

# TORNADO

## GAS FIRED MOBILE HEATER

# INSTALLATION AND OPERATING MANUAL



INDEX	Section
Introduction .....	1
Installation Requirements .....	2
Technical Details .....	3
Operating Information .....	4
Cleaning & Maintenance .....	5
Ducted Options .....	6
Servicing Instructions .....	7
Fault Finding & Spare Parts .....	8
User & Operating Instructions .....	9

### WARNINGS

- 1 This appliance must only be installed by a competent person in accordance with the requirements of the Codes of Practice or the rules in force.
- 2 All external wiring MUST comply with the current IEE wiring regulations.
- 3 Warning this appliance must be earthed.

## Introduction.

Welcome to the Ambi-Rad Tornado heater. A revolution in mobile gas fired space heating.

This instruction is intended for sole purpose of use as indicated.

The information contained within this instruction sheet is for use with Ambi-Rad products within the country of use and in accordance with the rules in force and by a competent person based on current HSE guidelines.

## Document Index.

### 2 Installation Requirements

- 2.1 Gas Leaks
- 2.2 Gas Cylinder
- 2.3 Electrical Supply

### 3 Technical Details

- 3.1 Dimensions
- 3.2 Technical Data
- 3.3 Internal Wiring Diagram

### 4 Operating Instructions

- 4.1 Moving the product
- 4.2 Operating the unit
- 4.3 Thermostat Control
- 4.4 Operation
- 4.4 Disconnection

### 5 Cleaning & Maintenance

### 6 Ducted Options

- 6.1 Flue Outlet
- 6.2 Ducted Air
- 6.3 Air Delivery

### 7 Servicing Instructions

- 7.1 Health & Safety
- 7.2 Tools Required
- 7.3 Combustion Fan Maintenance
- 7.4 Axial Fan Maintenance
- 7.5 Heat Exchanger Maintenance
- 7.4 Burner Maintenance
- 7.5 Component Replacement

### 8 Fault Finding & Spare Parts

- 8.1 Fault Finding Flow Chart
- 8.2 Spare Parts Listings

### 9 User and Operating Instructions



## Important, please read.

**PLEASE READ** this document prior to installation and operation to familiarise yourself with the components and any tools you require at the various stages of assembly.

**The manufacturer reserves the right to alter specifications without prior notice.**

This appliance must be installed in accordance with such regulations as are in force.

This appliance conforms to IP44 of IEC 34-5.

Subject to compliance to clearance distances, ventilation and flue requirements detailed in these instructions the heater can be used inside marquees.

Only use in a well ventilated area. See technical details Section 3.2.

The heater is not for domestic use.

The heater is designed for space heating only.

Do not use the heater in basements or below ground level.

This appliance is fitted with a hose and regulator.

These instructions must be given to the user.

Observe the cool down period and never handle the heater when hot.

Never place any objects, particularly combustible materials on top of the heater and always ensure that flues are not obstructed.

For your own safety we recommend the use of safety boots and leather faced gloves when handling any sharp or heavy items. The use of protective eye wear is also recommended.

Bend knees when lifting the product via the handles for wheeling.



# Installation Requirements.

## 2.1 Gas leaks

Propane gas is highly flammable and heavier than air. Consequently in the event of a gas leak there is a risk of explosion.

Prior to use, check gas supply connections with leak detection solution. Never use a naked flame when checking for a gas leak. In the event that bubbles are noted either rectify if considered competent or consult your supplier.

Do not use the heater until the fault is rectified.

In the event of a gas leak evacuate people from the immediate area and open doors and windows.

Do not operate electrical switches.

If you suspect a large amount of gas has escaped - call the Fire Service immediately.

After ventilating the room turn off the gas valve, and disconnect the electrical connector to the heater.

If the appliance is hot leave to cool then with the aid of a competent person identify and rectify the source of the leak.

## 2.2 Gas cylinders

This heater is designed to be used with at least two 47kg propane bottles.

Gas cylinders are heavy, never attempt to lift a cylinder, full or empty, by yourself. Always get help.

Keep cylinders upright at all times during use, transporting and when stored.

Liquid gas can cause severe freeze burns so avoid skin contact by wearing gloves when making connections or handling the cylinder. If ice is noted on the cylinder ensure it is not leaking. If leaking is suspected do not use the cylinder.

Do not drop or knock a gas cylinder as damaged cylinders can be dangerous.

Do not store full or empty bottles in the operating area of the heater and never apply heat to the cylinder.

