unexpected downtime with the unit. If a steady supply of fuel is not present or interrupted at the burner unit, the burner unit will shut down. Be prepared with an alternate source of heat to insure the building and all pipes are not at risk of freezing temperatures.

Taking Delivery of Equipment:

When taking delivery of your equipment, please be sure to check the shipment for any potential damages (MorrHeat is not responsible for any damaged shipments if signed for non-damaged). If any damage is identified upon delivery, either sign for as damaged goods specifically noting in detail the apparent damage / or / refuse the shipment completely and be sure to file a claim with the shipping company **immediately** regardless of the damage.

NOTICE

To insure the best performance, optimal efficiencies and heat output of the heating unit, it is recommended and necessary to become familiar with your unit and the procedures needed with initially starting, running, cleaning and maintaining the heating unit.

It is important to remember when burning used or dirty oils that contaminants could be present. Because of various contaminants, be aware of needing to change filters when needed. Keep the chamber and heat exchanger(s) passageways clean. Make sure the fuel pump is primed and lines are free of any debris, air bubbles or interruptions.

Draft is just as important as the rest; bad draft can cause serious problems and not allow the gasses within the unit to correctly leave the heating unit. Correct draft is needed for optimal performance. Bad draft will cause over-fire or overheating due to bottling up the heat or creating back pressure back in to the heating unit. If black smoke is present, bad draft, bad combustion or both is occurring.

Burner & Pump Specifications

BURNER ASSEMBLY

Performance Ratings

Voltage	–	120v
Cycles	–	60Hz
Total Operating Amperage (Burner Only)	Amp	8.4
Total Operating Amperage (Burner & Oil Pump)	Amp	10.5
Electrical Operating Consumption (Burner Only)	Watts	970
Electrical Operating Consumption (Burner & Oil Pump)	Watts	1,212
Weight	Lbs	36.5
Oil Primary	Amp	0.2
Oil Valve	Amp	0.075
Pre-Heater Block	Amp	4.2
Pre-Heater Controller Board	Amp	0.011
Igniter Transformer	Amp	0.3
Burner Motor	Amp	3.6

PUMP ASSEMBLY

Performance Ratings

Voltage	–	120v
Cycles	–	60Hz
Total Operating Amperage (Pump Assy Only)	Amps	2.1
Electrical Operating Consumption (Pump Assy Only)	Watts	241.5
Weight	Lbs	16
Oil Valve	Amps	0.075
Pump Motor	Amps	2.0

VENTING INSTALLATION

1. When installing the vent pipe, be sure all connections are fastened correctly to insure no leaks and proper draft is achieved. Minimum draft through the unit is, $-.02$ – with draft meter. Draft up the stack must be $-.04$ to $-.06$ inches of water column when checking a draft meter for proper draft readings.
2. If proper or desired draft isn't easily achieved, a third party draft inducer or power vent may be needed to prevent back draft from occurring (not provided).
3. Install a barometric damper (NOT included) in the stack only if the draft up the stack exceeds $-.08$. Draft up the stack must be $-.04$ to $-.06$ inches of water column. Check with draft meter between the top of the heater and damper. The draft should be a minimum of $-.02$ – checked through flame inspection port.
4. Keep the draft moving. If draft is too slow or bottles up, this could create a back draft and over-fire or over heat the unit. If a damper is present, losing the damper will increase draft make sure passageways are clean and clear.

FUEL SUPPLY LINES

- Use only 3/8" ID copper tubing with flare fittings from the tank to the fuel pump assembly and the fuel pump assembly to the heating unit. Ferrule fittings are not recommended and Teflon tape is not needed. Using a Teflon tape or liquids that dry on the threads increases the potential of creating a piece or flake of the material that could block passageways.
- Always keep the fuel suction line at least six to eight inches (6" – 8") from the bottom of the oil storage tank to prevent sucking water and sludge from the bottom of the tank. Drain water and sludge from the bottom of the storage tank when needed.
- It is recommended to use an inside supply tank vs. an outside or underground tank. If pulling from an underground tank it is possible a secondary transfer pump would be needed (Not Provided). Outside storage tanks or barrels can have water mixed in with the fuel supply. This will create issues (Not Recommended).
- The fuel pump assembly that comes standard with every unit needs to be mounted at tank level or below. Setting the fuel pump assembly at ground level will function properly. The fuel pump will push oil up to 100ft horizontal & up to 25 ft vertical.

