AMBIRAD TORNADO 600

TORNADO

GAS FIRED
MOBILE HEATERS

Operation, maintenance
and servicing manual

Index

1 Health & Safety Details

Important

Read these instructions before use.

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 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.

Suitable gloves should be worn when handling this equipment.

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.

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

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 a lot of gas has escaped call the Fire Service.

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.

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.

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 3 step 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.

2 Technical Details

Heat input gas	kW	45	
Gas type		Propane G31	
Gas category		$I_{3p(37)}$	$I_{3p(30)}$
Supply pressure	mbar	37	30
Nozzle pressure	mbar	14.5	
Injector size		4.6	4.6
Electrical supply	V	230/110	
Electrical input	W	400	
Weight	kg	85	
Hose (Ambi-Rad Part No 201308)		1.2m lg, 10mm ID approved to EN 1763-1 BS3212 (UK Only)	
Regulator	kg/h mbar	4 37	4 30
Min Room size	m^3	510	
Required ventilation	cm^2	1275	

Countries of destination

GB, IE, BE, CH, FR, NL, ES & PT.

3 Moving the Product

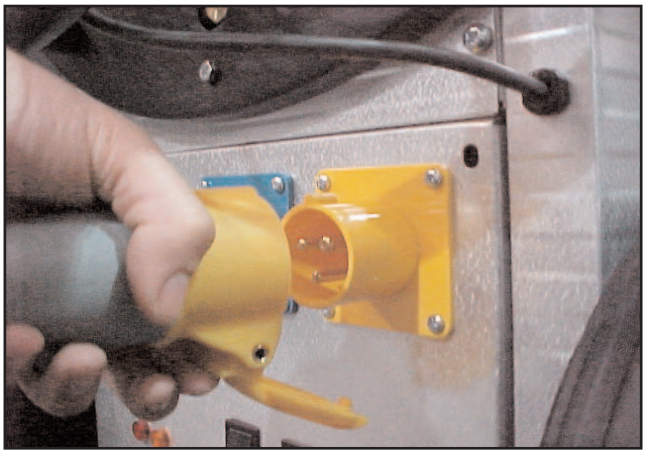
Figure 3.1 Wheeling

Figure 3.2 Standing for storage

4 Operating Instructions

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

Step 4.1



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 and select the appropriate voltage.

Step 4.2

Uncoil the hose from around the rear ring.

Step 4.3

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

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.

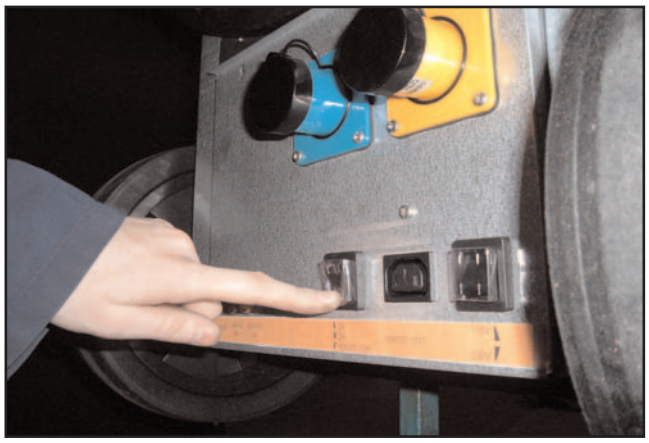
Note When positioning the heater please ensure that all inlets and outlets are unrestricted there are no combustible materials in the vicinity. Please ensure the heated air is not directed towards the gas bottle.

In dusty environments the fresh air duct must be used. See section 8.

