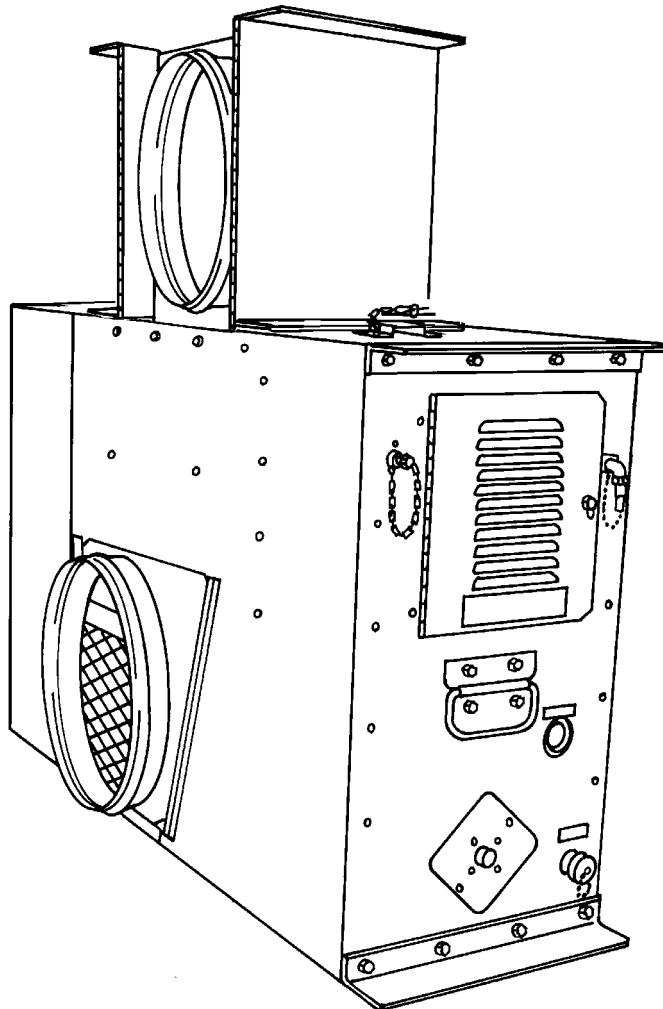


HUNTER

Heater, Tent Model UH68ODK, UH68ODH

Manual for UH68G1 with
Hunter Part Number 53100
Outdoor Kit Installed and
UH68ODH, Part Number 168325



Hunter Manufacturing Company
30525 Aurora Rd
Solon, OH, 44139
www.huntermfgco.com

WARNING!



FUEL WARNING

Gasoline and JP-4 should NOT be used with the UH68OKD/ODH under any circumstance. Only JP-8 or an approved alternate fuel as detailed in Chapter 1. Failure to observe fuel requirements could cause damage to the heater assembly and injury or death to personnel within or around the tent and the heater assembly. Always place fuel can in well-ventilated area as far away from open flames and other potential ignition sources as possible. Fuel spills shall be cleaned up in accordance with local requirements. Always switch heater to the OFF position and wait until the vent fan is off before refueling.



EXPLOSION HAZARD FUEL LEAKS

Do not operate heater if fuel leak is detected.



DEATH OR SERIOUS INJURY CARBON MONOXIDE

Carbon monoxide is without color or smell, but can kill you. Breathing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. Carbon monoxide can become dangerously concentrated under conditions of no ventilation.

Precautions must be followed to ensure operator's safety when the Space Heater, Convective is in operation.

- DO NOT operate Heater in an enclosed area without proper ventilation.
- BE ALERT at all times during operating procedures for carbon monoxide poisoning. If symptoms are present, IMMEDIATELY evacuate personnel to fresh air.
- BE AWARE the field protection mask used for nuclear-biological-chemical attack WILL NOT protect you from carbon monoxide poisoning.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION.



ELECTRIC SHOCK

Always disconnect power cable from heater before doing any type of service work or repairs.



SEVERE BURNS HOT EXHAUST

DO NOT MOVE THE HEATER ASSEMBLY WHILE ANY OF THE ADVISORY LIGHTS ARE LIT.

Small, portable, shelter heaters of this type are not designed to be moved during operation or before purge cycles are complete. Serious injury, burns, or death can occur if the heater assembly is moved while operating, the HEAT LED is on, or the vent fan is still running.

During operation, some metal components of the heater assembly, such as the outlet duct, the Pop Up Duct Adapter, combustion exhaust pipe, etc., can cause severe burn injuries if contact with bare skin occurs.

During heater operation, air leaving the HEATED AIR OUTLET of the heater and passing through outlet duct may exceed 220°F. Make sure tent personnel are aware of burn hazards and equipment hazards presented by the heated air.

Combustible material must be kept at least 2 feet away from the sides of the heater during operation.

Do not attempt service procedures on a burner that has recently been in operation. Let the burner cool down before performing these procedures to avoid the possibility of serious burns. Never touch the exhaust stack while heater is operating. Surface temperatures can exceed 800 degrees F. Allow sufficient time for heater to cool before removing exhaust stack. The exhaust elbow will remain hot for several minutes after the heater has shut down.

Chapter 1 Introduction

Scope

Type of manual: Operators

Model and Name: UH68ODK and UH68ODH, Forced air tent heater, with ducts.

Purpose of Equipment: Circulates heated air in the Alaska, TEMPER tent, and other soft walled structures. Maintains temperature via room thermostat in the remote control panel. Control panel also has diagnostic and operating LED's.

General

The UH68ODK is Hunter model UH68G1 modified for outdoor usage. The outdoor kit may be field installed or factory installed. The UH68ODK burns all grades of diesel fuel and JP8 to generate heated air. Fuel is pumped from remote tank to the carburetor, drawn through the fuel jet by venturi action of the mixer nozzle, ignited, and burned in the heat exchanger. A fan, capable of delivering up to 2 IWC static pressure, blows the heated air into the tent. The UH68ODK has the following applications:

- Alaska tent, Temper Tent
- Medium and small soft wall shelters

Features

- Variable room temperature control
- Remote control with 20 foot cable
- Diagnostic LED's on remote control
- Low voltage opto-isolated controls to eliminate shock hazard.
- "Fan only" ventilation.



WARNING!
ELECTRICAL SHOCK

Attempting to use an unmodified UH68 series heater outdoors may result in electrical shock, injury or death

Specifications

Manufacturer	Hunter Manufacturing
Model	UH68ODK
Voltage	120 VAC
Cycles	50-60Hz
Power	400 watts
Heat Output	60,000 BTU nominal
Air Flow	650 CFM @ .5 IWC Back pressure
**Fuel	*DF2, DF1, DFA, JP8
Dry Weight	130 Lbs.

* Heater is factory set on for DF2, adjustment to the carburetor is necessary for other fuels.

