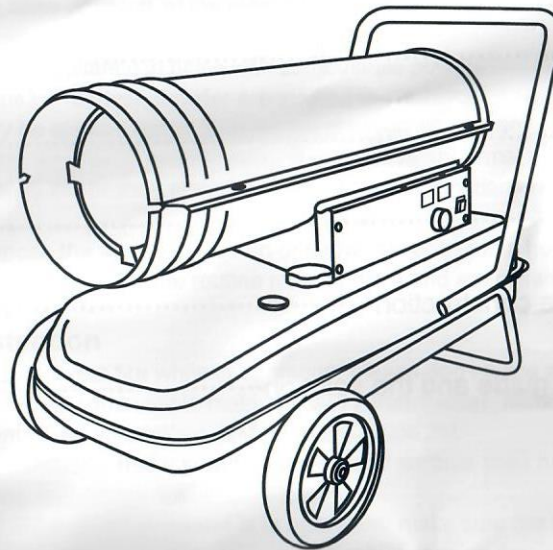


marko™ heating

DIESEL OIL HEATERS

INSTRUCTION MANUAL

BENZINE WILL BE FORBIDDEN
USED IN AERATION



YOU SHOULD READ THE MANUAL CAREFULLY BEFORE USING, AND KEEP
THE MANUAL WELL

Contents

Precautions-safety guide.....	Page1
Overview of heater design and Installation.....	Page2
Dimension technical parameters.....	Page3
Technical parameters	Page4
Prepare before using.....	Page5
Operation.....	Page6
Working principles.....	Page7
Maintenance.....	Page8
Introduction of the construction.....	Page9、 10
Trouble shooting guide and the solution.....	Page11.12

【Precautions-safety guide】

Page 1

For your own and other's safety please read this USER'S MANUAL and follow its instructions carefully.

▲ Danger

- 1、 The use of gasoline is strictly prohibited, it is high volatile fuel that can cause an explosion or uncontrolled flames.
- 2、 Never use the heater where flammable vapors may be present, there is danger of explosion, fire and burning.
- 3、 Always provide adequate ventilation during the use. Only use the appliance in well ventilated area, the air must be regular exchanged during the use (two times/one hour) , inadequate burning caused by oxygen shortage can cause carbon monoxide poisoning.

▲ Warning

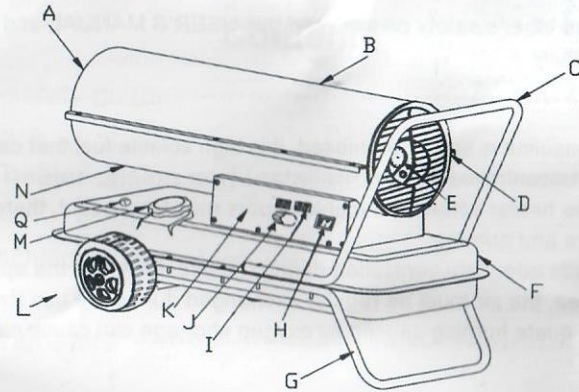
- 1、 Don't use spay products at the location where the heater is used. the gas from the spay tin can cause danger of fire and explosion.
- 2、 Don't use the appliance in place with combustible powder (wastepaper, wood crumbs, fibre scraps) , if these powder are sucked in the heater and heated up, flake and spark may be ejected out and cause fire and burning danger.
- 3、 Never block air inlet or heating part, it can cause abnormal burning and fire.
- 4、 Never modify the heater, alteration may cause malfunction and fire, is very dangerous.
- 5、 Don't expose the appliance to rain or snow, never use it in humidity places either. Pull out the plug before the routine maintenance and examination.

▲ Pay Attention

- 1、 In order to prevent fire while in operation, please don't place articles neat the heater. Keep all combustible materials away from heater. Minimum clearances: Outlet(front) 3M, air inlet(rear)2M, top 2M, side 2M.
- 2、 While in operation, make sure that the ground surface does not overheat. overheating may cause fire.
- 3、 Do not fill fuel tank while heater is in operation, make sure the heater stops and the flame is out. Filling while in operation may result causing fire.
- 4、 Before use the appliance, make sure that the voltage and frequency on site is in accordance with the ones shown on rating plate.