Thermostat Control

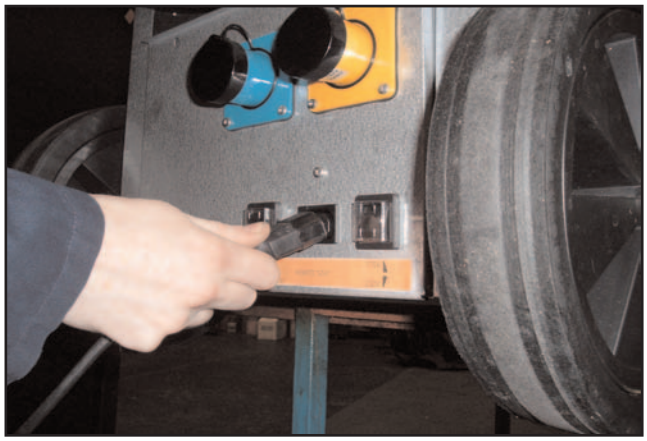
The temperature of the building can be controlled using an optional remote thermostat. A remote thermostat kit is available from Ambi-Rad by quoting part number 200587.

Step 4.4



Select remote thermostat.

Step 4.5



Plug the remote stat lead into the remote stat socket.

Step 4.6

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 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 there is probably 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 7 Fault Finding.

Step 4.7 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 and position the regulator in the clip provided.

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 Cleaning & Maintenance

The 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

6 Servicing Instructions

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.

Required tools

4mm Allen keys.
Phillips screwdriver.
6" Adjustable spanner.

Combustion fan maintenance

Step 6.1

Ensure electricity supply is isolated. Open the controls cover and remove the live, neutral and earth leads from the terminal block.

Step 6.2

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

Step 6.3

Remove the fan access cover.

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

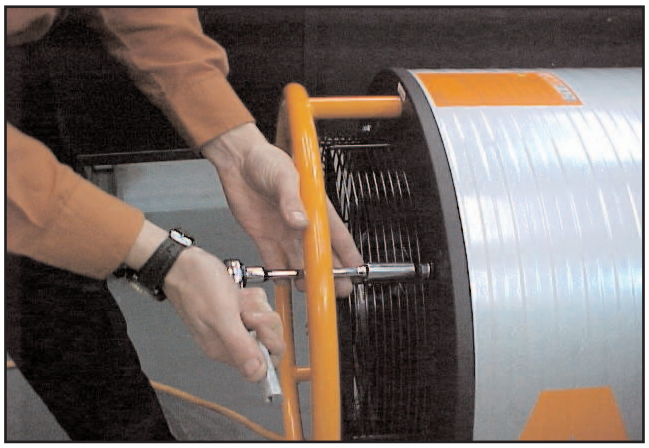
Inspect the main fan impeller and remove any dust by brushing with a soft brush. Similarly remove any dust from the finger guard covering the secondary (cooling) impeller and the mesh aperture in the motor cover.

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.

Axial fan & heat exchanger

Step 6.4 Axial fan



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 impellars and motor.

Replace the fan after checking the heat exchanger assembly.

Step 6.5 Heat exchanger assembly maintenance

Remove the screws fastening the front spinning to case assembly.

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.

Burner maintenance

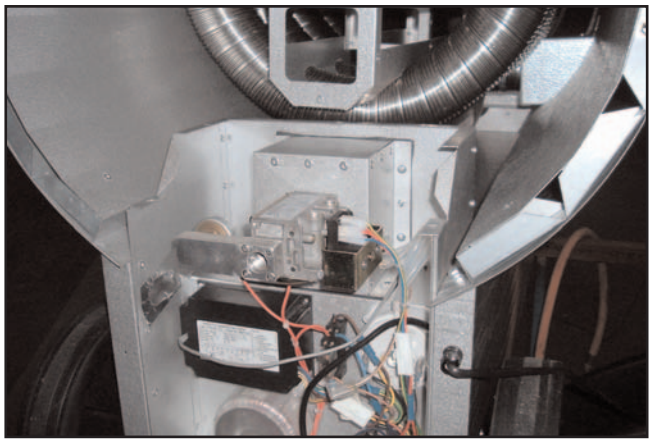
Step 6.6

Remove the screws fixing the rear spinning to the case assembly and the gas hose.