** Gasoline or MOGAS is not recommended for use on the UH68ODK

Environmental

Temperature Range	-65 to 120 F
Elevation	10,000 feet MSL

Authorized Fuels

NOTE: HUNTER MFG DOES NOT RECOMMEND THE USE OF GASOLINE OR MOGAS, or JP4

Ambient Temperature	Specification	Military Symbol
Above +20°F (-6,7°C)	VV-F-800	DF-2
Above -25°F (-33.3°C)	VV-F-800	DF-1
Above -25°F (-33.3°C)	MIL-T-83 133	JP-5
Above -60°F(-51.1°C)	VV-F-800	DF-A
Above-60°F(-51.1°C)	MIL-T-83133	JP-8

Chapter 2 Operating Instructions

Operator Controls and Indicators

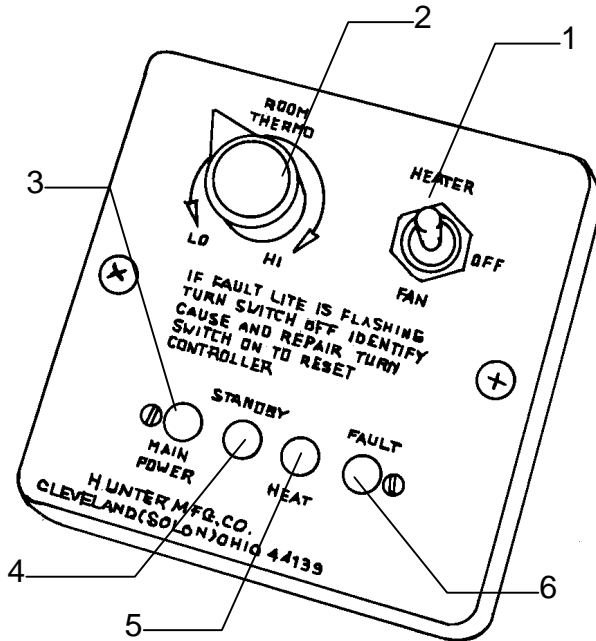


Table 2. Controls and Indicators

Key	Control or Indicator	Function
1	Main Switch	Starts and stops heater. FAN position turns fan only on for ventilation
2	Room Thermo	Set for desired temperature. *
3	Main Power LED (green)	Indicates heater is plugged in to AC power
4	Standby LED (green)	Indicates main switch is ON but room thermo is not calling for heat
5	Heat LED (green)	Indicates main switch is ON and combustion system is energized
6	Fault LED (red)	Blinks a diagnostic code for corresponding fault. (see fault codes table 3)

* Heat output is constant. Raising room thermo setting does not heat shelter faster.

Table 3. Blink Codes

Number of Blinks	Problem
1	Low voltage at AC input (< 100 VAC)
2	Reverse polarity at AC input
3	High voltage (>130 VAC)
4	Not used
5	PC Board over temp
6	Not used
7	Not used
8	Ignition Fault Lockout

Note: Only the Ignition fault lockout will shut down the heater. Any other code will flash the red led, but still allow the heater to operate normally.

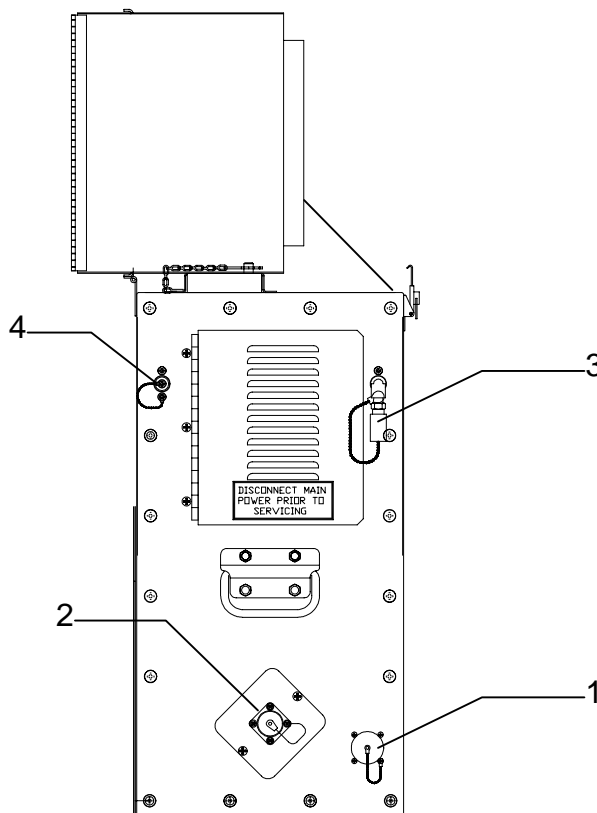


Table 4.

Key	Connection / Fitting	Function
1	Power Receptacle	Connection for power cable
2	Remote Control Receptacle	Connection for remote control
3	Fuel Inlet	QD fitting for fuel supply
4	Fuel Overflow	QD fitting for fuel overflow

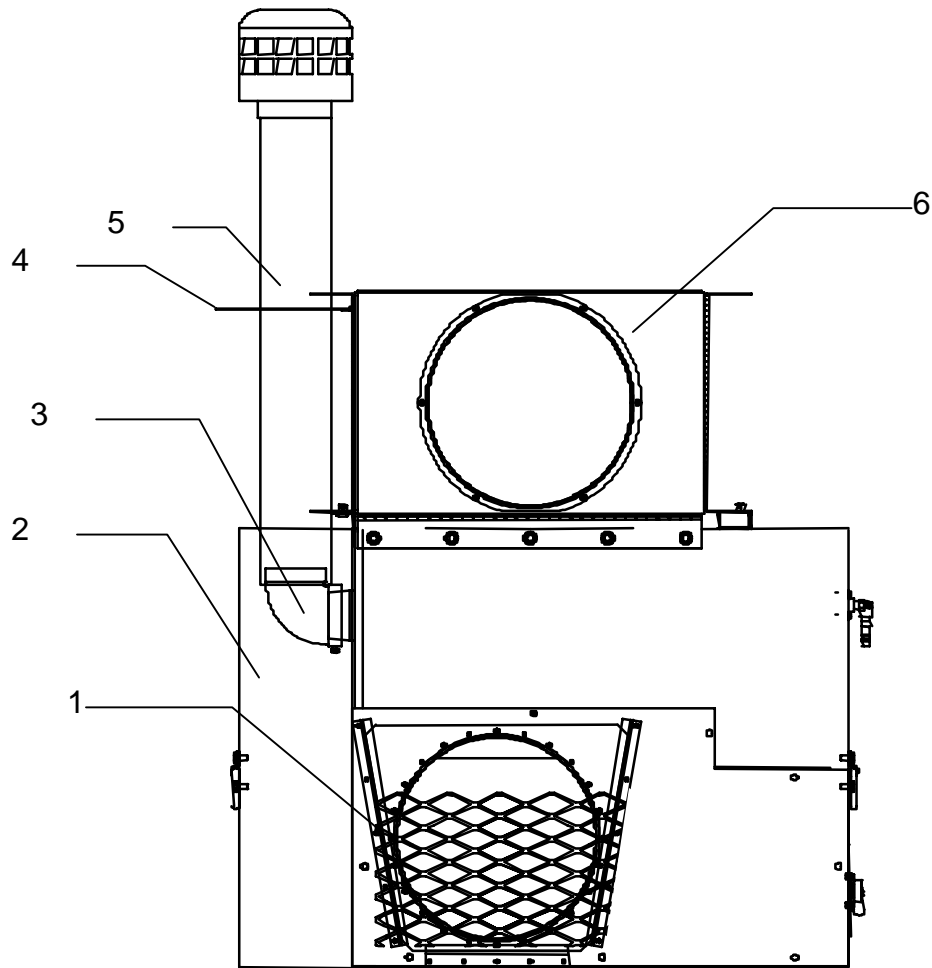


Table 5.

Key	Description	Function
1	Inlet Adapter	Attachment point for return air duct
2	Storage compartment	Storage for stack, fuel lines, power cord etc.
3	Exhaust elbow	Exhaust stack rests on top
4	Stack support	Holds exhaust stack securely
5	Exhaust stack	Double wall exhaust stack for extra safety
6	PUDA	Pop Up Duct Adapter , attachment point for supply duct

Operation Under Usual Conditions

Setup

Alaska Tent TEMPER Tent

Completely setup the Alaska tent, and deploy the duct collars at the end in which you are to setup the heater. Make sure the generator or power supply is on line.