【Overview of heater design】

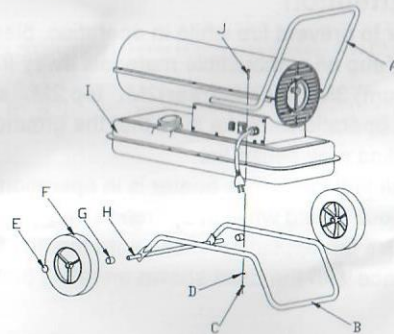
Page 2



A. Hot air outlet B. Upper shell C. Rear handle D. Back grill E. Pressure gauge F. Fuel tank G. Lower tube frame H. Power switch I. Display window J. Thermostat knob K. Side panel L. Wheel M. Fuel cap N. Lower shell O. Fuel gauge

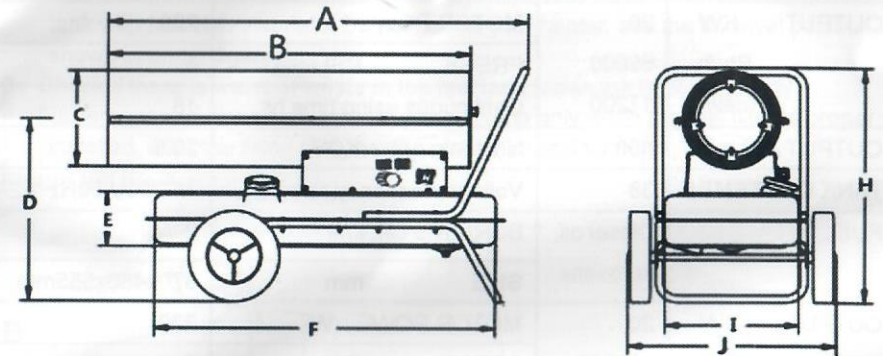
【Assembling wheels and tube frame】

1. insert the wheel axle to the corresponding hole of lower tube frame, set bushing G at the two ends, slide the wheel F over the wheel axle H, put on wheel cap E.
2. Put the heater body on the lower tube frame B, make sure the 4 holes of handle frame point towards the corresponding 4 holes on the lower tube frame respectively.
3. Insert screws J in the holes, place flat washers D under the lower frame B and tighten the hexangular screw C.
4. Insert other screws in the holes respectively and use a screw driver to tighten them by the same way.



【Dimensions】

Page 3



No.	MHT-D20	MHT-D30	MHT-D50
A	870mm	870mm	1090mm
B	690mm	690mm	950mm
C	210mm	210mm	225mm
D	405mm	405mm	490mm
E	140mm	140mm	160mm
F	795mm	795mm	980mm
H	555mm	555mm	720mm
I	375mm	375mm	375mm
J	460mm	460mm	520mm

【 Technical parameters 】

OUTPUT	KW	20	MOTOR POWE W	230
	Btu/h	69000	PRESS PSI	4
	Kcal/h	17200	Continuous using time hr	18
OUTPUT AIR	m3/h	600	N.W KGS	20.5
TANK CONTENT	L	38	Voltage, frequency, currency,	AC230V 50Hz 1.2A
FUEL	Diesel oil, kerosene	BURNING OIL L/hr	2	
		SIZE mm	870x460x555mm	
OUTPUT	KW	30	MOTOR POWE W	230
	Btu/h	102500	PRESS PSI	5
	Kcal/h	25800	Continuous using time hr	13
OUTPUT AIR	m3/h	720	N.W KGS	20.5
TANK CONTENT	L	38	Voltage, frequency, currency,	AC230V 50Hz 1.2A
FUEL	Diesel, oil, kerosene	BURNING OIL L/hr	3	
		SIZE mm	940x460x640mm	

