TRIANCO

AZTEC
ELECTRIC BOILERS

6, 9, 11 & 12KW SYSTEM BOILER



INSTALLATION, OPERATION AND SERVICING INSTRUCTIONS

Please read these instructions carefully before installing and operating this appliance

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IMPORTANT:
General Information:
To keep your boiler running efficiently DO NOT OBSTRUCT OR COVER any ventilation air inlet on the appliance or the compartment where it is installed.

To keep the casing clean, switch 'OFF' the boiler at the electrical supply and simply wipe with a damp cloth. DO NOT use abrasive cleaning fluids as this may damage the stove enamel paintwork.

Important

The electrical supply requirements:-
The 2kW boilers and 6kW boilers meet the requirements of EN 61000-3.3.
The 9kW and 11kW boilers must be installed in premises having a service of ≥100A per phase.
The 12kW boiler must be installed in premises having a system impedance of not more than 0.1939 + 0.1939Ω.

1. Health and Safety

Information for the User, Installer and Service Engineer
Under the Consumer Protection Act 1987 and the Health and Safety at Work Act 1974, it is a requirement to provide information on substances hazardous to health (COSHH Regulations 1998).
T R Engineering Ltd takes every reasonable care to ensure that its products are designed and constructed to meet these safety requirements when the products are properly installed and used. To fulfil the requirements, products are comprehensively tested and examined before despatch.
When working on the appliance, it is the responsibility of the user or engineer to ensure that personal protective clothing or equipment appropriate to parts that could be considered hazardous or harmful is worn.
This appliance may contain some of the items below:

Insulation and Seals
Glass rope, mineral wool, insulation pads, ceramic fibre and glass insulation.
When handling, avoid inhalation and contact with eyes. These may be harmful and cause irritation to the skin, eyes, nose or throat. Use disposable gloves, facemasks and eye protection.
After handling, wash hands and other exposed areas. When disposing of materials, limit dust and the risk of inhalation by using water spray. Ensure materials are securely wrapped.
Seek urgent medical attention if inhaled or ingested. Exposure to eyes and skin should be followed by immediate cleansing of the affected areas and medical attention if necessary.

Glues, Sealants and Paints
The glues, sealants and paints used present no known hazards when the appliance is used in the manner of which it is intended.

Notes:
a) Electrical safety checks should be carried out by a competent person.
b) It is a requirement of the guarantee and any extended warranty that an annual service is carried out by a competent person.

Installation Engineers Signature	
Company Name (if applicable)	
Company Address	
Company Tel. No	

Please read these instructions fully before installing this appliance.
If in doubt seek expert advice.
These instructions should be kept in a place close to the appliance for easy reference.

2. Pre-Installation Notes

Before installation, it is imperative that the following guidelines are heeded to ensure the trouble-free and efficient operation of the boiler.

2.1 Ventilation and Siting

When siting the boiler in a confined space it is essential that adequate ventilation be provided. This will ensure that air is allowed to circulate freely around the appliance keeping down the ambient temperatures. Refer to Ventilation Requirements (**Page 6**) for further details.

Ensure that the area surrounding the boiler is kept free of items which would impede the good ventilation of the appliance (e.g. towels, linen, etc.).

When siting the boiler, take into account the potential requirement for future servicing. Enough space should be provided at the front of the boiler to enable an engineer to adequately service and/or replace items such as the PCB or heat exchanger. Space should also be available for the removal of the front casing panel. Please refer to Siting Information (**Page 6**) for clearance dimensions.

2.2 Power Supply and Wiring

The power supply to the premises must meet the minimum requirements of the unit being installed, with special attention paid to the supply current, cable size and RCD recommendation. The supply voltage to the appliance must never drop below **207 volts**.
When fitting external controls, such as a room thermostat or programmer, particular consideration should be given to the wiring of these secondary items into the appliance. Please refer to the Wiring Instructions (**Pages 9-14**) for further details. Any breakdown attended to by T R Engineering Ltd which is found to be caused by incorrectly wired appliance will be chargeable.

2.3 System

Isolation valves must be fitted on both the flow and return pipe work of each boiler to be installed. These are useful as from time to time the boiler may require draining of water and the lengthy drawing-off process can be avoided by the astute placement of these valves. Please refer to **Page 8** for further details.
Ensure that any isolation valves are open before first use and that the system is full of water. The boiler can only be fitted in an upright position.

3. After Sales Service Information

3.1 How to Report a Fault

A qualified field SERVICE ENGINEER is available to attend a breakdown or manufacturing fault occurring whilst the appliance is under guarantee.

The appliance must be made available for service during normal working hours, Monday to Friday (no weekend work or bank holidays accepted).
A charge will be made where:-

- Our field service engineer finds no fault with the appliance or,
- The cause of breakdown is due to other parts of plumbing/heating system or with equipment not supplied by T R Engineering Ltd or,
- Where the appliance falls outside the guarantee period (see terms and conditions enclosed) or,
- The appliance has not been correctly installed, as recommended (see installation, operating and servicing instructions).

NOTE: Over 50% of all service calls made are found to have no appliance fault.

3.2 Technical Assistance

Step 1: Always contact your installer in the first instance, which must thoroughly check all his work **PRIOR** to requesting a service visit from T R Engineering Ltd for assistance.

Step 2: If your appliance has developed an in-guarantee fault your installer should contact T R Engineering Ltd for assistance.

What happens if my installer/engineer is unavailable?

Step 3: Contact T R Engineering Ltd. We will provide you with the name and telephone number of our service agent. However, a charge may apply if the fault is not covered by the appliance guarantee (payment will be requested on site by our independent service agent.

PLEASE NOTE: UNAUTHORISED INVOICES FOR ATTENDANCE AND REPAIR WORK CARRIED OUT ON THIS APPLIANCE BY ANY THIRD PARTY WILL NOT BE ACCEPTED BY T R ENGINEERING LTD.

Service Centre and Technical Support
Tel: 0114 257 2300
Fax: 0114 257 1419

Hours of Business
Monday to Thursday 8:30am – 5pm
Friday 8:30am – 2:30pm

4. Introduction

The Aztec electric system boiler is a wall mounted electric central heating boiler designed with smaller properties in mind. Fitted vertically only and requiring access to the front and the right hand side of the boiler for servicing. Once the boiler is switched on it is fully controlled by an automatic management system which monitors the safety and running functions of the boiler. Designed to work on a fully pumped wet system only. The boiler produces hot water by passing water over electric heating elements housed in an insulated copper heat exchanger.

There are four boilers in the range with outputs ranging from 6kW (20.472 Btu/hr) to 12kW (41.000 Btu/hr).

Important Safety Notes

Read these instructions before installing your boiler.
The heating system must comply with the latest editions of British Standards 5449 and The Building Regulations and Electrical Wiring Regulations BS 7671.

1. Always switch OFF the electrical supply before removing the cover.
2. If any part of the boiler is modified, then the guarantee/warranty will be invalidated.

We recommend that you keep these instructions in a place near your appliance for easy reference.

The Trianco Aztec system wall mounted boiler has been designed to conform to European Directive/Standards EN60335-1:1994/A16:2001, EN60335-2-35:1998/A1:2000, EN55014 – 1:2000, EN55014-2:1997, EN61000-3-2:2000 and EN61000-3-3:1995.

THE PERSON(s) WHO INSTALLS THIS APPLIANCE, SERVICES OR CARRIES OUT ANY REMEDIAL WORK, I.E. ELECTRICAL FAULT FINDING, MUST HAVE SUITABLE ENGINEERING QUALIFICATIONS.

WARNING: DO NOT SWITCH ON THIS APPLIANCE IF THERE IS ANY POSSIBILITY THAT THE WATER MAY BE FROZEN.

THE INSTALLATION OF THIS APPLIANCE MUST MEET THE REQUIREMENTS OF THE CURRENT ISSUE FOR ELECTRICAL INSTALLATIONS, IEE WIRING REGULATIONS.

THIS APPLIANCE IS NOT INTENDED FOR USE BY PERSONS (INCLUDING CHILDREN) WITH REDUCED PHYSICAL, SENSORY OR MENTAL CAPABILITIES, OR LACK OF EXPERIENCE AND KNOWLEDGE, UNLESS THEY HAVE BEEN GIVEN SUPERVISION OR INSTRUCTION CONCERNING USE OF THE APPLIANCE BY A PERSON RESPONSIBLE FOR THEIR SAFETY. CHILDREN SHOULD BE SUPERVISED TO ENSURE THAT THEY DO NOT PLAY WITH THE APPLIANCE.

5. User Instructions

The Trianco Aztec system boiler has been designed and constructed to give years of trouble free service and these instructions are provided to assist you in obtaining the best performance with the least trouble and cost.
The boiler is fully automatic in operation and requires little attention other than the setting of the thermostat and any external system controls such as a room thermostat and time switch.

IMPORTANT

DO NOT COVER OR BOX IN YOUR BOILER, ALLOW AIR TO CIRCULATE FREELY AROUND THE APPLIANCE.
WARNING: DO NOT ATTEMPT TO SWITCH ON THE BOILER IF THERE IS ANY POSSIBILITY THAT THE WATER HEAT EXCHANGER IS FROZEN.

Before firing the boiler, ensure the system is full of water and any valves fitted on the system are open.

Check that the time switch/programmer (if fitted) is ON and the room thermostat is calling for heat.

Set the boiler temperature to required temperature using the control buttons.

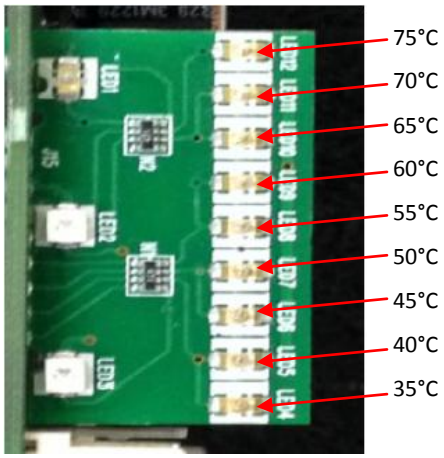
Switch on the electrical supply to the boiler and after a few seconds the boiler's green and amber light should illuminate. Set the time switch/programmer (f fitted) to the fitness and programs required.

The boiler will now operate automatically, cutting in and out according to heat demand.