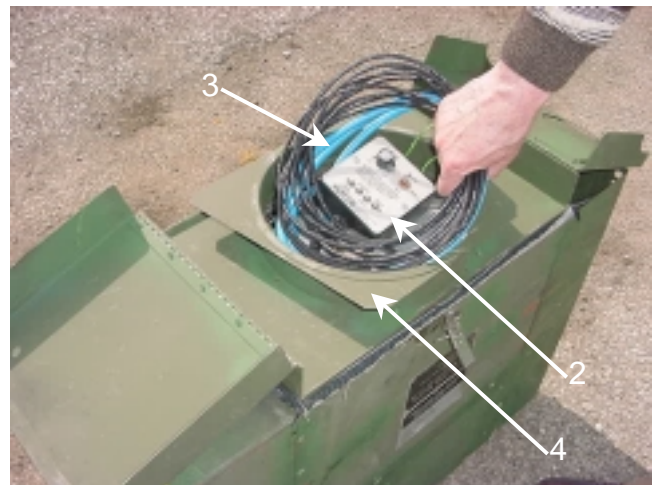
Before setting up the tent and heater, some thought should be given to the orientation of the structures as to the prevailing wind direction. Try to orient the heater and shelter so the exhaust is blown down range away from doors and shelter openings.



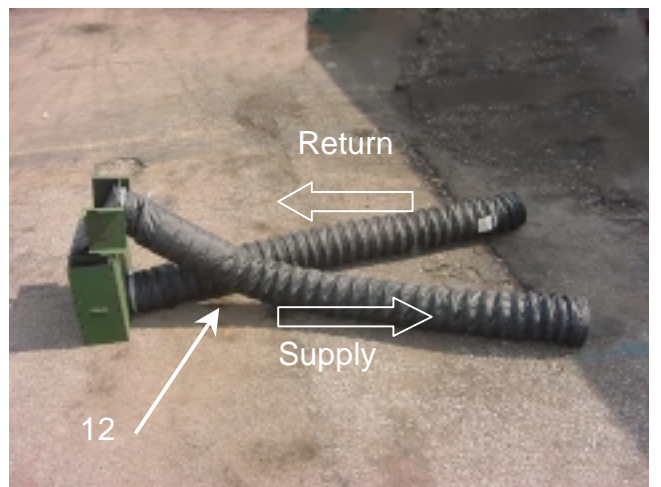
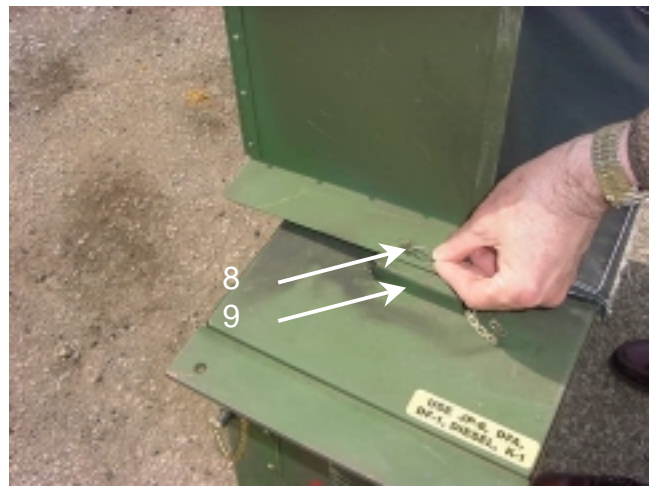
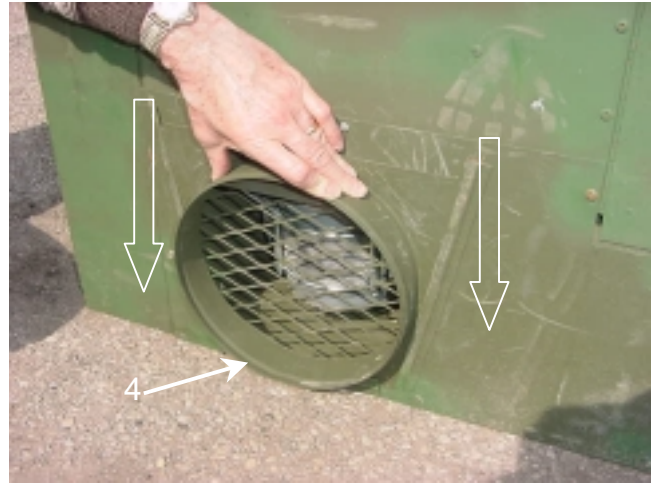
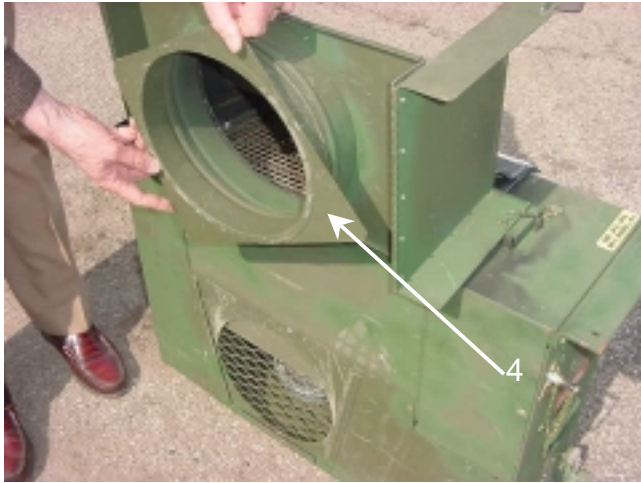
CAUTION
TWO PERSON LIFT

The UH68ODK weighs 130 Lbs. Attempting to lift without proper personnel may cause serious injury

1. Move the UH68 ODK into position near the duct collars. Set up off ground using skid or similar.
2. Open PUDA **(1)** and remove remote control**(2)** power cord**(3)** and inlet adapter**(4)**.
3. Attach inlet adapter**(4)** to heater and attach return duct**(5)** using band clamp**(6)**. Pay special attention to airflow tag**(7)** on duct. **DO NOT PUT RETURN DUCT ON BACKWARDS.** This will restrict incoming airflow.
4. Deploy PUDA**(1)** by tilting upwards and putting pins**(8)** in supports**(9)**.
5. Attach supply duct**(10)** using band clamp**(6)**. Pay special attention to airflow tag**(7)**.
6. Pull ducts into tent and point heated air duct away from inlet duct, towards center of tent. Pull heater away from tent until ducts are straight but not taught **(12)**.



