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All sizes for car & commercial use.



# Clarke<sup>™</sup>



## PARAFFIN/DIESEL HEATER

MODEL NO: XRV100

PART No: 6920291

## OPERATION & MAINTENANCE INSTRUCTIONS



Rev a: 1003

**Clarke** INTERNATIONAL

For spare parts and servicing, please contact your nearest dealer, or Clarke International on

**020 - 8988 - 7400**

e-mail: [Parts@clarkeinternational.com](mailto:Parts@clarkeinternational.com) e-mail: [Service@clarkeinternational.com](mailto:Service@clarkeinternational.com)

Thank you for purchasing this CLARKE, Paraffin/Diesel fired Space Heater.

This portable heater is designed for **industrial applications only**. As with all mechanical equipment, optimum performance will only be achieved if the correct application and servicing procedures are followed. Please read this manual thoroughly and follow the instructions carefully before attempting to use the heater. In doing so you will ensure the safety of yourself and that of others around you, and you can look forward to it giving you long and reliable service.

## Guarantee

This CLARKE product is guaranteed against faulty manufacture for a period of 12 months from the date of purchase. Please keep your receipt as proof of purchase. This guarantee is invalid if the product is found to have been abused or tampered with in any way, or not used for the purpose for which it was intended.

Faulty goods should be returned to their place of purchase, no product can be returned to us without prior permission. This guarantee does not effect your statutory rights.

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## Parts List

37	AXCAVALEUR1500UKSP2	Power Cord inc Plug	1
38	AXCRUSCGRYP#025F20	Left Side Panel	1
39	AX1016001600	Screw	4
42	AX1035001211	Fuse 5A	1
43	AX1001007736	Cover	1
44	AX1047003711	Control Board	1
45	AX1002005711	Gasket	1
46	AX1002002100	Rubber Gasket	1
47	AX1023002411	Ball	1
48	AX1023004511	Spring	1
49	AX1023002511	Screw	1
50	AX1017002111	Nut	1
51	AX1067006911	Cap	1
52	AX1067007000	Drain cap	1
53	AXCRUSCGRY028C20	Right Side panel	1
56	AX1002001111	Nozzle Gasket	1
57	AX1023004111	Spring	1
58	AX1018001311	Washer	4
59	AX1001014711	Suction Fitting	1
60	AX1078000411	Rubber Hose L=200mm	1
61	AX1067005800	Hose Connector	2
62	AX1042003611	Solenoid Valve	1
63	AX1094078411	Exhaust Hood	1
64	AX1001015680	Spacer	6
65	AX1032001900	Switch	1
66	AX1002002755	Switch Cover	1
67	AX1043000600	Socket Casing	1
68	AX1043000400	Socket	1
69	AX1052001800	Blanking Plug	1

**PARTS & SERVICE TEL: 020 8988 7400**

**or e-mail as follows:**

**PARTS: [Parts@clarkeinternational.com](mailto:Parts@clarkeinternational.com)**

**SERVICE: [Service@clarkeinternational.com](mailto:Service@clarkeinternational.com)**

## Parts List

<u>Item No</u>	<u>Part No</u>	<u>Description</u>	<u>Qty</u>
1	AX1006000311	Rear Guard	1
2	AX1086001711	Air Inlet Filter	1
3	AX1094007311	Compression Plate	1
4	AX1002001311	Gasket	1
5	AX1086000111	Air Outlet Filter	1
6	AX1094007211	Cover	1
7	AX1094008211	Stator Ring	1
8	AX1099001811	Rotor	1
9	AX1099001411	Blade	4
10	AX1001008311	Screw	1
11	AXMANTGRY4020	Handle	1
12	AX1040005611	Motor 230volt 50hz	1
13	AX1094006111	Motor Bracket	1
14	AX1033004111	Ignition Transformer	1
15	AX1094077811	Lower Casing	1
16	AX1094013111	Bracket	1
17	AX1050000311	Flame Sensor	1
18	AX1087006111	Impellor	1
19	AX1094078011	Upper Casing	1
20	AX1039033211	HT Cable	1
21	AX1030001111	Ignition Electrode	1
22	AX1094007111	Combustion Head	1
23	AX1067006011	Hose Connector	1
24	AX1088005711	Nozzle	1
25	AX1078000211	Hose L=170mm	1
26	AX1078001611	Hose L=230mm	1
27	AX1086001911	Oil Filter	1
28	AX1036001611	Safety Thermostat	1
29	AX1043002655	Cable + Connector	1
30	AXCAMERAGRY025	Combustion Chamber	1
31	AXSERBGRYP040STD20	Tank	1
32	AX1022000911	End Cap	2
33	AX1004000200	Wheel 200mm Ø	2
34	AXASSALEGRY4001	Axle	1
35	AX1094004311	Filler Cap	1
36	AXTELAOTGRY04020	Frame	1