To Turn Off the Boiler
Switch off the boiler at the time switch/programmer (if fitted).
If the boiler is to be switched off for any length of time it is recommended that the mains supply to the boiler is switched OFF.

Boiler Control Thermostat
The boiler control thermostat enables you to select the temperature of the water leaving the boiler. It is calibrated between 35°C and 75°C.
Using a small screw driver set the temperature by turning the knob to the required setting. The thermostat switches between low and high (35°C and 75°C in 5°C increments).

Boiler Indicator Lights
There are three LED indicator lights on the boiler fascia panel these are:
LED 1- GREEN – Power on to the boiler.
LED 2 – AMBER – Illuminated – in run mode.
Flashing – temperature satisfied.
LED 3 – RED – Boiler fault.
LEDs 4-12 – RED – Temperature lights – 35°C-75°C.



If the red LED light flashes, this means a fault has occurred. This would result in the boiler continuing to operate at a reduced output. If the red LED is permanently on, this indicates a fault has occurred (see simple fault finding chart on **Pages 15-19**).

Room Thermostat

The room thermostat should not be positioned near a source of heat such as a radiator or exposed to the sun as this will cause the central heating to switch off before the room is up to temperature. Follow the manufacturer's instructions for best siting position for the thermostat.

Frost Protection

If the boiler and central heating is shut down for many hours during very cold weather, the water may be in danger of freezing. The boiler incorporates a frost thermostat.
If the system is shut down for a long period during very cold weather, it is advisable to completely drain the system. However, frequent draining should be avoided, especially in hard water areas, as this could lead to scaling of the boiler waterways.
WARNING: DO NOT SWITCH ON THIS APPLIANCE IF THERE IS ANY POSSIBILITY THAT THE WATER HEAT EXCHANGER IS FROZEN.

Time Switch/Programmer

When choosing the operating times for your boiler, it is useful to remember that central heating usually takes between half an hour to an hour before it becomes effective.
It is suggested that the time switch/programmer is set to bring on the heating about an hour after boiler shut down. The timer can therefore be switched off earlier as an economy measure.

Cleaning Casings

Use hot soapy water applied with a damp cloth for the enamel, then dry with a soft dry cloth.

Simple Maintenance

Ensure that the natural ventilation around the boiler is not obstructed. If fitted in a compartment ensure all ventilation grilles are clear.

6. Simple Fault Findings

If the boiler fails to start for no apparent reason make the following checks before calling your service engineer.

Is the green LED illuminated?

NO

Check for blown fuse or blown circuit breaker. If replacement fuse or circuit breaker fails again, call your service engineer.

If the red LED is permanently illuminated, contact your service engineer.

Flashing red LED indicates an open circuit. The boiler can still be operated. Your service engineer should be contacted.

Check to see if all external controls i.e. programmer or room thermostat is calling for heat.

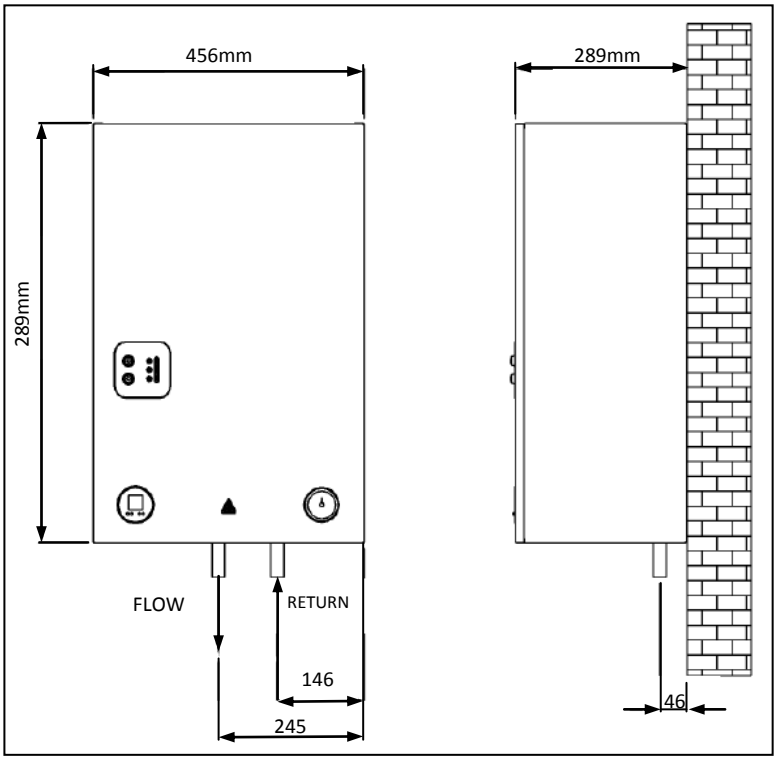
Resetting the Boiler

If a fault has occurred and the LED is illuminated but the pump continues to run, then switching the power off for 30 seconds and then on again should reset the light. This may be caused by the ambient temperature around the boiler being too high. Check to ensure that any boiler ventilation is not obstructed. If the fault reoccurs, contact your engineer.

IMPORTANT: Electrical safety checks should be carried out by a qualified electrical engineer.

7. Technical Specification

	UNIT	Aztec 6kW	Aztec 9kW	Aztec 11kW	Aztec 12kW
Electrical Input	kW	6	9	11	12
Supply Current	amp	25	39	45	51
RCD Rating	amp	32	40	50	63
Minimum Cable Size	mm	4	6	10	16
Weight	kg	25			
Water Content	litres	7			
Width	mm	456			
Depth	mm	289			
Height	mm	705			
Mains Supply	230V 50Hz				
Max Operating Pressure	300kPa / 3 bar				
Test Pressure	600kPa / 6 bar				
Boiler Flow Temperature	Adjustable between 35°C and 75°C				
Limit Thermostat	Factory set at 100°C				
Casing Finish	Stove enamelled white				
Thermal Insulation	Insulated with mineral fibre				



8. Installation instructions

8.1 Regulations

Installation of the boiler must comply with the following British Standards and Regulations:

BS5449 – Forced circulation hot water central heating systems.
BS 7074 – Part 1: Code of practice for sealed water systems
The building regulations; Part 'L' (Northern Ireland)
Current I.E.E Regulations
Local water undertaking By-laws.

8.2 Health and safety at Work Act

The installer should be aware of his responsibilities under the act and provide where necessary, appropriate protection for persons carrying out the installation. In the interests of safety a competent engineer should install the boiler and all wiring must be carried out in accordance with current IEE regulations.

IMPORTANT
ALL ELECTRICAL WORK MUST BE CARRIED OUT BY A QUALIFIED ELECTRICAL ENGINEER TO CURRENT IEE WIRING REGULATIONS.

8.3 Siting the Boiler

IMPORTANT: NOT TO BE INSTALLED IN A SHOWER COMPARTMENT OR BATHROOM.
The boiler is designed to be fitted in an **upright position only**. Ensure adequate clearance is allowed for making water connections as the boiler can only be fully serviced from the front. The boiler must also be fitted in a dry well ventilated position, which is not subject to adverse temperature conditions (See Ventilation Requirements).

Care should be taken when siting the appliance to make sure adequate access is available for future servicing of the appliance. Please note that the PCB and heat exchanger assembly may require removal during such times.

When installed in a compartment with a hot cylinder (see Fig.1), we recommend that the boiler is fitted in position 1, if fitted in position 2 provision should be made at the front of the boiler to enable the removal of the front casing. In both cases, where any additional equipment like a hot water cylinder or system controls are to be fitted after the boiler has been installed, attention should be given to ensure that they do not restrict access to the boiler for servicing.

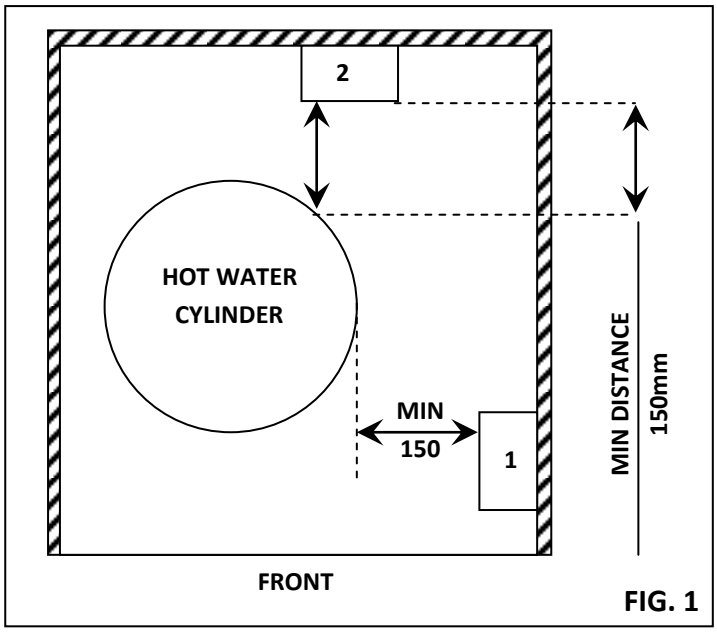


FIG. 1

8.4 Unpacking the Boiler

Carefully open the boiler carton, remove the boiler and place in a safe place until required.

NOTE: ALWAYS STORE THE BOILER IN A DRY PLACE PRIOR TO FITTING.

8.5 Fixing the Boiler to the Wall

The boiler should be fitted to a suitable wall in an upright position. Using the fixing dimensions supplied work out position of the boiler, mark three holes and fix wall mounting bracket and secure bottom of the boiler to the wall.

8.6 Ventilation Requirements

If the appliance is to be fitted in a confined space or compartment with a potential ambient temperature of 60°C or more, it is strongly recommended that adequate ventilation is provided to prevent the overheating of the boiler controls. Aeration of 110cm^2 will be required to the compartment, in both high and low positions.