UH68 ODK/ODH Tent Heater Operators Instructions

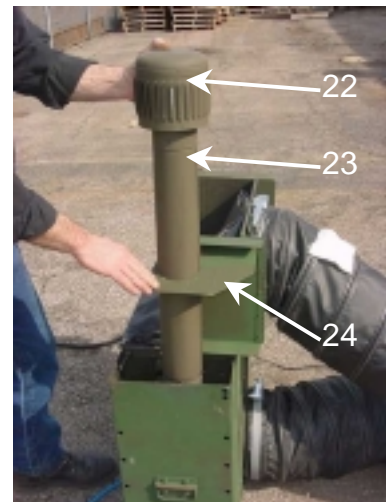
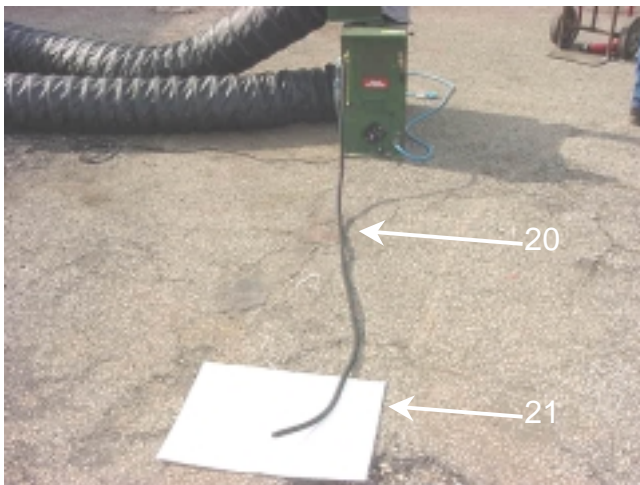
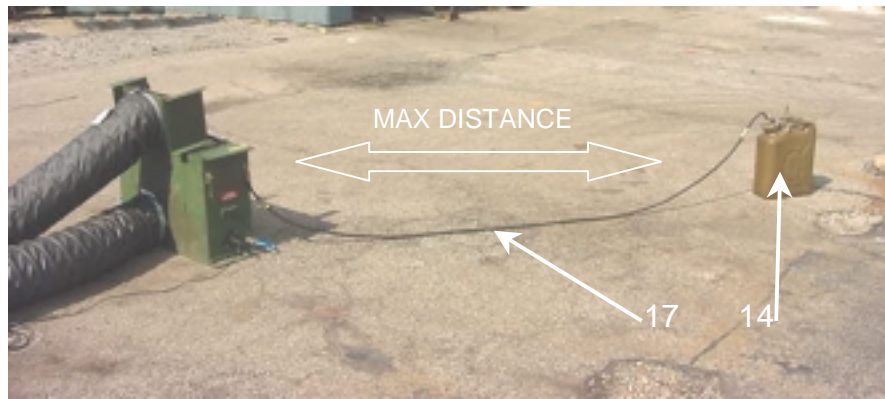
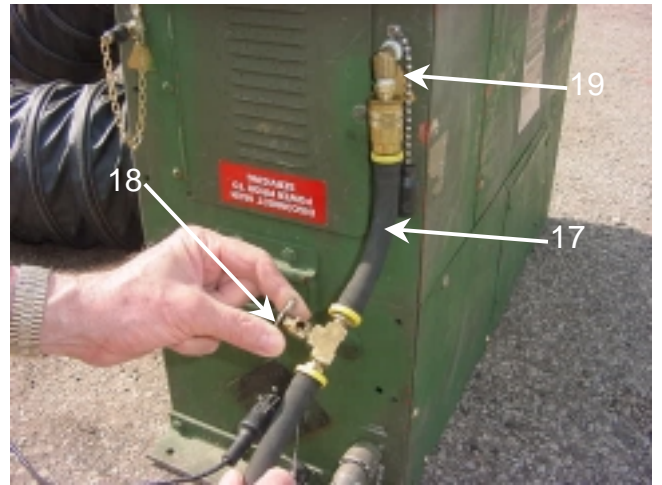
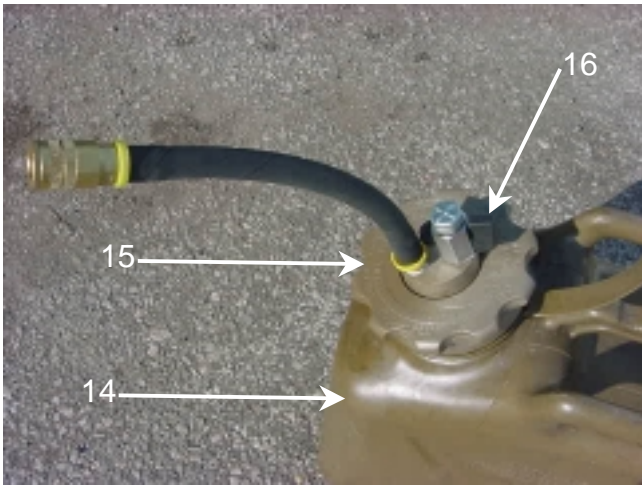


UH68 ODK/ODH Tent Heater

7. Uncoil remote control **(2)** inside tent and feed through the collar with the return duct**(5)**. Attach remote control **(2)** to heater. Make main sure switch is in the off position.
8. Attach power cable **(3)** to heater then plug in to power supply. The green, main power LED, on the remote panel should illuminate.
9. Check fuel in can**(14)**, fill if necessary with authorized fuel (see section one). Attach Suction Feed Adapter**(15)** and open vent**(16)**.
10. Attach fuel supply line**(17)** to Suction Feed Adapter**(15)**. Make sure drain cock**(18)** on supply line**(17)** is closed. Attach supply line**(17)** to heater QD fitting**(19)**. Move the fuel can**(14)** as far away from the heater as possible without pulling the fuel supply line**(17)** taught.
11. Attach overflow line**(20)**
NOTE!
Open end of overflow hose should discharge to a safe, outside location along a downslope and below the level of the heater. A piece of commercial petroleum absorbent material **(21)**, will be placed under the end of the overflow hose to catch any fuel that may spill.
12. Attach exhaust stack cap**(22)** to stack**(23)**. Slide exhaust stack**(22)** through stack holder**(24)** on side of PUDA and over exhaust elbow. Push down on stack holder**(24)** to stabilize stack.



UH68 ODK/ODH Tent Heater Operators Instructions



Operating Procedures

The UH68 ODK can be operated in either of two modes:

- a. Heating mode.
- b. Fan only mode.



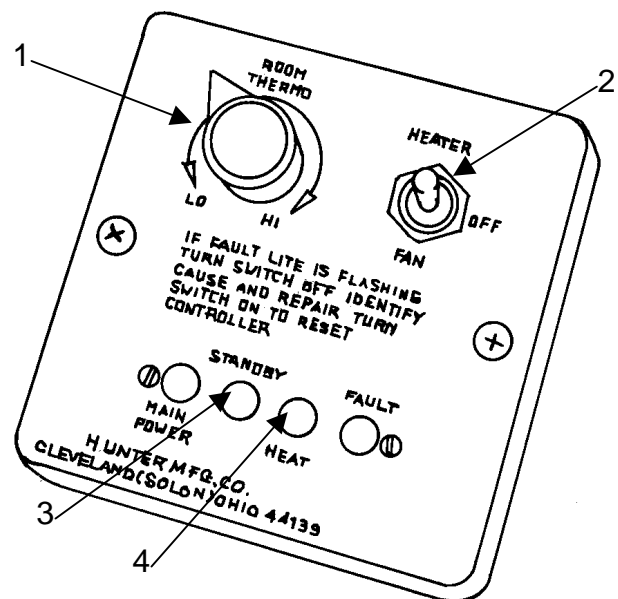
CAUTION

Never operate the UH68 ODK with the pop up duct adapter closed. Damage to the internal parts may occur.

Heating Mode

1. Set the room thermo (1) to the lowest detent setting.
2. Move main switch (2) to HEAT. The green standby LED (3) should illuminate
3. Rotate the room thermo until the green HEAT LED (4) illuminates.

After a five second delay the burner will come on. You may not hear the burner if you are inside the tent or there is a lot of ambient noise. The vent fan will come on when the heat exchanger comes up to temperature. The amount of time will vary (30 to 120 seconds) depending on the ambient temperature. Once the vent fan comes on the heater will continue to operate until the call for heat from the room thermo is satisfied or the main switch is turned off. If the airflow is reduced due to very high back pressure, the burner will cycle off from time to time.



4. Adjust room thermo (1) as necessary.

Fan Mode

Use this mode when no heat is required.

1. move main switch (2) to FAN position.

The vent motor will start and ambient air will circulate through the shelter

Shutdown



CAUTION

Never disconnect power to the heater while heat exchanger is hot. Damage to the internal parts may occur.

1. Place main switch in off position.

Vent fan will continue to run until heat exchanger has cooled down. The length of time will vary depending on ambient temperature.

Operation Under Unusual Conditions

Extreme Cold, Below 10°F

There is a thermostatically controlled fuel heater in the carburetor block. This heats the fuel when the temperature drops below 40 degrees F. Preheating the fuel aids combustion ignition during extremely cold conditions. Take these steps to insure reliable operation during extreme cold:

1. Keep fuel can full to prevent condensation in tank.
2. Clean snow and ice from fuel can filler to prevent moisture from entering fuel can, causing fuel line freeze up.
3. Rotate the room thermo fully counter clockwise to the lowest detent setting. Turn main switch to heat. Allow heater to stand for about sixty seconds. This allows the carb heater to reach operating temperature before heater is started. Operate as described in HEAT MODE section.