## 2.3 Electrical supply

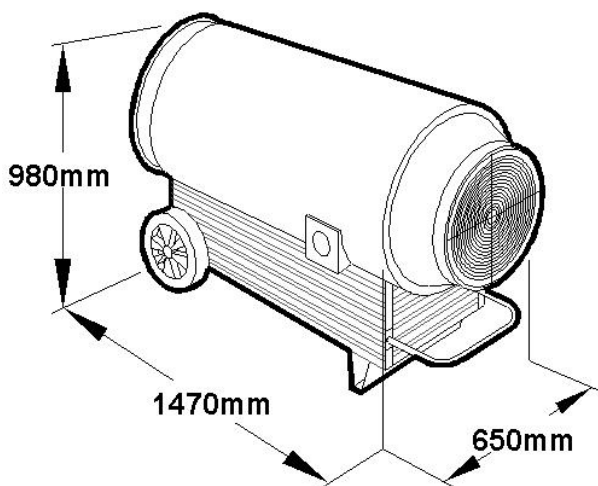
The heater is suitable for use with either a 230V/50Hz or 110V/50Hz supply. A selector switch enables the user to choose the desired voltage. See section 4.2.

Only female electrical connectors compatible to the male connectors on the rear of the unit must be used.

Always switch off and unplug the equipment when not in use.

