

# TRIANCO



## Electric System Boiler



KM 59690

# TRIANCO

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**FITTING, OPERATION,  
INSTALLATION & SERVICING  
INSTRUCTIONS**

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*To be retained by the householder*

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## HEALTH AND SAFETY

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### INFORMATION FOR THE INSTALLER AND SERVICE ENGINEERS

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 1988).

The Company takes every reasonable care to ensure that these products are designed and constructed to meet these general safety requirements, when properly used and installed.

To fulfil this requirement products are comprehensively tested and examined before despatch.

This appliance may contain some of the items below.

When working on the appliance it is the responsibility of the user/engineer to ensure that any necessary personal protective clothing or equipment is worn appropriate to parts that could be considered as being hazardous to health and safety.

#### INSULATION AND SEALS

Mineral fibre insulation is used on this appliance.

May be harmful if inhaled. May be irritating to the skin, eyes, nose or throat. When handling avoid inhalation and contact with eyes. Use (disposable) gloves, face masks and eye protection.

After handling wash hands and other exposed parts. When disposing, reduce dust with water spray, ensure parts are securely wrapped.

#### GLUES, SEALANTS & PAINT

Glues and sealants are used in the product and present no known hazards when used in the manner for which they are intended.

#### PACKAGING

Materials used for the packaging of this appliance are of a recyclable nature.

**Warning: plastic bags can cause suffocation. Keep out of reach of children.**

#### **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 Engineer's 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.

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## FITTING INSTRUCTIONS

The Aztec Gold is a wall-mounted electric central heating boiler designed with smaller locations in mind. The boiler can be fitted in the smallest of places and requires minimal attention to ensure efficient and reliable operation. The boiler produces hot water for a fully-sealed system by passing water over electric heating elements which are housed in an insulated stainless steel heat exchanger.

## PREPARATION & SITING

- 1) Before starting the installation, carefully unpack the boiler from the carton, ensuring all items are present and in good condition. The carton should include:

- 1 x fully-cased boiler
- 2 x cable strain reliefs
- 1 x hose connector with manifold fitting
- 1 x high-limit thermostat for underfloor heating

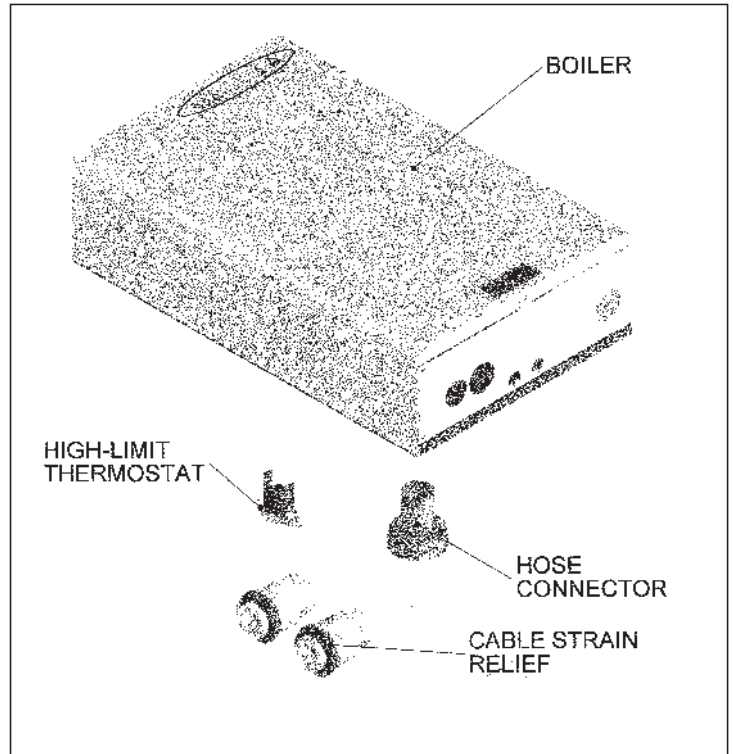
**Notes:** Always store the boiler in a dry place prior to fitting.

Retain all packaging until installation is complete. Plastic bags can cause suffocation; please keep out of reach of children.

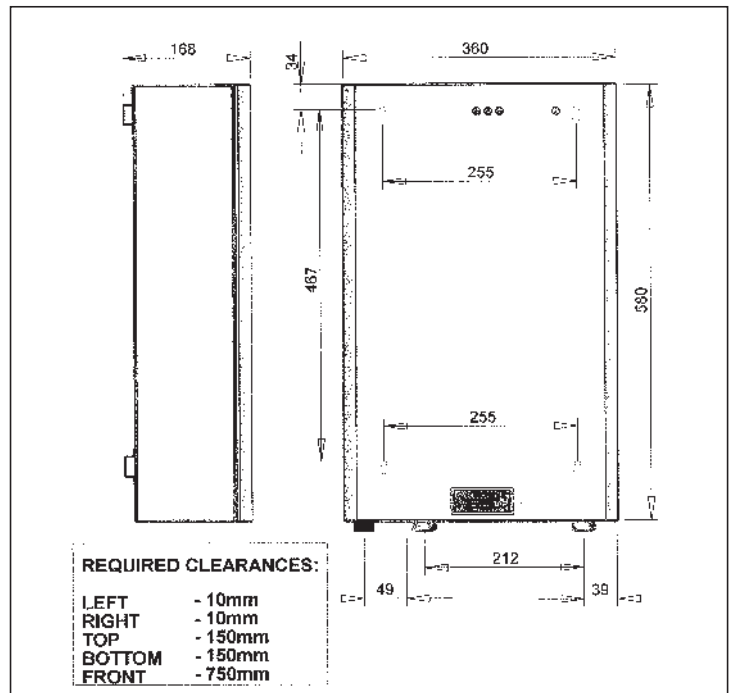
- 2) Work out the desired position of the boiler and, using the dimensions on **Fig. 2** for reference, drill 4 x 6mm holes in the wall to a depth of 38mm. Insert wall plugs and fixing screws (not supplied) into the wall.

**Notes:**

- a) If the appliance is to be fitted in a confined space or compartment with a potential ambient temperature of 60°C or above, it is strongly recommended that adequate ventilation is provided to prevent the overheating of the boiler controls. Aeration of 110cm<sup>2</sup> will be required to the compartment, in both high and low level positions.
- b) 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).
- c) When siting the boiler, take into account the need for future servicing. Enough space should be provided at the front of the appliance to enable an engineer to adequately service and/or replace components.
- d) The boiler is not to be fitted in a shower compartment or bathroom, and is not suitable for external installation, nor in any area subject to adverse temperature conditions or moisture.
- e) The appliance is designed to be fitted in an **upright** position only, with the flow and return connections to the bottom of the boiler.
- f) Ensure adequate clearance is allowed for making the water connections, as the boiler can be fully serviced from the front.



