



MAXI-HEAT®
MODEL MH-1000
Operator's Manual

Beginning with Serial Number 0236MXH12

ALLMAND BROTHERS INC.
P.O. BOX 888
HOLDREGE, NE 68949

PHONE: (308) 995- 4495, 1- 800-562-1373
ALLMAND FAX: (308) 995-5887
ALLMAND PARTS DEPT. FAX : (308) 995-4883

www.allmand.com

PART NO. 104203 REVISED: DECEMBER 2014



WARNING

Improper operation of this machine can cause death or serious injury.

Before transporting the trailer or starting the engine, do the following:

1. Read this owner's/operator's manual.
2. Read all safety decals on the machine.
3. Clear the area of other persons.

Learn and practice the safe use of the machine controls in a safe, clear area before you operate this machine on a worksite.

It is your responsibility to observe applicable laws and regulations, and to follow the manufacturer's instructions on machine operation and maintenance.

California

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

California

Proposition 65 Warning

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm.

Wash hands after handling

IMPORTANT INFORMATION

Company Equipment Number: _____

Model Number: _____

Serial Number: _____

Engine Model Number: _____

Engine Serial Number: _____

Generator Model Number: _____

Generator Serial Number: _____

TABLE OF CONTENTS

OPERATORS MANUAL

Inspection Check List	4
Introduction	5
Safety Decals	6
Set-up Procedure	10
Specifications and Serial Number Location.....	11
Fuel, Lubricant and Coolant	12
Maintenance Schedule	14
Starting Procedures.....	16
Maintenance and Towing Instructions	17
Cleaning Procedure.....	18
Troubleshooting	20
Electrical Schematics	23
Ductwork Installation Options.....	28

PARTS MANUAL

Trailer Assembly Parts and Accessories	A-1A
Heater Assembly Parts and Accessories.....	B-1A
Engine/Generator Assembly Parts and Accessories	C-1A
Optional Parts and Accessories.....	D-1A
Decals.....	E-1A
Warranty	Inside Back Cover

INSPECTION CHECK LIST

PREPARING THE MAXI-HEAT® FOR DELIVERY OR RENTAL

The Allmand Maxi-Heat® requires service as well as proper operation in order to provide the performance and safety for which it was designed. Never deliver or put a machine into service with known defects or missing instructions or decals. Always instruct the customer in the proper operation and safety procedures as described in the operator's manual. Always provide the manual with the equipment for proper and safe operation.

Check List:

- Visually inspect the equipment to ensure that all instructions and decals are in place and legible.
- Check the hitch assembly and safety tow chains.
- Check the jack to make sure they operate properly.
- Inspect the tires to ensure good condition and proper inflation.
- Check lug nuts and torque to 80-90 ft. lbs. Lug nuts should be retorqued after first 100 miles of towing.
- Check the ground rod cable and the ground lug. Make sure they are clean, undamaged and functional.
- Make sure the battery is fully charged and the terminals are tight and clean. Ensure the electrolyte is at the correct level.
- Check the service intervals for oil filters, fuel filter, air cleaner and engine oil (see operator's manual).
- Check the oil, fuel and coolant levels,
- Start engine and turn heaters on to assure proper operation.
- Check to make sure the operator's manual is with the equipment.

NOTE: See operator's manual for scheduled maintenance intervals.



WARNING!

**NEVER ALLOW ANYONE TO OPERATE THE EQUIPMENT WITHOUT
PROPER TRAINING.**

ALWAYS READ THE INSTRUCTIONS FIRST.

INTRODUCTION

This manual provides the information necessary for the safe operation and maintenance of the **Allmand Maxi-Heat®**.

Specific operating details and specifications are contained in this publication to familiarize the operator and maintenance person with the correct and safe procedures necessary to maintain and operate this equipment.

Take time to read this book thoroughly. If you are uncertain about any of the information contained in this manual, contact your dealer for clarification before operation.

SAFETY SYMBOLS

The purpose of the **SAFETY INFORMATION SYMBOL** shown below is to attract your special attention to safety-related information contained in the text.



WARNING!

FAILURE TO UNDERSTAND AND COMPLY WITH SAFETY RELATED INFORMATION AND INSTRUCTIONS MAY RESULT IN INJURY TO THE OPERATOR OR OTHERS. IF YOU DO NOT UNDERSTAND ANY PART OF THIS INFORMATION CONTACT YOUR DEALER FOR CLARIFICATION PRIOR TO OPERATING EQUIPMENT.

NOTE: *The word NOTE is used to bring your attention to supplementary information in relation to various aspects of proper operation and maintenance.*

NOTE: *Keep this manual accessible during operation to provide convenient reference.*

NOTE: *Any reference in this manual to LEFT or RIGHT shall be determined by looking at the trailer from the REAR.*

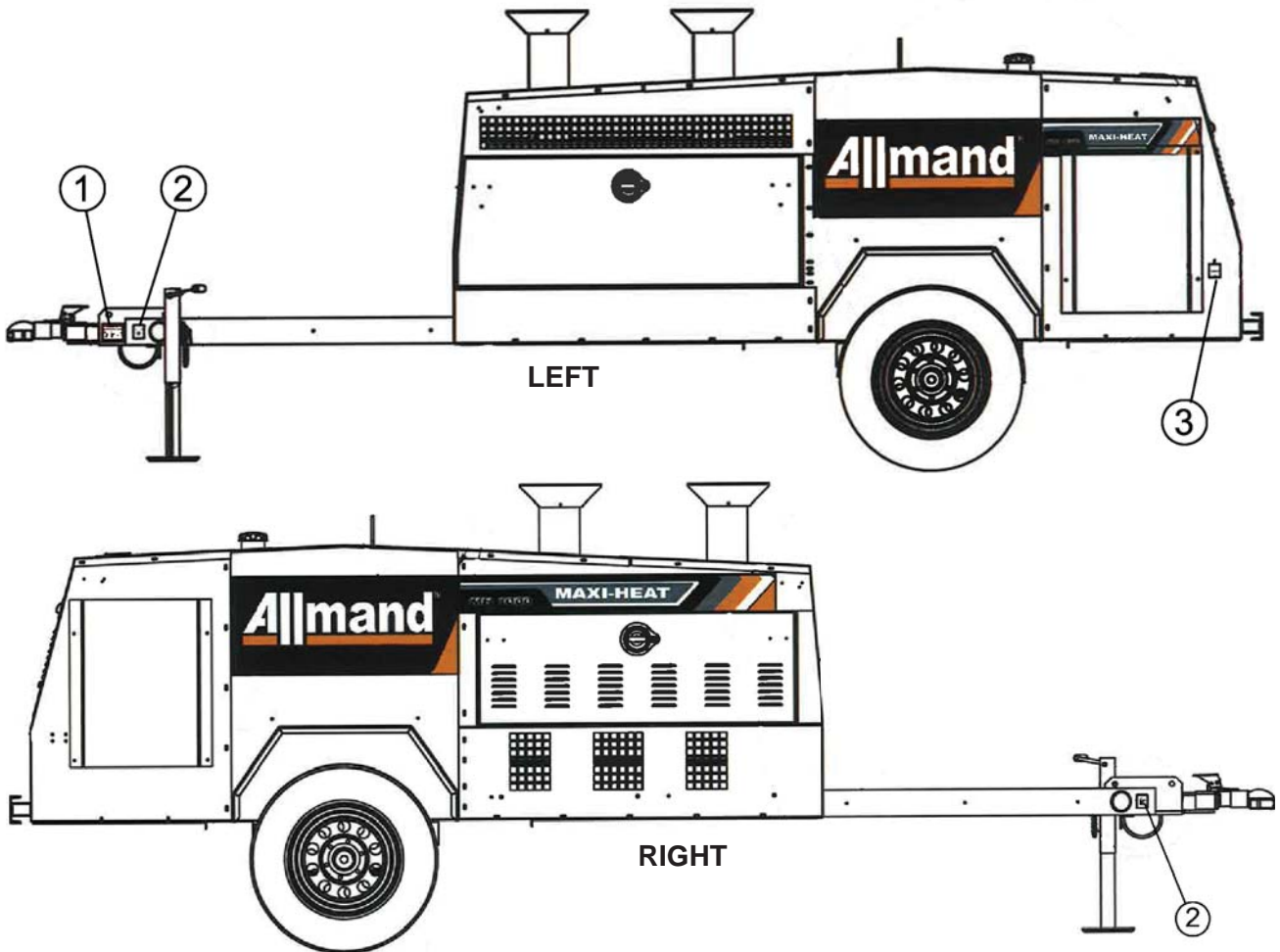
SAFETY DECALS



WARNING!