## Safety Precautions

### WARNING!

*Lack of ventilation can cause Carbon Monoxide poisoning.*

**CARBON MONOXIDE CAN KILL**

Signs of Carbon Monoxide poisoning are, headaches, dizziness and/or nausea. Should anyone show these signs, they must GET FRESH AIR IMMEDIATELY.

Turn off the heater and have it serviced before using again.

Pregnant women, persons with a heart or lung condition, anaemia or under the influence of alcohol, or those at high altitudes, are more likely to be effected by Carbon Monoxide than others.

Read, and make sure you fully understand the following precautions and the hazards associated with this type of equipment.

- Ensure the appliance is properly earthed.
- Use **ONLY** clean paraffin or Diesel Oil.
- Use **ONLY** with the electrical voltage specified
- Use **ONLY** in well ventilated areas. Provide fresh air ventilation of at least 3 ft<sup>2</sup> for every 100,000 BTU/ hr of rating.
- Use heater in accordance with all fire regulations.
- Keep children and animals away from heater at all times.
- The minimum clearance from any combustible materials is **300cm** from hot air outlet, **60cm** from the sides and flue, and **150cm** from the top.
- Maintain the heater on a stable, level surface whilst hot or operating, or a fire could occur.
- Store the heater in a level position when filled, or fuel leakage may occur.
- When used with a thermostat, bear in mind, the heater may start at anytime.
- **NEVER** use the heater where Gasoline, Paint thinners or other highly flammable vapours or high dust content is present.
- **NEVER** use Gasoline, Naphtha, Paint thinners, Alcohol or other highly flammable fuels.
- **NEVER** use heater in living or sleeping areas.
- **NEVER** leave a heater plugged in without adult supervision if children or animals are likely to be present.
- **NEVER** move, handle, refuel or service the heater when it is hot, operating or plugged in.
- **NEVER** cover or impede air flow into or out of heater.
- **NEVER** attach duct work to the front of heater.
- Disconnect the heater from the power supply when not in use.

## Electrical Connections

Connect the mains lead to a standard, 230 Volt (50Hz) electrical supply through an approved 13 amp BS 1363 plug, or a suitably fused isolator switch.

### **WARNING! THIS APPLIANCE MUST BE EARTHED**

**IMPORTANT:** The wires in the mains lead are coloured in accordance with the following code:

Green & Yellow	-	Earth
Blue	-	Neutral
Brown	-	Live

As the colours of the flexible cord of this appliance may not correspond with the coloured markings identifying terminals in your plug proceed as follows:

Connect GREEN & YELLOW cord to terminal marked with a letter "E" or Earth symbol  or coloured GREEN or GREEN & YELLOW.

Connect BROWN cord to terminal marked with a letter "L" or coloured RED

Connect BLUE cord to terminal marked with a letter "N" or coloured BLACK

If this appliance is fitted with a plug which is moulded onto the electric cable (i.e. non-rewirable) please note:

1. The plug must be thrown away if it is cut from the electric cable. There is a danger of electric shock if it is subsequently inserted into a socket outlet.
2. Never use the plug without the fuse cover fitted.
3. Should you wish to replace a detachable fuse carrier, ensure that the correct replacement is used (as indicated by marking or colour code).
4. Replacement fuse covers can be obtained from your local dealer or most electrical stockists.