**FIG. 1 - PACK CONTENTS**



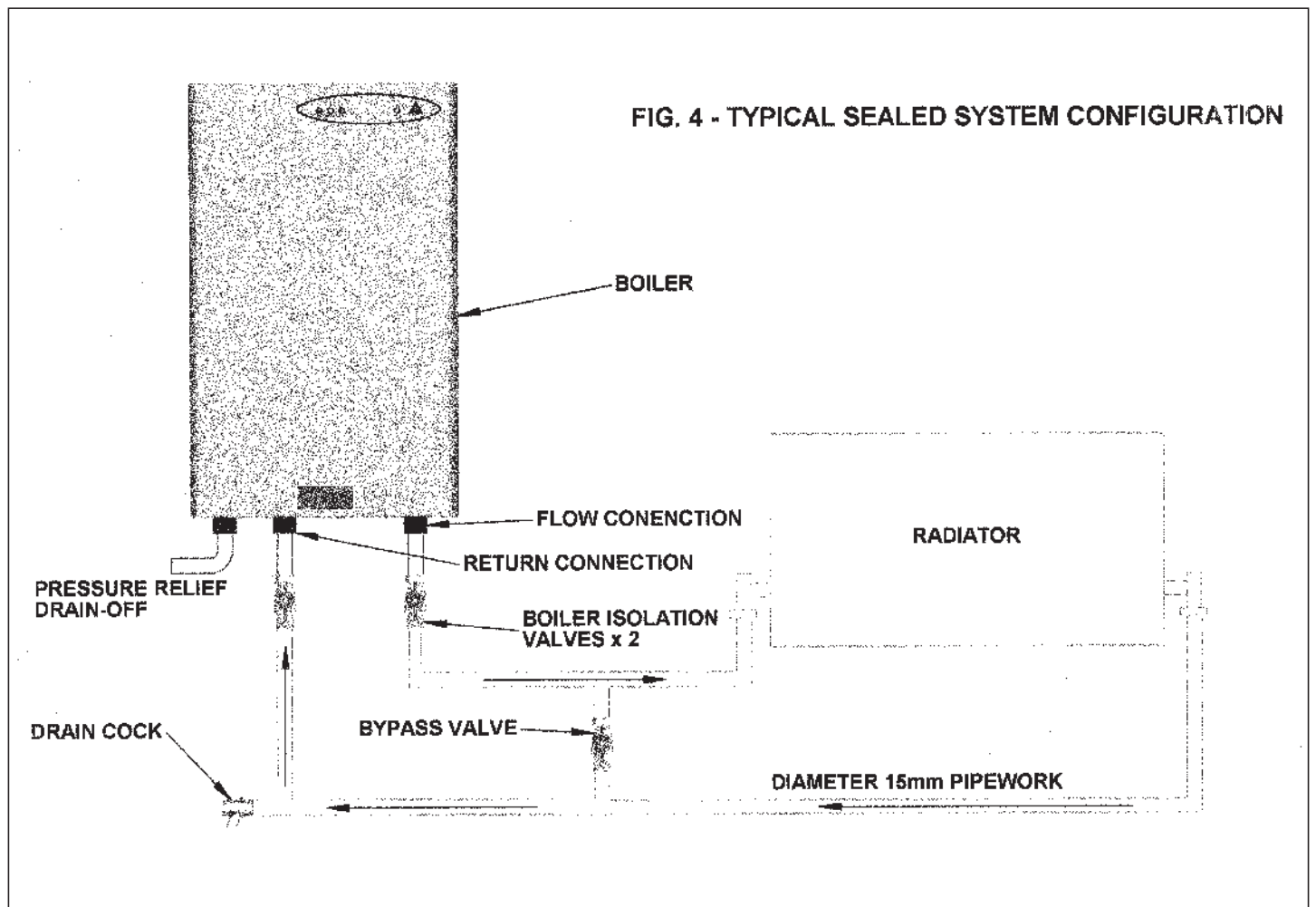
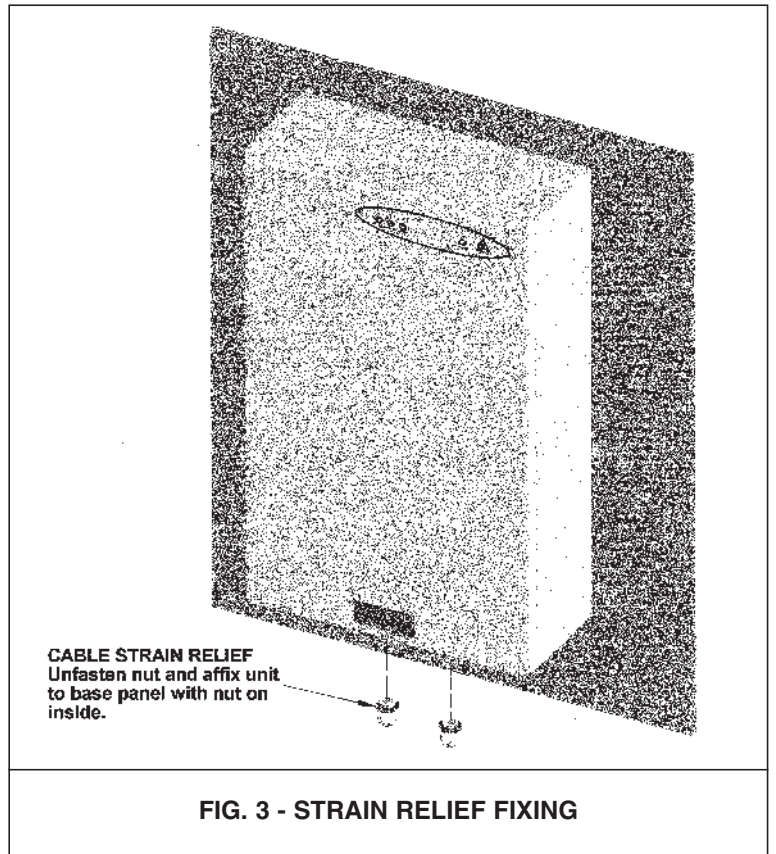
**FIG. 2 - DIMENSIONS & CLEARANCES**

## FITTING INSTRUCTIONS (cont.)

- 3) Removing the front panel beforehand, hang the boiler onto the screws in the wall, ensuring that all 4 keyhole fixing slots are utilised. Tighten screws to ensure a secure fixing.
- 4) Fit the 2 x cable strain reliefs into the base of the boiler.
- 5) Install the heating system (radiator/towel rails, etc) in the desired positions as per the manufacturer's instructions. A drain cock must be fitted at the lowest part of the system for ease of drainage. See Fig. 4 for a typical system layout.

### IMPORTANT

While the Aztec Gold is entirely suitable for use on heating systems which utilise plastic pipework, the first 100mm from the boiler manifold must always be 15mm copper.



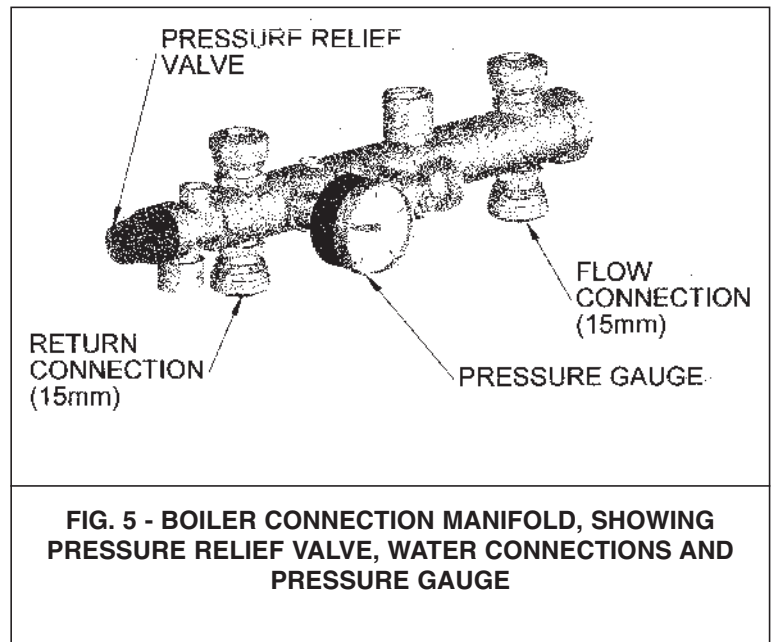
## FITTING INSTRUCTIONS (cont.)