# Technical details.

## 3.1 Dimensions

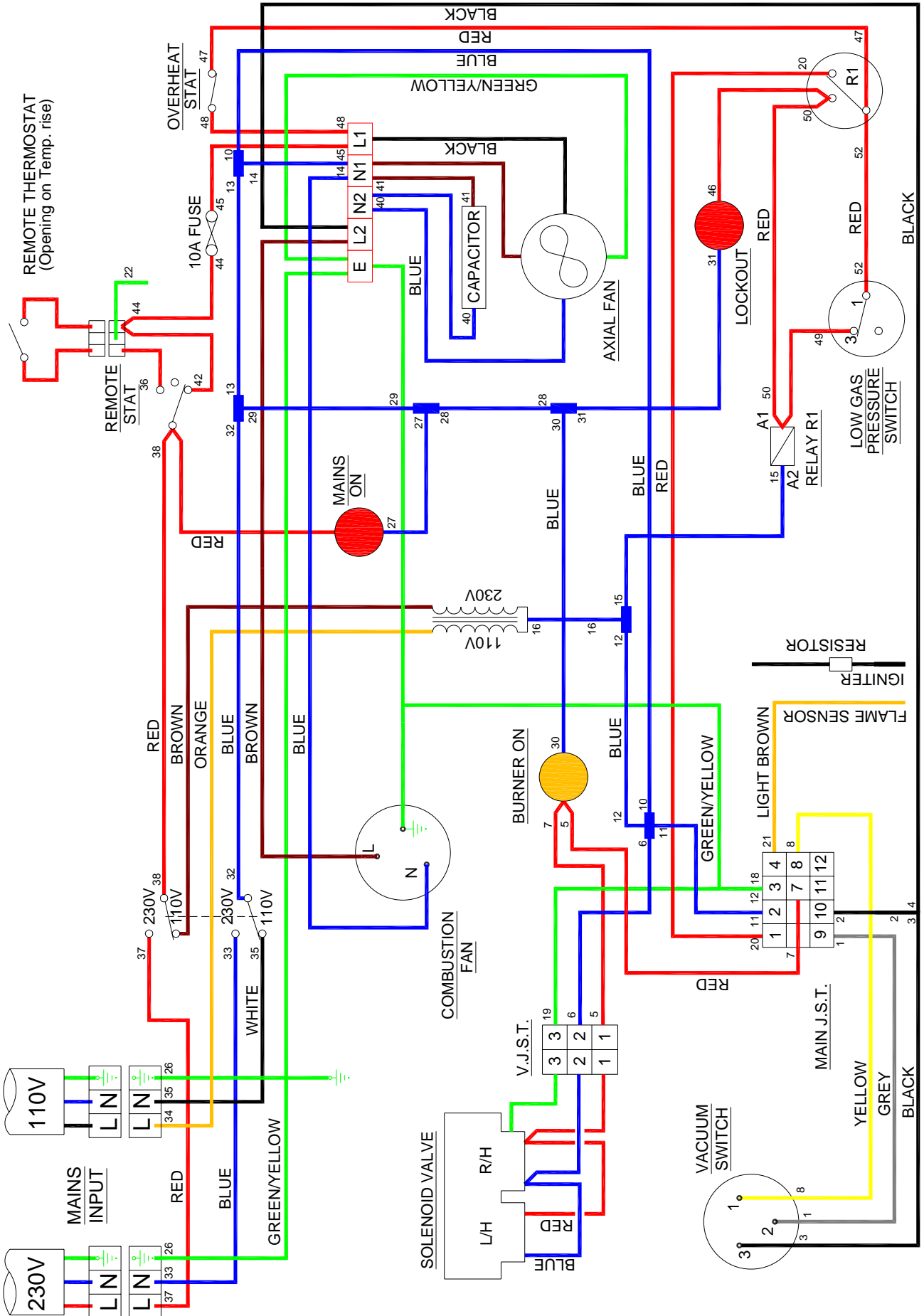


## 3.2 Technical Data

Heat input gas	kW	45	
Gas type		Propane G31	
Gas category		I3p(37)	I3p(30)
Supply pressure	mbar	37	30
Nozzle pressure	mbar	16.0	
Injector size		7x1.8	
Electrical supply	V	230/110	
Electrical input	W	400	
Weight	kg	85	
Hose (Ambi-Rad Part No 201308)		1.2m lg, 10mm ID*	
Regulator	kg/h	4	4
	mbar	37	30
Min Room size	m3	510	
Req'd ventilation	cm2	1275	

\*approved to EN 1763-1 BS3212 (UK Only)

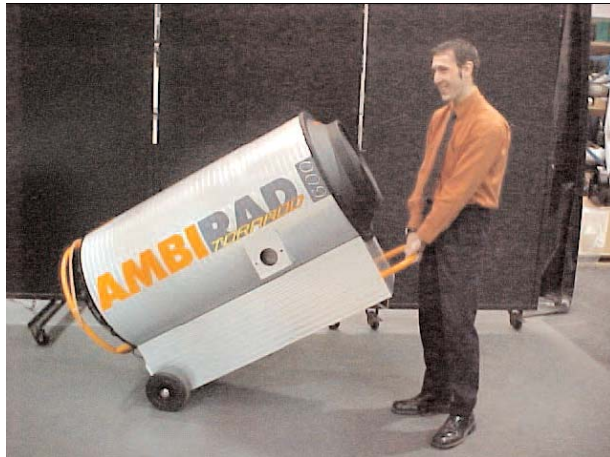
### 3.3 Internal Wiring Diagram



# Operating Instructions.

## 4.1 Moving the product

### 4.1.1 Wheeling.



### 4.1.2 Standing for storage.



Plug the supply lead into the connector on the rear of the product.



Select the appropriate voltage.

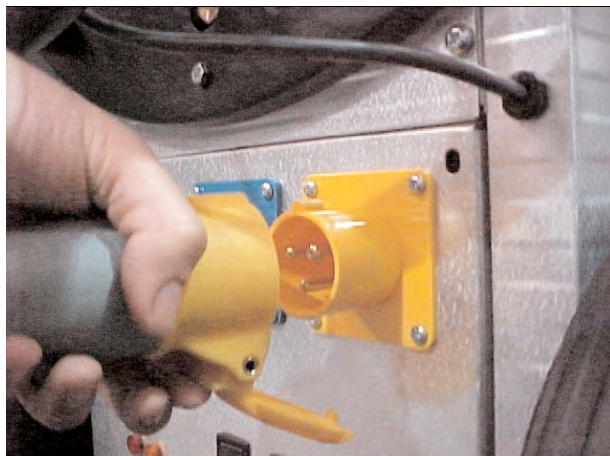


Uncoil the hose from around the rear ring.

## 4.2 Operating instructions

Ensure that you have read all other detail included in these instructions prior to following the operating instructions detailed below.

The heater can be operated on either a 110 or 230 volt electrical supply by inserting a suitable connector/lead into either the 110 or 230 volt appliance connectors.



Attach the regulator to the gas bottle using the spanner provided. *Note Left hand thread.*

Check for any gas leaks with soapy liquid solution .

Ensure the hose is not twisted or damaged and that the gas bottle is positioned at the side of the unit to avoid heating at the outlet.

*Note When positioning the heater please ensure that all inlets and outlets are unrestricted there are no combustible materials in the vicinity. Please ensure the heated air is not directed towards the gas bottle.*

 **In dusty environments the fresh air duct must be used. See section 4.**

### 4.3 Thermostat Control

The temperature of the building can be controlled using an optional remote thermostat. A remote thermostat kit c/w 5 metres of cable is available from Ambi-Rad by quoting part number 200587.



Select remote thermostat.



Plug the remote stat lead into the remote stat socket.