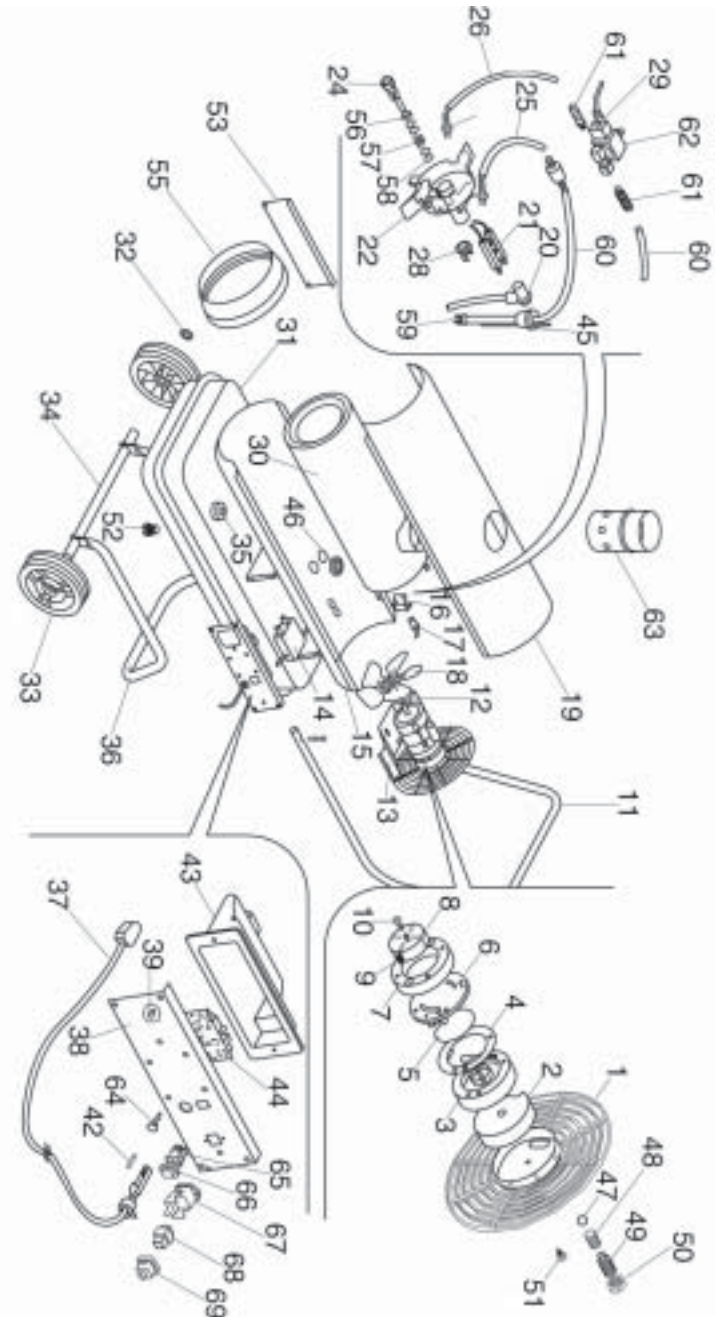
We recommend that this machine is connected to the mains supply through a Residual Current Device (RCD).

### **Fuse Rating.**

The fuse in the plug must be replaced with one of the same rating (**13 amps**) and must be ASTA approved to BS1362.