### WATER SYSTEM

Connect the flow and return pipework from the radiator(s) into the corresponding fittings on the boiler manifold. Ensure all fittings are made water-tight.

#### Notes:

- The pressure relief valve must be piped to a permanent drain-off on the outside of the building. The drain must not discharge above an entrance, window, or any public access area. It should be clear of any electrical fittings, and positioned so that any discharge can be clearly seen. The terminating point of the drain-off should be bent down at an angle of 90°.
- It is recommended that isolation valves are fitted to the pipework. A bypass, as shown in Fig. 4, must be fitted if TRVs are used on the radiators.
- The flow and return connections are made to the boiler by 2 x 15mm compression fittings.

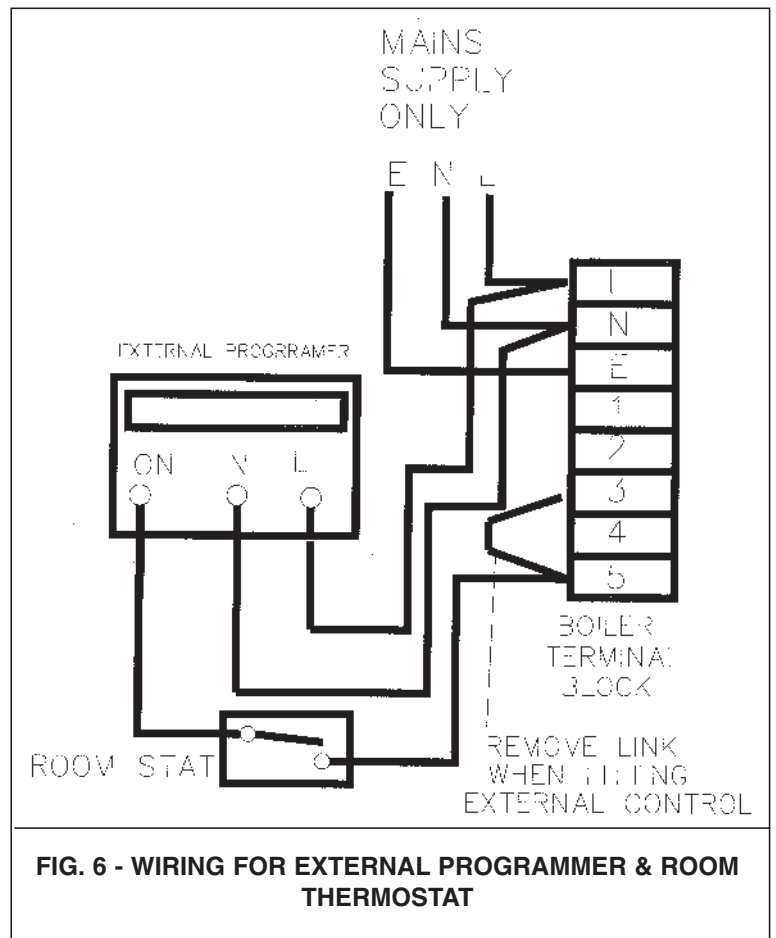


### ELECTRICITY SUPPLY

First isolating the electricity, pass the electrical supply cables and any external control cables through the cable strain reliefs in the base of the boiler, and wire securely into the terminal block. The terminal block is located within the casings at the top left-hand side of the boiler.

#### Notes:

- This appliance must be earthed.
- It is recommended the boiler is fitted with an external control, such as a room thermostat or programmer.
- If the water in the system is to be subject to freezing conditions during the pipework run, the appliance should be fitted with a frost thermostat. This will activate the boiler should the temperature fall to a level which could damage the installation.
- Incoming mains and controls cables should not be routed close to heating pipes.
- The diagrams opposite are for reference only. Refer to manufacturer's instructions for specific fitting instructions for the room thermostat or programmer.
- It is recommended that the boiler is wired via a 13 amp RCD plug or switched fused spur.
- Remove the link wire between terminals 3 & 5 when fitting any external controls.