【 preparation before the operation 】

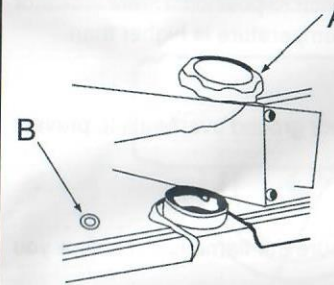
- 1、 Never use high volatile fuel such as gasoline etc;
- 2、 Only fill the fuel tank when the heater stops running and the flame goes out;
- 3、 Please use No JIS1 kerosene or frostbite-prevent light diesel, never use degenerative, impure kerosene or diesel;
- 4、 When you fill the fuel tank, the tank filter must be installed;
- 5、 When kerosene or diesel touches human body please wash with soap immediately, to prevent potential skin inflammation;
- 6、 The burner surface is very hot just after flame out, so never touch it with hand or let oil pump come in touch with the burner, to prevent scalding or some other injure.

◆ When there is no fuel (kerosene or diesel) in the tank:

How to fill the tank:

- 1、 Make sure the power plug is removed from the power source and the power switch is in OFF position "0";
- 2、 Place the appliance on a stable and level ground, remove the fuel cap and fill the fuel tank with fuel filter installed. Do not overfill your heater, see the full level position as shown in under figure;
- 3、 Check if there is water or waste in the fuel tank, clean the tank if it is dirty;
- 4、 Fill kerosene or diesel in fuel tank with oil pump only when the fuel filter is proper installed, after the filling turn the cap clockwise and tighten it.

Figure (fill the fuel tank)



A. Fuel tank cap B. Fuel gauge

◆ When there is some fuel (kerosene or diesel) in the tank

Attention

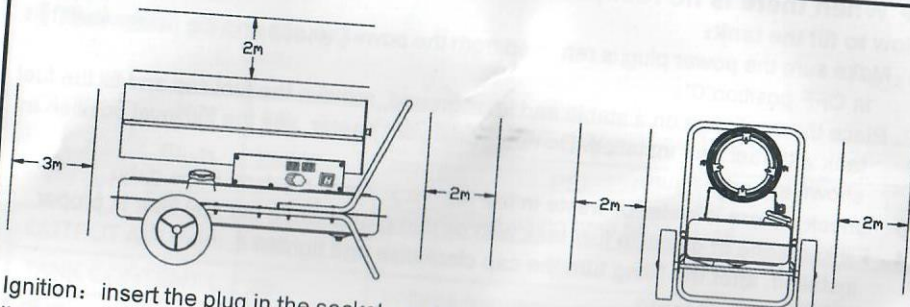
- 1、 Only check the appliance after flameout and removal of the power plug from power source;
- 2、 Before the ignition make sure there is no oil leakage, when oil leaks please don't use the appliance and contact your dealer;
- 3、 please check the fuel tank interior, clean the tank if there is water and waste in the tank.

【 Operation 】

Warning by ignition:

- 1、 check the fuel tank and make sure there is enough fuel in it;
- 2、 do not close your face near the heating part after the ignition, keep the safe distance, min. 3 meter front from hot air outlet. top 2 meter, left and right side more than 2 meter. (see under figure)
- 3、 stop using the appliance when there is smoke or strange odor omitted;
- 4、 make sure the heater is ignited before you leave it.

Safety clearances



Ignition: insert the plug in the socket, put the power switch to position "1", the indicator lights up, It would ignite automatically when the setting temperature is higher than ambient temperature in LED digital temperature display.

Attention: while the heater is operating, never let the floor ground overheats to prevent causing fire.