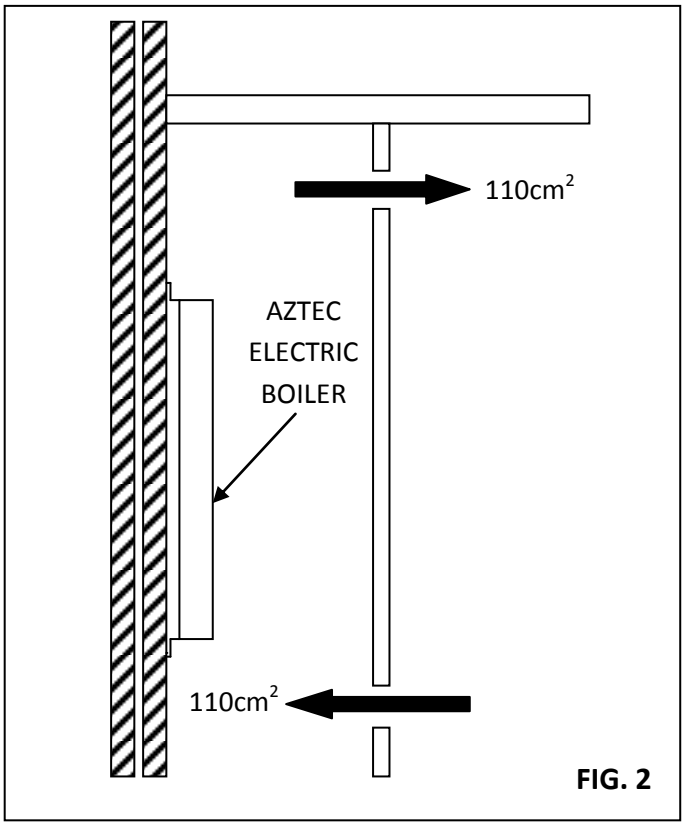


FIG. 2

8.7 Water system

IMPORTANT: USE ONLY COMPRESSION FITTINGS WHEN CONNECTNG THE BOILER TO THE CENTRAL HEATING SYSTEM.
The installation must comply with the requirements of the following codes of practice:

BS 5449 Part 1: Forced Circulation Hot Water Systems
BS 7074 Part 1: Code of Practice for Sealed Water systems
BS 7593 Treatment of Water in Domestic Hot Water Central Heating Systems.
The water system must be thoroughly flushed out with cold water without the pump in position.
Refit the pump and fill the system. Vent all air from the system and clear any air locks and examine the system for water leaks.

IMPORTANT: ENSURE ALL SERVICE VALVES ARE IN THE OPEN POSITION.

Ensure boiler is fitted with flow pipe at top and return pipe at the bottom.
The boiler is supplied with Ø22mm compression fittings both top and bottom. The Aztec ranges of boiler are low water content boilers so require a good flow rate at all times (see chart).

Model	Minimum Flow Rate/Min
6kW	8
9kW	10
11kW	11
12kW	12

Aztec boilers are approved for use on fully pumped open vented systems and sealed systems. When fitting on a sealed system a 3 bar safety valve **must be fitted** to the system. Where thermostatic radiator valves are fitted it will be necessary to fit a bypass to obtain minimum flow rates.

IMPORTANT: IF MINIMUM FLOW RATES ARE NOT OBTAINED THE BOILER MAY GO TO LOCK OUT ON HIGH LIMIT THERMOSTAT.

Where more than 1 boiler is fitted refer to multiple boiler instructions. System must be flushed out before adding inhibitor to BS 7593:1992 Treatment of Water in Central Heating Boilers.

IMPORTANT: THIS BOILER IS TO BE FITTED ON FULLY PUMPED SYSTEMS ONLY.

9. Sealed Water System Requirements

The installation must comply with the appropriate requirements of the current issue of BS 4814, BS 5449, BS 6798 and BS 7074 Part 1 and 2.

Safety Valve
A 3 bar safety valve is fitted within the unit. The drain must be routed to the outside of the building. The drain must not discharge above an entrance or a window or any public access area, be clear of any electrical fittings and positioned so that any discharge can be seen.

Expansion Vessel Capacity
A diaphragm type expansion vessel, conforming to the current issue of BS 4814. The expansion vessel must be connected to the system at a point close to the inlet side of the circulating pump. The expansion vessel volume depends on the total water system volume and the initial system design pressure. For any system an accurate calculation of vessel size is given in the current issue of BS 5449 and BS 7074 Part 1.

The water content of the boiler is given in the technical specification. **Note:** A higher initial design pressure requires a larger volume expansion vessel.
The charge pressure must not be less than the static head of the system, which is the highest point of the system above the expansion vessel.

Capacity of Expansion Vessel
Where design information is not complete the following chart (below) can be used for selecting the size of the vessel, it should be noted that the size given in the table takes into account of fault conditions.
NOTE: Failure to ensure the correct vessel size could result in premature failure of the expansion vessel which in turn may adversely affect other components in the system i.e. circulating pump and diverter valve.

Safety valve setting (bar gauge)	3 bar		
Vessel charge and initial system pressure (bar gauge)	0.5	1.0	1.5
Total water content of system	Vessel Volume		
Litre	Litre	Litre	Litre
25	2.3	3.3	5.9
50	4.4	6.7	11.8
75	7.0	10.0	17.7
100	9.4	13.4	23.7
125	11.7	16.7	29.6
150	14.1	20.1	35.5
175	16.4	23.4	41.4
200	18.8	26.8	47.4

System Temperature
The normal running temperature of the system is 75°C, if a fault was to occur then the safety device would allow the system temperature to rise to 100°C. It is recommended that this figure be used in the calculations of the vessel size.

Expansion vessel connection
The expansion vessel should be connected in the neutral part of the system, this being the return pipe work close to the boiler. Refer to sealed system pipe work layout drawing (**Fig. 5**).

Pressure Gauge
A 0 to 4 bar pressure gauge is fitted within the unit.

Inhibitor
If using an existing system take care to drain down the entire system including the radiators then thoroughly clean out before fitting the boiler. Attention is drawn to the current issue of BS 5449 and BS 7593 on the use of inhibitors in central heating systems.

Drain Tapping
A drain tapping is provided on the boiler. An additional tapping must be provided at the lowest point of the system, which will allow the entire system to be drained.

System Makeup
Water loss from the system should be replaced from a makeup vessel connected to the system. This vessel should be higher than the top of the system. Alternatively provision can be made by pre-pressurisation of the system via a temporary hose connection and through a double check valve (non-return) and stop valve.
There must be no permanent connection to the mains water valve supply even through a non return valve.

Alternative Methods of Filling a Sealed System

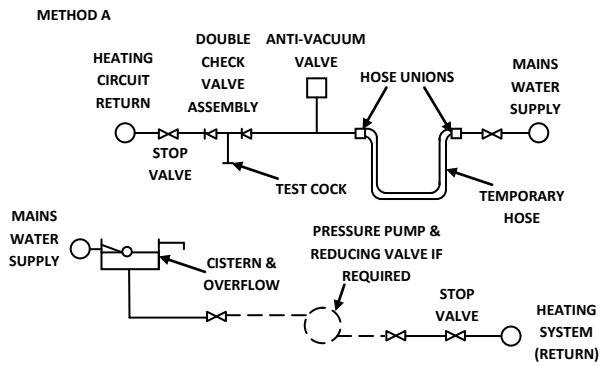


FIG. 3

PUMP FLOW CURVE

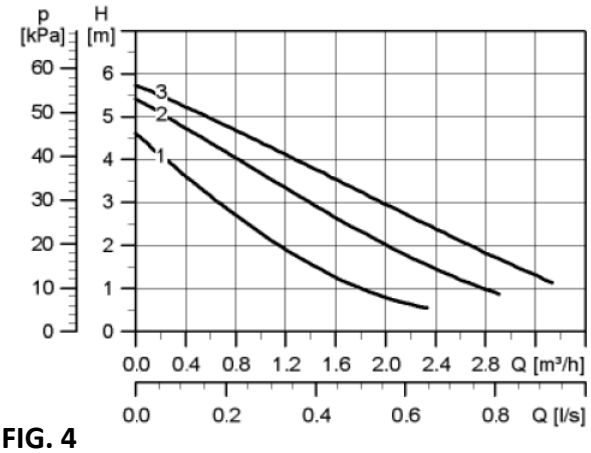


FIG. 4

Sealed System

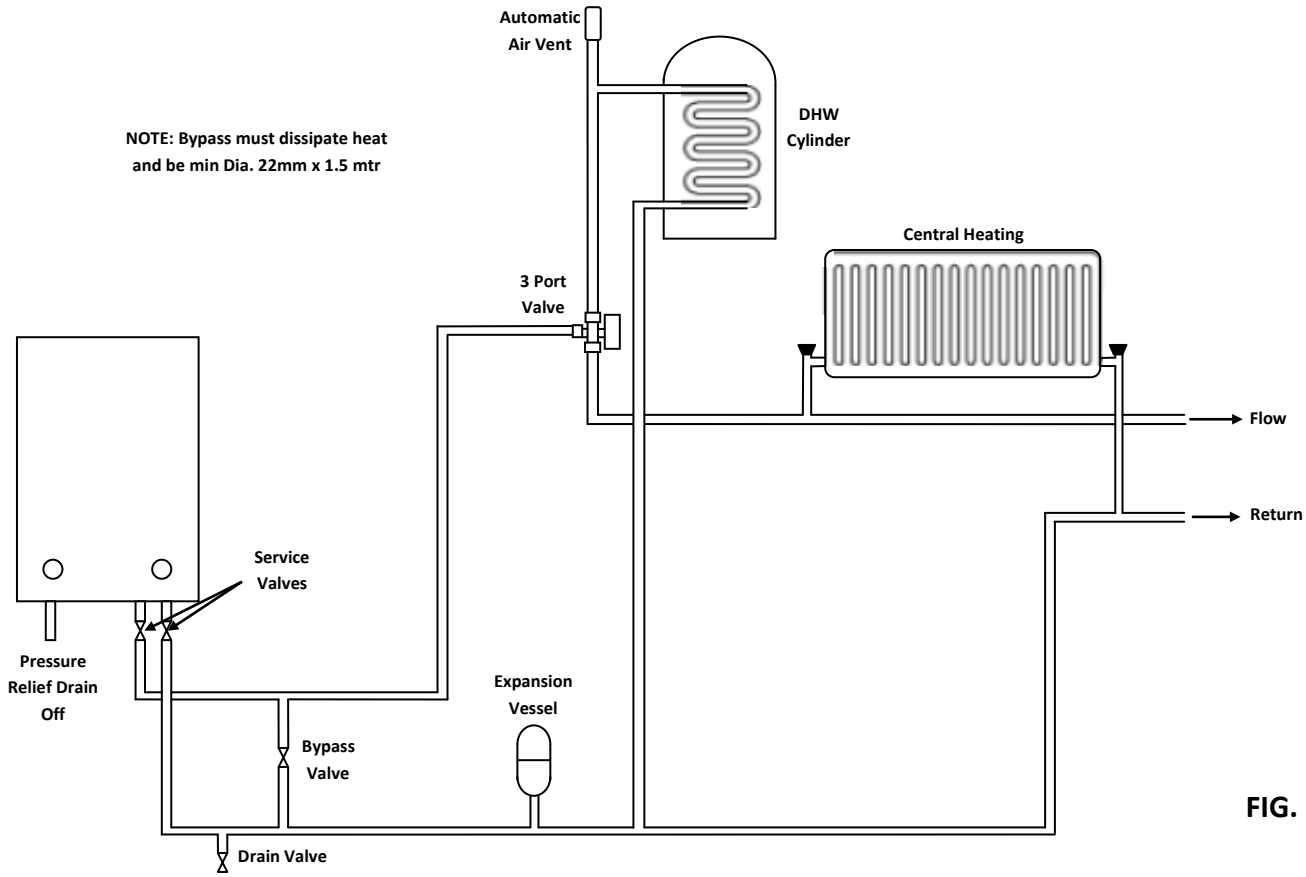


FIG. 5

10. Wiring Instructions

All electrical work must be carried out in accordance with current IEE wiring regulations (seventeenth edition).