Operation at High Altitudes

The UH68 ODK is designed to operate at elevation up to 10,000 feet without any modifications. At 10,000 feet heat out put may be reduce about 15 percent. This is a normal condition which cannot be prevented.

Operation Under Rainy Conditions

1. The remote control panel is water-resistant. No special instructions for setting up in the rain.
2. Do not remove protective covers from the remote and power receptacles until ready to connect.
3. To keep rain water from collecting around heater, place heater on skid **(1)**, bricks or small logs. Make sure heater is stable.
4. Paint all chipped and scratched surfaces to prevent rust



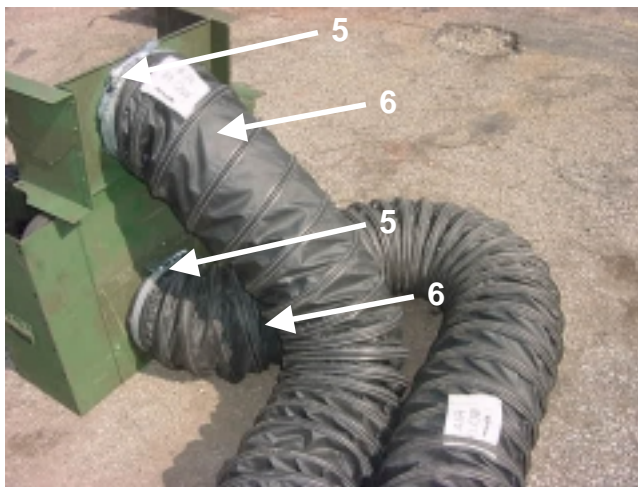
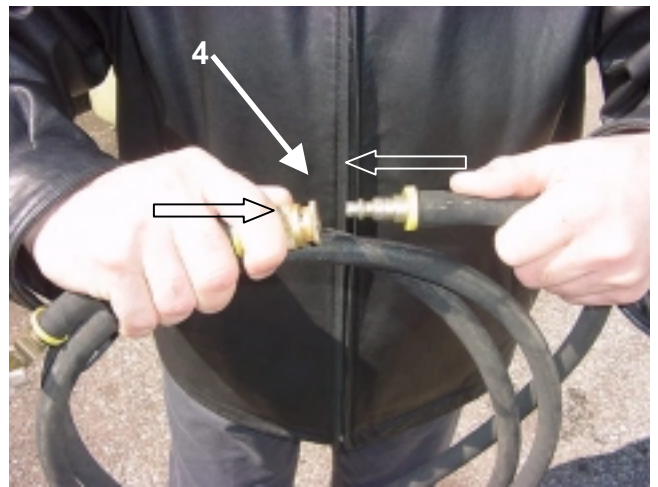
Strike Procedure

1. Drain fuel lines
 1. While heater is burning, open drain cock **(1)** on fuel supply line. Let heater run until you hear combustion stop. (burner)
 2. Move main switch to OFF and allow heater to cool.

BEFORE PROCEEDING MAKE SURE HEATER IS COOLED DOWN AND DISCONNECTED FROM POWER SUPPLY

3. Close drain cock **(1)** on supply line. Using a rag or fuel absorbent mat remove supply line from heater at QD fitting. Make sure to hold rag beneath heater QD fitting to catch any fuel left in the fitting.
 4. Attach heater QD cover **(2)**.
 5. Hold supply line **(3)** above fuel can and open drain cock **(1)**. Raise as high as possible to let fuel drain into fuel can.
 6. Close drain cock **(1)** and detach supply line from suction feed adapter. Coil up supply line and connect both ends together **(4)** to keep out dirt.
 7. Disconnect overflow line and coil up. Attach QD cover **(2)**
2. Disconnect ducts **(6)** and clamps **(5)**, store separate from the heater. (* see duffle bag option for storage)
 3. Remove stack, fold PUDA fabric **(7)** and close PUDA leaving doors open.

UH68 ODK/ODH Tent Heater Operators Instructions



UH68 ODK/ODH Tent Heater

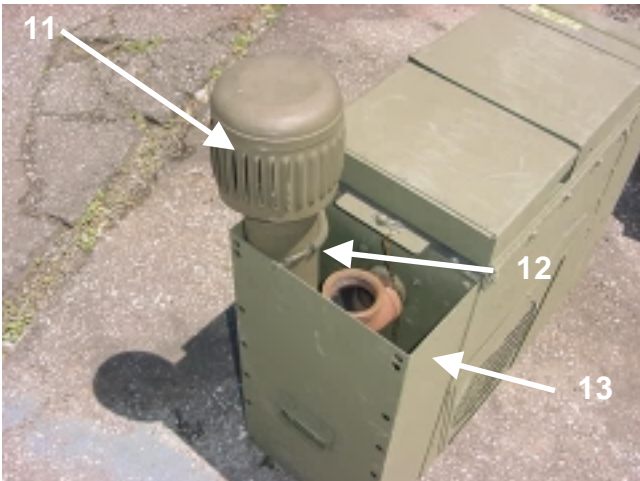
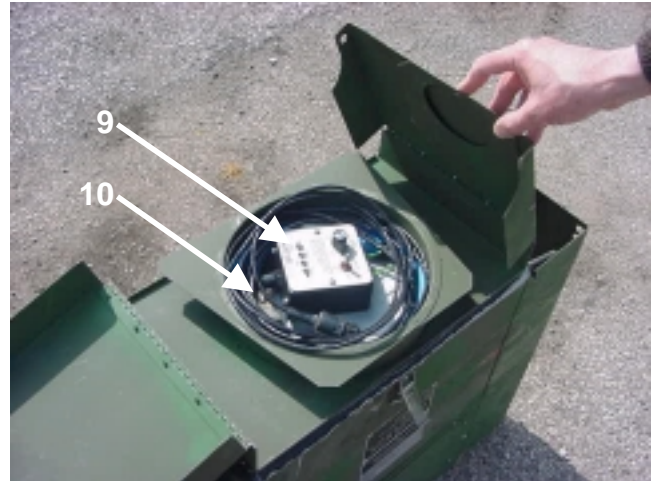
4. Remove inlet duct collar **(8)** and stow in PUDA
5. Disconnect Remote Cable **(9)** coil up and stow in PUDA
6. Disconnect power cable **(10)**, coil up and stow in PUDA. Close PUDA
7. Remove stack **(11)** and stow in storage compartment **(13)**. Secure with spring hold down **(12)**.*
8. Store fuel lines in storage compartment **(13)**
9. Fuel can adapter may be left on the fuel can. Make sure to close the air vent **(17)**.

Heater can now be transported.

*Packing using duffle bag

1. collapse both ducts **(14)** together.
2. place band clamps **(15)** over collapsed ducts
3. place stack **(11)** inside ducts
4. place all inside duffle bag **(16)**
5. Fuel can adapter may be left on the fuel can. Make sure to close the air vent **(17)**.

UH68 ODK/ODH Tent Heater
Operators Instructions



Chapter 3 Maintenance Instructions

Lubrication Instructions

Doors, Pop Up Duct Adapter

Lubricate all hinges with MIL-A-907 anti-seize compound.