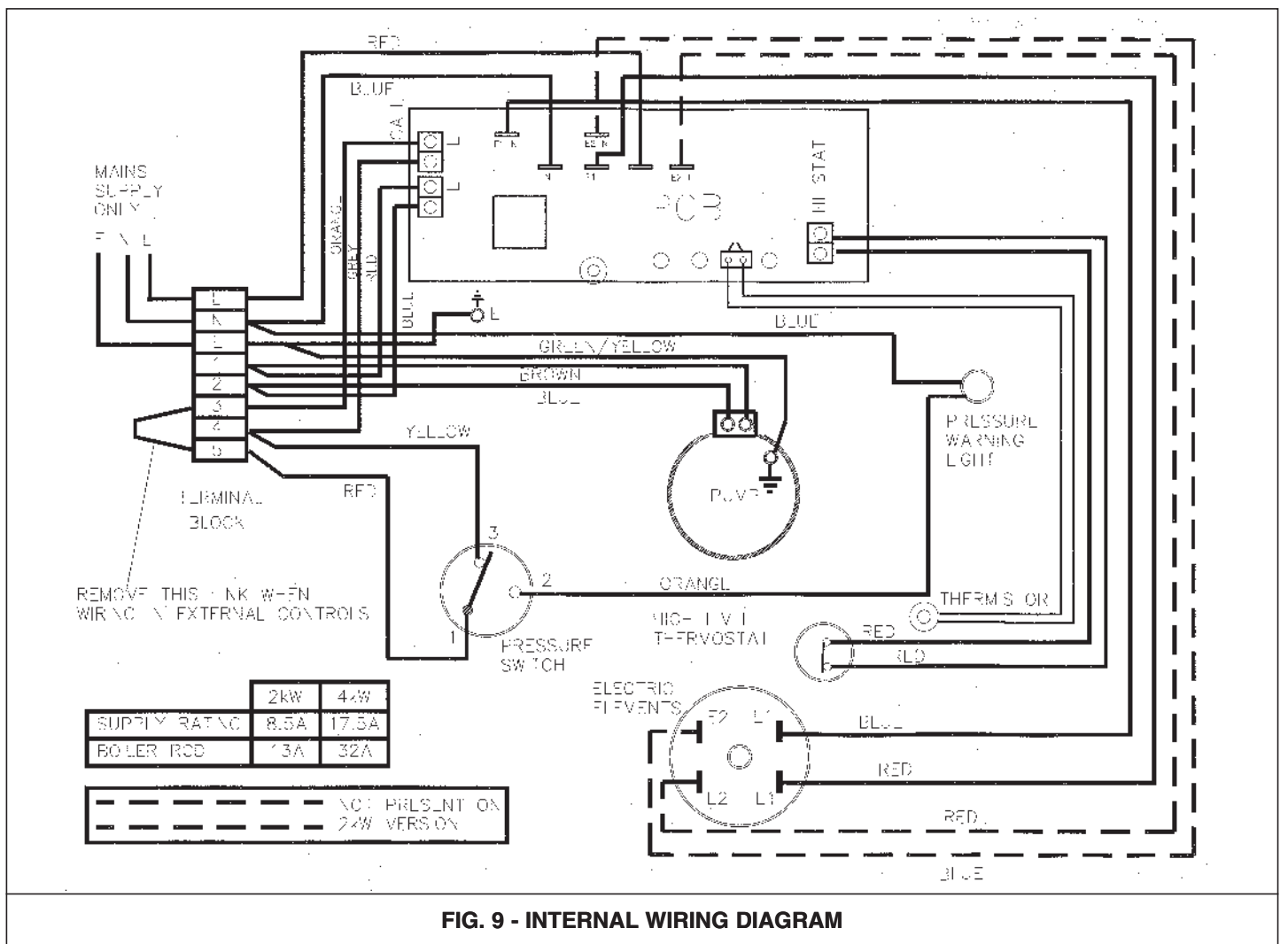
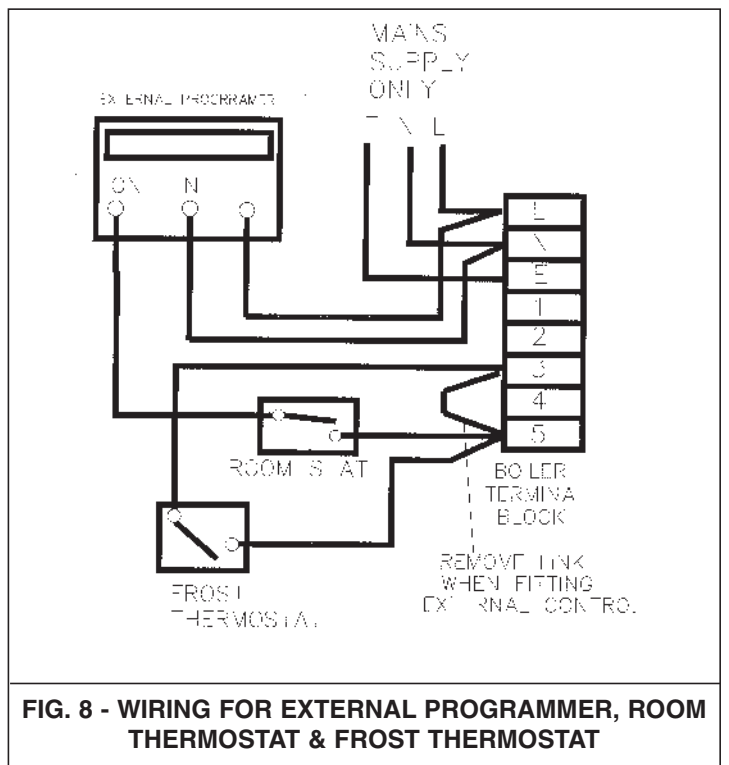
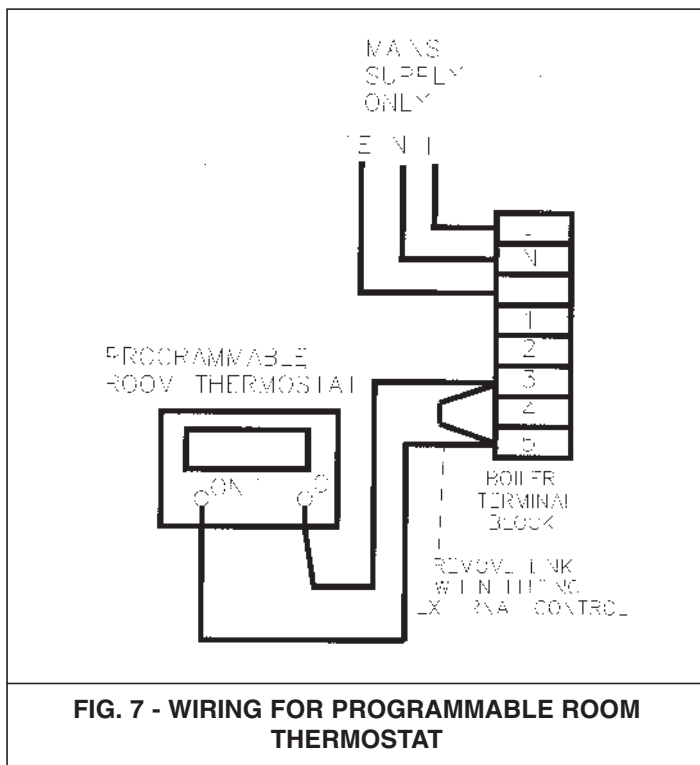


#### Important Note:

**Before installation, please ensure that the supply voltage to the appliance is above 207v. If the voltage drops below this level, a temporary boiler malfunction may result.**

# FITTING INSTRUCTIONS (cont.)

## ELECTRICAL SUPPLY (cont.)



## FITTING INSTRUCTIONS (cont.)

### FILLING THE SYSTEM

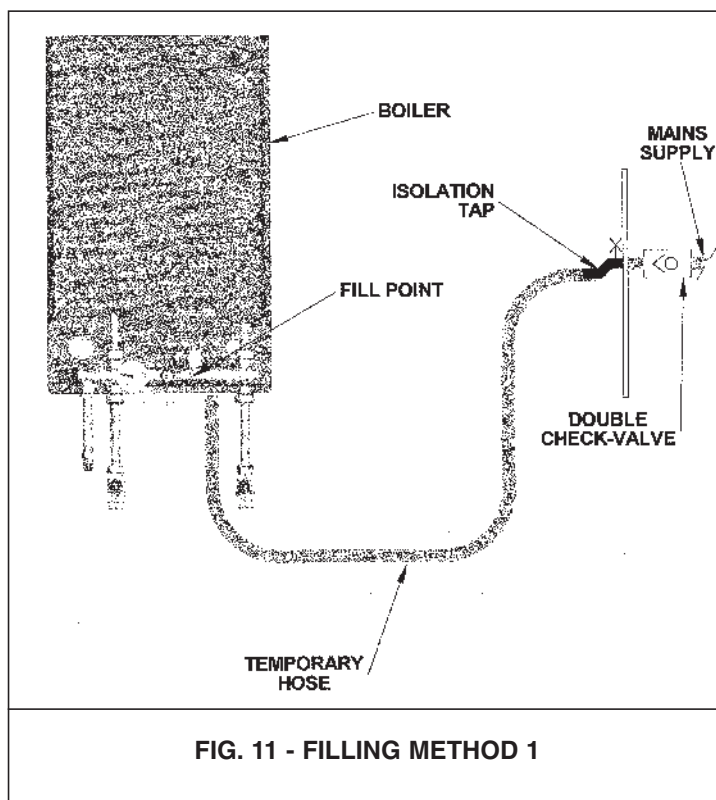
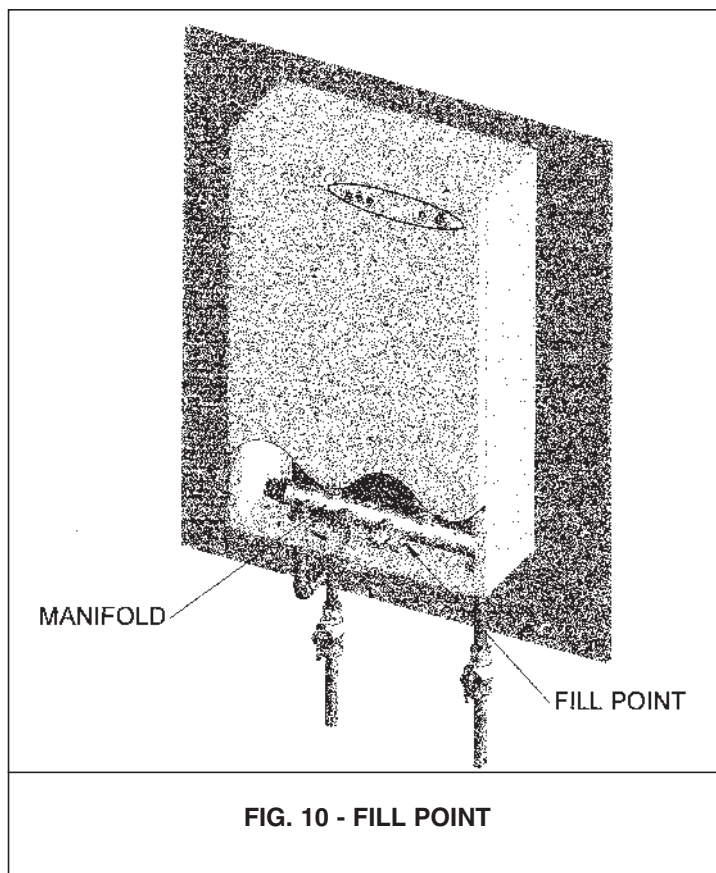
A filling point connection is provided on the front face of the boiler manifold to facilitate the initial filling and pressurising of the system via a hose connection (supplied). Alternatively, a permanent filling-loop may be employed.