Before commencing installation check power supply to the property to ensure that there is sufficient current and voltage available for size of boiler fitted. Take into account requirements of other electrical appliances, the boiler must be connected to the mains supply by means of a double pole isolator linked with 3mm contact gap in both poles.

IMPORTANT:
After completing electrical installation work preliminary safety checks should be carried out as described in BS 7671:2001.

The electrical supply requirements:
The 6kW boiler supply should meet the requirements of EN61000-3.3.
The 9kW and 11kW boiler must be installed in premises having a service supply ≥100A per phase and meet the requirements of IEC 60417-5855.
The 12kW boiler must be installed in premises having a system impedance of not more than 0.1939Ω + 0.1939Ω.

A double pole RCD with a trip level sensitivity of 30mA can be used capable of breaking full load current to BS EN 61008:1994.

NOTE: RCD unit can be used as the isolating switch if mounted close enough to the boiler.
Miniature circuit breakers (MCB's) **MUST** be fitted between RCD unit and boiler and RCD and any external controls. Refer to technical specification. For MCB rating refer to wiring diagrams.

It is important the correct size MCB is used in the supply from the RCD to the boiler. An additional MCB rated 6A will be required to supply the external controls.

Electrical Connections

WARNING: THIS APPLAINCE MUST BE EARTHED.

The mains connection block is located inside the boiler on a bracket at the bottom left hand side of the boiler which can be directly wired to the boiler MCB. Use the correctly rated cable.

Where the pump is wired directly back to the boiler both live and neutral connections must be used with the earth being wired back to the earth post.

IMPORTANT: CORRECT POLARITY MUST BE OBSERVED WHEN BRINGING THE MAINS SUPPLY INTO THE BOILER.

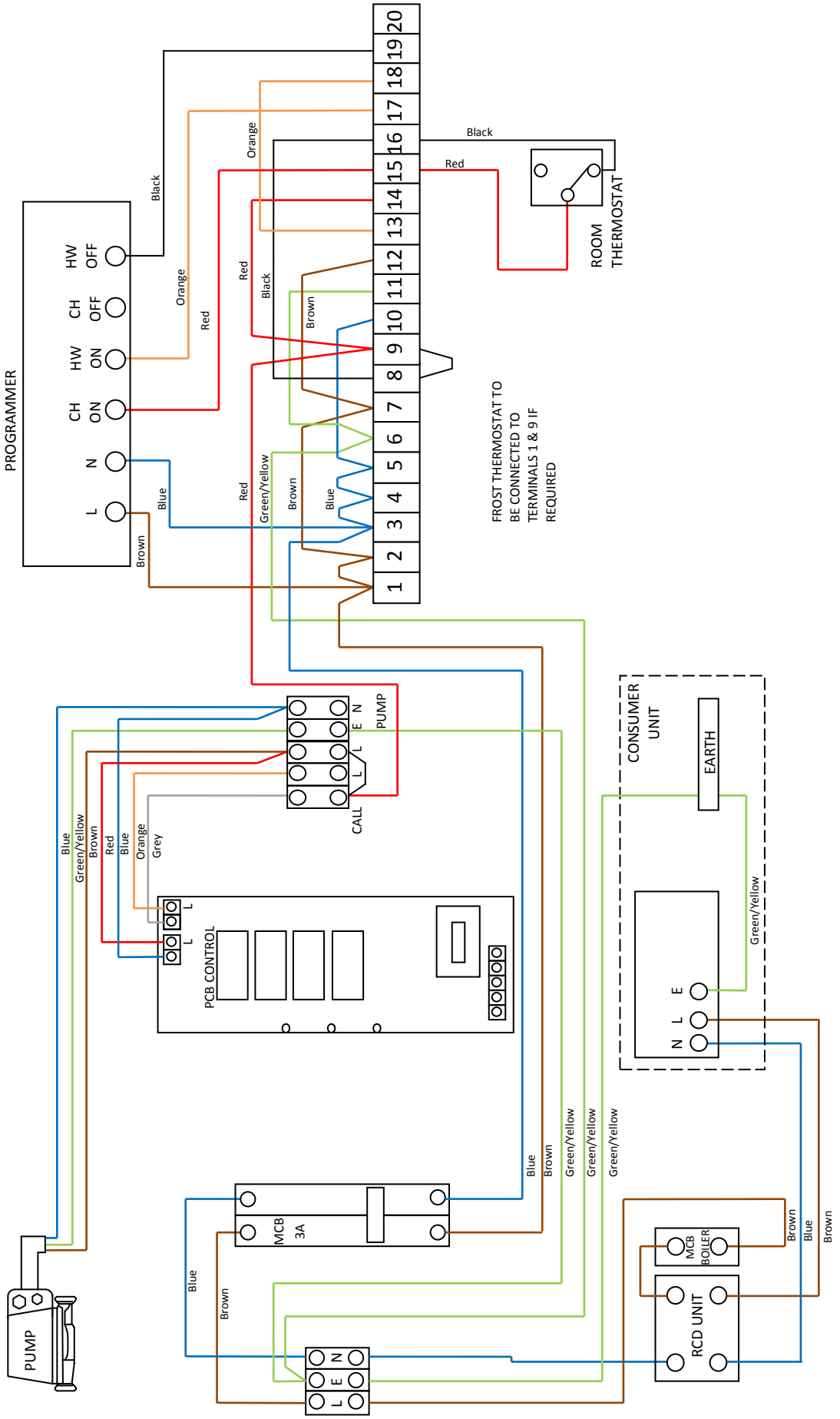
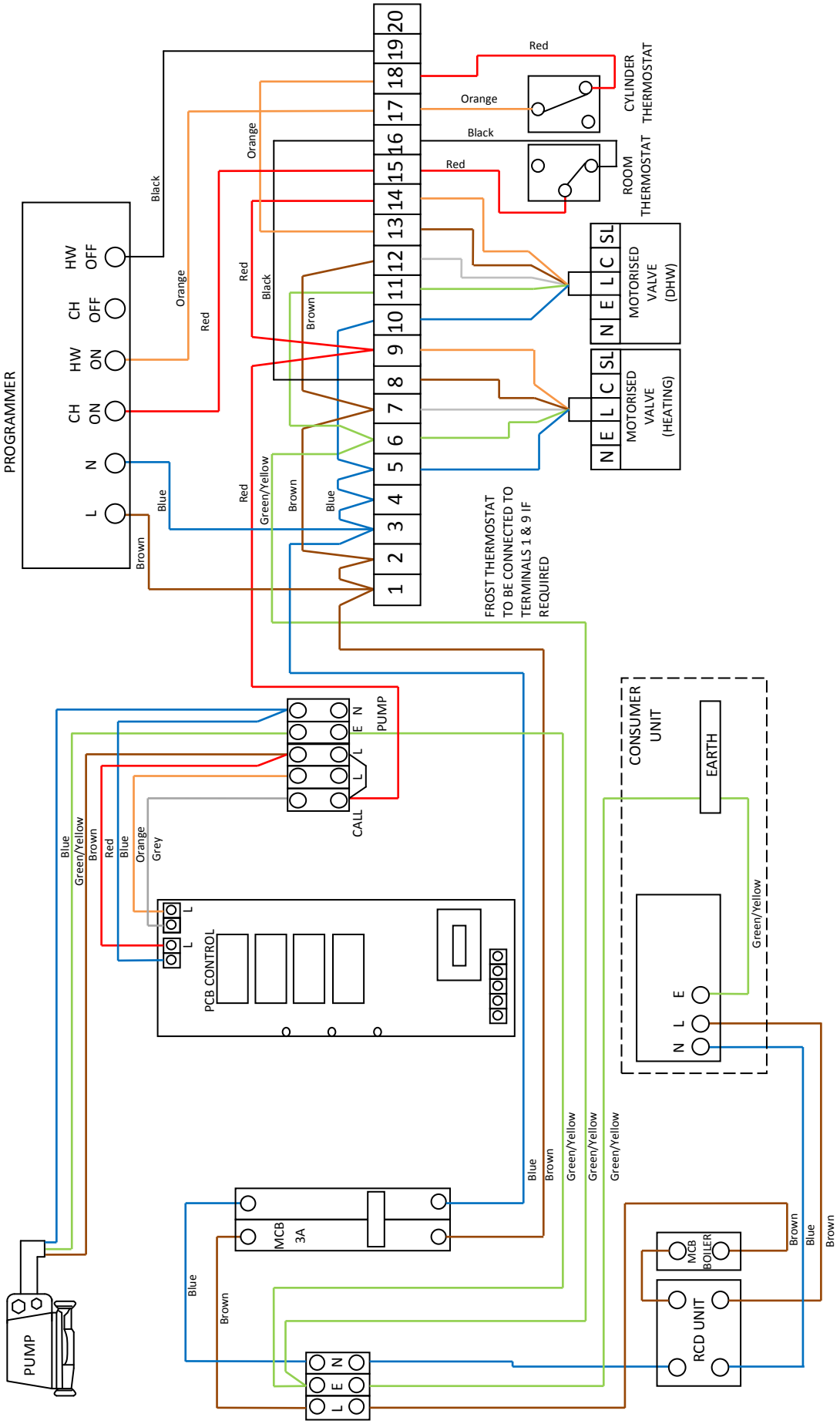