- Be sure when priming or bleeding the fuel pump that you allow enough time to completely burp any and all air within the system out of the fuel pump and fuel lines. If any skips or slight interruptions are still present in the system, it is likely the unit will not properly ignite or run without a steady and consistent fuel supply. The flame sensor needs to recognize flame in the chamber or it will not ignite.
- It is necessary to connect the 3/8" ID copper fuel line from the storage tank to the filter housing, to the fuel pump inlet that is located on the same side as the bleeder valve. Once connections are secure, continue the fuel line from the fuel pump assembly to the burner assembly.

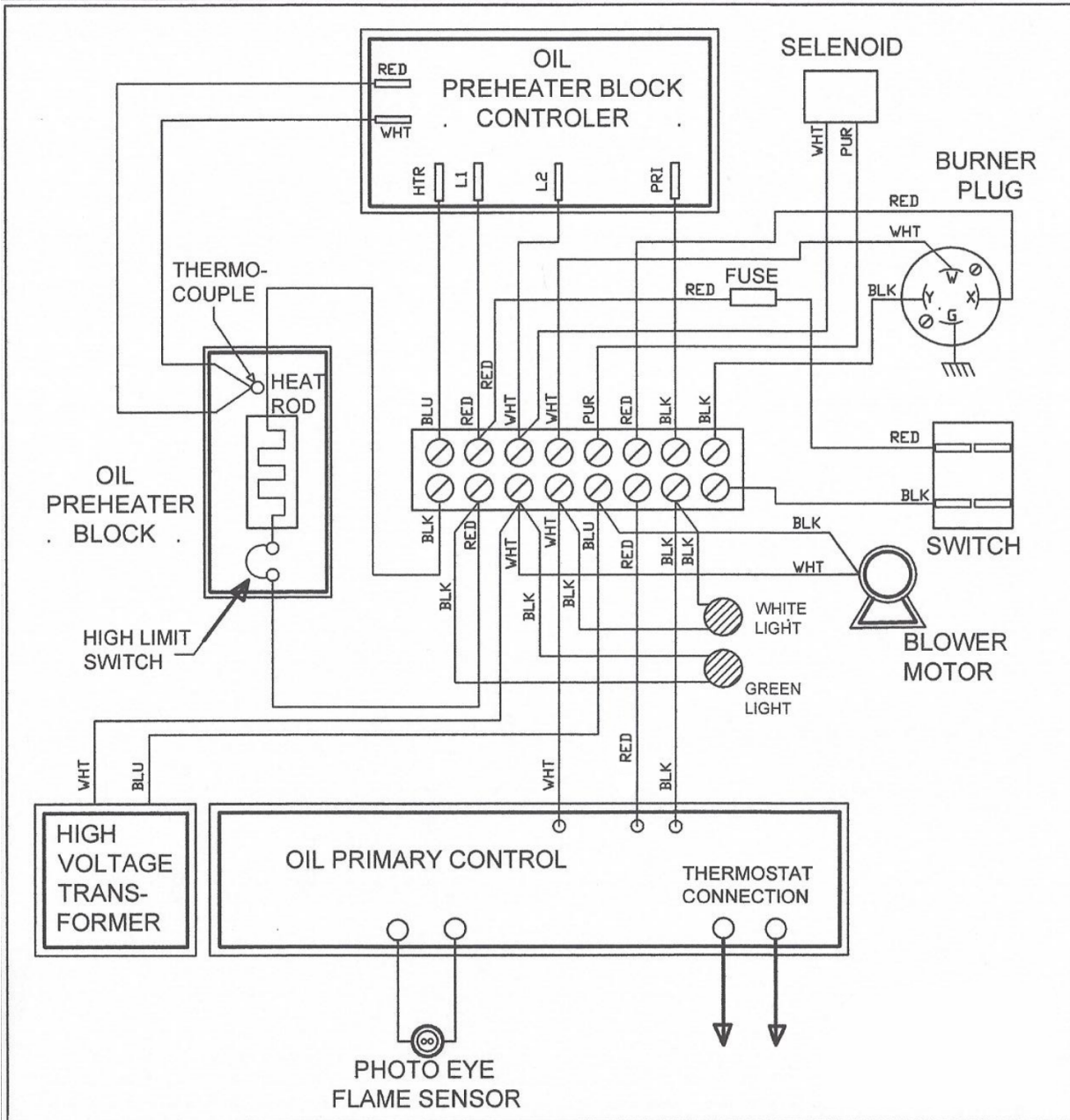
WIRING

- You will need to wire 120v with separate 20 amp circuit protection using 12-gauge wire.
- Make sure to connect the power line to the black wire and all white wires which are neutral or common together. It's very important that the ground wire gets connected to a mounting point within the main junction box or at least grounded.
- Wires from the main junction box need to be connected to the fuel pump assembly power. Yellow connects to yellow and the neutral or common connect together, which is white to white.
- The low voltage thermostat needs to be wired to the "T" terminals on the oil primary, located on the top of the burner assembly. (wire diagram pg. 8)