Step 6.7

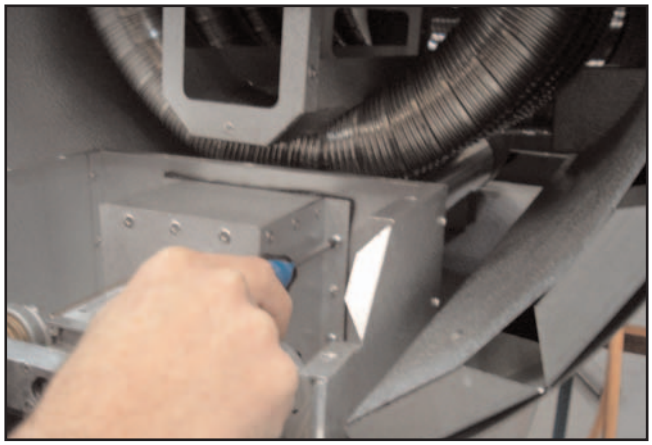
Remove the screws retaining the burner shroud.

Step 6.8



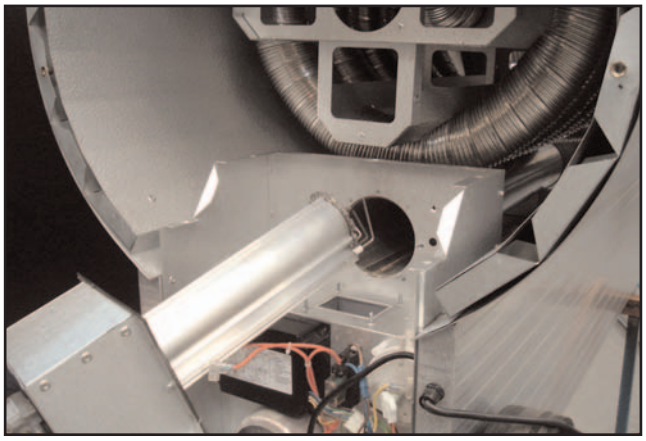
The burner shroud can now be removed.

Step 6.9



The combustion chamber can now be unscrewed.

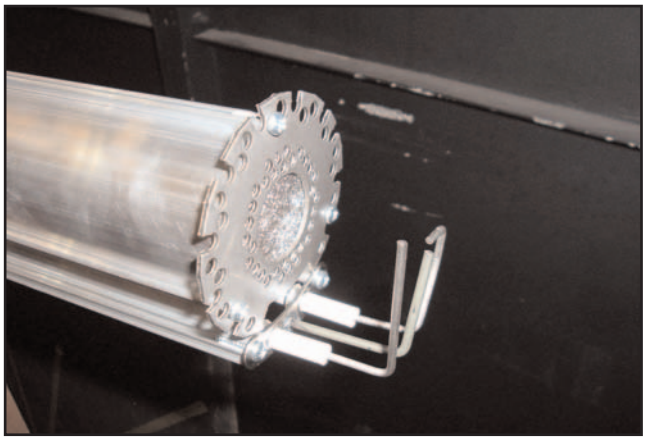
Step 6.10



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

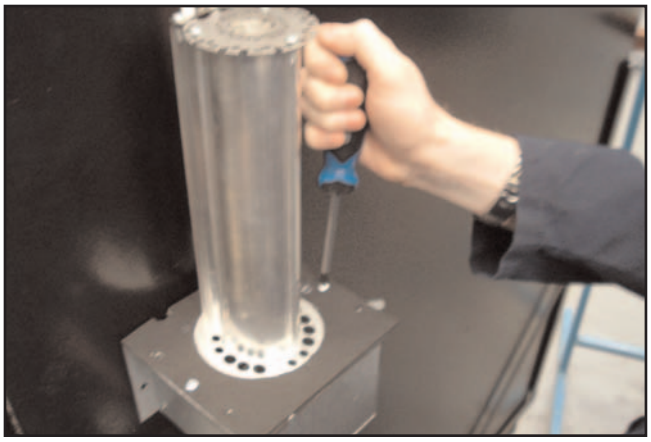
Inspect the burner electrode assembly condition taking care when reassembling to ensure that the leads to the assembly are fitted the same way as on removal. If the electrode assembly is in good order check the spark electrode gap. This should be 3.5mm $\pm$ 0.5mm. Adjust the gap if necessary by bending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