Refer to these representations of the safety warning decals used on the Maxi-Heat® to ensure correct ordering if replacing becomes necessary.

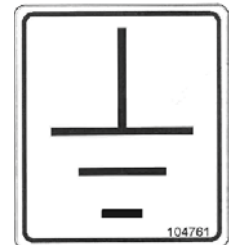
ALWAYS REPLACE ANY SAFETY AND INSTRUCTION DECALS THAT BECOME DAMAGED, PAINTED, OR OTHERWISE ILLEGIBLE.



Item 1
Part No. 090160

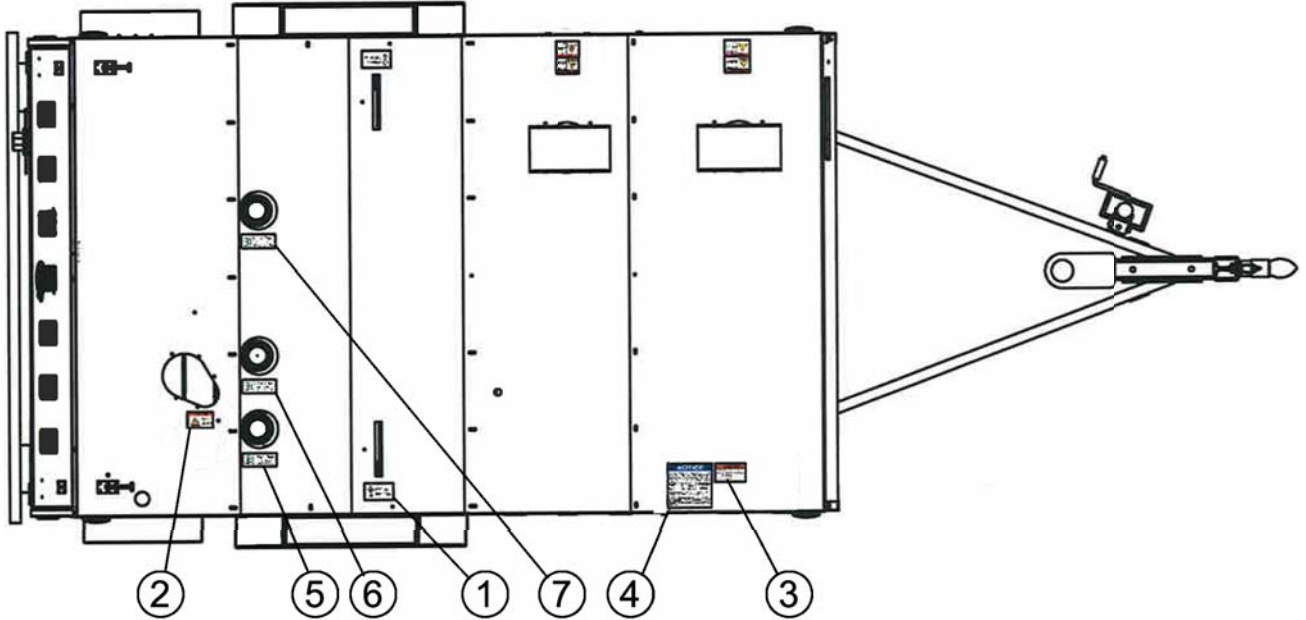


Item 2
Part No. 104753

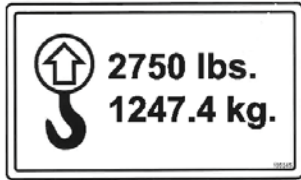


Item 3
Part No. 104761

SAFETY DECALS



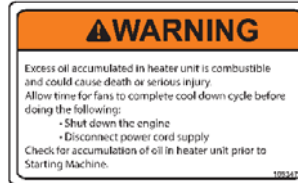
TOP VIEW



Item 1
Part No. 105345



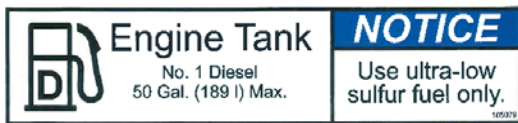
Item 2
Part No. 090108



Item 3
Part No. 105347



Item 4
Part No. 090449



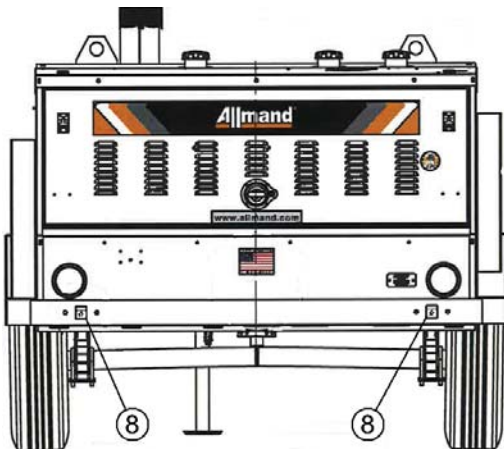
Item 5
Part No. 105079



Item 6
Part No. 105077



Item 7
Part No. 105078

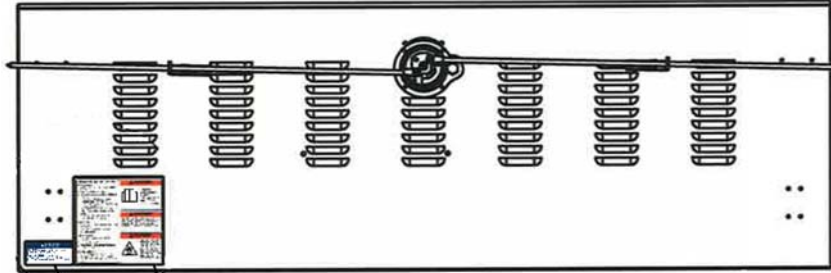


REAR



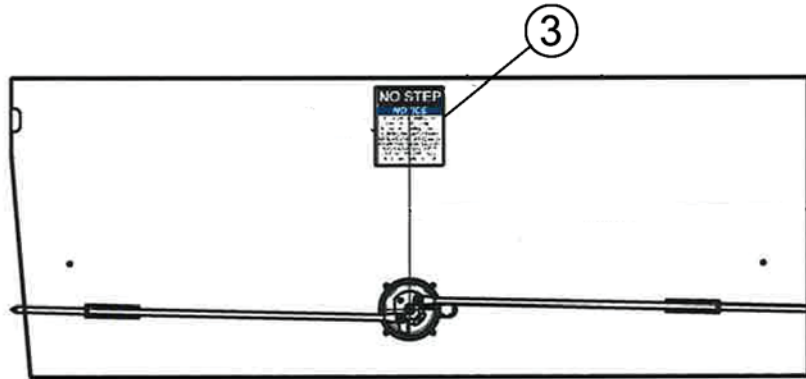
Item 8
Part No. 104753

SAFETY DECALS

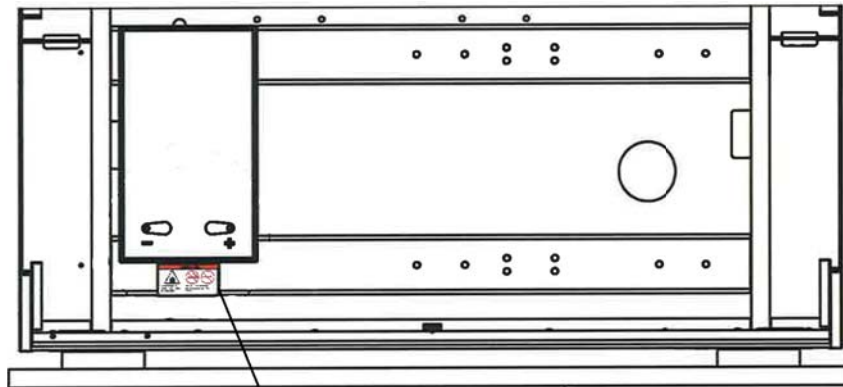


INSIDE REAR DOOR

1 2



INSIDE LEFT DOOR



BATTERY

4



Item 5
Part No. 090163

NOTICE

DO NOT DISCONNECT SUPPLY CORD OR POWER SUPPLY WHILE FAN IS OPERATING.

TO STOP UNIT TURN SWITCH TO "OFF" POSITION. FIRING WILL STOP BUT FAN WILL CONTINUE TO OPERATE UNTIL UNIT COOLS DOWN.