**Do not attempt any electrical repairs yourself unless fully competent. If in doubt, consult a qualified electrician.**

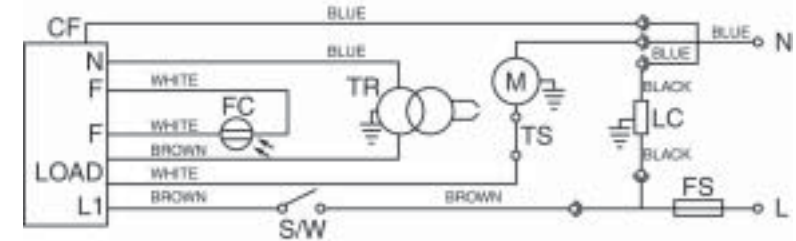
## Parts Diagram



## Troubleshooting

FAULT	CAUSE	REMEDY
Motor does not start.	<ol style="list-style-type: none"> <li>No power.</li> <li>Faulty Motor/Capacitor.</li> <li>Lock out of appliance due to overheating.</li> <li>Internal Fuse Blown.</li> </ol>	<ol style="list-style-type: none"> <li>Check power supply, power cable and fuse, and replace if necessary. Check External Thermostat if fitted.</li> <li>Check and if necessary, replace.</li> <li>Detect cause of overheating. Check air inlet and outlet. Wait for 5 minutes, and restart. If condition persists contact your Clarke dealer.</li> <li>Check and replace fuse.</li> </ol>
Motor runs, but the heater does not ignite.	<ol style="list-style-type: none"> <li>Empty fuel tank, dirty or wrong fuel.</li> <li>Fuel filter clogged.</li> <li>Air leaks in fuel line.</li> <li>Burner nozzle Clogged.</li> <li>Oil viscosity increased due to low temperature.</li> </ol>	<ol style="list-style-type: none"> <li>Drain dirty or wrong fuel, clean filter and fill with clean paraffin or equivalent.</li> <li>Clean or replace fuel filter.</li> <li>Check pipes, tighten connections, if necessary replace pipe.</li> <li>Clean nozzle with compressed air. Replace if necessary.</li> <li>Mix with 10-20% paraffin.</li> </ol>
Flames emitted from the flue.	<ol style="list-style-type: none"> <li>Insufficient air flow into combustion chamber.</li> <li>Pump pressure too high.</li> </ol>	<ol style="list-style-type: none"> <li>Check air inlet is not blocked. Check fan is not damaged and is operating correctly.</li> <li>Check air pump pressure, and reduce to nominal value.</li> </ol>
Heater starts normally, but flame-out control system shuts off the heater.	<ol style="list-style-type: none"> <li>Dirty photocell.</li> <li>Faulty photocell.</li> <li>Defective connection between photocell and flame-out control.</li> <li>Faulty flame-out control.</li> </ol>	<ol style="list-style-type: none"> <li>Check photocell and ensure it acknowledges the flame. (Contact your Clarke dealer)</li> <li>Replace photocell.</li> <li>Check, and connect properly.</li> <li>Check and replace if necessary.</li> </ol>

## Wiring Diagram.



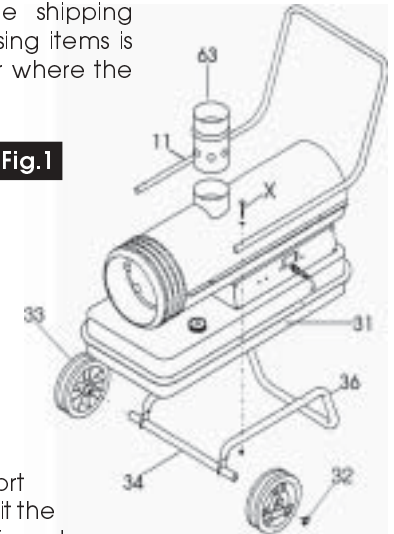
<b>FC</b>	Photocell	<b>FS</b>	Fuse 5A
<b>S/W</b>	Switch	<b>M</b>	Motor
<b>TR</b>	Transformer	<b>TS</b>	Safety Thermostat
<b>CF</b>	Flame Control	<b>LC</b>	EMC Filter

## Assembly (Item Nos in brackets also refer to parts list on pages (13-14))

Unpack and check the heater for possible shipping damage or missing items. If any damage/missing items is found, immediately notify your CLARKE dealer where the heater was purchased.

- Handle (11)
- Wheel Support Frame (36)
- Wheels - 2 pcs (33)
- Axle (34)
- End Caps - 2 PCs (32)
- Exhaust Hood (63)
- Screws, nuts and washers 6 sets (X)

Fig.1



To assemble the heater, proceed as follows.

Slide the axle (34) through the wheel support frame (36). Slide the wheels onto the axles and fit the end caps (32) by tapping them on using a soft faced mallet or similar. DO NOT use a metal hammer as this will damage the caps.

Place the heater on the wheel support frame with the air outlet end over the wheels, line up the fixing holes on the fuel tank and wheel support frame, place the handle on the tank and line up the fixing holes. Fit screws, washers and nuts (X), DO NOT tighten nuts until all screws etc. are in place.

Fit the exhaust hood (63), **IMPORTANT**, the hood is a push fit, must always be fitted even if it is not intended to duct the heater to the outside. It may be necessary to ease the hood on to the heater due to manufacturing differences in shape.



## Installation

The XRV 100 is designed with a fume exhaust system, allowing it to be ducted to the outside using suitable 410mm/5½" ducting (not supplied).

When the heater is installed in a closed environment, with fume venting to the outside through a duct, an external air delivery of approx. 80 m³/h must be assured for good combustion.