Step 6.11



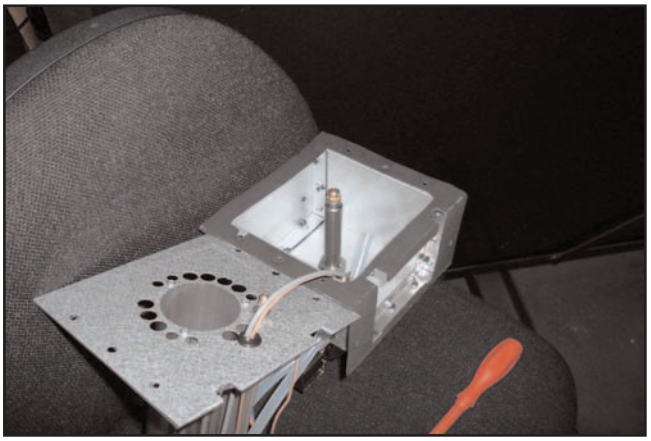
IMPORTANT The filter should be replaced annually by removing the ignitor assembly with a small screwdriver and prising the filter from its location.

Step 6.12



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

Step 6.13



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.

Component replacement

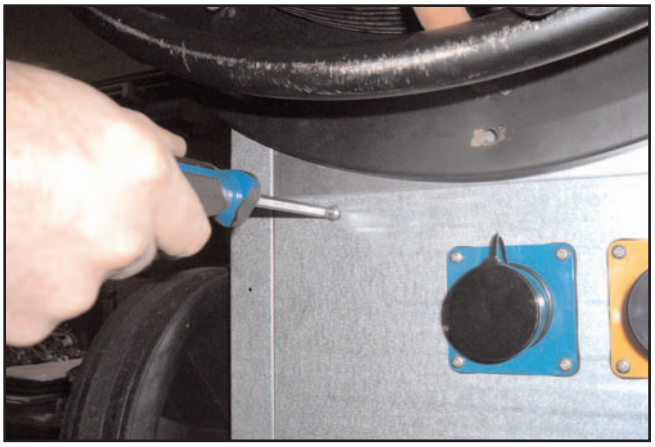
To replace gas safety control valve

Follow instructions for burner maintenance from 6.6.

At step 6.13 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.

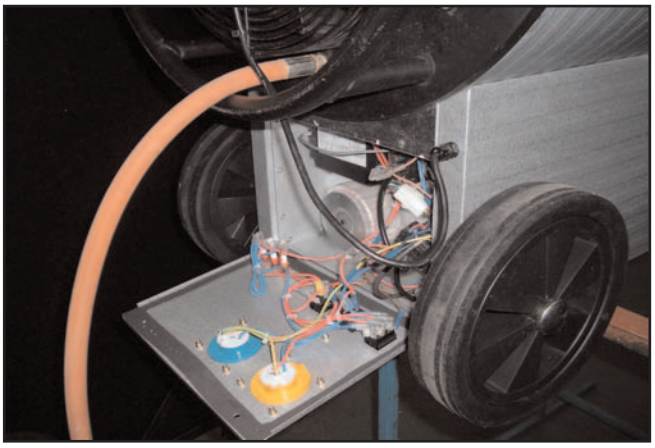
To replace the electronic sequence controller, transformer, thermostat and pressure switch.