### 4.3 Operation

After switching on the mains supply, ignition is controlled by the automatic ignition unit incorporated on the burner assembly.

Firstly you will hear the combustion and convection fans running. ( Note - If the

combustion fan does not operate, then check to see if the overheat stat reset has tripped. This is located behind the combustion fan access door - see 7.3)

Then, after a delay of 15-20 seconds, you will hear a 'Clicking' noise, as the igniter assembly attempts to light the gas. On ignition the amber light will illuminate. If ignition does not occur then the light turns off indicating there is potentially air in the gas line.

Re-ignition can be attempted by restarting the appliance. If ignition still does not occur and the lockout lamp illuminates, it is likely that the low gas pressure switch is activated indicating that the LPG bottles are exhausted of gas and require changing. If after changing the gas bottles and ignition still cannot be achieved, please refer to section 8.1 Fault Finding.

### 4.4 Disconnection

*Note Connecting and disconnecting cylinders MUST take place in a flame free atmosphere. When the appliance is not going to be used for a period of time the unit MUST be disconnected from the electrical mains and gas cylinder.*

When heating is complete, turn OFF the gas supply. Leave the electric supply turned ON to enable the combustion fan to operate for 10 minutes to cool the product prior to moving.

After cooling is complete, switch the 3 position rocker switch on the rear of the product to the OFF position and disconnect from the electric supply and remove the electrical connector.

Disconnect the gas supply and recoil the hose around the rear ring assembly..

*Note If the appliance is not to be used for a period of time, ensure that the appliance is stored in a dry environment.*

### 5.0 Cleaning & Maintenance

The gas hose should be checked regularly for its integrity, if any damage is found the hose must be replaced. See Technical details for hose details.

Ensure that the air intakes and flue outlet on the sides of the product are clean and free from any blockage.

The casing can be cleaned with a soft cloth and a mild detergent as required.

# Ducted Options.

## 6.1 Ducted flue gasses

The products of combustion can be taken away from the room where the product is being used by the use of a flue duct.

To keep touch and floor temperatures to an acceptable level, Ambi-Rad recommend a twin wall flue pipe with a 108mm diameter capable of withstanding 175°C. A total length of 10m must be used.

Ambi-Rad can supply the 5m ducted flue kit by quoting part no. 200584. A 5m extension kit is also available by quoting part no. 200601.



Care must also be also taken by the user to ensure that any potentially combustible materials do not come into contact with the flue pipe. A flue pipe connection is available from Ambi-Rad to connect to the flue pipe on request.

Firstly, attach the front flue pipe section to the product by pushing the flue duct spigot into the flue outlet to ensure that the spring loaded flap moves through 90° to close off the flue outlet to the axial fan air stream.



Secondly, attach the rear flue pipe section at the end of the front section as shown above. The securing clip can now be tightened to keep both sections together.

## 6.2 Ducted air



**! IMPORTANT** In environments where dust, moisture or fumes are present a ducted air inlet is provided to allow fresh air to be drawn into the burner to aid combustion and prevent obstruction of the burner with foreign objects. The tube feeding the ducted air inlet must be 150mm diameter and have a maximum length of 10 metres.

Ambi-Rad can supply a 5m ducted air spigot kit by quoting part no 201847.

To fit the ducted air tube assembly push the ducted air spigot into the connection point on the side of the product as shown in the above photo.

## 6.3 Air delivery duct



A 450mm air delivery duct can be fitted to the outlet spinning as shown using a suitable fixing method. A material capable of withstanding 120°C must be used.

Ambi-Rad can supply a 10m air delivery duct by quoting part no 201848.

For Full installation details, please refer to separate doc ref GB/TOR/175/1107.

# Servicing Instructions.

## 7.1 Health and Safety



**IMPORTANT** This heater should be serviced annually.

These instructions are intended to be used only by competent service engineers, and details all the service operations that are authorised by the manufacturer.

Isolate gas and electrical supplies before carrying out any repair work. Always test for gas soundness with a suitable leak detection fluid. Use gloves and safety glasses.

If it is not possible to leave the appliance in a safe condition, disconnect the plug on the electronic sequence controller.



Place the product on the rear ring in the vertical position to gain access to the fan cover.

## 7.2 Tools & Equipment required



**Pozidrive  
Screwdriver**



**Adjustable  
Wrench**



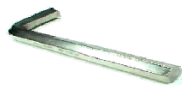
**Ratchet**



**Leather  
faced  
Gloves**



**\*10mm  
Deep reach socket**



**4mm Allen key**



\* Suitable alternative tools may be used.