If the heater is installed in a closed environment and fumes are not vented through a duct, good ventilation of the environment **MUST** be assured.

To obtain a draught of at least 0.1mbar in the flue, the flue **MUST** rise vertically for 3m minimum before adding any bends etc.

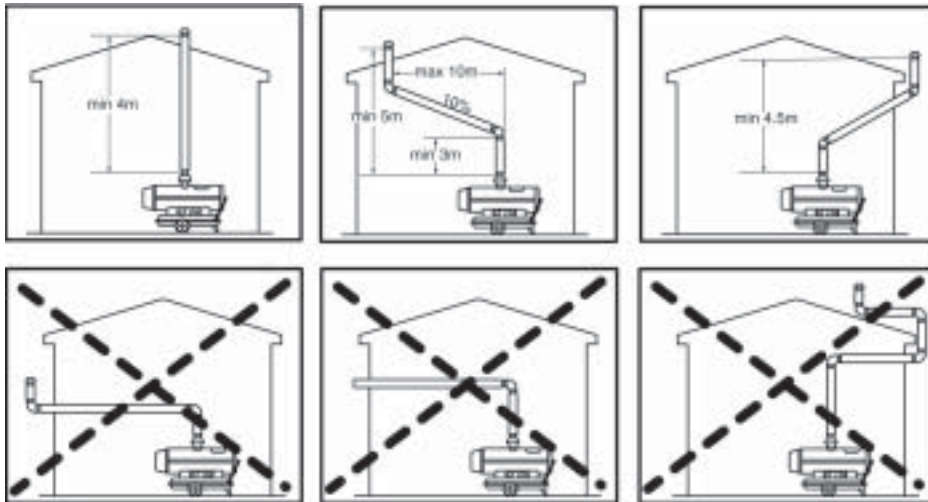
See Fig. 2 for examples of how and how not to duct the heater.

For the heater to operate efficiently, adequate ventilation, providing a supply of fresh air of at least 260 m²/kw, is necessary.

When using the heater, the safety regulations in force at the time **must** be adhered to. In particular, the safety distances from flammable materials should be taken into consideration.

<b>Sides and Flue:</b>	<b>0.60m</b>	<b>Air intake End:</b>	<b>0.60m</b>
<b>Top:</b>	<b>1.50m</b>	<b>Air Outlet End:</b>	<b>3.00m</b>

**Fig.2**



### IMPORTANT

Before installing fume extraction system, always check with local building and fire authorities to ensure local regulations are adhered to.

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## Fuel Filter.

Removal of the fuel filter should it become blocked or contaminated, and require cleaning, involves the removal of the burner head complete. The fuel pipe, complete with filter, may then be detached, cleaned, using a good quality solvent, and dried with compressed air. It is recommended however, that if the filter becomes blocked, the complete assembly - fuel pipe with filter- should be renewed.

## General.

It should be noted that should the heater be used with Diesel oil, the interval between servicing will be less, due to the fact that Diesel does not burn as cleanly as paraffin, and some 'sooting up' will therefore occur.

It is recommended, that paraffin be used wherever possible

## Storage.

Drain all fuel from tank before storing.

1. Drain the fuel tank completely and add approximately one gallon of clean paraffin. Attach the fuel cap and rock the heater backwards and forwards to circulate the fuel. Remove fuel cap or drain plug and drain tank completely
2. Replace fuel cap or drain plug and properly dispose of the old and dirty fuel.
3. Store the heater in a dry location free from corrosive fumes and dust.
4. Do not store paraffin over the summer months for next seasons usage.

## Specifications

Thermal Power (BTU/hr)	<b>89,000 Btu/hr</b>
Air Flow	<b>900 m³/hr</b>
Fuel	<b>Diesel / Paraffin</b>
Tank Capacity	<b>46 Litres</b>
Fuel Consumption.	<b>2.2 kg/h (2.6 lt/hr)</b>
Motor Voltage	<b>230v 50Hz</b>
Power Input	<b>390W (Total) 250 W (Motor)</b>
Current Rating	<b>2.00 A</b>
Length (mm)	<b>930mm</b>
Width (mm)	<b>560mm</b>
Height (mm)	<b>750mm (inc exhaust hood)</b>

Please note that the details and specifications contained herein, are correct at the time of going to print. However, CLARKE International reserve the right to change specifications at any time without prior notice. Always consult the machine's data plate

## Bi-Monthly.

### Fan.

Having removed the top cover, thoroughly clean the fan using a cloth moistened with paraffin or light solvent, and dry using an air line if possible.