◆ Flame out

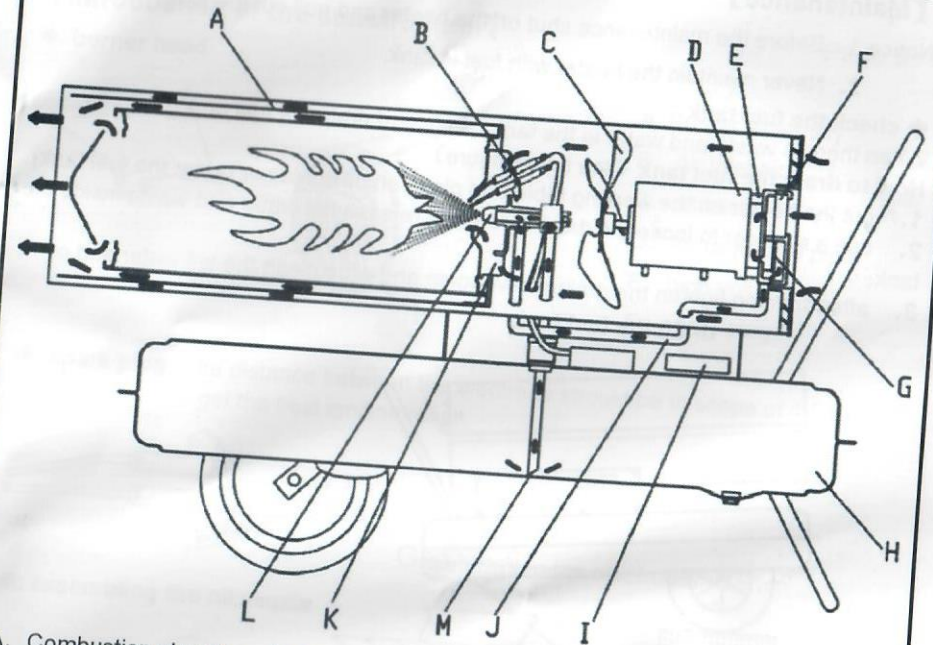
- Pay attention
1. when you shut off the heater, make sure the flame is out before you left the appliance.
 2. Put the power switch to position "0" waiting fan stop working and the indicator extinguishes, then remove the plug from the socket.

◆ safety device

Flame-out protection: Utilizes a photocell to monitor the flame in burn chamber during normal operation. The photosensitive resistor will become infinite big, cut off Electrovalve Assy, will stop offer oil automatic.

Electrical power breakdown protection: when the power breaks down the heater stops working without the plug being removed from the socket. When the power is recovered, the indicator will light but the heater will not work. Please press the power switch to start up the heater.

【 working principles 】



- A. Combustion chamber
- B. Spark plug
- C. Fan blade
- D. Motor
- E. Pump
- F. Air intake filter
- G. Air output filter
- H. Fuel tank
- I. Controller
- J. Air inlet pipe
- K. Flame steady plate
- L. Oil nozzle
- M. Oil sucking pipe

Description of working principles:

Open the fuel cap to add kerosene/diesel in the tank. put on the fuel cap and plug the power cord in the socket. Turn the power switch on to position "1", motor start working and the digital temperature display light up at this time. The left display window is setting temperature and right one is room temperature. It would ignite automatically when the setting temperature is higher than room. It begins to work, the spark plug ignites. This heater is equipped with an electric air pump that forces air through the air line connected to the fuel intake and then through a nozzle in the burner head. When the air passes in front of the fuel intake it causes fuel to rise from the tank and into the burner nozzle. This fuel and air mixture is then sprayed into the combustion chamber in a fine mist. The air blew by the fast turning fan blades 1. enters the flame steady plate and the burner, supplies additional oxygen to the burning and makes the burning more sufficient and takes away the heat from the burner interior to outside 2. enters the heat insulation layer of A, takes away the heat from the insulation layer, so that the burner surface will not overheats. The spark plug stops working after 12s of sparking.

【Maintenance】

Notice 1、 Before the maintenance shut off the heater and pull out the plug;

2、 Never maintain the heater with fuel in tank.

◆ check the fuel tank

When there is waste and water in the tank, clean and drain the fuel tank.