Remove the fan access cover.

Remove the four bolts that attach the fan to the base of the product.

Inspect the main fan impeller and remove any dust by brushing with a soft brush. Similarly remove any dust from the finger guard covering the secondary (cooling) impeller and the mesh aperture in the motor cover.

Ensure that the impeller turns freely and there is no excessive play in the bearings.

Following any servicing the correct operation of the appliance should be verified by following the operating instructions.

## 7.3 Combustion Fan Maintenance



**Ensure electricity supply is isolated.**

Open the controls cover and remove the live, neutral and earth leads from the terminal block.

## 7.4 Axial Fan Maintenance

Remove the 4 nuts securing the axial fan to the rear spinning assembly.



Check that the fan spins freely without any sign of being out of balance or bearing noise. If so replace the fan.

If fan operation appears fine, then with a soft brush remove dust from the impellers and motor.

Replace the fan after checking the heat exchanger assembly.

## 7.5 Heat Exchanger Maintenance



Remove the screws fastening the front spinning to case assembly. 'Allen' head type screws shown.

Using a soft brush remove any dust and dirt from the rigid tubes and flexible coil. Access can be gained from the front and rear of the product. Inspect the tube assembly and if holes or internal blockages are suspected either replace the at risk component by removal of the heat exchanger assembly through the front of the product or clear any blockage.

Refit the front spinning assembly.

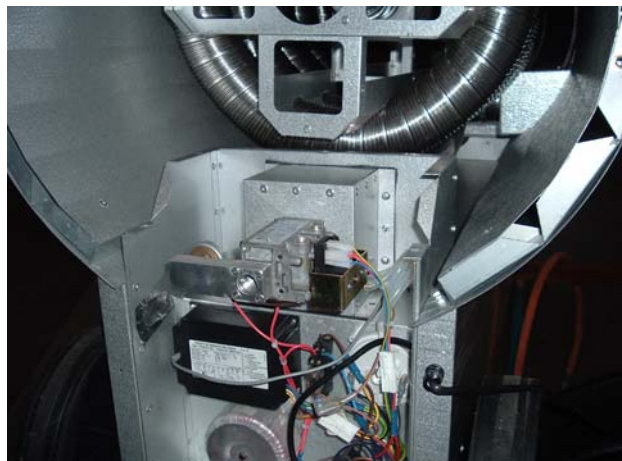
## 7.6 Burner Maintenance



Remove the screws fixing the rear spinning to the case assembly and the gas hose. 'Allen' head type screws shown.



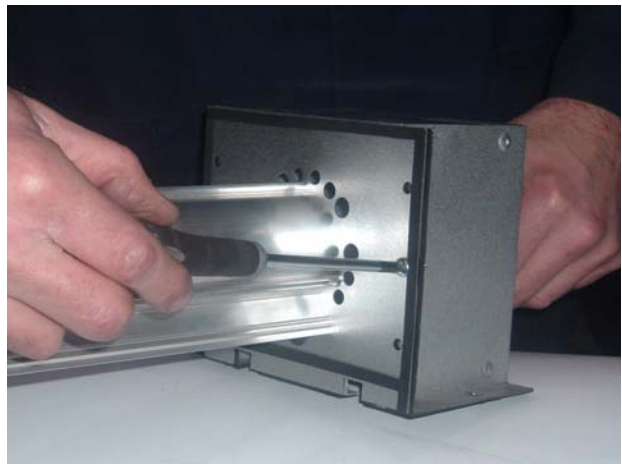
Remove the screws retaining the burner shroud.



The burner shroud can now be removed.



The combustion chamber can now be unscrewed.

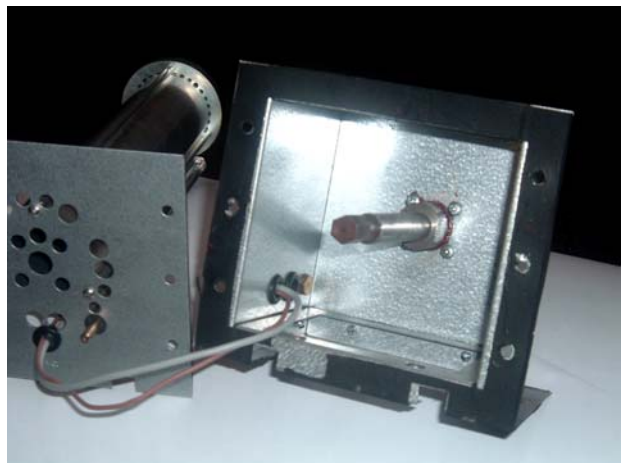


Access to the injector is by removal of the screws that attach the orifice fixing plate to the burner assembly.