Step 6.14



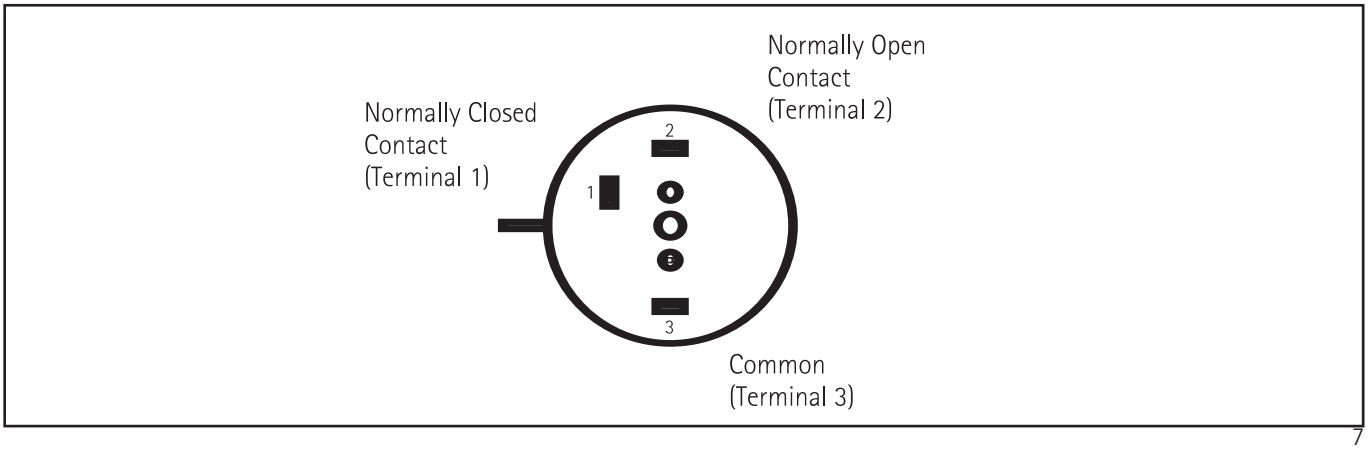
Access to these components is via the hinged lid. Remove the lid securing screws.