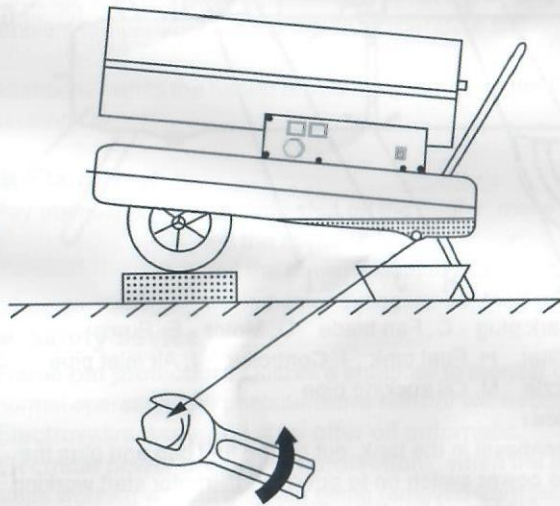
How to drain the fuel tank (see below figure)

1、 put the heater on the working table and place an oil container under the fuel tank;

2、 use a spanner to loose the drain screw and release the water and waste inside the tank;

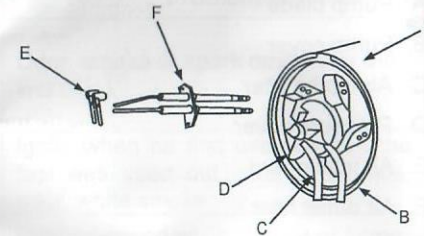
3、 after draining tighten the drain screw again and wipe clean the left water and oil.

drain the fuel tank



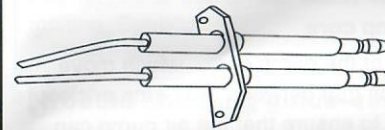
【Introduction of the construction】

◆ burner head



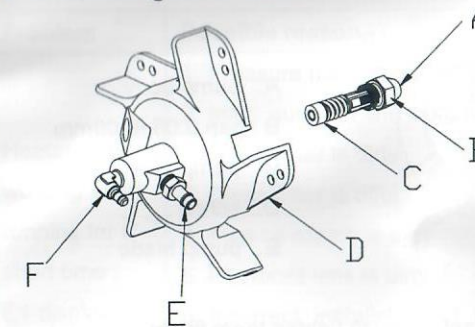
- A. Burner assembly
- B. Air inlet pipe
- C. oil inlet pipe
- D. flame steady plate
- E. high voltage line
- F. spark plug

◆ **spark plug** the distance between the electrode should be in scope of 4-5 mm, to get the best ignition result.



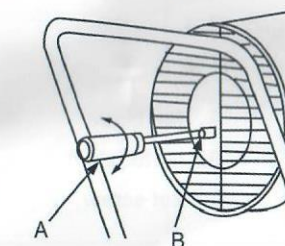
Gap between the electrode: 4-5mm

◆ assembling the oil nozzle



- A. Oil nozzle
- B. Nozzle core
- C. Seal ring
- D. Flame steady plate
- E. Air pipe fitting
- F. Oil pipe fitting

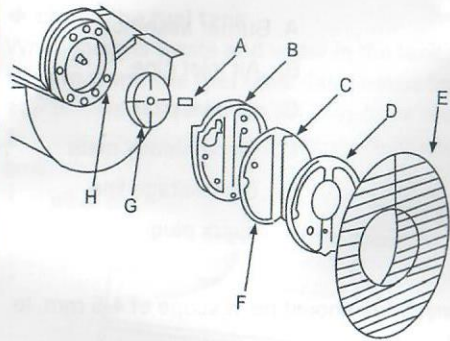
◆ Pressure adjustment



- A. Minus screw driver
- B. Pressure adjustment screw

◆ Air pump

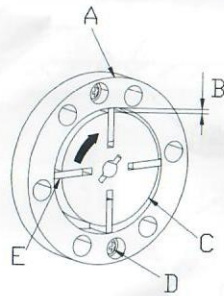
By maintenance the air pump must be proper assembled, to prevent low air pressure or air leakage.