105923

Item 1
Part No. 105923

OPERATING INSTRUCTIONS

Starting Engine

1. Heater toggle switches must be in Off position.
2. Open door for heater outlets.
3. Turn Engine ignition switch to **START** position.
4. Turn engine ignition switch to **MANUAL** position, release the key when engine starts.

For Caterpillar Engine: hold for approximately 10 seconds.

For Isuzu Engine: hold until glowing indicator light goes out.

Starting Heater

1. Allow engine to come to proper operating temperature.
2. Turn heater toggle switch at heater to **MANUAL** position.

Heater Shutdown

1. Turn heater toggle switch to OFF position.
2. Leave engine running.
3. Allow time for the fans to complete the cool-down cycle.

Engine Shutdown

1. Before turning engine off the heaters must be switched to the OFF position, and allow fans to complete the cool-down cycle.

WARNING

Read and understand the supplied Owner/Operator's Manual before operating machine.

WARNING

Operating machine inside an enclosed area could lead to asphyxiation, which could cause death or serious injury. Always operate machine in a well-ventilated area.

WARNING

Operating machine near combustible materials may result in fire, which could cause death or serious injury. Position machine clear of any flammable materials. Do not place combustible materials near machine.

Item 2
Part No. 105346

NO STEP

NOTICE

Kinks in ducting could cause excessive heat exchanger temperatures resulting in heater or ducting damage. Avoid sharp bends and kinks in ducting and do not use more than 110 ft. (33.5 m) of 16 in. (406 mm) dia. or 50 ft. (15.2 m) of 12 in. (305 mm) dia. ducting on each heater outlet.

Item 3
Part No. 105912

WARNING

Explosive gases could cause death or serious injury.

Keep sparks, flames and lighted materials away from battery.

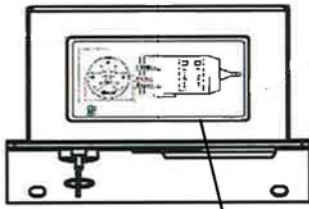
090159

Item 4
Part No. 090159



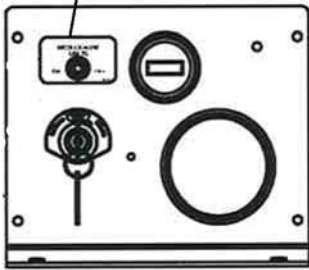
BREAKER BOX

SAFETY DECALS

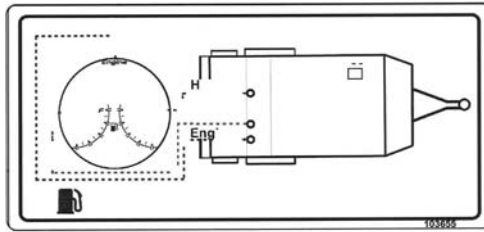


2

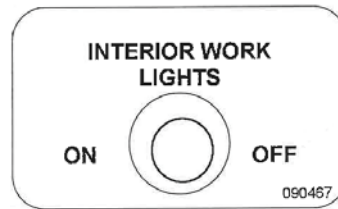
1



CAT CONTROL PANEL



Item 1
Part No. 103655



Item 2
Part No. 090467

MAXI-HEAT® SETUP PROCEDURE

The Frost Fighter heater units need to be set up for each operation and tuned to operate efficiently depending on the altitude of intended use. As you go up in elevation, the air gets thinner. As the air gets thinner the ability to burn or consume a certain amount of fuel is diminished. When you move the machine to a different elevation you may need to change the nozzle size and air settings to get a clean efficient burn. The nozzle size is determined by the number of gallons per hour (GPH) number. A number is stamped on the nozzle indicating the amount of fuel that the nozzle will deliver to the burning chamber. For higher elevations, selecting a nozzle that delivers less fuel allows you to make the air mixture adjustments needed to burn all of the fuel with less air (thinner air).

Test Equipment:

Bacharach Oil Burner Smoke Tester – is used to determine the amount of soot in the exhaust gasses. This can indicate the level of combustion being achieved. It is recommended that the Smoke Tester be used for tuning the Maxi-Heat® Frost Fighters.

Instructions for setting up the Maxi-Heat® at elevations above sea level.

1. Ensure that fuel pressure is set at 140 PSI.
2. Shutter Setting - #5 Setting - half open.
3. Band Setting - half open. — #5 Setting
 - Starting at 50% open allows adjustment in both directions during tuning.
4. Install nozzle size suited for your altitude. See decal or right side of machine.
 - You may have to experiment with different nozzles to find one that works well. Test nozzles until you have a nozzle that gives satisfactory initial smoke tester readings.
 - Example:
 1. Initial startup with settings as noted above (Fuel 140 PSI, Shutter #5, Band #5) gives a smoke reading between 6 and 9 (heavy smoke on test strip with visible smoke coming from the stack and possibly a rumbling sound coming from the burner).
 2. Smoke indicates too much fuel or not enough air. (fuel not being totally burned)

Action:

1. Turn off switch and let the Frost Fighter cool down.
2. Shut off the power to the Frost Fighter.
3. Remove Fuel Rail, and determine the nozzle rating in GPH (gallons per hour), e.g. 3.
4. Select a nozzle that has an output lower than 3. Read the following suggestions for selecting a nozzle size and depending on the initial startup and smoke test readings you can make an informed decision on which nozzle to select.
 - For heavy smoke and a rumbling sound you may select a 2.5 GPH nozzle for the next test.
 - For heavy smoke and no rumbling, you may want to select a 2.75 GPH nozzle for the next test.
5. Install nozzle.
6. Check igniter tips for correct location for the unit you are setting up. Adjust if necessary. (see owners manual)
 - For the IDF 500:
 - 5/32" apart
 - 1/4" above center of nozzle
 - 1/8" in front of nozzle
7. Re-install the fuel rail, hook up fuel lines, etc.
8. Restart the heater and check the flue gas for smoke using the True-Spot Smoke Tester.

MAXI-HEAT® SETUP PROCEDURE

9. If you get a smoke test reading in the 2 to 3 range you will be ready to fine tune the burner to achieve a #1 or possibly a 0 on the smoke scale. If you still have heavy smoke, you may have to go down another nozzle size to be able to get the burner to burn efficiently.

Fine Tuning the Frost Fighter Burners

1. Use the True-Spot Smoke Tester to determine where you are on the Smoke Scale.
2. To reduce the amount of smoke, open the band 1 or 2 numbers and recheck with the True-Spot Smoke Tester.
3. Make further adjustments if necessary to achieve the lowest number you can on the Smoke Scale.
4. Tighten the air band and shutter-securing screws to prevent them from moving after you have made the adjustments.

SPECIFICATIONS

DIMENSIONS

Height:	71.9 in. (182.6cm)
Length:	16 ft.-4.5 in. (4.99m)
Width:	80 in. (203cm)

WEIGHT

Empty:	3,853 lbs. (1,748kg)
With Fuel:	5,655 lbs. (2,565kg)

ENGINE/GENERATOR

CAT C1.5 Diesel Engine

Starting:	12V Electric 8D Battery
Oil sump capacity:	5.9 qts (5.6L)
Cooling system capacity:	6.3 qts. (6.0L)
Low Oil Pressure Shutdown:	Solenoid actuated fuel rack instant shutdown
Generator:	8kW , 60 Hz, 1-ph. 1800 rpm

ISUZU 3CE1 Diesel Engine

Starting:	12V Electric 8D Battery
Oil sump capacity:	7.1 qts (6.7L)
Cooling system capacity:	5.6 qts. (5.3L)
Low Oil Pressure Shutdown:	Solenoid actuated fuel rack instant shutdown
Generator:	8kW , 60 Hz, 1-ph. 1800 rpm

FUEL SYSTEM

Fuel Requirements:	No.1 Diesel
Fuel Capacity:	
Heater Tank (X2):	105 gal. (397L)
Engine Tank:	53 gal. (201L)
Fuel Consumption:	
Engine: ISUZU 3CD1	0.5 gal/hour (1.9L/hr)
Engine: CAT C1.5	0.5 gal/hour (1.9L/hr)

TIRES & WHEELS

Wheels	15 X 6JJ
Tires:	ST 225/75R15
Cold tire inflation:	80 PSI (551kPa)

HEATERS

Two (2) I.C.E. Frost Fighter IDF 500
500,000 BTU Output with 2.5 gph, 60° solid nozzle
Each standard heater includes one (1) 16 in. heated air outlet, which connects easily to the ducting. Limit to 110feet of 16" ducting.
Heated Air Output: 2,850 CFM per heater w/o duct.
Temperature Rise:185° with duct creating 0.5 in. static pressure
Operating Time: More than 24 hours without refueling

SERIAL NUMBER LOCATIONS

TRAILER: Plate attached to left side of frame in front of fender.
ISUZU ENGINE: Plate attached to top of valve cover.
CAT ENGINE: Plate attached to injector pump on right side of engine.