#### Notes:

- a) Before filling, ensure that all fittings and joints have been made.
- b) Thoroughly flush out the system to remove any swarf and residue from the pipework and radiator(s).
- c) There must be no permanent connection between the boiler and the mains water supply.

#### Filling Method 1: Temporary Hose (Figs. 10/11)

- 1) Connect a hose to the fill point on the manifold using the fittings supplied.
- 2) Connect the other end of the hose to the mains water supply, ensuring that all safety valves are fitted in the run (**Fig. 11**) to prevent system water entering the mains supply. Approved hose unions should be used on all connections.
- 3) Open the fill point on the manifold (**Fig. 10**) by turning the isolating knob anti-clockwise.
- 4) Ensure all isolation valves to the system are open, that the bypass valve is closed, and that the automatic air vent contained within the boiler casings is open (turn the black cap on the device fully anti-clockwise).
- 5) Switch on the mains supply to the boiler and test the pressure relief valve by continuing to fill until this device activates and releases water into the drain.
- 6) Switch off the mains water supply.
- 7) Using the pressure gauge on the front face of the manifold for reference, reduce the water content of the system until the pressure is indicated as 1.5 bar.
- 8) Thoroughly vent all parts of the system of air and, if necessary, readjust pressure back to 1.5 bar.
- 9) Close off the fill connection on the manifold, remove the hose and close the automatic air vent.
- 10) Check all joints are water-tight before operating the appliance.





## FITTING INSTRUCTIONS (cont.)

### Filling Method 2: Filling Loop (Fig. 12)

- 1) During installation, feed a permanent 15mm supply to any part of the system via the use of a WRC-approved filling loop. A fixed-spindle stop valve should also be fitted to the mains water supply to the system.
- 2) Open the supply valves to fill the system, following all further instructions as per those for filling with a hose from (4) onwards (**page 8**).
- 3) Once complete, close all supply valves.

#### Notes:

- a) The filling method adopted must be in accordance with the Water Supply Regulations and the Water Bylaws.
- b) Approved hose unions should be used on all connections of this type.

### COMPLETION

- 1) Replace the front casing of the boiler.
- 2) Switch on the electricity supply to the boiler and external controls.

The appliance is now ready for use (**Fig. 13**).

See overleaf for additional fitting instructions when using the boiler in conjunction with underfloor heating systems.

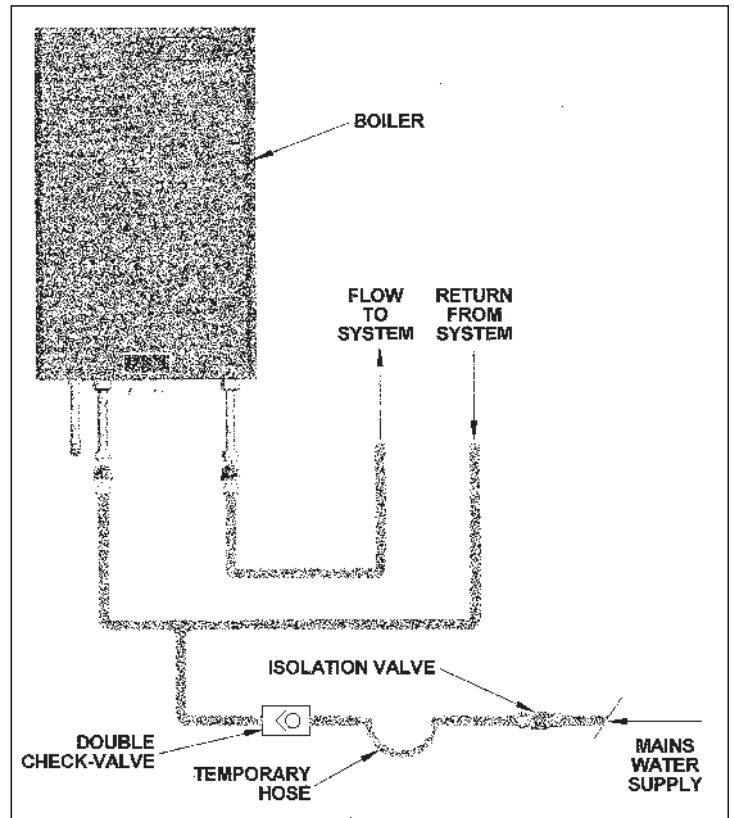


FIG. 12 - FILLING METHOD 2

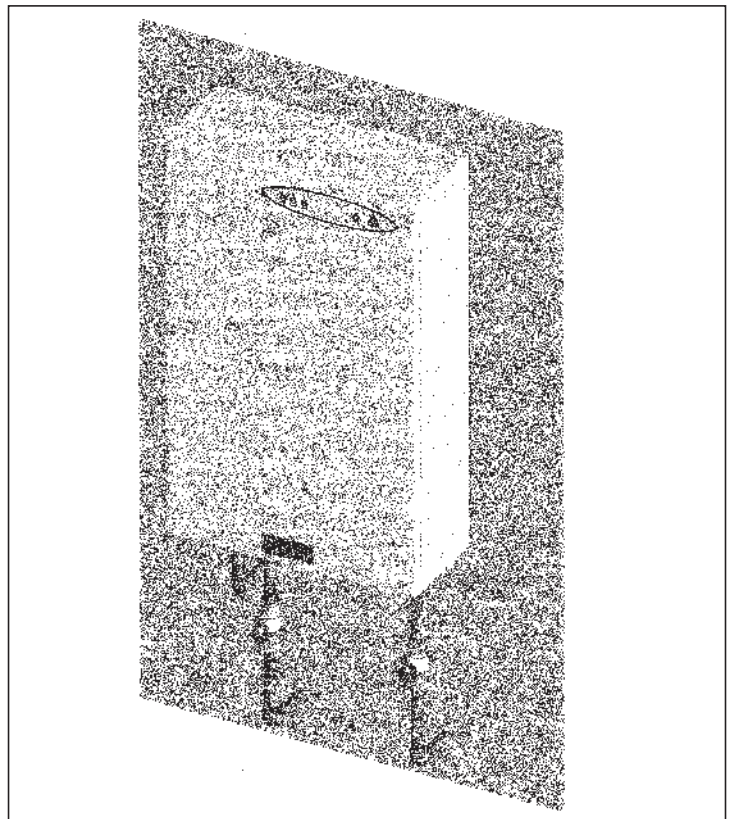


FIG. 13 - COMPLETED INSTALLATION

## ADDITIONAL FITTING INSTRUCTIONS - UNDERFLOOR HEATING SYSTEMS

When installed on an underfloor heating system without the use of a mixing valve, the following instructions **must** be adhered to.