NOTICE

Installation and use of this product shall be in accordance with the standard for oil burning equipment ANSI/NFPA 31-2016 along with the national electric code ANSI/NFPA 70-2017, the requirements of the inspection authorities having jurisdiction.

120v Schematic



Oil Burner Technology

MorrHeat's waste oil burner technology improves the efficiency of the oil burn process by continuously burning the waste oil with no interruptions.

The waste oil enters into the Oil Pre-Heater Block and is pre-heated to a specific temperature setpoint. Then compressed air from the air compressor is infused with the oil prior to spraying out the nozzle by breaking up the oil particles into a finer mist or spray. The electrodes mounted above the nozzle provide an electrical arc across the electrodes to ignite the fine oil mist as it sprays out of the nozzle. Once ignited the flame is forced into a vortex caused by the burners blower and flame cone providing a very efficient and thorough burn. **[See pg 10-11 Parts & Component]**



Oil Burner Components



- Igniter Transformer: Supplies high voltage to the electrodes generating electrical arc igniting the oil. Transfers the high voltage from the igniter transformer to the electrodes.



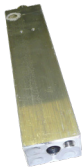
- Solenoid Oil Valve: Opens when burner is running and closes when burner is not running eliminating bleed back of oil out of the Pre-heater block.



- Air Band: Adjusts amount of air introduced into the combustion chamber. Air band is adjusted at the factory for optimum performance, closed to 1" inch open.



- Oil Primary Control: Controls the oil burner ignition. Checks for flame in the combustion chamber, if no flame is detected within 45 seconds, the oil primary will shutdown the oil burner. To restart the unit, reset the red button on the oil primary. Hard lock-out may require holding the reset for 30-45 secs.



- Oil Pre-Heater Block: Pre-heats the oil and air before entering combustion chamber.



- Photo Eye: Senses flame in combustion chamber and signals oil primary when no flame is present, to shut down or lock-out the system from operating.



- Air Pressure Gauge: Displays air pressure supplied by onboard air compressor. (8-14 PSI depending on unit)



- Air Muffler/Filter: Filters air and quiets the sound generated by the compressor.



- Pre-Heater Control Circuit Board: Controls temperature of the Oil Pre-Heater Block and controls safety feature of not allowing burner to energize until oil has established operating temperature setpoint or shutdown burner if Pre-Heater Block temperature falls below shutdown temperature setpoint.



- Electrodes: Provides continuous high voltage electrical arc from electrode to electrode igniting the waste oil as it is being sprayed out of the nozzle.



- Nozzle: Low-pressure nozzle. (3 pc. and cleanable)



- Flame Cone: Flame cone forces the flame into a swirl pattern improving the flame for a complete burn.



- Burner Motor: Multitask motor turns the burner blower and integrated air creates combustion and atomization air at the same time.



- Air Pressure Adjuster: Adjusts the air pressure going to the pre-heater block. Should be adjusted between 8 PSI and 14 PSI as indicated on the Air Pressure Gauge.



- Oil Filter With Housing: The fuel filter with housing allows an easy spin on/off feature making it simple when changing filters. Pre-filters the oil prior to the burner.



- Suntec/Webster Fuel Pump: Single stage fuel pump will push the waste oil 25 ft. vertical, and 100 ft. horizontal. (Always run fuel lines up to the burner, never down, or you could create an air pocket in the system – Hard to Bleed)



- Power Indicator: Indicates when power is present at the burner.



- Run Indicator: Indicates that the burner is ready for operation after the initial pre-heat, this process could take 3–4 minutes to pre-heat the system.