FUEL, LUBRICANT AND COOLANT

General Fuel Information

Cat C1.5 and Isuzu 3CE1 Engines

The diesel fuel used for the engine must be clean and free of dirt, contaminants and water.

In North America, diesel fuels that meet ASTM D975 for Ultra Low Sulfur Diesel (ULSD) are required to be used. ULSD has a maximum sulfur content of 15 Parts Per Million (PPM) or 15 mg/kg. Diesel fuel may be No. 1-D or No. 2-D.

For those countries governed by the rules of the European Community (EC), diesel fuels that meet EN590 for Ultra Low Sulfur Diesel (ULSD) are required to be used. Diesel fuels meeting this standard have a maximum sulfur content of 10 mg/kg.

For non-regulated countries, and for further information on fuels for your engine, see the Engine Instruction, or Engine Operation and Maintenance manual.

Engine Oil

Check engine oil level daily with the engine stopped. Maintain engine oil level between the "Full" and "Add" marks on the dipstick. Add oil as necessary. Do not overfill the crankcase.

When replenishing or replacing engine oil, use oils with an API Classification of CI-4, CH-4 or CG-4. See tables below for Engine Oil Viscosities for Ambient Temperatures.

Stop the engine prior to replacing the engine oil. Do not drain the oil when the engine is cold. Dirt and debris will not be suspended in cold engine oil, and will not flow out with the draining oil. Bring the engine to operating temperature. Stop the engine and drain the crankcase with the oil warm to ensure that dirt and debris will remain in solution with the oil and flow out with the oil.

For further information on oil for your engine, checking or changing the oil see the Engine Instruction, or Engine Operation and Maintenance manual.

For Cat C1.5 engine:

Engine oil capacity for the Cat C1.5 engine is 5.9 quarts (5.6 liters). This includes the oil filter, which is recommended to be changed with the engine oil.

Cat C1.5		
Engine Oil Viscosities for Ambient Temperatures		
Viscosity Grade	Ambient Temperature	
	Minimum	Maximum
SAE 0W-20	-40° C (-40° F)	10° C (50° F)
SAE 0W-30	-40° C (-40° F)	30° C (86° F)
SAE 0W-40	-40° C (-40° F)	40° C (104° F)
SAE 5W-30	-30° C (-22° F)	30° C (86° F)
SAE 5W-40	-30° C (-22° F)	50° C (122° F)
SAE 10W-30	-18° C (-0° F)	40° C (104° F)
SAE 10W-40	-18° C (-0° F)	50° C (122° F)
SAE 15W-40	-9.5° C (15° F)	50° C (122° F)

For Isuzu 3CE1 engine:

Engine oil capacity for the Isuzu 3CE1 engine is 7.1 quarts (6.7 liters). This includes the oil filter, which is recommended to be changed with the engine oil.

Isuzu 3CE1		
Engine Oil Viscosities for Ambient Temperatures		
Viscosity Grade	Ambient Temperature	
	Minimum	Maximum
SAE 10W	-20° C (-4° F)	10° C (50° F)
SAE 20W	-10° C (14° F)	10° C (50° F)
SAE 10W-30	-15° C (5° F)	30° C (86° F)
SAE 15W-40	-30° C (-22° F)	40° C (104° F)
SAE 20	0° C (32° F)	20° C (68° F)
SAE 30	10° C (50° F)	30° C (86° F)
SAE 40	20° C (68° F)	40° C (104° F)

Engine Coolant

Cat C1.5 and Isuzu 3CE1 Engines

The Maxi-Heat is equipped with a coolant recovery bottle in the engine coolant system. Keep engine coolant in the overflow bottle between 1/3 and 2/3 full at all times.

The engine coolant in the Maxi-Heat as delivered from Allmand is a 50/50 mix of ethylene glycol and de-ionized water. This mix provides protection from freezing to -36.4° C (-33.5° F).

FUEL, LUBRICANT AND COOLANT

When replenishing or replacing engine coolant, use an ethylene glycol based heavy duty engine coolant that meets ASTM D6210. Coolant may be either prediluted (pre-mixed 50/50 with water), or coolant concentrate which is then mixed 50% by volume with low mineral content, low corrosive, de-ionized water.

Never replenish the engine coolant system with coolant concentrate alone or water alone. Always pre-mix concentrate and water prior to adding to the cooling system.

When using coolant concentrate, mix with de-ionized water that meets the requirements shown in the table below. Do not use hard water, soft water that has been conditioned with salt, or sea water.

Property	Specific Values
Chlorides, µg/g (ppm (grains/gal))	25 (1.5) max
Sulfate, µg/g (ppm (grains/gal))	50 (3.0) max
Hardness, as CaCO ₃ , µg/g (ppm (grains/gal))	20 (1.2) max
pH	5.5 to 8.5
Iron, µg/g (ppm (grains/gal))	1 (0.06) max

When ambient temperatures are expected to drop below -34° C (-29° F), ethylene glycol coolant concentrate mixed 60% by volume may be used. See table below for freezing and boiling protection information.

Do not use ethylene glycol coolant in concentrations of greater than 60%. Greater concentrations result in less freezing and boiling protection. 100% ethylene glycol coolant will freeze at -23° C (-9° F).

Ethylene Glycol		
Concentration	Freeze Protection	Boiling Protection
50 Percent	-36° C (-33° F)	106° C (223° F)
60 Percent	-51° C (-60° F)	111° C (232° F)

Propylene glycol may also be used. When mixed 50% by volume with de-ionized water, propylene glycol will provide similar protection against freezing and boiling. See table below.

Do not use propylene glycol in concentrations that exceed 50% because of propylene glycol's reduced heat transfer capability.

Propylene Glycol		
Concentration	Freeze Protection	Boiling Protection
50 Percent	-29° C (-20° F)	106° C (223° F)

Supplemental Coolant Additives (SCA's) that are part of the coolant provided by Allmand are depleted during engine operation. These additives must be replaced periodically. SCA's must be added at the proper concentration. Over-concentration of SCA's can cause the inhibitors to drop out of solution, and be detrimental to the cooling system's performance.

Have the coolant analyzed regularly to determine when it is necessary to add SCA's.

For further information on coolant for your engine, checking or changing the coolant see the Engine Instruction, or Engine Operation and Maintenance manual.

MAINTENANCE SCHEDULE

Cat C1.5 Engine						
System	Item	Daily	Every 250 Hours	Every 500 Hours	Every 1,000 Hours	Every 2,000 Hours
Fuel System	Fuel Level	Check				
	Fuel / Water Separator	Check & Drain				
	Fuel Filter			Change		
	Crankcase Breather					Change
	Fuel Hoses					Change
Engine Oil	Engine Oil Level	Check				
	Engine Oil & Filter		Sample & Analyze	Change		
Cooling System	Coolant Level	Check				
	Radiator Fins			Check & Clean		
	Fan Belt		Adjust		Change	
	Cooling System		Sample & Analyze SCA	Sample & Analyze SCA	Flush & Change	
	Cooling System Hoses			Check		
Intake System	Air Cleaner Service Indicator	Check				
	Air Precleaner	Check & Clean				
	Air Cleaner Element			Replace		
Cylinder Head	Intake & Exhaust Valves				Valve Clearance	
Emission Related Maintenance						
Every 3000 Hours		Fuel Injectors – Test / Change				

MAINTENANCE SCHEDULE

Isuzu 3CE1 Engine							
System	Item	Daily	Every 50 Hours	Every 250 Hours	Every 500 Hours	Every 1,000 Hours	Every 2,000 Hours
Fuel System	Fuel Level	Check					
	Fuel Injection Valve Pressure					Check & Adjust	
	Fuel Injection Pump						Check & Adjust
	Fuel Hoses						Change
Engine Oil	Engine Oil Level	Check					
	Engine Oil & Filter		Change 1st Time	Change			
Cooling System	Coolant Level	Check					
	Radiator Fins			Check & Clean			
	Fan Belt		Adjust 1st Time				
	Adjust						
	Cooling System					Flush & Change	
	Cooling System Hoses						Change
Intake System	Air Cleaner Element			Check	Replace		
Cylinder Head	Intake & Exhaust Valves					Valve Clearance	Lap Valve Seats
Emission Related Maintenance							
Every 1500 Hours		Check Fuel Valve Nozzle & Clean					
Every 3000 Hours		Adjust, Clean & Repair Fuel Injection Pump and Fuel Valve Nozzle					

STARTING PROCEDURES

BEFORE STARTING:

1. Fill the engine with the specified grade and quantity of lubricating oil to correct level (check dipstick).
2. Ensure there is an adequate supply of fuel in all 3 tanks.
3. Ensure that the air cleaner is firmly attached and air joints are properly sealed. Air cleaner element should be checked and replaced if necessary.