Preventative Maintenance Checks and Services (PMCS)

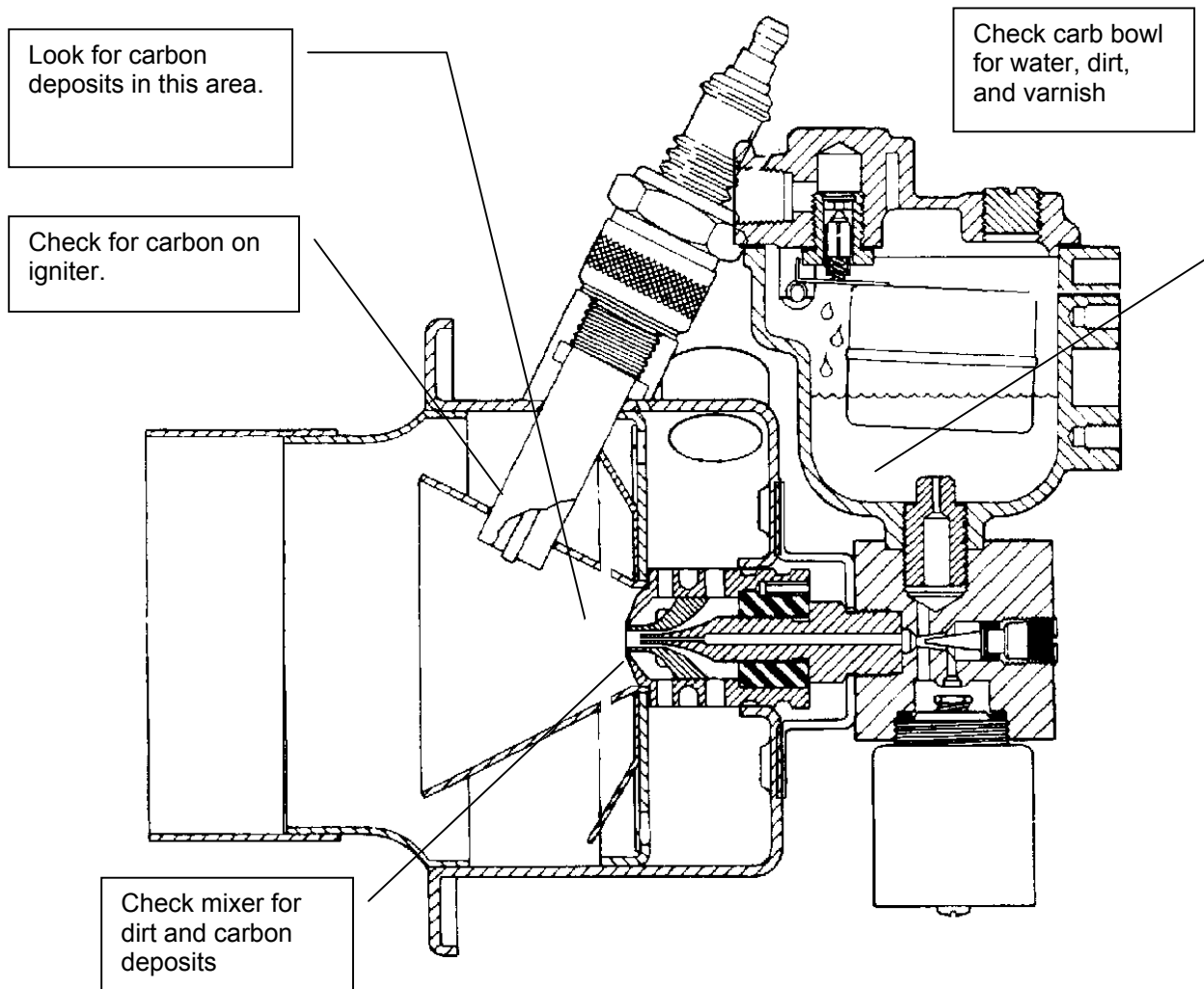
Systematic, periodic PMCS are essential to ensure that the heater is ready for operation at all times.

B – Before Operation A – After operation
D – During Operation Q – Quarterly

Description	Ref. Para.	Daily	Monthly	Semi Annually	Annually	Interval
Fuel Line system	1.1					BDA
Exhaust Stack	1.2					B
Fuel Supply	1.3	X				BD,9Hrs
Electrical Connections	1.4					B
Remote Control Panel	1.5					B
PUDA	1.6					B
Ducts	1.7					B
Sediment Bowl	1.8					1000 Hrs
Carburetor	1.9					500 Hrs
Burner Head	1.9				X	
Igniter	1.10				X	
Fuel Pump	1.11				X	
Heat Exchanger	1.12				X	
Overheat Safety System	1.13					B

PMCS Procedures

- 1.1 Fuel Line System** - check all fuel lines and fittings for leaks. Make sure vent at top Suction Feed Adapter is clear of ice and snow.
- 1.2 Exhaust stack** - make sure exhaust stack is clear of ice and snow. Check for damage or anything that might obstruct the flow of exhaust gas.
- 1.3 Fuel Supply** – before filling, check for water or dirt at the bottom of the can. Fill can before operation. Heater will operate for about 9 hours with full can. Check at regular intervals to avoid running dry.
- 1.4 Electrical connections** - check cord for nicks or cuts, make sure cord is securely plugged in to power supply
- 1.5 Remote Control Panel** – check cord for nicks or cuts. Check overall condition of control box
- 1.6 Pop Up Duct Adapter** – check for cuts in fabric. In the field, repair cuts with duct tape. Cuts may be sewn shut. If cut is too large to be sewn shut, replace entire fabric interface.
- 1.7 Ducts** - check for cuts in fabric. In the field, repair cuts with duct tape. Cuts may be sewn shut. If cut is too large to be sewn shut, replace entire duct.
- 1.8 Sediment Bowl** – check for dirt and water. Clean if necessary.
- 1.9 Carburetor, Burner Head** – use the following procedure to service the carb and burner head:



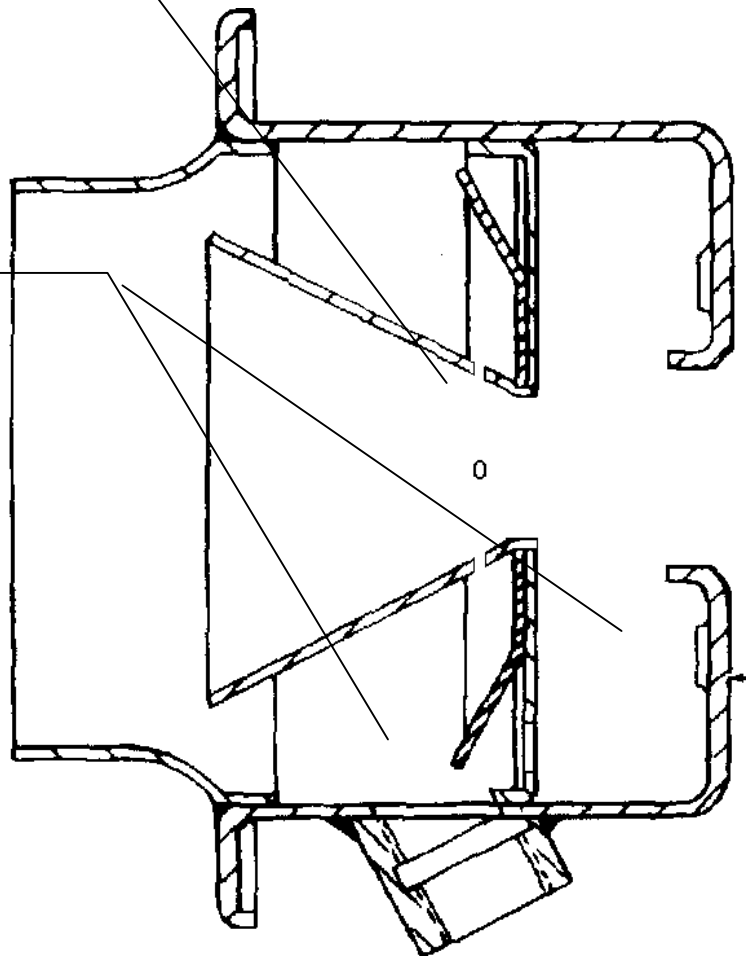
Cleaning, burner head

1. Remove Carb mixer assembly
2. Remove Igniter

3. Clean carbon deposits in this area. Use a small wire brush.

4. Clean these areas using compressed air.
CAUTION: Wear appropriate eye protection when performing this operation

5. Finish up with solvent wash commonly used in parts cleaning stations or carb cleaner. Let dry before assembly.



Cleaning, Mixer

1. Remove mixer from carb assembly

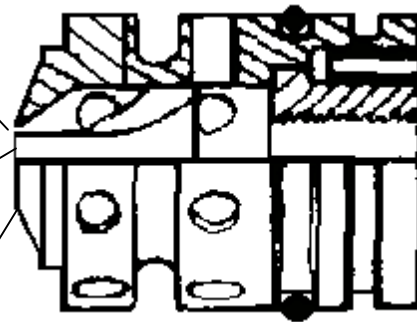
Caution: The mixer assembly is made of brass and can be scratched or dented very easily. Great care must be taken not damage the mixer nozzle. The performance of your heater depends on this delicate part.