**IMPORTANT NOTE:** Ensure the mains supply to the boiler is disconnected before carrying out any work.

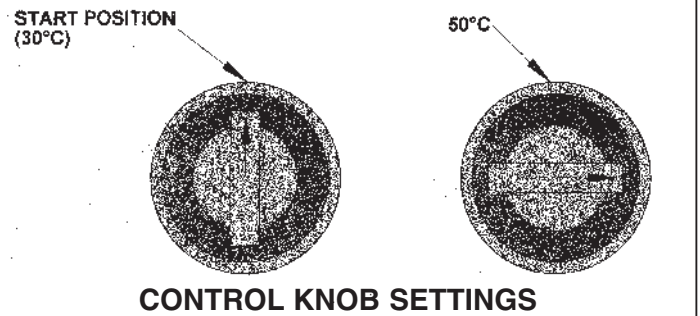
- 1) Replace the safety high-limit thermostat with the alternative stat provided within the literature pack (**Fig. 15**). See **page 19** for more detailed instructions on how to replace high-limit thermostat.
- 2) Using the white control knob on the front of the PCB controller, the temperature must be set to its lowest setting (30°C) before initial firing.

**Important:** The temperature should only be subsequently increased in accordance with underfloor heating manufacturer's instructions and BS EN 1264-4.

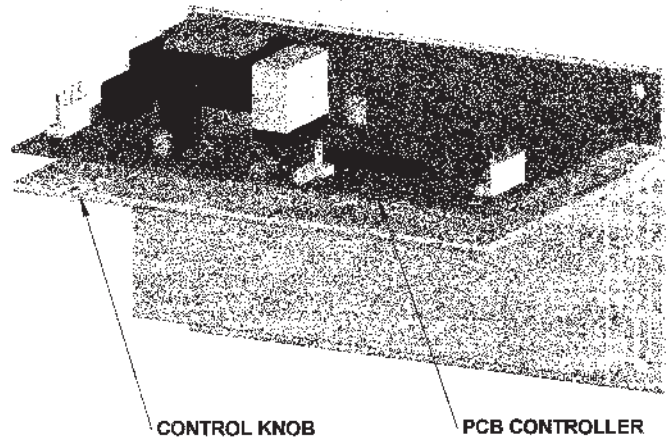
- 3) After the temperature has been adjusted to the preferred level, it may be useful to remove the control knob from the PCB controller to prevent further modification. Carefully pull the knob from the PCB, ensuring its mooring is held securely in position (**Fig. 14**).

### Notes:

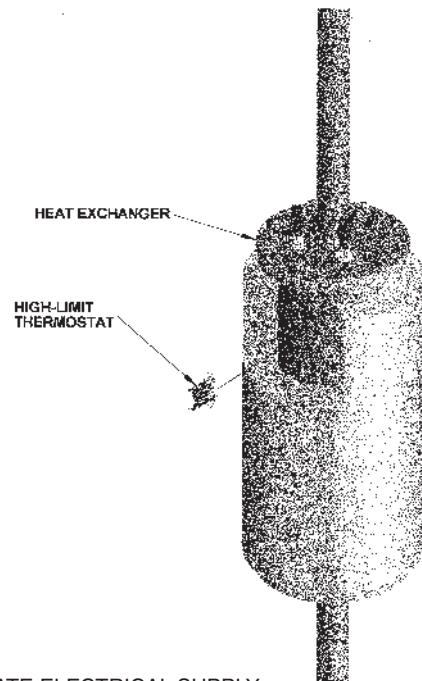
- a) The factory-fitted safety high-limit thermostat is set at 100°C, and is suitable for use with radiator heating systems. The additional high-limit thermostat, for exclusive use with underfloor heating systems, is set at 60°C and **must** be fitted. **Failure to do so will result in damage to the floor surfaces.**
- b) If the high-limit thermostat operates often, the temperature may be set too high. **It is essential that the temperature is not set to above 50°C** (refer to Fig. 14 for temperature settings).
- c) The pump fitted to this appliance is suitable for a Ø 15mm plastic pipework run of up to 100m in length. Pipework runs greater than this **will** require the fitting of an additional pump.
- d) Fit the underfloor heating system in accordance with manufacturer's instructions. Trianco cannot accept any responsibility for breakdowns or damage caused by incorrectly-fitted systems.



**CONTROL KNOB SETTINGS**



**FIG. 14 - CONTROL KNOB**



- 1 - ISOLATE ELECTRICAL SUPPLY
- 2 - REMOVE THE BOILER FRONT CASING
- 3 - REMOVE CABLES FROM HIGH LIMIT STAT
- 4 - LOOSEN 2 X RETAINING CLIPS
- 5 - REMOVE THERMOSTAT & REPLACE IN REVERSE ORDER

**FIG. 15 HIGH LIMIT THERMOSTAT REPLACEMENT**

# OPERATING INSTRUCTIONS

The Trianco Aztec Gold 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 any external system controls such as a room thermostat or programmer.

## BOILER CONTROLS

Before initial firing of the boiler, ensure that the system is full of water and the isolation valves (other than the bypass) are fully open. **Do not attempt to switch on the boiler if there is any possibility that the system water is frozen.**

- 1) Check that the time-switch/programmer is **ON** and that the room thermostat is calling for heat.
- 2) Switch on the electrical supply to the boiler. After a few seconds the green light should illuminate, followed by the amber light.
- 3) Set the time-switch/programmer to the times and programme required.

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

To switch off the boiler, set the time-switch/programmer to the **OFF** position. It is recommended that if the boiler is to be left idle for a long period of time, the mains supply should also be switched off.

## BOILER INDICATOR LIGHTS (Fig. 16)

There are four indicator lights on the boiler. Left-to-right, these are:

- Green** - the boiler is switched on
- Amber** - illuminated: boiler is running  
- flashing: heat requirement is satisfied
- 1<sup>st</sup> Red** - a fault has occurred. See **page 12**.
- 2<sup>nd</sup> Red** - the system pressure has dropped below 1 bar. See **page 12**.

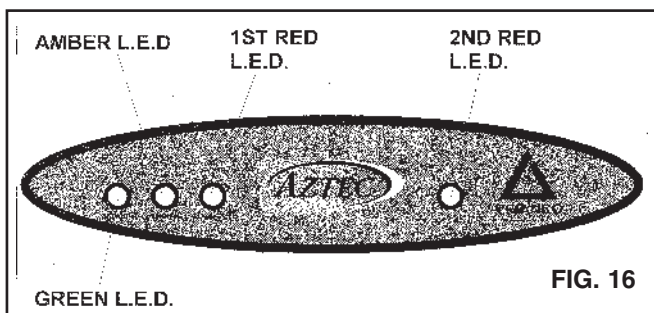


FIG. 16

## SAFETY CONTROLS

### High-limit Thermostat

The boiler is fitted with an in-built safety thermostat which will cause the appliance to shut down should the boiler thermostat malfunction and the boiler overheat.