Slide the burner assembly away from the firing tube to reveal the burner assembly.

Inspect the burner electrode assembly condition taking care when reassembling to ensure that the leads to the assembly are fitted the same way as on removal. If the electrode assembly is in good order check the spark electrode gap. This should be  $3.5\text{mm} + 0.5\text{mm}$ . Adjust the gap if necessary by bending the earth rod.



To remove the injector with the burner head removed, unscrew the injector from its carrier using a spanner on the hexagon portion of its body.

When replacing the injector ensure that it is fully tightened in its carrier using an approved thread sealant. Replace the sealing gasket if this is not in good condition.

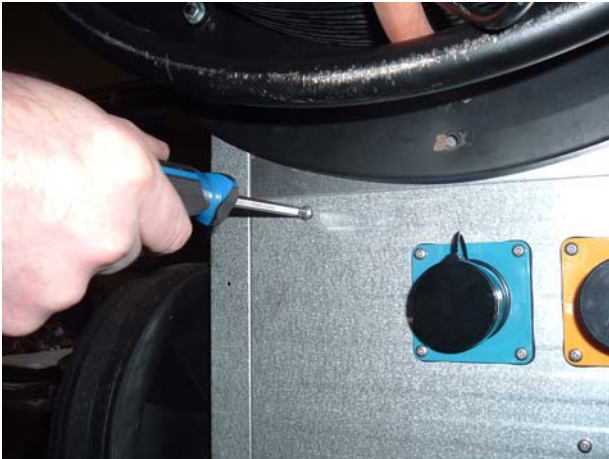


## 7.7 Component Replacement

To replace gas safety control valve, follow instructions for burner maintenance from 7.6.

At previous step, do not remove the injector, but unscrew the injector carrier and low gas pressure switch block from the gas valve. The valve can be replaced and the injector carrier re-fitted using an approved pipe joining compound.

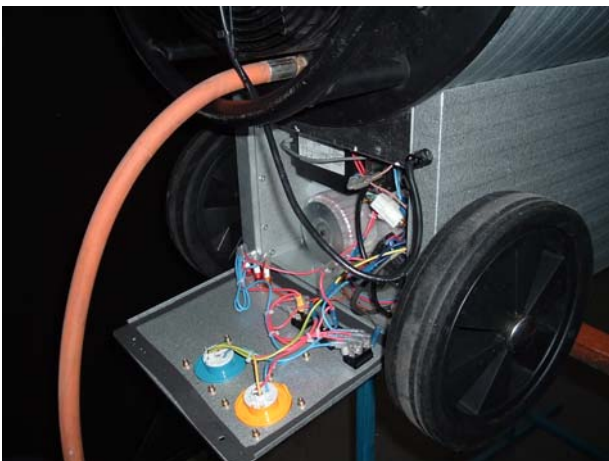
To replace the electronic sequence controller, transformer, thermostat and pressure switch.



Access to these components is via the hinged lid. Remove the lid securing screws.



Remove the fan access cover.



Components can be seen behind the hinged lid.

Replace as required ensuring connections are made in the same order as on removal.

To replace (or reset) the thermal cut out switch.



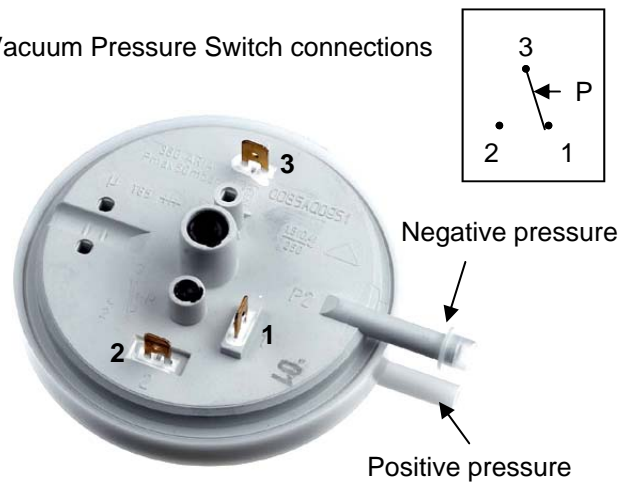
The thermal cut out is located on the inside back wall and can be changed by removing the two self tapping screws.

To reset a failed thermal cut out, press the small button located in the centre of the product.