### Output Air Filter.

Remove the grille, and pull off the Intake Air Filter, revealing the 3 screws securing the filter housing. Remove the screws and pull off the housing to reveal the Output Air Filter. If contaminated, this filter must be renewed.

In dirty environments this procedure should be carried out monthly.

### Nozzle.

Having removed the top cover, gently unscrew and remove the burner head, and unscrew the nozzle. Clean, using compressed air and a soft brush, if necessary. DO NOT prod or poke the nozzle in any way, with a metal tool.

## Following a period of Storage.

### Pump Pressure.

Before putting the heater back into service, following a period of storage, you should carry out all checks previously specified. In addition, you should test and adjust if necessary, the Air Pump Pressure, as follows:

Near the centre of the Grille, is a cutout to accommodate the Air Pump Pressure Relief Valve, and a plug (Fig. 6) for installing a Pressure Gauge.

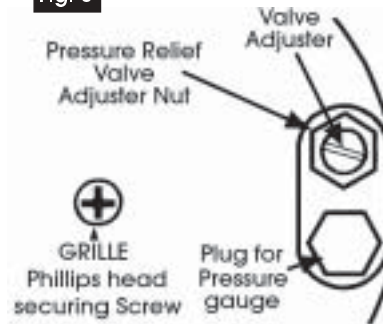
Remove the plug, and install a gauge with a resolution of at least 0.02 bar (0.3psi). Start the heater, and observe the pressure reading, which should be as follows:

To adjust the pressure Loosen the pressure relief valve adjuster nut whilst holding the valve adjuster using a suitable flat bladed screwdriver. Turn the adjuster clockwise to increase pressure, and anticlockwise to decrease. Tighten the securing nut when the correct pressure is reached, ensuring the adjuster does not turn in the process.

#### IMPORTANT:

The use of parts other than CLARKE replacement parts may result in safety hazards, decreased tool performance and may invalidate your warranty.

Fig. 6

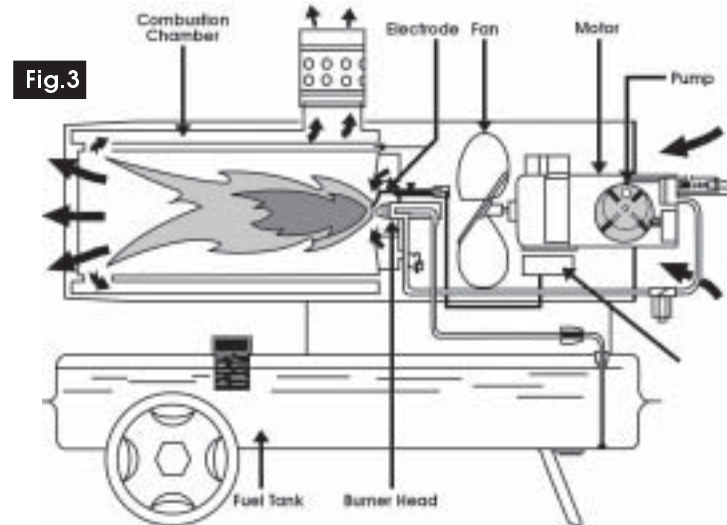


## Operation

Understanding the basic operation of the heater, will reinforce the need to maintain the unit in top condition at all times, whilst **always** observing the safety precautions.

The heater comprises four basic systems:

1. The fuel system.
2. The air system.
3. The ignition system.
4. The safety control system.



### 1. The Fuel System.

Fuel is held in the tank at the base of the system, at atmospheric pressure. An air pump, mounted on the end of the motor, draws air through a filter, compresses it, and forces it through a second filter, and via an air line, directly to the burner head nozzle. The speed of the air over the nozzle, causes a depression. Fuel is therefore forced up the tube by atmospheric pressure, through a filter, and out of the nozzle in the form of a spray.

It is important to ensure that the vent in the filler cap is not blocked at any time, otherwise fuel will not reach the nozzle.