STARTING ENGINE:

1. Heater switches must be in OFF position.
2. Open door for heater outlets.

NOTE: Engine will not start with heater outlet door closed.

3. Turn the key switch to the PREHEAT position. For Isuzu engine, hold until the glow indicator light goes out, then release switch. For Cat Engine, hold for approximately 10 seconds.
4. Turn the key switch to the START position and the engine should start. Release the key immediately when the engine starts. If engine fails to start it may be necessary to cycle the glow plugs again.

NOTE: If engine fails to start, see engine operators handbook for cold start procedures.

NOTE: The low engine oil pressure shutdown solenoid is activated by an oil pressure switch, therefore it will take several seconds of engine cranking to build oil pressure in the switch before fuel will be allowed to the engine.

OPERATING INSTRUCTIONS

1. Do not start heater when excess oil has accumulated in chamber.
2. Do not fill fuel tank while unit is operating.
3. Do not shut off by disconnecting supply cord.
4. Use only #1 diesel fuel.

HEATER STARTING:

NOTE: Circuit breakers for heaters must be switched to the ON position.

NOTE: Allow engine to come to full RPM and warm up before starting heaters.

1. With engine operating, turn toggle switch at heater to manual position.

IF HEATER FAILS TO START:

1. Press and hold manual reset button on burner relay for 30 seconds.
2. Check fuel level.
3. Check fuel filter and suction tubing.
4. Check nozzle assembly.



WARNING

BEFORE TURNING THE ENGINE OFF, THE HEATERS MUST BE SWITCHED TO THE POSITION WHICH ALLOWS THE FANS TO COMPLETE A COOL DOWN CYCLE FOR THE HEAT EXCHANGER

TO STOP HEATER:

Flip switch to OFF position



WARNING

BURNERS WILL STOP BUT THE FAN WILL AUTOMATICALLY CONTINUE TO CYCLE UNTIL THE UNIT COOLS DOWN

ENGINE SHUTDOWN:

1. Shut heater off. Allow time for the fans to turn off.
2. Turn ignition switch to OFF position.

MAINTENANCE AND TOWING INSTRUCTIONS

NOTE: DO NOT TAMPER WITH UNIT. HAVE A COMPETENT SERVICEMAN MAKE ANY ADJUSTMENTS.

NOTE: Before moving guards out of position ensure power cord is disconnected.



WARNING

FAN COULD CYCLE ON AUTOMATICALLY

High Limit Switch:

The limit switch should be checked every heating season to insure the burner will shut down if temperature exceeds 200° F

This can be done by restricting the air flow through the unit. After tests are complete, remove restrictors as ducts must be open for proper operation.

Fan Switch:

The adjustable fan switch will turn on the fan when the heat exchanger temperature is at 900°F and off at 600°F. If the fan fails to stop when the heat exchanger has cooled, replace switch.

Fuel Filter:

Replace element at least every six months of normal usage, or more frequently in dirty conditions.

Flame Detector:

The flame detector is located in the burner housing below the transformer. Periodically clean cell detector face with a soft nonabrasive cloth.

Burner:

The electrode spacing must be checked and adjusted, if necessary, after every nozzle change. Nozzles should be replaced annually or sooner if burner cannot be set up to operate properly. Nozzle size is dependent on altitude of operation. Nozzle size and type are marked on the rating plate.

Motors:

No lubrication is necessary since the bearings are the sealed type.

Fuel System:

Do not store unit containing diesel fuel for long periods.

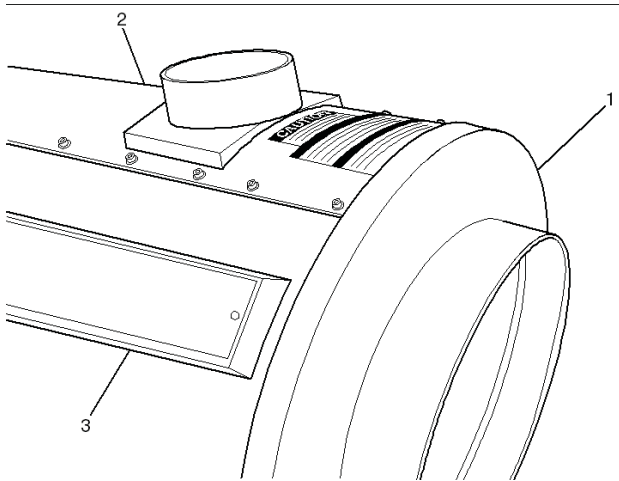
NOTE: Service intervals have been established for operation under normal conditions. Where equipment is operated under severe conditions (very dusty, extreme cold, etc.) affected items should be serviced more frequently. For detailed information see the Engine Instruction Manual for Heater Unit Installation-Operating Maintenance instructions.

TOWING INSTRUCTIONS

Before towing the Maxi-Heat®, the trailer should be inspected visually to assure that the following operations have been completed:

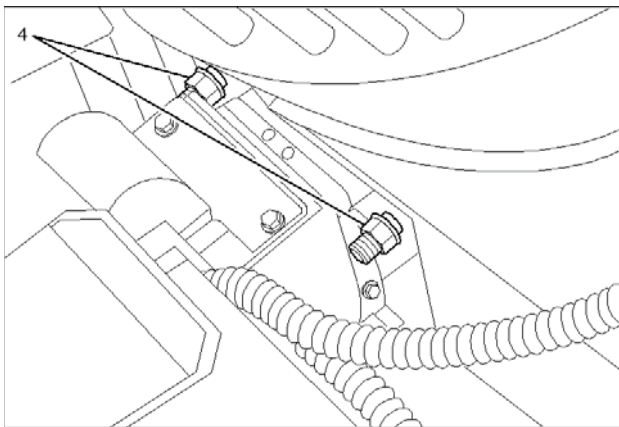
1. Hitch is securely attached to towing vehicle (safety chain secured).
2. Front jack retracted.
3. Ducting removed from heaters and stored.
4. Doors are closed and secure.
5. Check for adequate tire pressure.
6. Taillights are connected and operating.
7. Remove ground rod from earth and secure in trailer.

CLEANING PROCEDURE



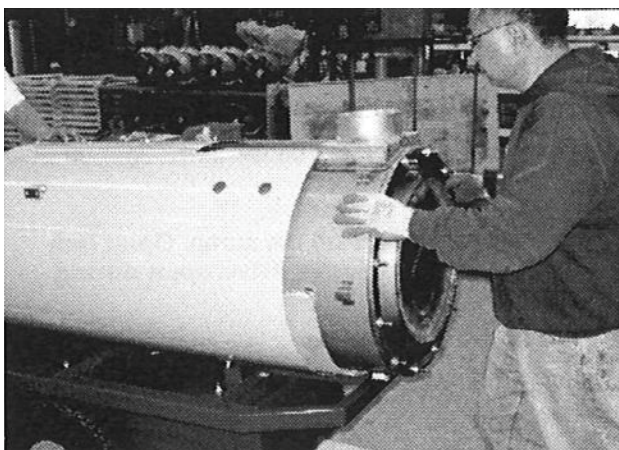
Step 1.

1. Remove front cap (#1) and cover panel (#2). These are attached with a series of tek screws.
2. Remove high limit/fan switch cover(#3).
3. Remove both the high limit & fan switch with temperature feeler.
4. There are two tek screws that are situated at the 3 and 9 o'clock position 20cm (8 inches) from the front of the unit. These are to be removed.



Step 2.

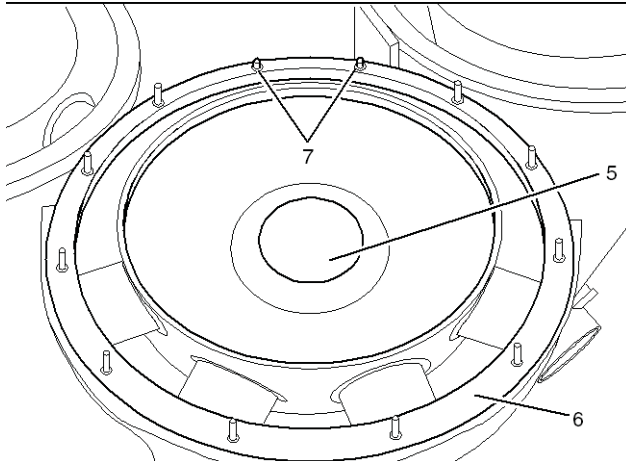
5. Loosen the 4 nuts (#4) that hold the burner to the fan entry. Loosen only, do NOT remove.