2. Soak mixer in solvent bath for an hour or so to loosen up carbon deposits.

3. With a flashlight look for dirt or carbon here. Dirt may be blown out using compressed air. **Do not use a pick or any hard tools to clean this area**

There are two concentric rings here. The center ring is paper-thin. Inspect for dents, scratches and nicks. This area must be free of dirt and carbon.

4. Clean this area using a soft cloth and solvent. Wipe with a twisting motion.



Mixer Assembly



IMPORTANT

If the mixer assembly cannot be cleaned satisfactorily, replace it.

Reassembly



IMPORTANT

The mixer assembly must be seated correctly to insure that your heater has good combustion.

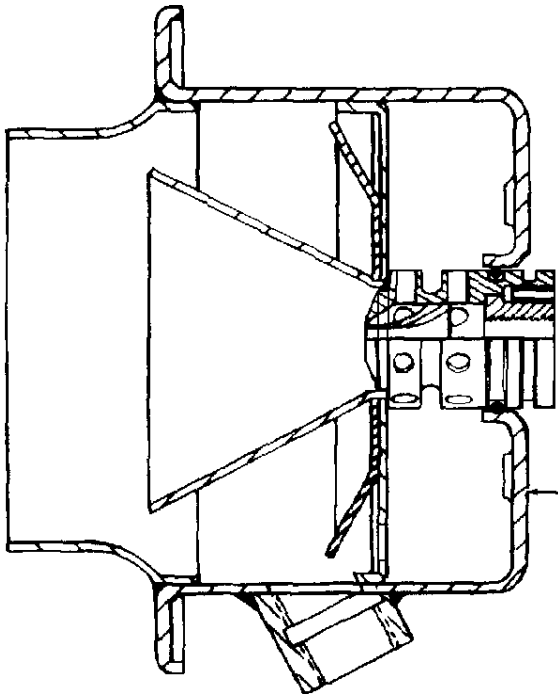


Figure 1

Figure 1 shows the mixer assembly properly seated in the burner head.
(carburetor not shown for clarity)

Figure 2 shows the mixer incorrectly seated. If left in this position combustion air will leak past the mixer and cause poor combustion and hard starting.

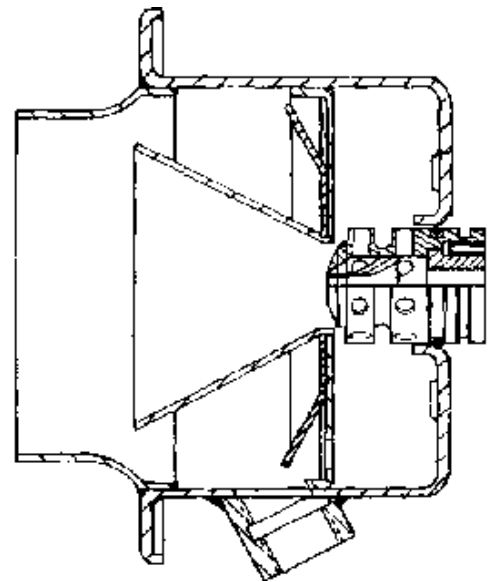
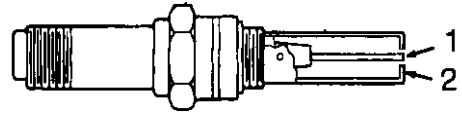
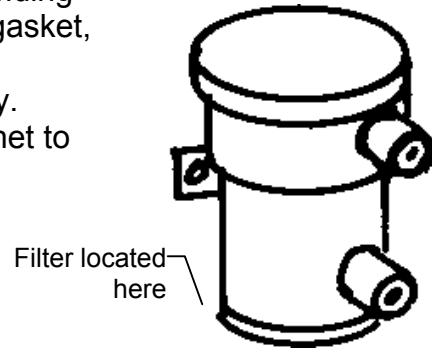


Figure 2

1.10 Igniter – Check igniter for carbon build up and signs of wear. As the igniter wears the gap between 1. and 2. will become wider and oval shaped. Replace when signs of wear are evident.



1.11 Fuel Pump – the fuel pump has a filter screen located at the inlet end. To clean remove three screws holding the cap on, remove the cap being careful not to tear the gasket, and remove the filter screen. Pay close attention to the orientation of the filter screen in the pump for reassembly. Clean screen and cap with carb cleaner. Cap has a magnet to trap metal particles. Reassemble and check for leaks.



1.12 Heat Exchanger



WARNING!
DEATH OR SERIOUS INJURY
CARBON MONOXIDE

The heat exchanger must be inspected annually, or more frequently if heater usage is heavy. A damaged heat exchanger can allow poisonous gases to seep into the heated enclosure causing illness or death to occupants.

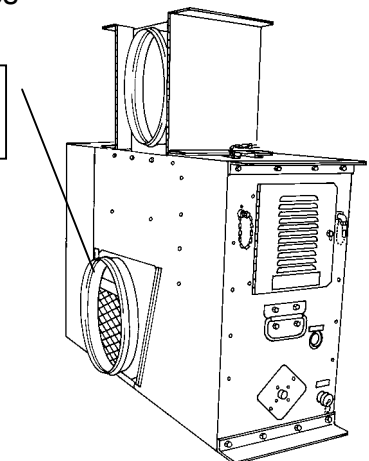
Inspect heat exchanger in accordance with the procedures in TM 5-4520-253-13

1.13 Overheat Safety System

The overheat safety switch must be cycled before heater is used after storage or replacement of overheat switch.

Overheat Testing - Start heater and let run for about 10 minutes without the ducts attached. Using a piece of paper or similar, block the inlet air about three-quarters of the way shut. At 70 degrees F the heater will shutdown in about a minute. Temperature at shutdown should be between 275 and 300 degrees F. If the overheat safety switch does not work it MUST be replaced. Replace thermostat in accordance with procedures in TM 5-4520-253-13, 3-105

Block inlet air here for testing



Chapter 4 Troubleshooting

General

This section contains information for locating and correcting most operating problems. This manual can not list all that may occur. When performing trouble shooting procedures, follow all warnings and safety procedures. At no time does this manual supercede good common sense.

Sequence of Operation

1. Move main switch to HEAT. The green standby LED should illuminate
2. Rotate the room thermo to the nine o'clock position or until the green HEAT LED illuminates.
3. After a five second delay the burner system will come on. This includes the ignition transformer, fuel pump, fuel solenoid, and combustion blower.
4. The vent fan will come on when the heat exchanger comes up to temperature and the flame switch closes. The amount of time will vary (30 to 120 seconds) depending on the ambient temperature.
5. Once the vent fan comes on the heater will continue to operate until the call for heat from the room thermo is satisfied or the main switch is turned off. If the airflow is reduced due to very high back pressure, the burner will cycle off from time to time. This is normal.