Initial Start Procedure

1. Make sure the heating unit and all components have been properly and securely installed.
2. Check that all electrical connections and hook-ups are properly wired and connected.
3. It is recommended prior to priming the fuel pump and bleeding the air to pre-fill the fuel filter to help speed up the process. For a secondary check you can always pressurize the fuel lines to eliminate any potential leaks in the line or fittings. Consistent fuel supply to the burner is very important.
4. Check that venting connections are properly installed and connected from the heating unit.
5. While first starting the unit it may take several minutes to get the oil in the pre heater block up to temperature. Once the oil reaches the desired temperature, oil is then supplied through the fuel pump assembly and burner assembly. Make sure burner and pump are turned on.
6. Optimal draft when running the unit is another very important part of the process. Be sure desired draft is achieved while burner is running. If exhaust fans are present in the building, it is possible you will need a draft inducer or power vent of some kind (not provided).
7. Thermostat must be off while supplying power to the burner assembly.
8. After the oil in the pre heater block has hit the desired temperature, while the burner is running, briefly jump the "F" terminals on the oil primary to allow the burner to run during the fuel pump and priming procedure.
9. After bleeding the fuel pump and flame is established at the burner assembly, remove the temporary jumpers on the "F" terminals on the oil primary control. This allows the safety features of the controls to operate properly.
10. Adjust air pressure to 8-14psi if needed.(can vary due to geographic area) (pre set from manufacturer)
11. Air band on the side of the burner assembly should be closed to 1" open (pre set from manufacturer) Open too far can cause delayed start or no fire.
13. After properly running and all minor adjustments, if any, are made (pre set from manufacturer) Check inspection port for bright yellow not orange flame.
14. Flame should be halfway or less down the chamber.
15. Use adjustment screw on the air compressor to achieve proper air (8-14 psi)
16. Contact installer or manufacturer for fuel pump adjustment if needed

DO NOT START HEATER WHEN DELAYED START HAS OCCURRED AND CHAMBER / HEAT EXCHANGERS ARE HOT, LET UNIT COOL BEFORE ATTEMPTING ANOTHER RESTART & CHECK FOR ACCESSIVE OIL IN THE CHAMBER PRIOR TO RESTART. TOO MUCH OIL IN THE CHAMBER UPON RESTART CAN CAUSE A BACKFIRE IN THE COMBUSTION CHAMBER. IF TOO MUCH OIL IS PRESENT, IT IS RECOMMENDED TO CLEAN OR WIPE UP AS MUCH AS POSSIBLE BEFORE A RESTART TO AVOID THIS FROM HAPPENING.

SUGGESTED MAINTENANCE

IT IS RECOMMENDED THAT YOUR FACILITY GETS ON A REGULAR MAINTENANCE SCHEDULE AND OR SET REMINDERS OF CLEANING AND MAINTENANCE OF THE HEATING UNIT, TANK, OIL FILTER, AIR FILTERS AND ALL OTHER WORKING COMPOENTS AND CONSUMABLES THAT MAY NEED ATTENTION OR REPLACED BEFORE OR DURING SEASON.

Make sure the unit is clean prior to every heating season

HIGHLY RECOMMENDED TO TURN POWER OFF OR UNPLUG THE BURNER UNIT WHEN CONDUCTING CLEANING AND MAINTENANCE

Monthly:

- Check the ash build up periodically for optimal performance
- Remove all ash when cleaning the combustion chamber and heat exchangers. The viscosity and oil's being burnt, cleanliness of the oil and run time play a factor when determining a maintenance schedule. Every end user will have a little different schedule with all factors considered for every location and application.
- Check or change oil filter
- Check or change air filters
- Clean flame cone if needed

Twice Per Season:

- Clean or change fuel pump filter. Fuel pump cover comes off to access filter, gasket inside may also need to be replaced.
- Inspect, adjust or replace electrodes if needed (See part description for desired setting)
- Drain excess water and sludge from fuel storage tank(s)

Once Per Season:

- Remove ash build up within the vent pipe
- Replace nozzle if needed (will erode over time). When replacing make sure the nozzle sticks slightly past the end cone (1/4" past inside radius of flame cone) to insure no buildup of oil occurs at the nozzle and flame cone.
- Check the vanes and carbon plates for any chips, cracks or wear within the onboard air compressor, replace vanes and carbon plates if needed.