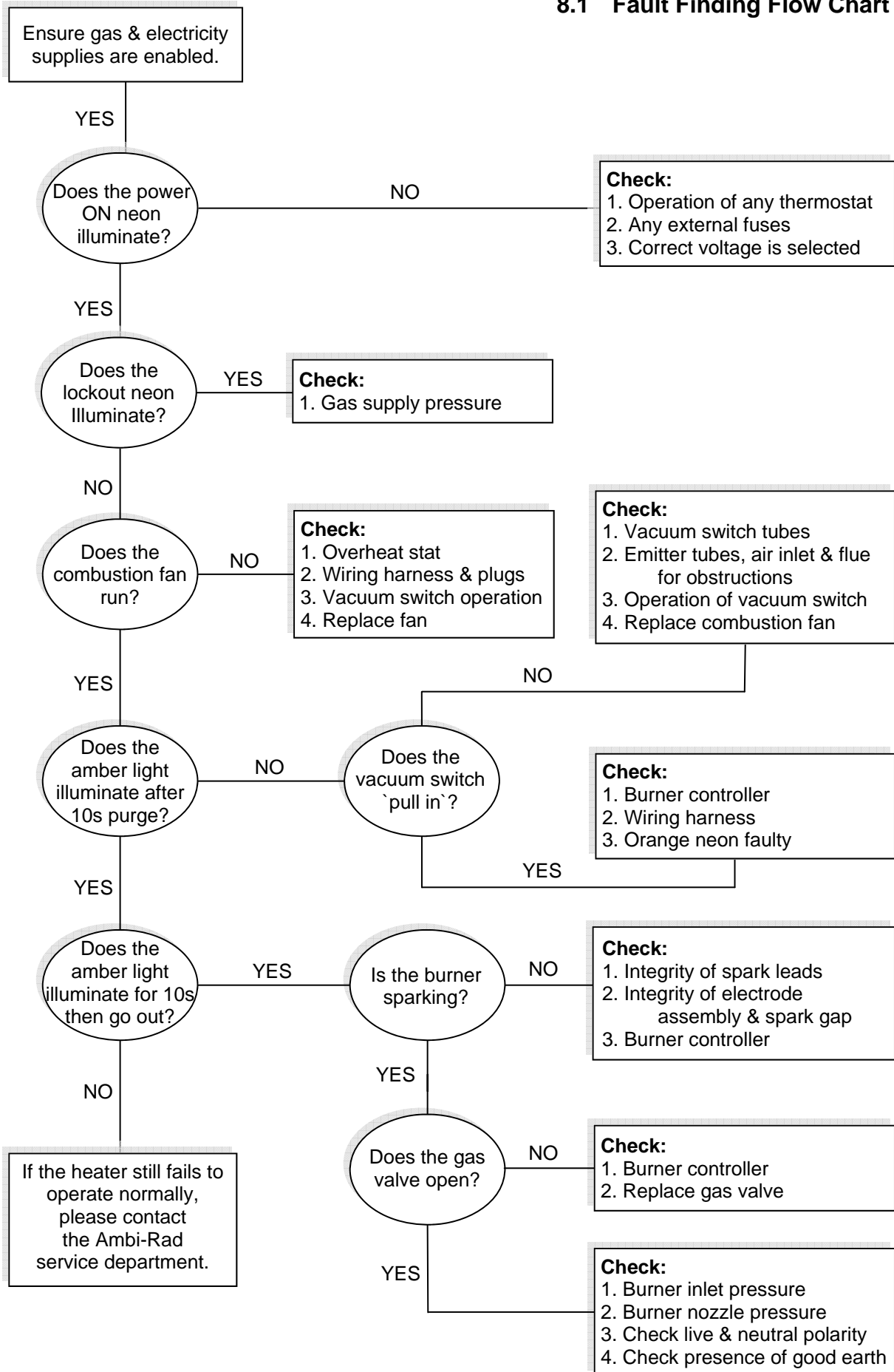
Place the product on the rear ring in the vertical position to gain access to the fan cover.