Blink Code Troubleshooting

Blinks	Para.	Problem / Remedy
1		Low voltage at AC input (< 100 VAC) Check power supply or generator. If using an extension cord, make sure the wire is heavy enough.
2		Reverse polarity at AC input Check power supply or generator. If using an extension cord check connections.
3		High voltage (>130 VAC) Check power supply or generator
4		Not used
5		PC Board over temp
6		Not used
7		Not used
8		Ignition Fault Lockout
	1.1	Check fuel supply, refill if necessary.
	1.2	Check Flame switch.
	1.3	Check fuel pump
	1.4	Check fuel flow at carburetor
	1.5	Check Ignition transformer
	1.6	Check Overheat thermo

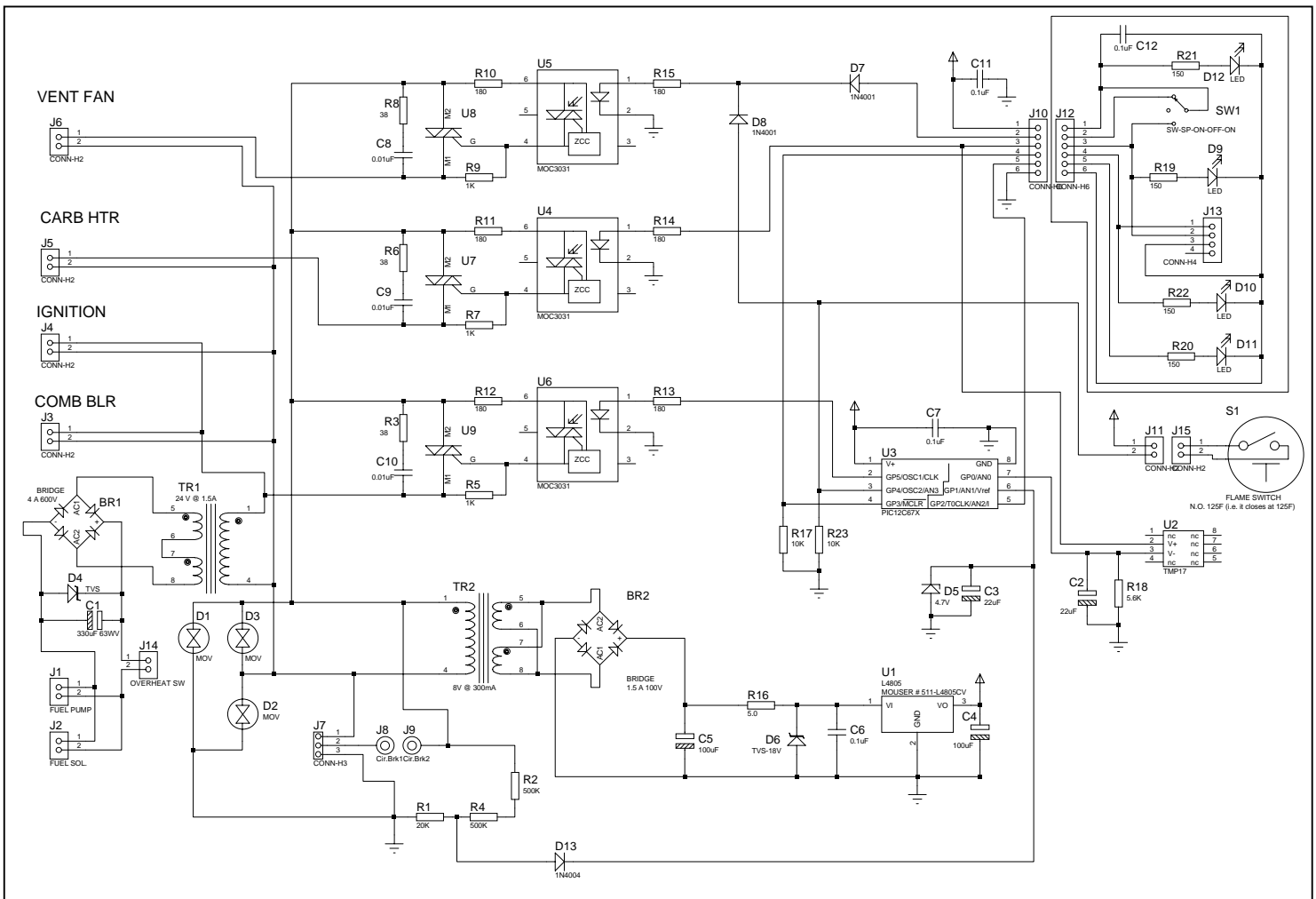
UH68ODK Tent Heater

Note on Blink Codes

Only the ignition fault will stop heater operation. The other flash codes will be displayed but the heater will continue to operate.

Troubleshooting Procedures

Electrical Schematic



Troubleshooting Procedures

1.1 Fuel Supply – See PMCS

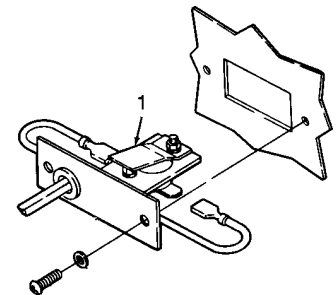
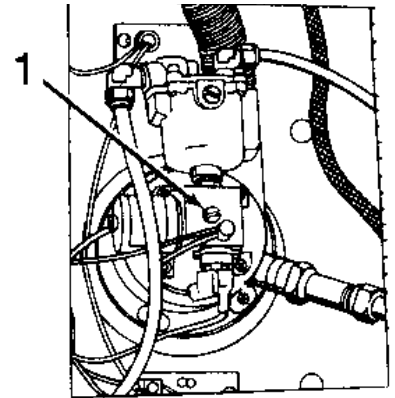
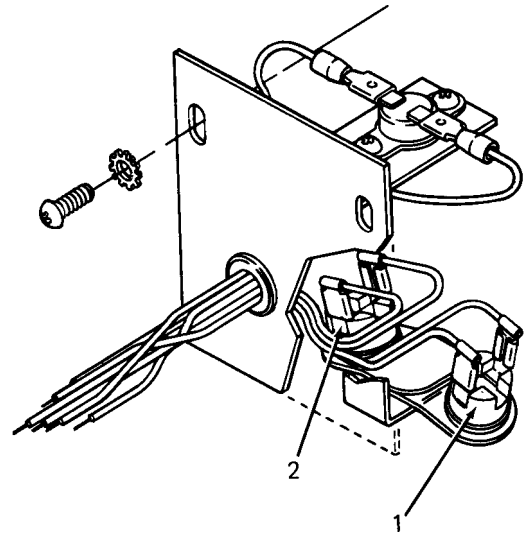
1.2 Check Flame Switch – the flame switch is a normally open heat sensitive switch. The UH68G has two switches. As used in the 68 outdoor kit, only the normally open switch is active. Normally switch 1, red and brown wires, is used. The other switch is normally open and is not used.

1.3 Check Fuel Pump – The fuel pump operates on 24vdc. Energize the pump and listen for operation. Remove outlet connector and check for fuel flow. Pump develops about 4 psi., if fuel slowly runs from pump, clean filter as defined in PMCS. If fuel runs out of pump at a good steady rate pump is ok.

1.4 Check Fuel Flow at Carburetor – remove fuel needle (1), start heater. when combustion blower comes on fuel should run from the fuel needle hole. If not fuel flow has been stopped up stream. Check fuel solenoid and float bowl needle and seat.

1.5 Check Ignition Transformer – **CAUTION! The ignition transformer develops 10,000 volts.** Disconnect ignition cable from igniter. Position spring at tip of cable not more than 1/8 inch from grounded surface. Turn heater on. If no spark is detected, check power to igniton transformer.

1.6 Check Overheat Thermostat – the overheat thermostat (1) is a normally closed temperature sensitive switch. Disconnect wires from switch, and check continuity across switch.



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