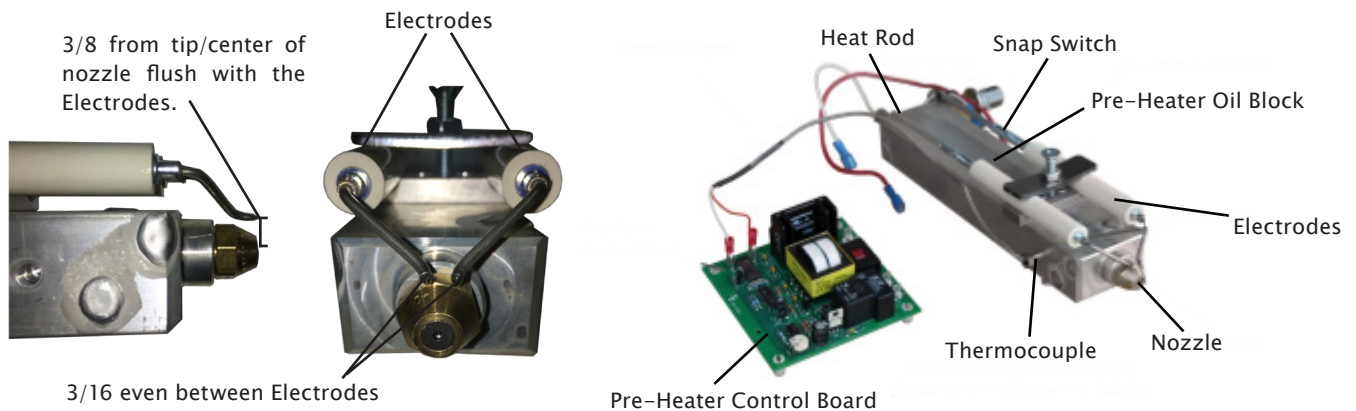
The cleaner the unit, the better it performs and longer it lasts!

NOZZLE ASSEMBLY REFERENCE

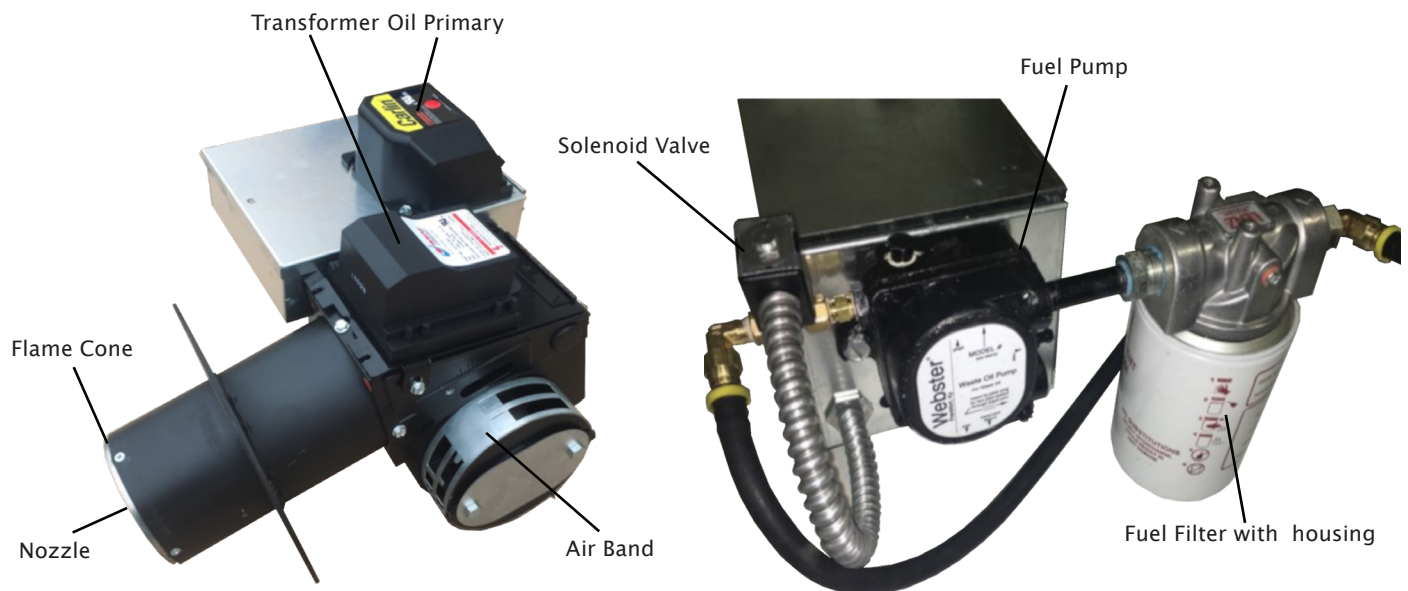


When cleaning, inspect all three pieces thoroughly.