Vacuum Pressure Switch connections



# Fault Finding & Spare Parts.

## 8.1 Fault Finding Flow Chart



## 8.2 Spare Parts

Item	Description	Part No.	Item	Description	Part No.
	Ignition Controller	2015S		Transformer	200423
	Valve Twin sol reg 220/240	2055		Mini - Harness BCH	E300002
	Low Gas Pressure Switch (set to 20mbar)	201307		Ignition & Rectification Leads (pair)	900050
	Pepperpot Head	200988		Amber Neon (Burner ON)	2175
	Extruded Burner Head	200358		Red Neon (Mains On & Low gas)	2180
	Injector 7x1.8mm	201007-18		Three Position Switch 110V/OFF/230V	200533
	Jet Carrier	200420		Remote Thermostat Socket	200526
	Igniter Assembly	201284		Remote Thermostat Switch	200527
	Pressure Switch	200487		Mains Appliance Connector 110V	200532
	Gaskets	please call spares		Mains Appliance Connector 230V	200535

## 8.2 Spare Parts cont.

Item	Description	Part No.	Item	Description	Part No.
	Thermal Cut Out	900001		Handle Assembly Black	200544
	Combustion Fan	200421		Wheel	200535
	Axial Fan c/w Basket	200433		Wheel Spacer	200354
	Axial Fan Capacitor	900049		1" push on fix with dome cap	200349
	Inlet Spinning Assembly	200457		Propane Regulator	200480
	Rear Ring Assembly	200543		Gas Hose	201308
	Outlet Spinning Assembly	200466		Spanner	200212
	Low Gas Pressure Switch Relay	2104		Fuse	900071
	Combustion Flue Kit 5m	200584		Ducted Air Kit 5m	201847
	Combustion Extension Flue Kit 5m	200601		Air Delivery Duct Kit 10m	201848
	Remote Thermostat c/w cable	200587		Quick Release Clip for Air Delivery Duct	200596

Notes.



# User & Operating Instructions.

Ensure that you have read all other detail included in these instructions prior to following the operating instructions detailed below.

The heater can be operated on either a 110 or 230 volt electrical supply by inserting a suitable connector/lead into either the 110 or 230 volt appliance connectors.

Plug the supply lead into the connector on the rear of the product.

Select the appropriate voltage.

Uncoil the hose from around the rear ring.

Attach the regulator to the gas bottle using the spanner provided. *Note Left hand thread.*

Check for any gas leaks with soapy liquid solution .

Ensure the hose is not twisted or damaged and that the gas bottle is positioned at the side of the unit to avoid heating at the outlet.

*Note When positioning the heater please ensure that all inlets and outlets are unrestricted there are no combustible materials in the vicinity. Please ensure the heated air is not directed towards the gas bottle.*

The temperature of the building can be controlled using an optional remote thermostat. Select remote thermostat. Plug the remote stat lead into the remote stat socket.

After switching on the mains supply, ignition is controlled by the automatic ignition unit incorporated on the burner assembly.

Firstly you will hear the combustion and convection fans running. ( Note - If the combustion fan does not operate, then check to

see if the overheat stat reset has tripped. This is located behind the combustion fan access door - see 7.3)

After a delay of 15-20 seconds, you will hear a 'Clicking' noise, as the igniter assembly attempts to light the gas. On ignition the amber light will illuminate. If ignition does not occur then the light turns off indicating there is potentially air in the gas line.

Re-ignition can be attempted by restarting the appliance. If ignition still does not occur and the lockout lamp illuminates, it is likely that the low gas pressure switch is activated indicating that the LPG bottles are exhausted of gas and require changing. If after changing the gas bottles and ignition still cannot be achieved, please refer to section 8.1 Fault Finding.

*Note Connecting and disconnecting cylinders MUST take place in a flame free atmosphere. When the appliance is not going to be used for a period of time the unit MUST be disconnected from the electrical mains and gas cylinder.*

When heating is complete, turn OFF the gas supply. Leave the electric supply turned ON to enable the combustion fan to operate for 10 minutes to cool the product prior to moving.

After cooling is complete, switch the 3 position rocker switch on the rear of the product to the OFF position and disconnect from the electric supply and remove the electrical connector.

Disconnect the gas supply and recoil the hose around the rear ring assembly.

*Note If the appliance is not to be used for a period of time, ensure that the appliance is stored in a dry environment.*

Patented under European patent number 1561074



AmbiRad Limited Fens Pool Avenue  
Brierley Hill West Midlands DY5 1QA  
United Kingdom.

Telephone 01384 489700  
Facsimile 01384 489707  
Email [info@ambirad.co.uk](mailto:info@ambirad.co.uk)  
Website [www.ambirad.co.uk](http://www.ambirad.co.uk)  
Technical Support [www.s-i-d.co.uk](http://www.s-i-d.co.uk)

  
**AMBIRAD**  
ENERGY EFFICIENT HEATING SYSTEMS

AmbiRad is a registered trademark of AmbiRad Limited. Because of continuous product innovation, AmbiRad reserve the right to change product specification without due notice