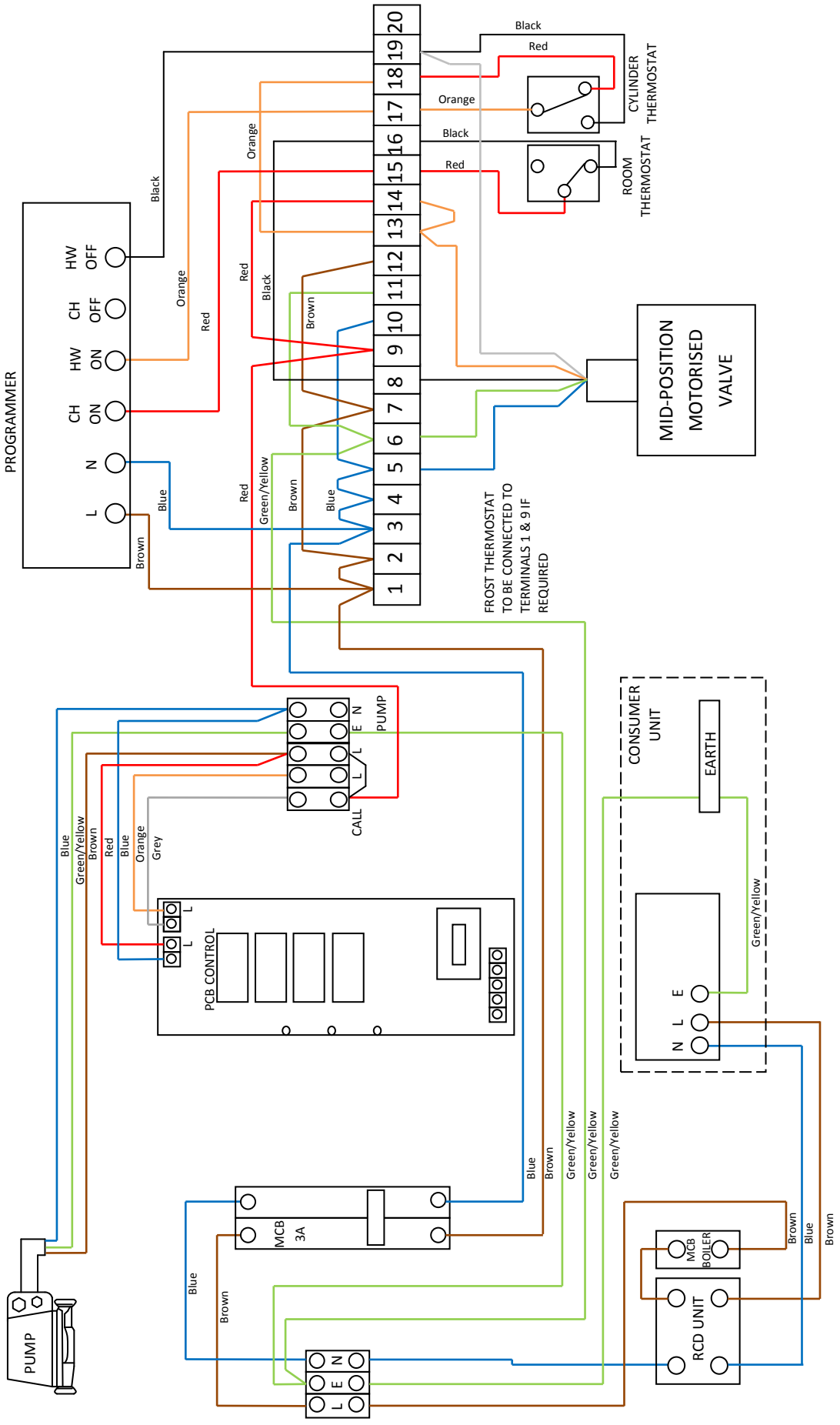
FIG. 6

WIRING DIAGRAM FOR HEATING ONLY SYSTEM CONTROL



WIRING DIAGRAM FOR 'S' PLAN SYSTEM CONTROL

FIG. 7



WIRING DIAGRAM FOR 'Y' PLAN SYSTEM CONTROL

FIG. 8

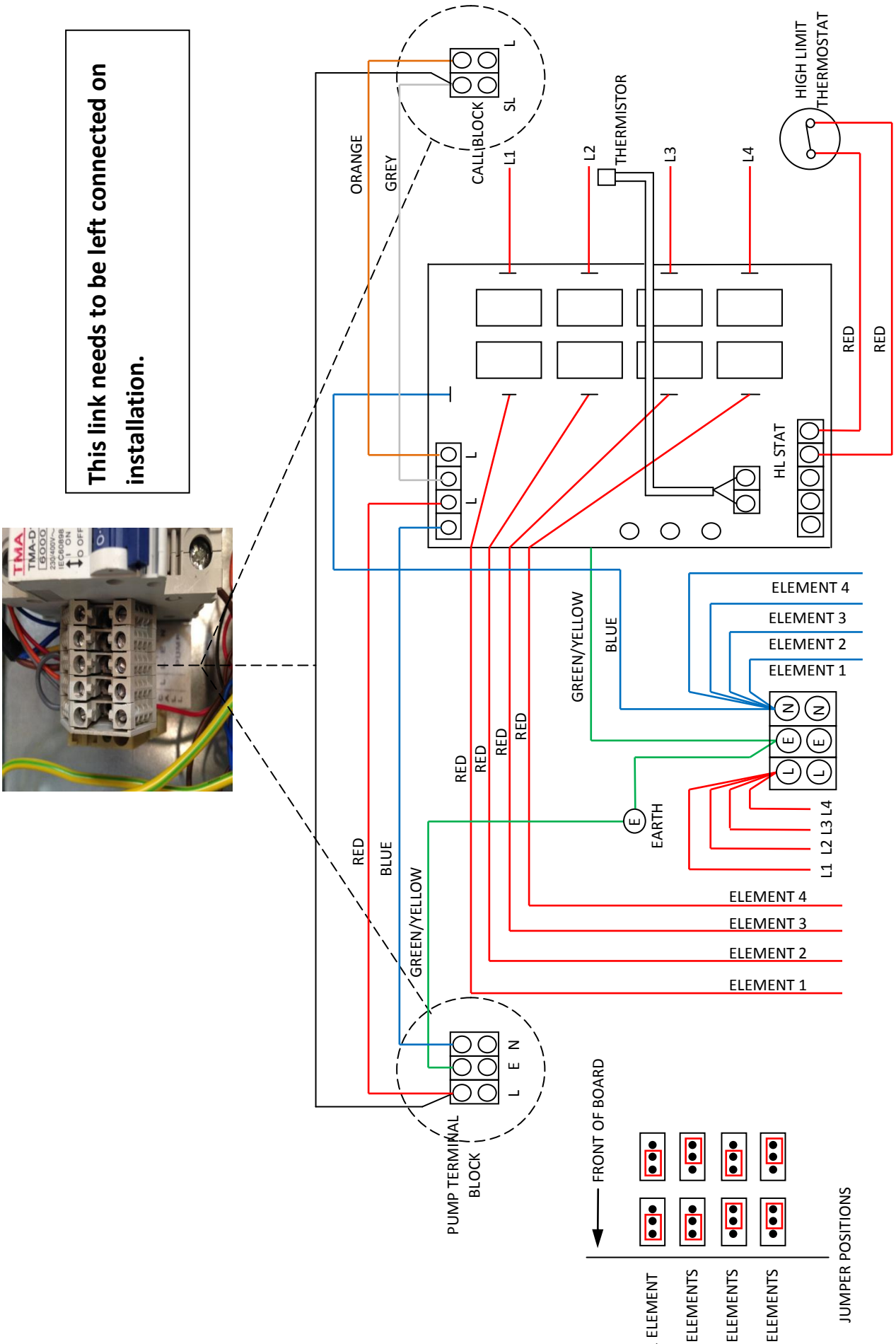

This link needs to be left connected on installation.
ORANGE
GREY
CALLBLOCK
L
SL
L1
L2
THERMISTOR
L3
L4
HIGH LIMIT THERMOSTAT
RED
RED
HL STAT
L
L
GREEN/YELLOW
BLUE
ELEMENT 4
ELEMENT 3
ELEMENT 2
ELEMENT 1
RED
RED
RED
RED
N
E
L
EARTH
L1 L2 L3 L4
ELEMENT 4
ELEMENT 3
ELEMENT 2
ELEMENT 1
RED
BLUE
GREEN/YELLOW
L E N
PUMP TERMINAL BLOCK
FRONT OF BOARD
1 ELEMENT
2 ELEMENTS
3 ELEMENTS
4 ELEMENTS
JUMPER POSITIONS

Fig 9

IMPORTANT: To prevent damage to the switch wires are left disconnected. After installation connect the switch plug to the connector on the printed circuit board as shown in the diagrams below.

11. Servicing Instructions

To ensure reliable operation of your Aztec electric system boiler, it is recommended that you have your boiler serviced once a year.

The person(s) who services or carries out any remedial work, i.e. electrical fault finding must have suitable engineering qualifications.

Isolate main supply before carrying out any service work.

Check all electrical connections on the PCB and electric elements to ensure they are secure and clean.
Check insulation on wiring.
Ensure all air grilles are clean and free from obstructions.
Inspect seals around elements and also, the heat exchanger's top and bottom flanges.

11.1 Parts Replacement

11.1.1 Casing Removal

Isolate electrical supply to the boiler.
Remove 4 fixing screws securing front case in position.
Disconnect temperature button cables from the PCB.
This will allow the front casing to be removed.

IMPORTANT: All electrical connections should be checked. Loose connections can cause problems.

The boiler is fitted with a manual reset high limit thermostat. Before replacing any part, ensure that the thermostat does not require resetting.

11.1.2 PCB Assembly Replacement

Ensure electrical supply to the boiler is isolated.
Remove the 4 fixing screws and washers (2 top and 2 bottom) securing the front casing. Disconnect the temperature button cables from the PCB and remove the front casing.
Disconnect the pump and call plug, the thermistor plug, the fan (where fitted) and high limit thermostat plug.
Disconnect all element cables apart from the rear element.
N.B. Take note of wiring arrangement before disconnecting.