Step 6.15

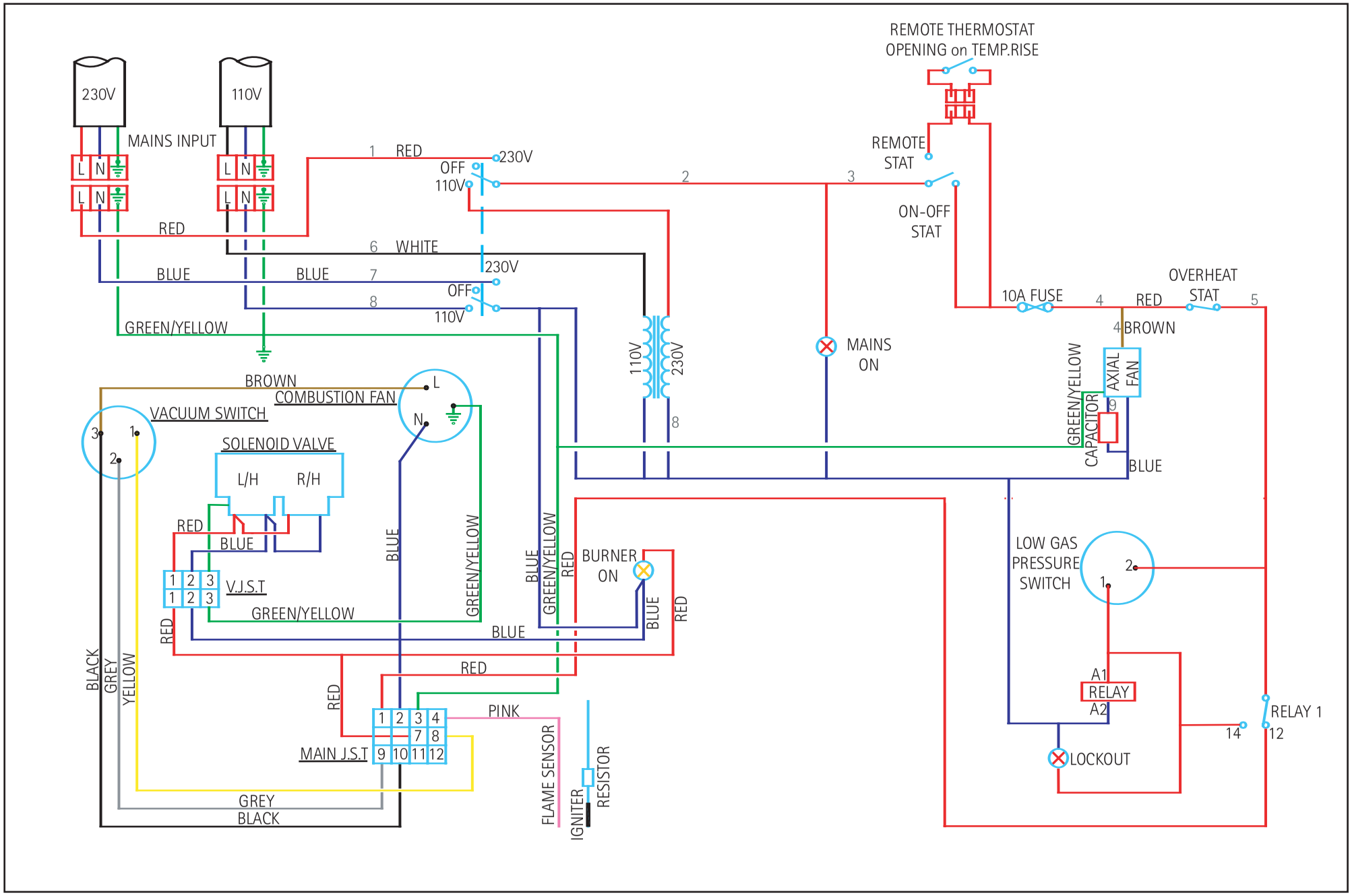


Components can be seen behind the hinged lid. Replace as required ensuring connections are made in the same order as on removal.