Step 3.

6. Slide heat exchanger out of jacket and place front face down on floor.

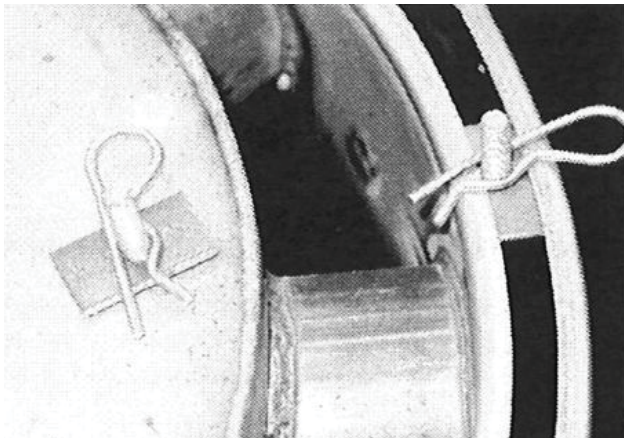
CLEANING PROCEDURE



Step 4.

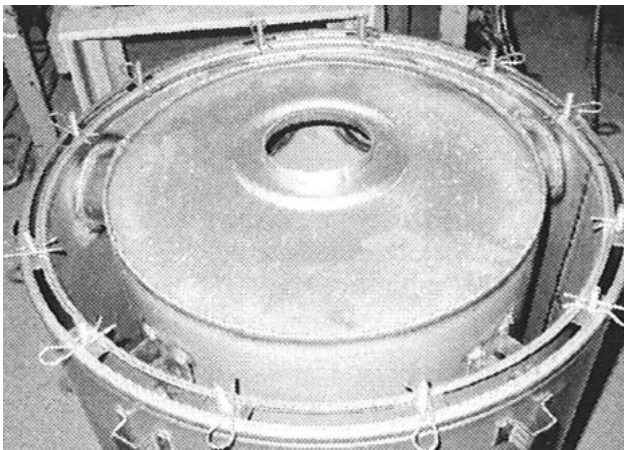
6. Access for combustion chamber and heat exchanger cleaning is obtained through the burner head opening (#5) and by removing the heat exchanger cap ring(s) (#6). Once all the nuts are removed from both cap rings, you will be able to separate the outer shell from the combustion chamber.

IMPORTANT: THERE ARE TWO BOLTS (#7) THAT ARE SHORTER THEN THE OTHERS. THIS IS DUE TO THE FACT THAT THE FAN BLADE WILL SLIGHTLY HIT THEM WHEN YOU REASSEMBLE WITH THE LONGER BOLTS. THESE SHORTER BOLTS ARE ALWAYS ON TOP.



Step 5.

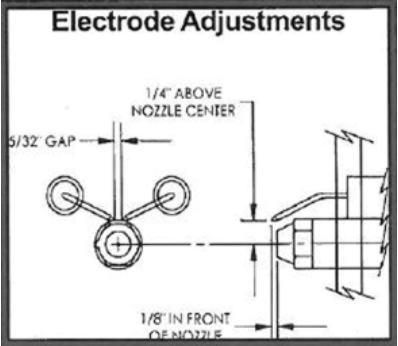
7. When reassembling, use a hitch pin to hold the bolts in place. This will help keep the bolts from dropping. Do this for all 12 first before placing cap ring on.



TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Burner lights, then locks out (flashing red light) five seconds after ignition.	» Cad cell dirty	» Clean lens with soft cloth
	» Cad cell defective	» Replace Cad cell
Burner lights, runs but shuts off (no lockout or flashing red light) after a few minutes due to high limit switch (fan does not kick on) .	» Fan switch defective	» Replace fan switch
	» Fan relay (if equipped) defective	» Replace fan relay
	» Fan motor Defective	» Replace fan motor
	» Fan wires may be unhooked or shorted	» Correct or replace as necessary
Burner lights and runs, fan comes on but burner turns off and on occasionally with no lockout indication (no flashing red light).	Heat exchanger is getting hot enough that it is tripping the high limit switch causing the burner to turn on and off.	This is a normal function, however operator should ensure that there are no sharp bends or other restrictions in the ducting.
Accumulation of oil in the combustion chamber	The unit has been reset a number of times without ignition.	Tilt the unit up at the burner end to let the excess oil drain out of the secondary chamber. Allow unit to drain for 15-20 minutes or until all oil has drained out. Turn burner on. When burner lights and starts smoking, temporarily open band and shutter until smoke quits, then close to 1/2 open, tune burner with smoke tester.
The heater fails to start.	No power to burner	Check to see that the ON-OFF switch is in the ON position and that there is adequate power (120V 60Hz) to the unit.
	Low fuel available. Either the unit has not been fueled or the fuel feed is blocked.	Check fuel level. Replace fuel filter if clogged. Replace or clean fuel hoses.
	Nozzle assembly misaligned.	Check that the electrode assembly and gap set in accordance to operating instructions.
	Burner fuse failure.	Replace fuse.
	High limit switch failed in the open position.	Replace the high limit switch.
	Wrong grade of diesel for the climate in which the heater is operating. #2 diesel can potentially gel at temps at and below +20° F.	Pump out tank and fill with #1 diesel or treated diesel. Then tune FrostFighters with smoke tester.
Fan motor fails to operate.	Failed fan motor.	Replace fan motor.
	Fan cycling thermostat failed in the open position.	Replace thermostat.
	{2010 and up models) Fan relay failure	Replace relay
There is power to the burner but the burner will not start.	Blown burner fuse	Replace if defective
	Faulty high limit switch	Replace if defective
	Faulty sensor	Replace if defective

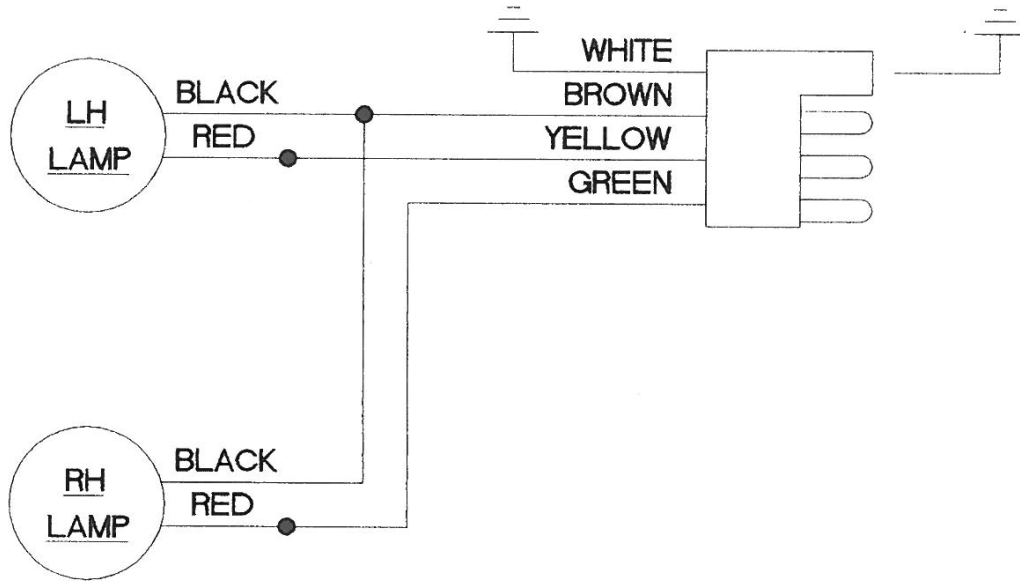
TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
<p>The heater smokes when firing and/or there is a rapid build-up of soot in the chamber and on the flame detector. As a result the heater may prematurely lock out or (<i>in the worst case</i>) have a fire in the combustion chamber.</p>	Check the burner fan blade	Clean if dirty
	Check combustion chamber for	Replace chamber if damaged
	Check nozzle. If clogged it could produce an off-center fire.	Clean nozzle if clogged
	Check for a loose nozzle	Tighten nozzle
	Incorrect nozzle size for operating altitude or burners have not been adjusted for operating altitude	Replace nozzle with correct size for operating altitude and tune burners for operating altitude with a Bacharach Smoke Tester.
	Faulty or fouled nozzle will hamper the efficient burn of the oil and may cause an accumulation of excess fuel in the bottom of the heat exchanger cavity. The oil residue will continue to burn after the heater shuts down and soot will then “burn back” into the controls area.	Replace the nozzle and tune burner with Bach arch Smoke Tester per instructions in operator’s manual.
	Electrodes out of alignment. The electrode holder has an adjustment screw that is used to center the electrode in the center of the cone. Should the screw loosen and the electrode be off center, the oil, when firing, may strike the side of the blast tube and then accumulate in the bottom of the heater resulting in a “burn back” condition.	<p>Check the alignment of the electrodes in the end cone and adjust as necessary.</p> 
Improper setting of the air band assembly. The air band assembly should be set with approximately 1/2 of the slot area open; an opening less than that may cause a sooty burn as a result of choking off the required combustion air.	<p>Check the air band adjustment and tighten the retaining screw. Tune burner with Bacharach Smoke Tester per instructions in the operator’s manual.</p>	