- A. Pump blade
- B. Pump cover
- C. Air intake filter
- D. Pressure cover
- E. Air inlet guard
- F. Air outlet filter
- G. Pump core
- H. Connecting part
- I. Pressure gauge

◆ the match between the pump body and pump core

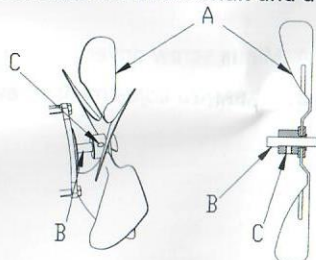
The four pump blades were set in the four grooves of the pump core, which move centrifugally clockwise in the pump, the cooperation gap between the pump enclosure and the pump core should be kept in 0.06~0.08mm. to ensure that the air pump can produce sufficient pressure.



- A. pump body
- B. gap 0.06~0.08mm
- C. pump core
- D. screw
- E. pump blade

◆ fixation of the fan blades

Install fan blade on motor shaft und use set screw to tighten them firmly



- A. fan blade
- B. motor shaft
- C. set screw

【Trouble analysis】

Before you send out the heater for repair please check the following points first, they are not faults:

Problem	reason
Odor, smoke or spark omitted by the first use	It is normal. Because at the beginning there are air and dust mixed in the burning. Wait for some time they will disappear.
Ignite when he first use or when the fuel was used out, strange sounds, odor, white smoke	Air is mixed in the pipe, the phenomenon will disappear when the air in the pipe was pressed out.
Strange sound while igniting or flame out	The metal parts of the heater expand and contract cause the noises. normal
Fire appears out of the outlet while igniting. Sparkle	Fuel and air of last time were left in the oil pipe of the nozzle, so the air and fuel are not proper mixed, the burning isn't continuous. Sparkle is caused by the left carbon powder, is also normal

【trouble shooting guide--reason and solution】

Problem	Possible reason	Solution
Heater stop working after running for a short time , E1 displayed on the screen	1. Pressure not correct	1. Adjust the pump pressure
	2. Inlet, outlet or the cotton of the air filter is dirty	2. Clean or exchange a new air filter
	3. Diesel filter is dirty	3. Clean or exchange a new fuel filter
	4. Fuel oil nozzle is dirty	4. Clean or exchange a nozzle
	5. Photocell lens is dirty	5. Clean or exchange a new photocell
	6. Incorrect installation of the photocell	6. Adjust the position of the photocell
	7. Damage of the photocell	7. Exchange the photocell
	8. The abnormal connection between main PCB and the photocell .	8. Check the all electrical connection

The heater do not work, or motor stop working after a short time, E1 displayed on the screen .	<ol style="list-style-type: none"> 1. Fuel exhausted 2. Pressure not correct 3. Spark plug or the air lock is corroded 4. Fuel filter is dirty 5. Fuel nozzle is dirty 6. Fuel and fuel tank is wet 7. The connection between PCB circuit and transformer is abnormal 8. The ignition pin and ignition transformer is not connected 9. Defective igniter 	<ol style="list-style-type: none"> 1. Fill the fuel tank 2. Adjust the pump pressure 3. Clean or exchange the spark plug 4. Clean and exchange fuel filter 5. Clean or exchange the nozzle 6. Rinse the fuel tank with fresh kerosene 7. Inspect all the electrical connection 8. Connect the ignition pin and the spark plug 9. exchange the igniter
LED display shows "E2"	Damage or fall off of the temperature probe	Exchange the temperature probe
Poor combustion / Too much smoke	<ol style="list-style-type: none"> 1. outlet or the inlet cotton of the air filter is dirty 2. Fuel filter is dirty 3. Poor quality of fuel 4. Air pressure too high or too low 	<ol style="list-style-type: none"> 1. Clean or exchange Air inlet 2. Clean or exchange Fuel filter 3. Be sure fuel is not contaminated and old 4. Adjust air pressure
Heater can not turn on and LED display show "--"	<ol style="list-style-type: none"> 1. The temperature sensor has overheated 2. PCB fuse is burnout 3. Temperature sensor is not well connected with the PCB panel 	<ol style="list-style-type: none"> 1. Turn off power switch and turn on The power 10 minutes later after the heater is cooled down . 2. check and replace the fuse 3. Check the all electrical connection .