**Note:** Should the appliance be used for supplying underfloor heating, **this thermostat must be replaced by the secondary stat** supplied within the literature bag.

## EXTERNAL CONTROLS

### Room Thermostat

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

### 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 also worth noting that the heating system will usually remain effective for up to half an hour after boiler shutdown. The timer can therefore be set to switch the appliance off earlier as an economy measure.

### Frost Thermostat

If the system is not in operation for many hours during very cold weather, the water may be in danger of freezing. As such, it is advisable that the installation is protected with a frost thermostat.

Where the system is not protected, the boiler should be left switched on and the room thermostat set to a low setting (e.g. 7°C) to prevent the water temperature falling too low.

If the system is to be shut down for a long period during very cold weather, it is advisable to completely drain the system. However, too-frequent draining should be avoided, especially in hard-water areas, as this could lead to scaling of the boiler waterways.

## CLEANING & GENERAL MAINTENANCE

To clean the casings, isolate the electrical supply and apply hot soapy water with a damp cloth. Then dry with a second, soft cloth. Ensure that the natural ventilation around the boiler is not obstructed. If fitted in a compartment, ensure all ventilation grilles are clear.

See **page 17** for comprehensive fault-finding.

## SIMPLE FAULT-FINDING

Should the boiler fail to start for any reason, please make the following checks before calling a service engineer:

(1) Is the green light illuminated?

**No.**

Check for a blown fuse or thrown power-breaker.

**Yes**

(2) Is the 1<sup>st</sup> red light illuminated?

**No**

Check to see if all external controls, such as a room thermostat or programmer, are operational and calling for heat and proceed to (3).

**Yes**

If the light is permanently illuminated, switch off all power to the appliance for at least 30 seconds. This should reset the boiler and return it to normal operation. If the problem persists, then a fault has occurred. Please contact a service engineer for assistance.

If the light is flashing, this indicates that a fault has occurred with the heating elements. As it contains 2 elements, in this case the 4kW model will continue to operate safely at a reduced output. As the 2kW model only incorporates 1 element, the boiler will not operate.

In either case, a fault has occurred. Please contact a service engineer for assistance.

(3) Is the 2<sup>nd</sup> red light illuminated?

**Yes**

This indicates that the system pressure has dropped to below 1 bar. Check the system pressure and, if necessary, re-pressurise to above 1 bar.

**No**

If all system controls (room thermostat/programmer) have been checked, please contact a service engineer for assistance.

**IMPORTANT NOTE: Electrical safety checks should only be carried out by a competent person.**

Refer to **page 16** for after-sales service information.

A comprehensive fault-finding guide for the service engineer can be found on **page 17**.

## TECHNICAL SPECIFICATION

ELECTRICAL INPUT	2kW	4kW
SUPPLY CURRENT (amp)	8.5A	17.5A
RCD RATING (amp)	13A	32A
WEIGHT (kg)	16	16
WATER CONTENT (litres)	2.0	2.0
WIDTH	360	360
DEPTH	156	156
HEIGHT	580	580
MAINS SUPPLY	230V 50Hz	230V 50Hz
MAXIMUM OPERATING PRESSURE	3 bar 43.5 psi	3 bar 43.5 psi
TEST PRESSURE	4.5 bar 65 psi	4.5 bar 65 psi
CONTROL THERMOSTAT	- Adjustable between 30°C and 75°C	
PRESSURE SWITCH	- Set at 1 bar	
SAFETY VALVE	- Set at 3 bar	
EXPANSION VESSEL	- 2 litre capacity	
PUMP	- Grundfos UP15-14B	
LIMIT THERMOSTAT (FACTORY FITTED)	- Set at 100°C (for wet radiator systems)	
LIMIT THERMOSTAT (ALTERNATE)	- Set at 60°C (for underfloor heating systems)	
PRESSURE GAUGE	- 0 to 4 bar	
CASING FINISH	- Stove enamelled white or bronze	
THERMAL INSULATION	- Mineral fibre	

## INSTALLATION NOTES

### REGULATIONS & SAFETY

This boiler must only be installed by a competent person. The installation must comply with the following regulations and standards:

The Building Regulations Part L

I.E.E. Wiring Regulations

Local Water Undertaking bylaws.

BS 4814 - Specification for Expansion Vessels for Sealed Hot Water Heating Systems

BS 6798 - Measurement of Emitted Noise

BS 5449 - Forced Circulation Hot Water Central Heating Systems

BS 7074 Part 1 - Expansion Vessel Selection, Code of Practice for Sealed Water Systems

BS 7074 Part 2 - Expansion Vessel Selection, Code of Practice for Low and Medium Temperature Hot Water Systems

BS 7593 - Treatment of Water in Domestic Hot Water Central Heating Systems

BS 7671 - Electrical Wiring Regulations

BS EN 1264 Part 4 - Installation of Floor Heating, Systems and Components.

The installer should be aware of his/her responsibilities under the Health and Safety at Work Act and provide, where necessary, appropriate protection for the person(s) 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 I.E.E. wiring regulations.

**IMPORTANT: This boiler is only to be fitted on fully-pumped systems.**

It is recommended that a scale-inhibitor is added to prolong the life of the system. Follow manufacturer's instructions for best practise on installation.

The appliance must not be operated until the system is full of water and properly vented and pressurised.

Always switch **OFF** the electrical supply before removing the front door.

Cardboard packaging is recyclable.

**IMPORTANT: To avoid danger of suffocation, please keep all packaging away from children.**

### Manufacturer's Declaration of Conformity

#### European Directives Covered by this Declaration:

EN 60335-1: 1994 / A16:2001  
EN 60335-2-35:1998 / A1:2000  
EN 55014-1:2000  
EN 55014-2:1997  
EN 61000-3-2:2000  
EN 61000-3-3:1995

#### The Basis on Which Conformity is Being Declared

The products identified herein comply with the requirements of the Low Voltage Directive (73/23/EEC) and the EMC Directive (89/336/EEC).

Samples of the product have been tested by the manufacturer and a third-party certification body (The British Standards Institute).

The product has been awarded the British Standards Kitemark (KM 59690).