TROUBLESHOOTING

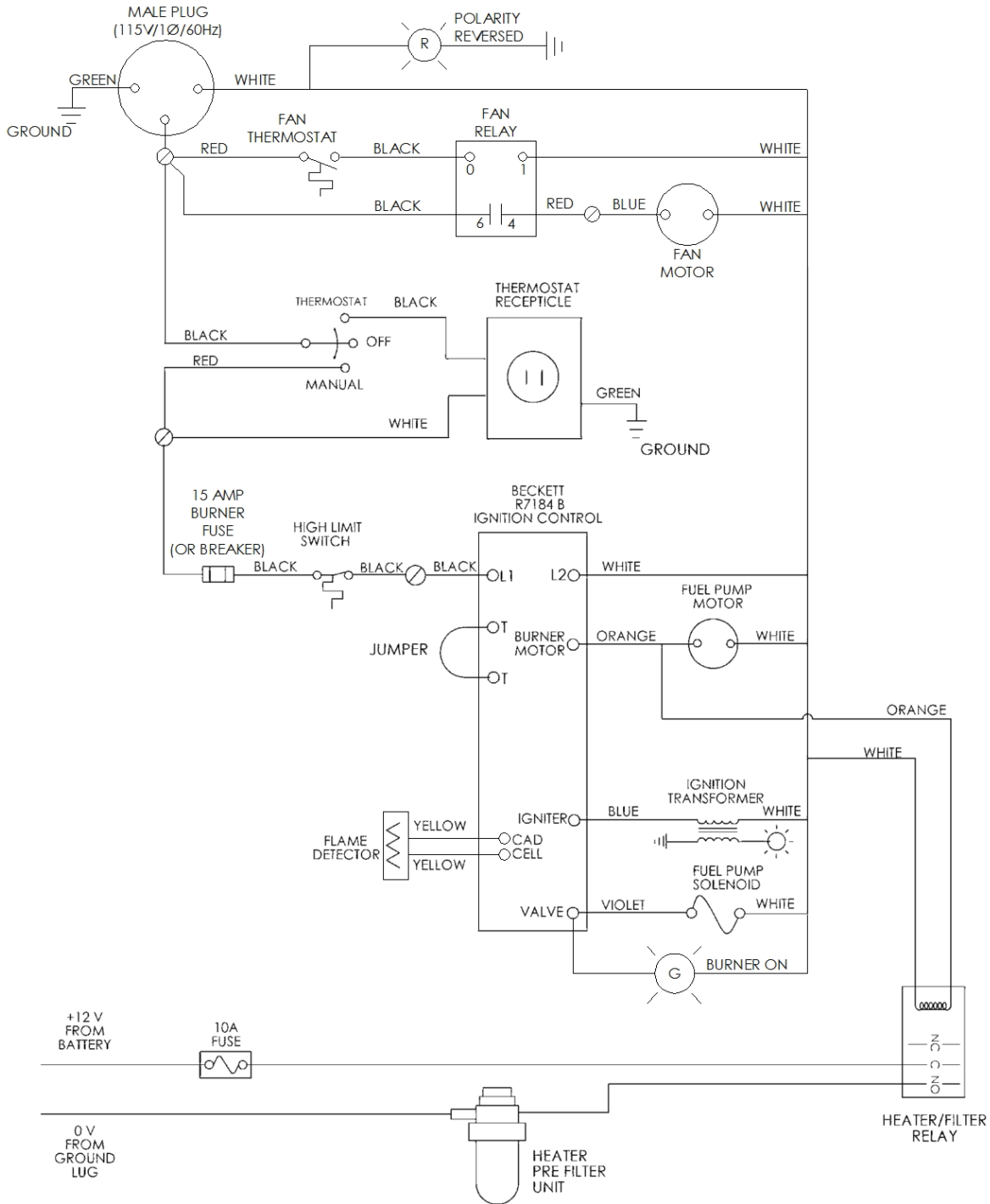
PROBLEM	POSSIBLE CAUSE	SOLUTION
Delayed Ignition	Electrodes not set correctly	Check for proper electrode setting. See previous page for electrode setting
	Isolators dirty or cracked	Check the isolators for cracks or for a conducting coat of soot or oil. Cracks sometimes occur under the electrode bracket causing a short circuit. Clean or replace isolators as needed.
	Too much air into combustion chamber	Check to see that air shutter is not open too far. Close shutter to half its current opening and tune with smoke tester after burner lights.
	Fuel pump pressure set too low.	Check to insure that pump pressure is properly set. Adjust pressure to 140 psi if required.
	Fuel filter dirty.	Check fuel filter - replace if dirty
	Nozzle worn.	Check nozzle - replace if worn
	Wrong grade of diesel for the climate in which the heater is operating. #2 diesel can potentially gel at temps at and below +20° F.	Pump out tank and fill with #1 diesel or treated diesel. Then tune FrostFighters with smoke tester.