Now remove the grey pipe insulation, it is now possible to disconnect the remaining element.
Will all elements disconnected, again taking note of wiring arrangement, carefully disconnect and remove the element cables from the PCB. **IMPORTANT: Care must be taken.**

Disconnect the remaining red and black power cables from the PCB.
For ease of access disconnect from the main terminal block both the red and black cables and also the power input cables, leaving the earth cable connected.

Free both the pump and call terminal blocks be removing the terminal block fixing screws.
Finally remove the 4 fixing screws holding the PCB mounting bracket in position and remove the PCB from the unit.
Re-fit in reverse order on reassembly always refer to wiring diagram.

11.1.3 High Limit Thermostat Replacement

Ensure electrical supply is isolated to boiler.
The high limit thermostat can be found fixed to top front face of the boiler.
Remove 2 terminal connectors from high limit thermostat.
Remove 4 M6 nuts, clamping and then remove thermostat out from behind.
It is important when replacing thermostat a heat sink compound is used between back of thermostat and face of boiler. (See Fig. 10 for positioning), and thermistor is clamped behind plate.
Inspect retaining straps and replace where necessary.

11.1.4 Thermistor Replacement

Isolate electrical supply to the boiler.
The thermistor is located fixed to the top side of the boiler above the high limit thermostat.
Disconnect from PCB board and slide out from behind clamping plate.
It is important when replacing thermistor ensure a heat-sink compound is used between thermistor and boiler body (See Fig. 10 for positioning).
Inspect retaining strap and replace where necessary.
When replacing front casing, ensure the thermostat control shaft passes through hole in front control panel.

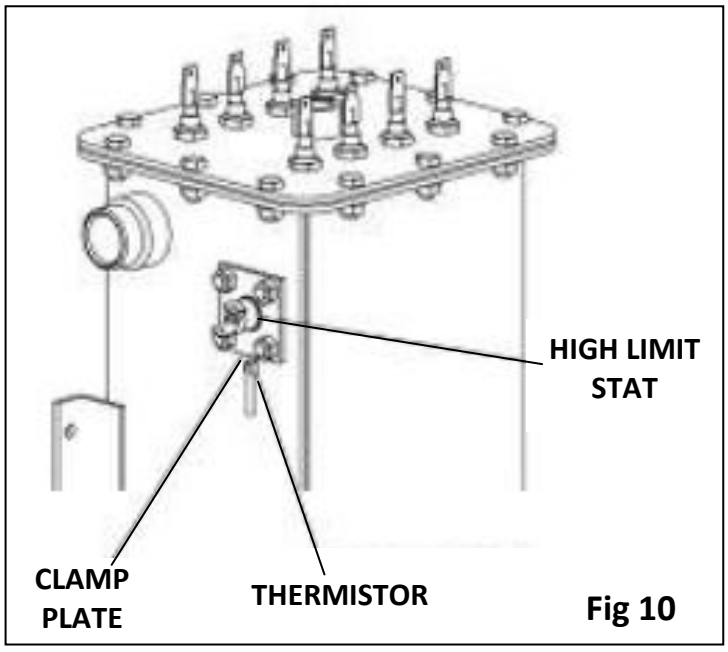


Fig 10

11.1.5 Element Replacement

Isolate electrical supply to the boiler.
Drain down system.
Disconnect terminal connectors from high limit thermostat.
Remove thermistor from behind retaining strap.
Disconnect electrical elements and earth wire.

Disconnect compression fitting top & bottom of the boiler.
Remove securing bracket on bottom of the boiler then carefully remove top bracket.
Boiler unit can now be carefully removed.
Remove 8 fixing screws on top flange and withdraw the element assembly.
Remove the bottom element positioning bracket.
Remove damaged element.
Refit in reverse order and ensure element seals are fitted.
Check for continuity through 2 terminals on each element.

IMPORTANT: Inspect all seals and changer where necessary.

11.2 Fault Finding

Red LED permanently illuminated indicates one of the following faults.

High limit thermostat has operated or faulty electrical connections

The high limit thermostat is fitted to the front top of the copper heat exchanger and secured in position with 2 retaining clamps. Check electrical connections on thermostat and PCB to check thermostat has not failed using a multi-meter check continuity across terminals of the thermostat. To reset press red button in centre of thermostat. Thermostat may have tripped due to one of the following:

a) Faulty circulation pump
b) Isolation valve on system closed
c) Air trapped in system
d) Out of calibration limit thermostat
e) Temperature settings on PCB incorrect
f) No water in system

Thermistor
The thermistor is fitted to the front top of the heat exchanger and secured in position with a clamp; the other end terminates with a white connector that plugs on to the PCB. Check the connections on the board to make sure it is correctly fitted; also inspect the thermistor for any broken wires.

Mains Inlet Wiring
If the mains supply to the boiler is wired incorrectly on the inlet terminal block. Check polarity.

PCB Damage
Inspect the LED lights and the boiler temperature control adjuster for any damage to connections to the PCB controller.

Voltage Drop
If the voltage drops below 207 volts.

Red LED flashes indicates one of the following faults

Poor Electrical Connection
Check the electrical connections to the elements and the PCB controller, a poor controller would show up as a fault.

Element Failure
To check elements for failure, disconnect each individual element and check continuity through the element if there is continuity between the two terminals the element is ok. Check each element individually replacing the electrical connectors after testing.

Element Cables
If there is a break in the element cable, this would show up as a fault. Check all element cables and connections.

Green LED
If the green LED is illuminated but the boiler is not functioning, check that any external controls fitted are calling for heat. If no external controls fitted check that link wire is in place on call terminal block (refer to wiring diagrams).

Blown Fuse on PCB
If there is power to the boiler but no LED illuminated then the fuse on the PCB may have blown. The fuse is located above the PCB transformer (fuse type 20mm 630mA anti-surge Bessman Type S560). The fuse may have blown due to one of the following:

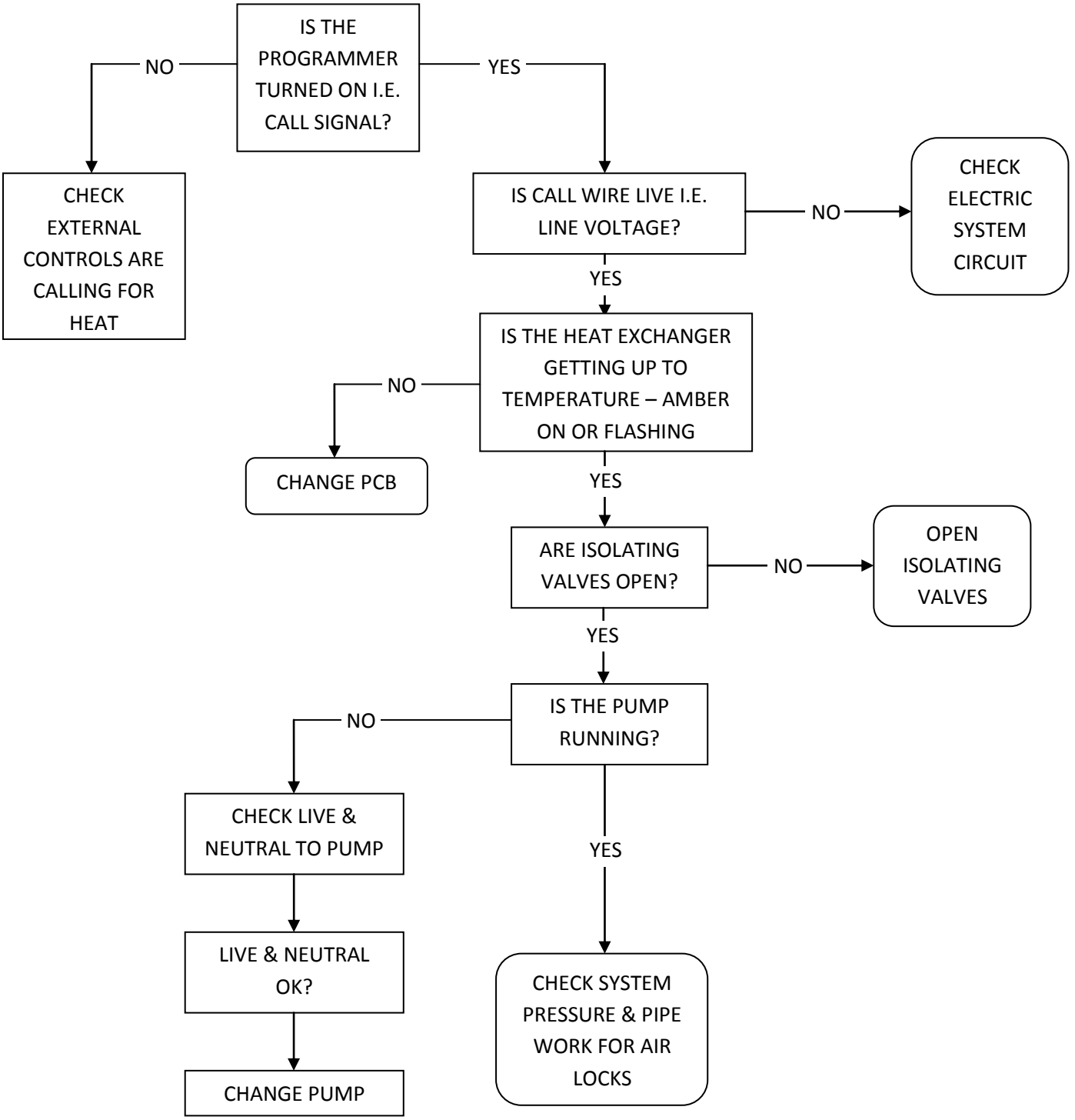
a) When multiple boilers are fitted and a larger pump is used. If the pump is wired directly into the PCB the fuse may need upgrading.
b) If the call terminal is used to supply power to ancillary controls.

RCD Unit Trips
Check that the RCD unit is correctly rated for boiler size. If under-sized change. Inspect mains terminal block wiring for short-circuiting. Check electrical elements for earth continuity, if element is found to be faulty fit new element.