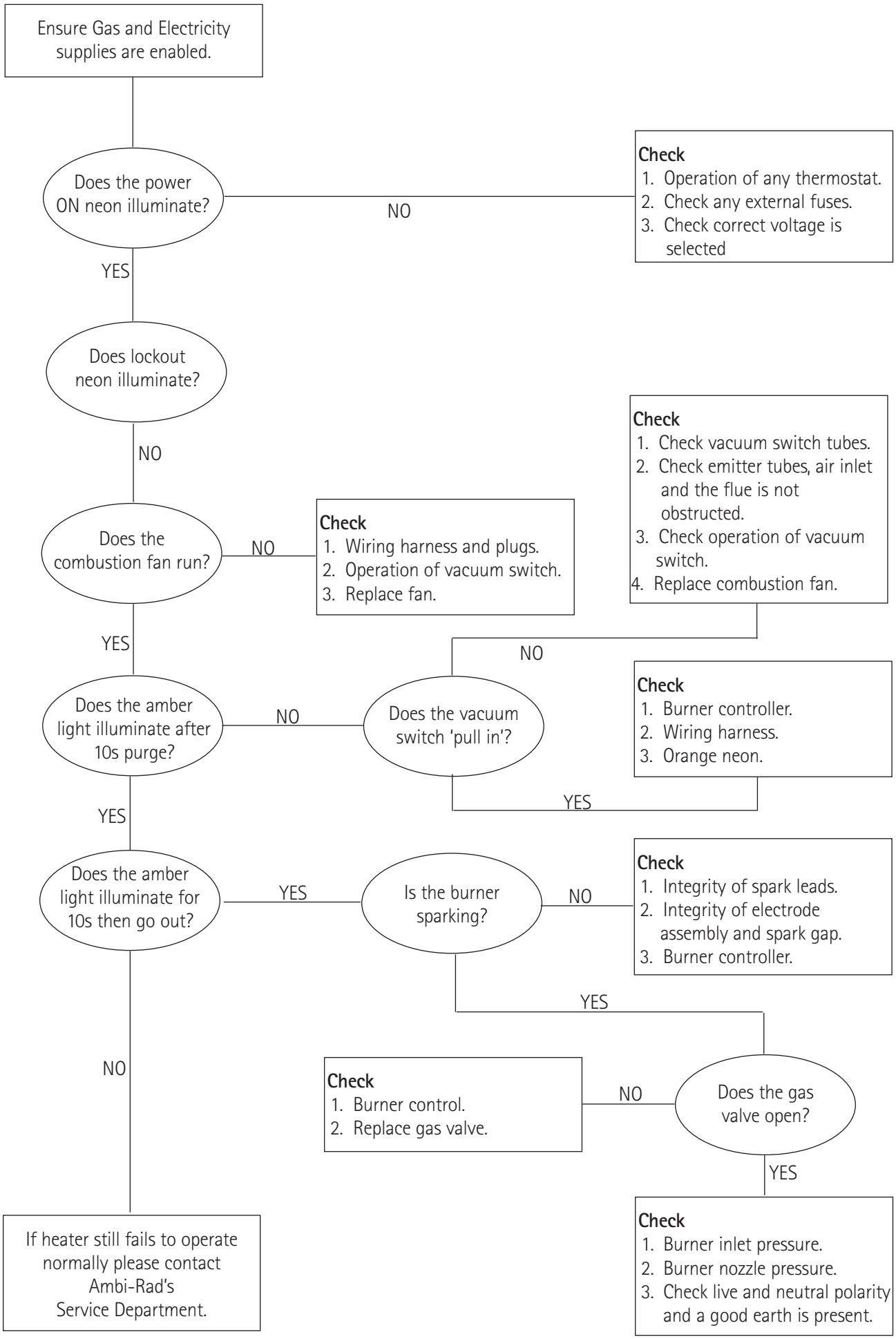
Figure 1 Vacuum switch connections



∞Figure 2 Wiring diagram



7 Fault Finding



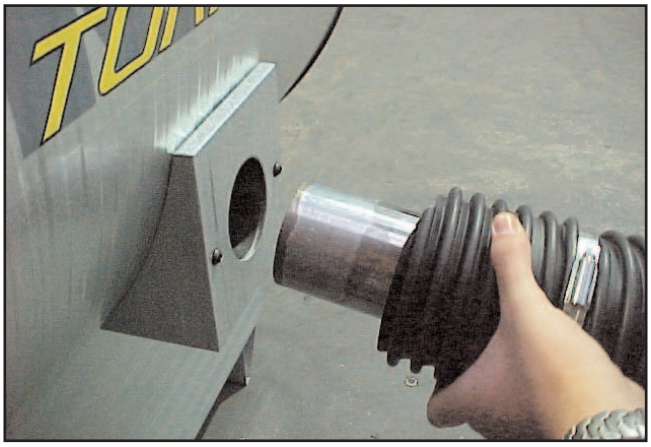
8 Ducted options

Flue

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

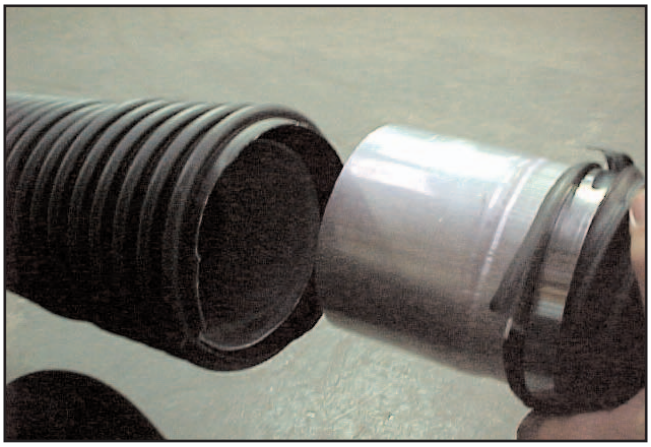
A flue pipe capable of withstanding 175˚C, 108mm diameter, and maximum length of 10m shall be used.