TAILLIGHT WIRING SCHEMATIC

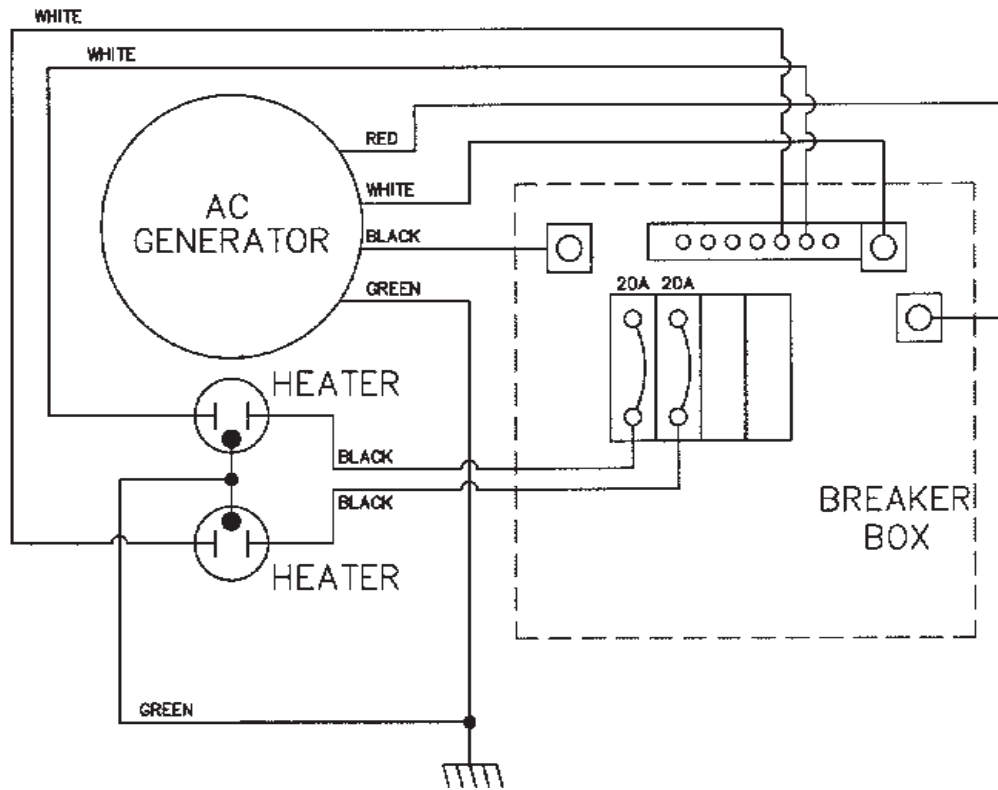


MAXI-HEAT® ELECTRICAL SCHEMATIC

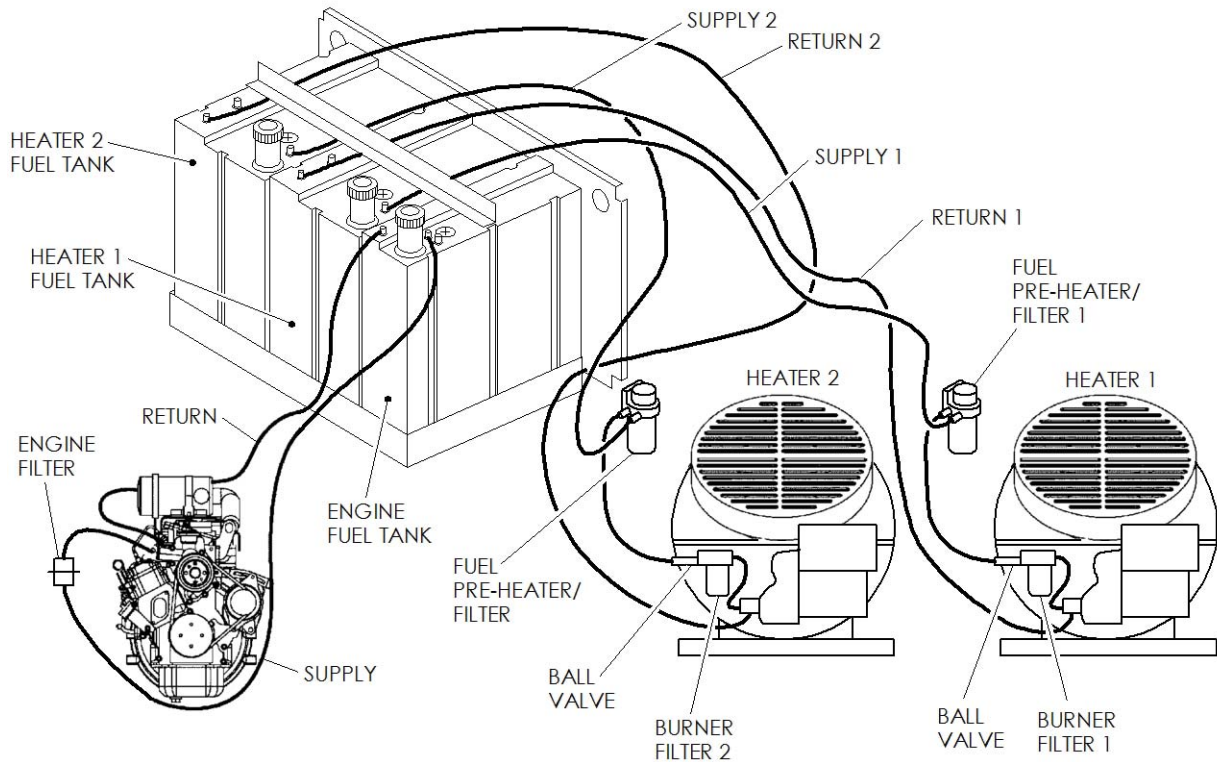
IDF 500 WITH STANADYNE HEATER/FILTER WIRING DIAGRAM



CONTROL BOX AND GEN SET WIRING

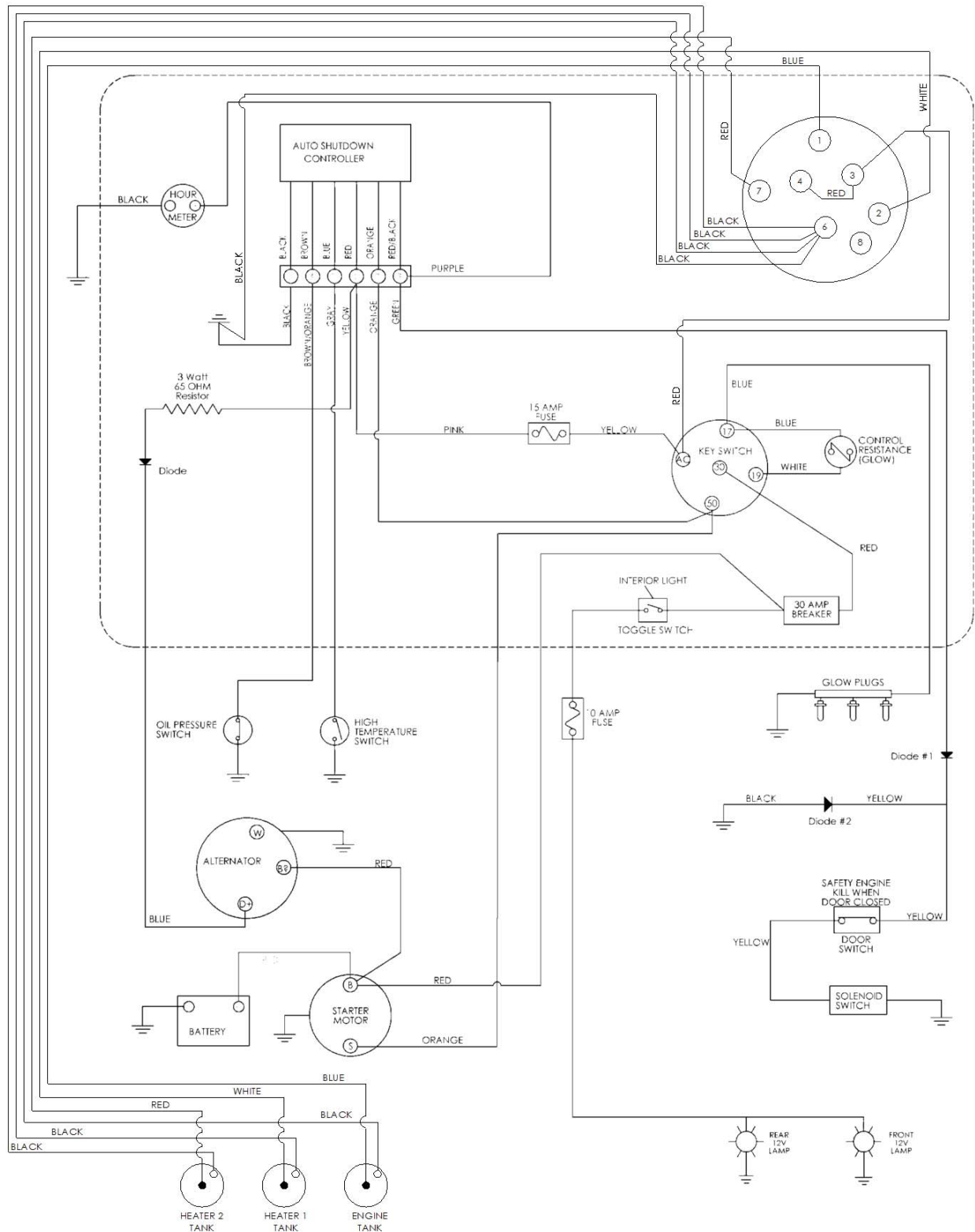


FUEL CIRCUIT SCHEMATIC



ENGINE WIRING SCHEMATIC

CAT C1.5 ENGINE



MAXI-HEAT® DUCTWORK INSTALLATION OPTIONS



Illustration of lock pin and arrow on 16" slip lock connector (pn848974) for duct installation



Duct ready for installation on heater using 16" Slip-Lock Connectors (pn 848974)



Connecting Band (pn848976) for connecting multiple hose lengths



Duct (pn848172) installed on connecting band (pn848976) with 16" screw clamp (pn848176)

MAXI-HEAT® DUCTWORK INSTALLATION OPTIONS

Installation Instructions for Installing the Slip-Lock Duct Connectors (PN #848974)

Duct-Work Section – Outer Ring

1. Slide the end-cuff of the ducting over the larger outer ridge and stop when the cuff makes contact with the small inner ridge (approximate center of connector ring). This leaves 1" of the outer ring exposed. Note: Make sure that this alignment remains constant all the way around the outer ring.
2. Using a scratch awl, poke a hole through the ducting at the location of each of the (3) 3/16" holes and attach the ducting (large head on outside of duct-work) to the outer ring using a pop rivet gun and (3) 3/16" pop rivets
3. Take the 16" screw clamp (PN #848176) and install it right over the top of the (3) 3/16" rivets on the outer ring and tighten down securely on the ducting. Note: Make sure that this alignment remains constant all the way around the outer ring before tightening.
4. Your ductwork is now ready to be connected to the heater unit.