***This heater is capable of burning Paraffin or Diesel oil. NEVER use petrol.***

### 2. The Air System.

Additional air is supplied to the combustion chamber by a fan, which is mounted on the opposite end of the motor shaft to the Air Pump. Openings around the burner head allow a portion of this air to be drawn into the combustion chamber, where it mixes with the air and fuel from the nozzle, and ensures that all the fuel is burned, preventing the emission of black smoke. The remaining air is directed around and over

the combustion chamber, until it finally mixes with the heated air from the combustion chamber, and is ejected as a jet of clean hot air.

### 3. The Ignition System.

A constant arc is struck between the electrodes, which ignites the air and fuel mixture. It is important that the electrode gap is correctly maintained, otherwise arcing will not take place...see Maintenance.

### 4. The Safety Control System.

A light sensitive photo cell (flame sensor) trips the motor if the flame goes out for any reason, causing the heater to shut down.

## Starting Procedure

### Warning!

**Before starting the heater, you MUST ensure that the minimum ventilation requirements are observed, to avoid the risk of carbon monoxide poisoning.**

Ensure the fuel tank is filled with clean diesel/paraffin, before plugging in to a suitably earthed supply.

Observing all precautions previously stated, push The start switch - 'I' located on the left side of the machine.

Using the heater with an environment (room) thermostat (not supplied), remove the blanking plug ('A' Fig.4) from the thermostat socket ('B' Fig.4) and insert the thermostat.

Store Blanking plug safely and re-fit if room thermostat is removed.

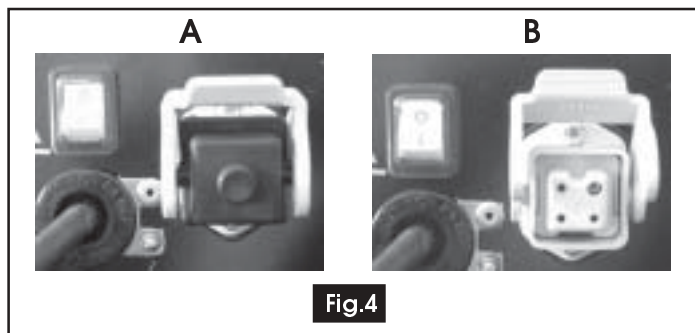


Fig.4

Set the environment thermostat to maximum temperature.

Switch the heater ON by pressing the ON/Off switch, ('I' position).

Adjust the environment thermostat to the required temperature.

## Maintenance (Item Nos in brackets, ref to Parts List on page 12)

### IMPORTANT

Before carrying out any adjustment or maintenance, ensure the heater is switched OFF, disconnected from the mains supply, and has been given adequate time to cool down, unless otherwise stated.

It is essential that the heater is correctly maintained and kept in top condition at all times.

Those items requiring regular maintenance comprise,

1. Intake Air Filter (Item 2)
2. Output Air Filter (Item 5)
3. Fan (Item 18)
4. Fuel Nozzle (Item 24)
5. Ignition Electrodes (Item 21)
6. Fuel Filter (Integral part of item 27)

The Intake and Output Air Filters, are accessible by removing the Grille (by removing the single phillips head screw Fig. 8), whereas accessibility to the remaining items requires the removal of the top cover (by removing the six screws at the centre joint).

### Monthly.

#### Intake Air Filter.

Pull off the Intake Air Filter, which lies directly behind the Grille, and wash in a light detergent. Thoroughly dry before reinstalling.

In dirty environments it may be necessary to carry out this procedure weekly. Never allow the filter to get blocked.

#### Ignition Electrodes.

Having removed the heaters' top cover, remove the single screw retaining the electrode holder. Withdraw the holder, clean and adjust the gap between the electrodes, to 4mm.

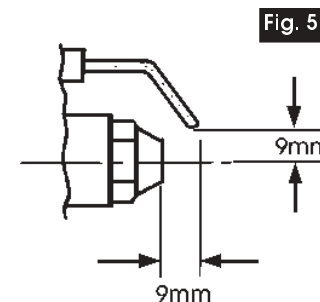
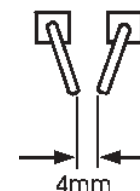


Fig. 5

When reinstalling the electrode holder, there must be a gap of 9mm between the electrodes and the nozzle (see fig. 5). If this adjustment needs to be reset, it is preferable to remove the burner head complete, by removing the securing screws around its edge, taking care not to damage the photocell. The electrodes may then be adjusted to their correct clearance before replacing the Burner Head.