ELECTRODE ADJUSTMENT REFERENCE



BURNER & PUMP ASSEMBLY



Troubleshooting Suggestions

▲ Most likely || ► Less likely || ▼ Least Likely

Problem	Cause	Suggestion
1. Heater shuts off 2. Loss of prime overnight	<ul style="list-style-type: none"> ▲ Manual reset ▲ Vacuum air leak in air line ► Plugged filter or tank empty ▼ Plugged pump screen 	<ul style="list-style-type: none"> ▲ Required manual reset ▲ Tighten all fuel connections ► Check pump screen ▼ Clean filter (use vent port), reprime pump
3. Fails to Start	<ul style="list-style-type: none"> ▲ Vacuum leak ▲ Inadequate fuel supply ► No pressure ► No pre-heat ► Auto start circuit not functioning ► No arc ► No air pressure 	<ul style="list-style-type: none"> ▲ Open bleeder port if air is present. ▲ Clean filter. Check all fuel connections . Tighten fittings. ► Check, may need cleaning – to access, remove, pump cover. ► Use vent port, and reprime pump. ► Be sure all wiring to pre-heater is tight. ► Bad heat rod – replace. ► Check circuit control board and replace if necessary. ► Check continuity at terminals of heat rod limit snap switch. ► Check springs to electrode rod adjustment (under transformer) – make sure they have good contact. Open burner door and make sure electrode tips aren't touching flame cone. ► Check pressure regulator and adjust. Check air supply line for restrictions or leaks. Pull compressor cover and inspect carbon vanes. May need to replace. Check filter, clean if needed.
4. Reduced air pressure and can't increase	<ul style="list-style-type: none"> ▲ Gauge may be bad. ▲ Intake filter muffler is plugged with dust or dirt. ► Exposed to winter ▼ Compressor vanes may be worn 	<ul style="list-style-type: none"> ▲ Replace gauge ▲ Remove & clean with carburetor cleaner, dry thoroughly. Do not use. ► Remove cover, clean rust with emery cloth ▼ Replace carbon vanes
5. Hard starting (Diminished flame)	<ul style="list-style-type: none"> ▲ Partially plugged filter. ► Restriction in nozzle usually only when initially installed. New lines may have foreign material in them. ► Air band open too far ▼ Out of fuel ▼ No oil to burner 	<ul style="list-style-type: none"> ▲ Clean filter. Using vent port–reprime pump ► Remove nozzle and check for foreign objects ► Aluminium block pre-heater inside burner should not build up carbon. If carbon present, pre-heat circuit is malfunctioning. Thermocouple heat sensor wire could have open circuit. Heat control board may have blown circuit and circuit board fuse. Inspect both and replace either if needed. ► Close air band – while viewing flame; open air band slowly until combustion chamber a clear, not orange ▼ Refill storage ▼ Clean pump screen – remove pump cover. Using vent port, re-prime pump.

6. Heater cycles frequently, without set temperature being reached	<ul style="list-style-type: none"> ▲ Heater over firing ► High limit safety switch bad ▼ Temperature setting wrong 	<ul style="list-style-type: none"> ▲ Investigate and locate reason for over firing. I.e nozzle eroded, pump not functioning properly, decrease pump motor speed. ► Replace high limit fan safety switch ▼ Check temperature setting and adjust as necessary.
7. Heater rumbles and excessive heat blow back from flame vision port	<ul style="list-style-type: none"> ▲ Pump setting wrong ▼ Draft incorrect. If proper draft can't be achieved. Heater could have excessive amount of ash and won't allow sufficient draft 	<ul style="list-style-type: none"> ▲ Pump not functioning properly–over firing. May need RPM readjust. Reset flame slightly less than 1/2 way down tube combustion chamber. Use adjustment knob on pump motor. ▼ Set draft. Clean out combustion chamber and exchangers of ash. Check draft–reset if needed.
8. Heater establishes flame but locks out or shuts off. Need to reset primary.	<ul style="list-style-type: none"> ▲ Photo eye can't see flame ▼ Due to back draft. Flame end cone may have ash. 	<ul style="list-style-type: none"> ▲ Clean photo eye which is smoked up by back draft smoke. ▼ Swing open burner door and clean ash build up from flame end cone.
9. Proper draft setting can't be achieved	<ul style="list-style-type: none"> ▲ Negative draft in building or exhaust fans present. ▼ Excessive ash buildup/heater 	<ul style="list-style-type: none"> ▲ May need to install power vent/draft inducer's in stack. ▼ Clean ash and soot from combustion chamber and heat exchangers.
10. Poor or reduced heat production	<ul style="list-style-type: none"> ▲ Flame too small ► Excessive ash buildup exchangers ► Through vision port, check flame to see if flame is smaller than usual. ▼ Entire fuel supply may be plugged. 	<ul style="list-style-type: none"> ▲ Nozzle may be plugged with debris–usually after filter is cleaned. ► Clean ash from combustion chamber and exchangers. ► May need to readjust pump RPM. (Use knob on pump motor). ▼ Clean filter both, oil strainer and oil pump screen.