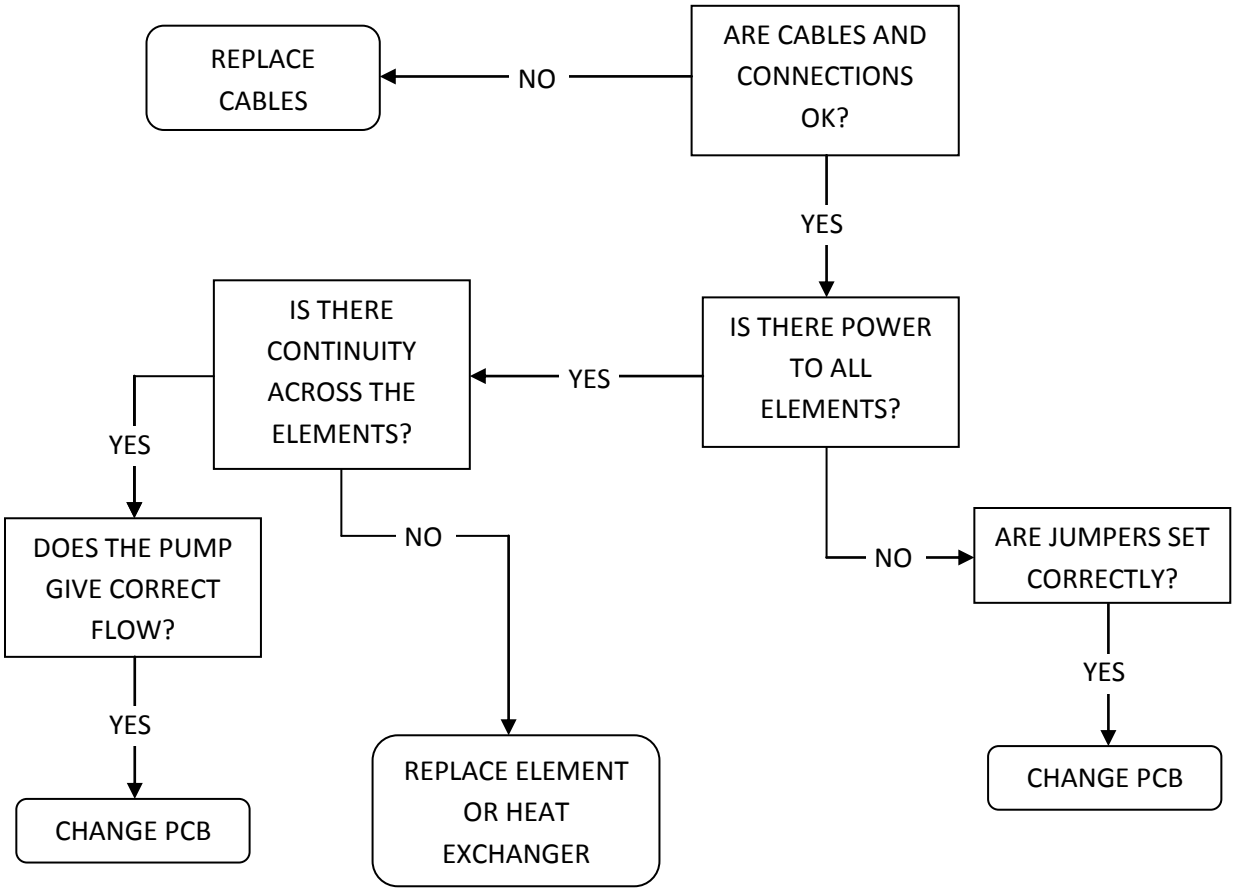
Thermistor Values

Temperature (°C)	Resistance (Ohms)
0	32554
5	25339
10	19872.2
15	15698.5
20	12487.7
25	10000
30	8059.1
35	6543.7
40	5329.9
45	4371.7
50	3605.3
55	2988.7
60	2490
65	2084.4
70	1753
75	1480.9