To keep touch and floor temperatures to an acceptable level, Ambi-Rad supply a twin wall flue pipe and it is recommended that such a flue pipe is used. 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. Ambi-Rad Flue Duct Kit can be ordered by quoting part number 200584 and 200601.



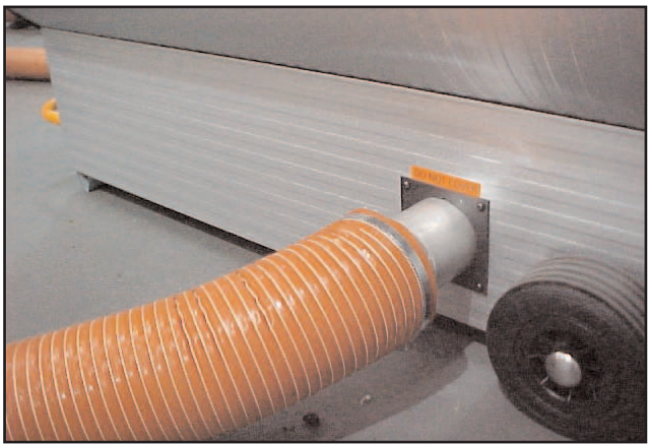
The flue pipe provided by Ambi-Rad is in two sections.

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.

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 mesh 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 the tube and ducted air spigot by quoting part no 200585.

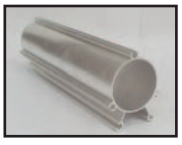
To fit the ducted air tube assembly push the spigot into the turbulator recess on the side of the product.

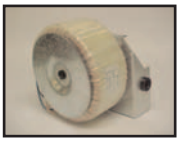
Air delivery duct

A 450mm air delivery duct can be fitted to the outlet spinning as shown. A material capable of withstanding 120˚C must be used.

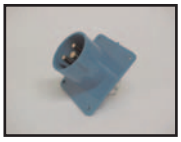
Ambi-Rad can supply the air delivery duct and attachment clip on request. If the Ambi-Rad outlet duct is used, ensure that the green end is fitted to the spinning. Ambi-Rad air delivery duct kit can be ordered by quoting part no 200586.

9 Spare parts

Photograph	Description	Part Number
	Ignition controller	2015
	Valve twin sol. step reg 220/240V	2052
	Amber neon (Burner ON)	2175
	Red neon (Mains ON)	2180
	Injector 4.6mm	2289
	Fulham hoze nozzle 1/2" BSPT x 10mm o/d	200209
	1" push on fix with domed cap	200349
	Gaskets	Call Service
	Wheel spacer	200354
	Extruded burner head	200358
	Gas hose	201308
	Harness - BCH mini	E300002

Photograph	Description	Part Number
	Igniter assembly	200418
	Burner head mesh	200419
	Jet carrier	200420
	Combustion fan	200421
	Transformer	200423
	Axial fan c/w basket	200433
	Inlet spinning assembly	200457
	Outlet spinning assembly	200466
	Propane regulator	200480
	Spanner	**200212**
	Capacitor	900049
	Overheat thermostat	900001

9 Spare parts (Cont)

Photograph	Description	Part Number
	O clip double ear	200483
	Vacuum switch	200487
	Remote thermostat socket	200526
	Remote thermostat switch	200527
	Mains appliance connector 110V	200532
	Mains appliance connector 230V	200533

Photograph	Description	Part Number
	Three position 110/OFF/230volt	200535
	Wheel	200538
	Rear ring assembly	200543
	Handle assembly black	200544
	Controls hinge cover label	200546
	Low gas pressure switch	201307

AMBIRAD TORNADO 600

MOBILE RADIANT HEATER

International Patent Application No
PCT/GB/2003/00418

CE CORGI

BCEMA

Document reference number NL/TN/108/1104

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AMBIRAD
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