Attention

If you are experiencing technical or servicing issues and haven't been able to diagnose and fix the potential issue, please contact us with any questions Monday – Friday PST. A third party HVAC or mechanical contractor may need to be contacted if trouble shooting over the phone still does not solve the potential issue. If a third party is involved MorrHeat is not responsible for any fee associated with the service provided by a third party.

Warranty Information – 10 Year

MorrHeat warrants the materials and workmanship will be free of defects for the duration of the warranty specified. Warranty is valid from the date of delivery and warranty card must be sent in to MorrHeat within 30 days of delivery date. MorrHeat is **not** responsible for damaged goods. Please check your shipment for any damages. If damages are apparent, either sign for the shipment as damaged goods and **file a claim immediately** or refuse the shipment and **file a claim immediately**. Nothing can be done for damaged goods that have been signed for non-damaged, the shipping company will deny those claims if filed and MorrHeat will not be responsible.

Warranty is void if heating unit is improperly installed and neglected of proper routine maintenance. Warranty is also void if contaminants and corrosives have been attempted or burnt in the heating unit. Chemical's such as, **but not limited to**, chlorine can deteriorate the metals when introduced to high temperatures.

If a defect has occurred (bad metals, welds etc.), MorrHeat reserves the right to determine if the defect can be repaired or a complete unit swap is necessary. Pictures of the unit and potential defect will be required. All returned items must be approved by MorrHeat and returned with a RA# (return authorization number). Please call MorrHeat to acquire the RA# information and process.

The Pre-Heater block has a ten (10) year full warranty and MorrHeat extends the manufacturer's warranty subject to their terms and conditions, one (1) year on all other parts and components.

Warranty is Void if * :

- *Warranty card is not returned within 30 days of delivery date
- *Parts or equipment have been altered from original manufactured state
- *Installed improperly
- *Maintenance has been neglected
- *Heater has been misused
- *Wired incorrectly
- *Unit has been over fired or over heated
- *Unit has been operated in contaminated conditions or exposed to corrosive chemicals, such as but not limited to chlorine
- *Warranty is not transferable
- *MorrHeat is not responsible for additional labor or freight charges unless there is written and documented arrangements and authorization from MorrHeat.

WARRANTY CARD

REMINDER:

Warranty coverage is specific to the materials and workmanship of the unit and does not cover additional labor and freight charges unless written authorization is provided. Warranty assures and covers welds when maintained and used properly but does not cover stress cracks caused by excessive heat or over fire. Bad draft, back draft or simply too much fuel and too large of flame are a direct cause of an over fire or over heated unit. Neglected maintenance and cleaning the unit is another direct cause to over firing or over heating the unit. Keep your unit clean and maintained properly for best performance and longevity of the unit

If return is deemed necessary for warranty evaluation and determination of repair or replacement, unit heater is to be sent to MorrHeat with freight prepaid. MorrHeat reserves the right to determine appropriate action for repair or replacement.

No parts will be accepted by MorrHeat without RA# (return authorization number) clearly marked on outside of shipping package. Obtaining RA# requires model and serial numbers, description of part being replaced and nature of defect. Call factory to receive RA#.

Warranty card must be filled out & Returned within 30 days of delivery date

Date of Purchase: _____

Serial #: _____

Model #: _____

Customer (Company) Name: _____

Address: _____ City: _____

State: _____ Zip Code: _____

Contractor: _____

Address: _____

City: _____ State: _____

Zip Code: _____

Installed By: _____

What is Included



Parts Included:

- Waste oil burner assembly (1)
- Waste oil fuel pump assembly with filter (1)
- Thermostat (1)
- Draft meter (1)