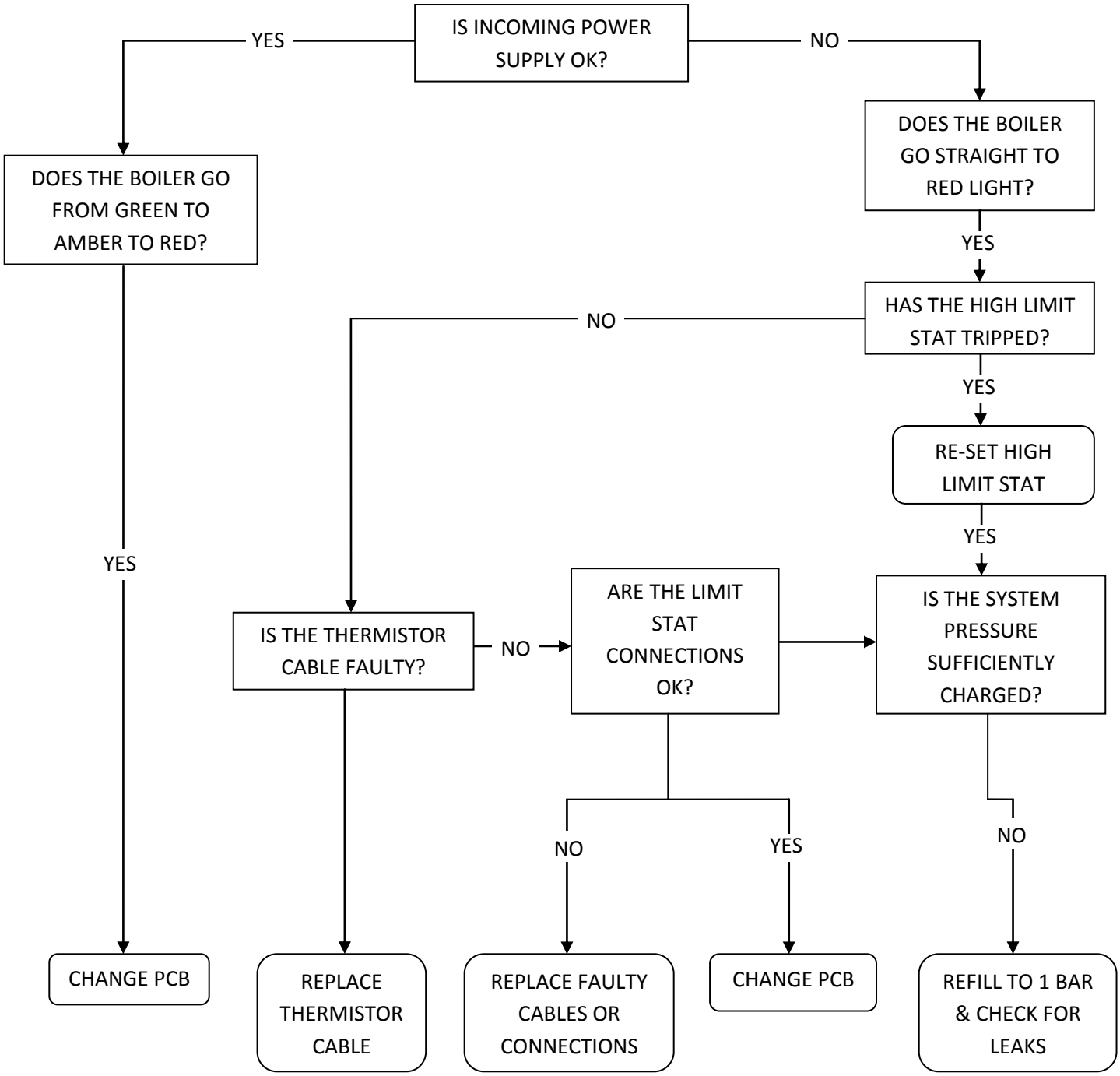
NO HEAT – PERMANENT GREEN LIGHT



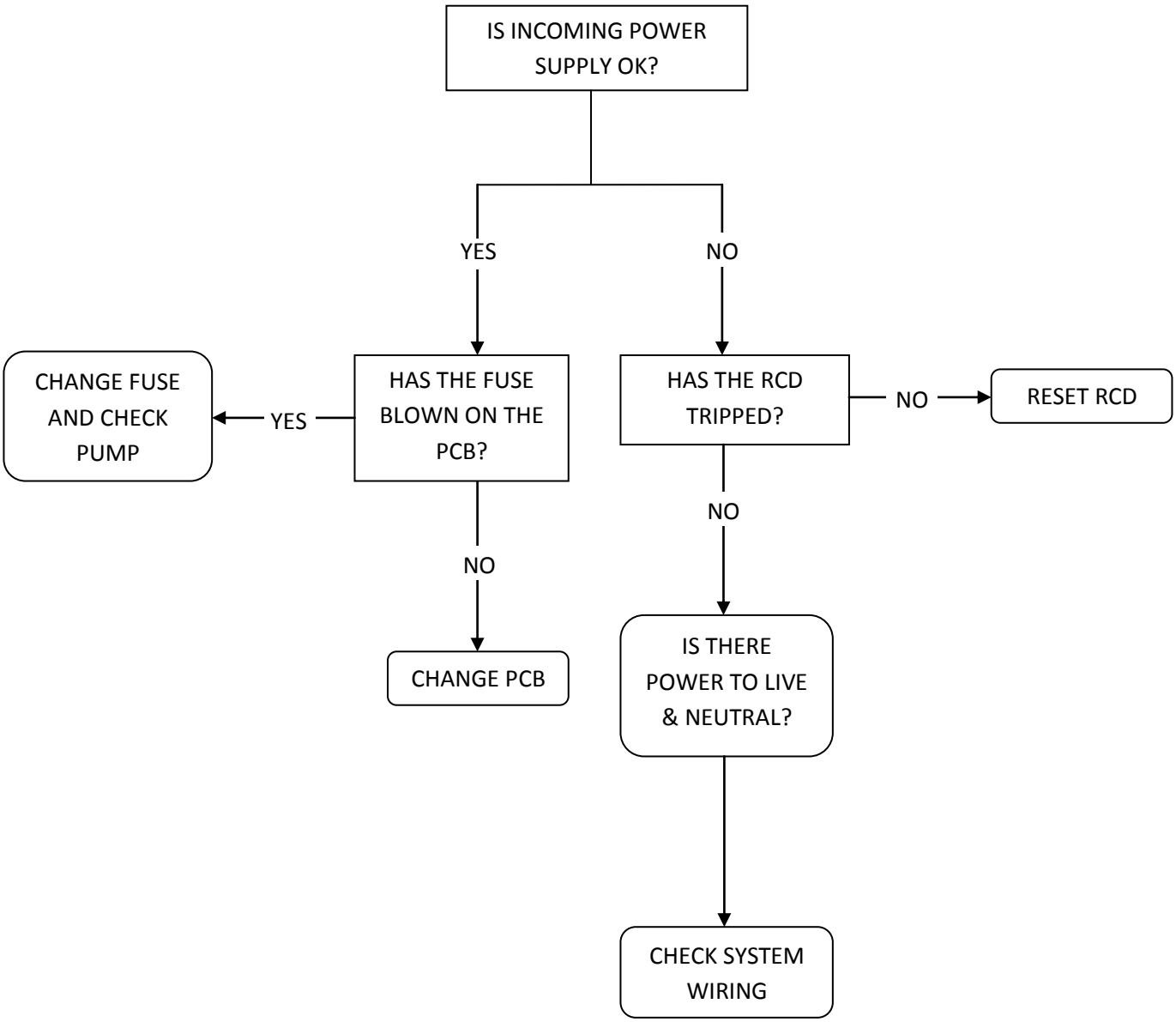
FLASHING RED LIGHT

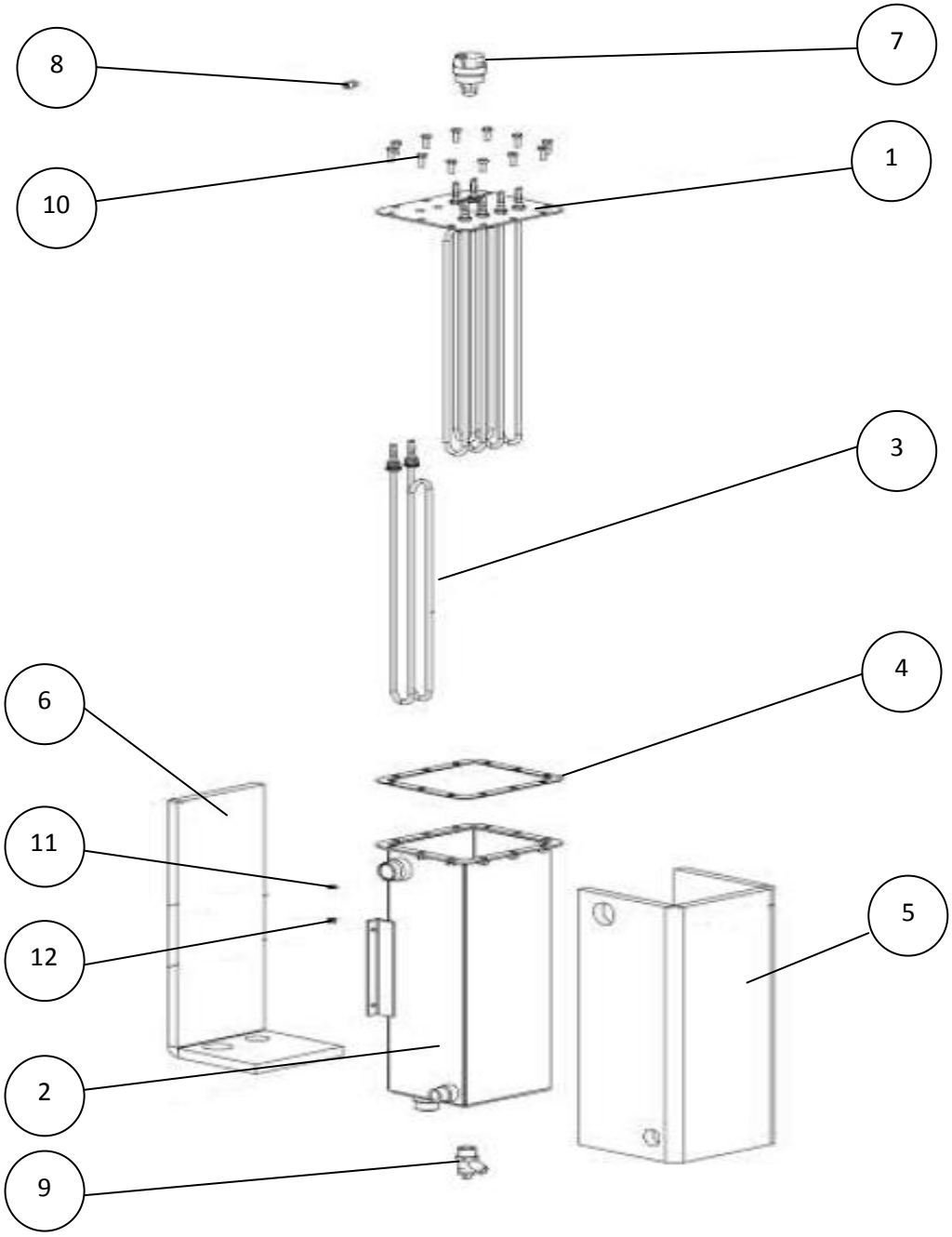


PERMANENT RED LIGHT

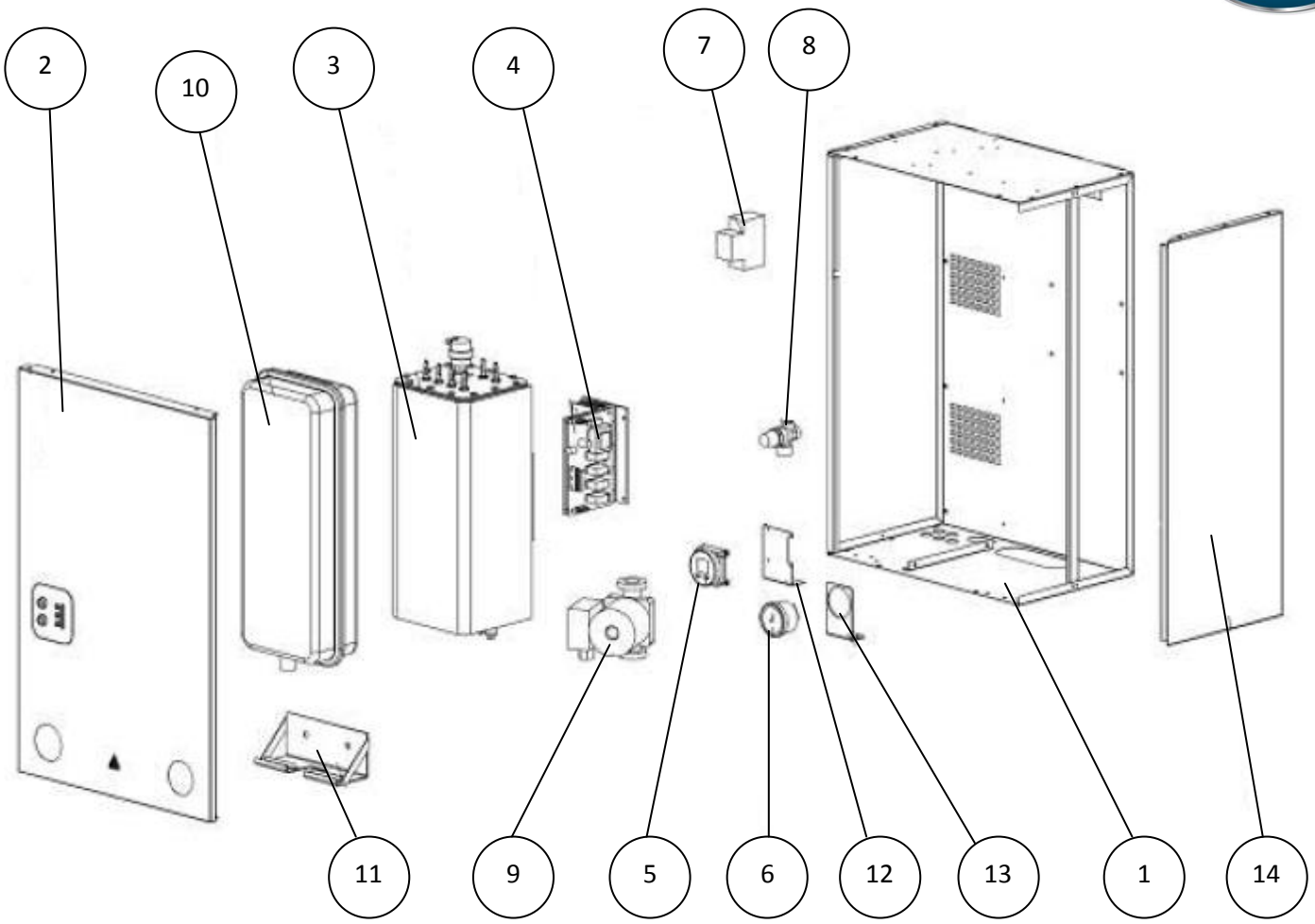


NO GREEN LIGHT





ITEM	PART No.	DESCRIPTION	QUANTITY
1	211501	ELEMENT FLANGE W.U.	1
2	211503	HEATER BODY W.U.	1
3	211701	3KW ELEMENT	4
4	211509	GASKET	1
5	211554	INSULATION FRONT & SIDES	1
6	211555	INSULATION REAR & BASE	1
7	207296	AUTOMATIC AIR VENT	1
8	211549	AIR VENT FITTING	1
9	99592	DRAIN COCK	1
10	91088	M6X 16 HEX HD SETSCREW	12
11	92199	M6 SHAKEPROOF WASHER	12
12	94217	M6 HEX NUT	12



ITEM	PART No.	DESCRIPTION	QUANTITY
1	211510	Back Casing Assembly	1
2	211515	Front Casing assembly	1
3	211500	12kW Heater Assembly	1
3	211560	11kW Heater Assembly	1
3	211570	9kW Heater assembly	1
3	211580	6kW Heater Assembly	1
4	211550	PCB	1
5	224960	Programmer	1
6	211548	Pressure Gauge	1
7	211532	MCB	1
8	221920	Pressure Relief Valve	2
9	500014	Pump	1
10	211529	6 Litre Expansion Vessel	1
11	211540	Expansion Vessel Bracket	1
12	211544	Programmer Bracket	1
13	211547	Pressure Gauge Bracket	1
14	211519	Side Panel	2



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T R Engineering Ltd's policy is one of continuous research and development. This may necessitate alterations to this specification.

211525 June 2014