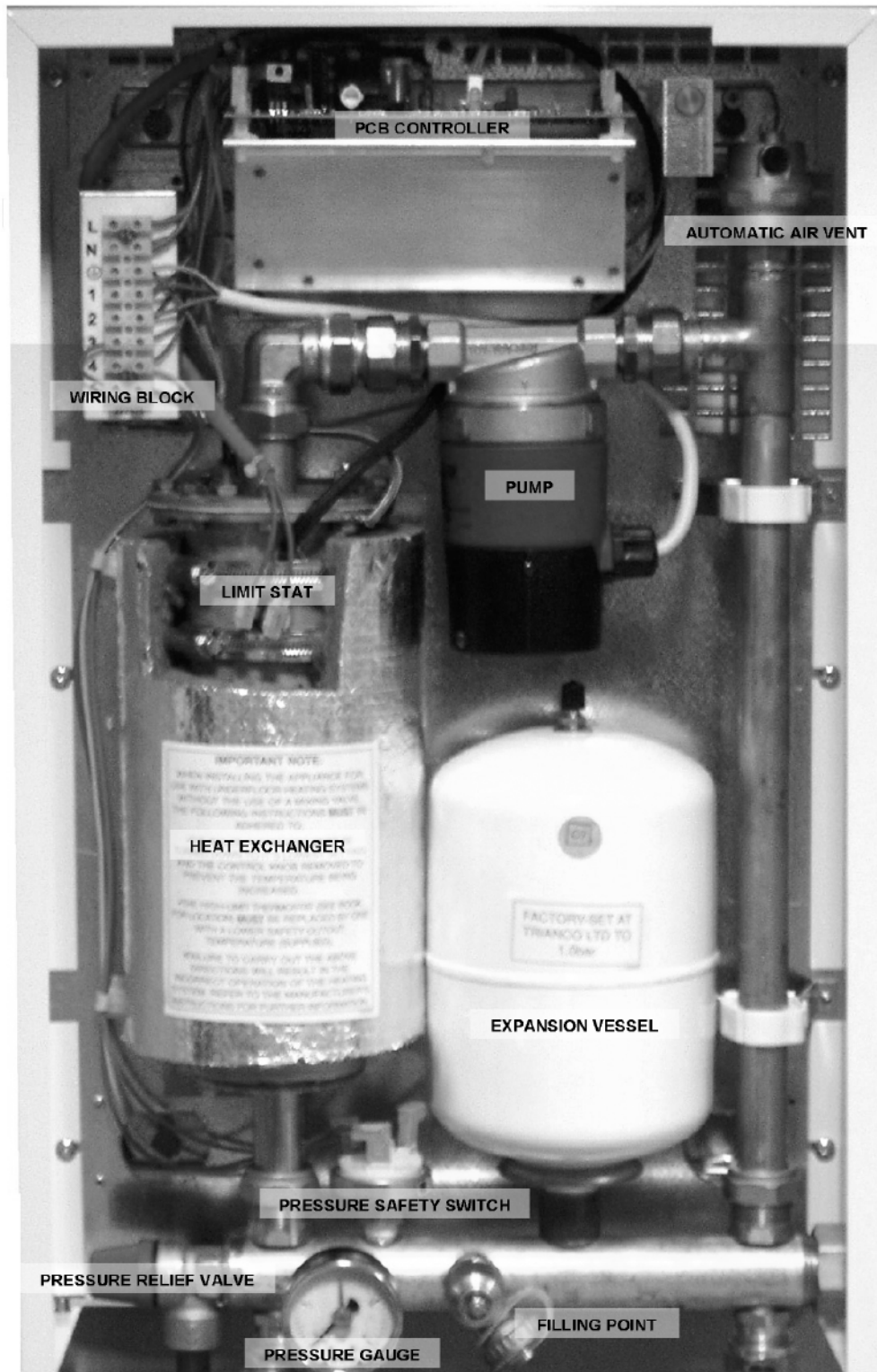


FIG. 17 - BOILER SCHEMATIC

## BOILER COMPONENTS (Fig. 17)

The Aztec Gold electric boiler consists of several components, all integral to the running of the appliance.

### PCB CONTROLLER

The Printed Circuit Board controls the operation of the boiler, bringing the element on and off according to the heating demand.

Extreme care should be taken when handling the PCB, as damage to even one component will necessitate the replacement of the entire unit.

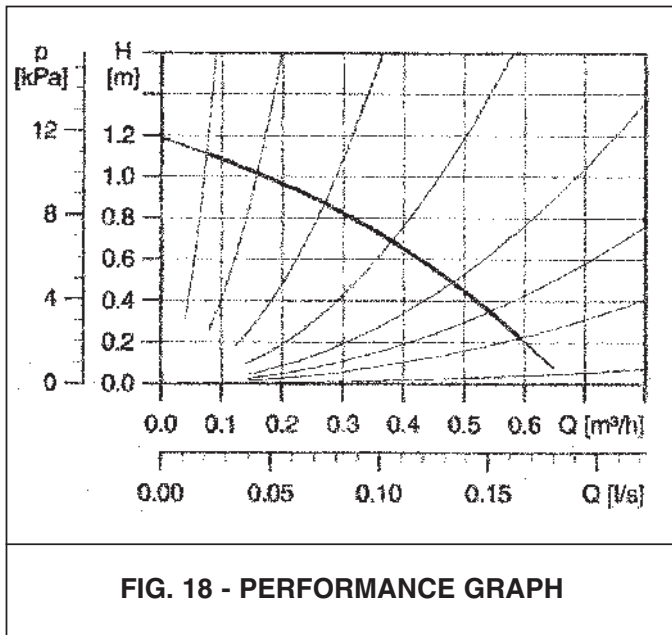
Always ensure the electrical supply to the boiler is switched off before commencing work on the PCB.

### AUTOMATIC AIR VENT

The air vent automatically expels any air generated by the system.

### PUMP (Fig. 18)

The pump is responsible for moving the heated water throughout the system. The pressure loss throughout the system is negligible, so all the pressure head developed by the pump can be used for the system.



## EXPANSION VESSEL

The expansion vessel has a capacity of 2 litres and is pre-charged to 1 bar. This is suitable for a system with a static head of up to 10 metres.

Note: The air charge should not exceed a pressure of 1.5 bar (22 psi).

The capacity of the expansion vessel is suitable for systems with a water content of 28 litres (including the boiler). Should the system volume exceed this capacity, an extra expansion vessel will be necessary.

An additional expansion vessel will also be necessary should the system pressure exceed 2.5 bar once the boiler reaches its highest temperature.

### PRESSURE GAUGE

The pressure gauge provides a visual indication of the system water pressure. Upon installation, the red pointer should be set to the cold-fill pressure, allowing any drop or rise in pressure to be easily observed.

### PRESSURE RELIEF VALVE

The pressure relief valve will discharge water from the system should the water pressure exceed 3 bar. Ensure that the discharge is routed to the outside of the building, does not discharge above a window, door, or other public access area, and is easily visible so any discharge can be seen.

### PRESSURE SAFETY SWITCH

The pressure switch is set at 1 bar and will automatically switch off the boiler should the system pressure drop below this. Pressure loss below 1 bar is indicated by the illumination of the 2<sup>nd</sup> red light on the front of the boiler.

### HEAT EXCHANGER

The heat exchanger contains the element, which heats the water as it passes through, and has a water content of 1 litre.

## AFTER-SALES SERVICE INFORMATION

### A step-by-step guide to reporting a fault with the appliance

A qualified field service engineer is available to attend a breakdown occurring during the guarantee period of the appliance.

The boiler must be made available for service during normal working hours, Monday to Friday. No weekend or bank holiday work is accepted.

**Step 1:** The person(s) who installs this appliance should thoroughly check his/her work **prior** to requesting a service visit from a Trianco engineer.

**Step 2:** Contact Trianco. You will be provided with the name and telephone number of your nearest service engineer.

Please quote the appliance serial number in any correspondence with the Service Department. Failure to provide this will result in a delay in the attendance of an engineer.

The serial number is located on the lower right-hand side of the boiler casing.

#### IMPORTANT NOTES:

##### An on-site charge will be made where:

- a) The service engineer finds no fault with the appliance.
- b) The cause of the breakdown is due to other parts of the heating system, or equipment not provided by Trianco.
- c) The appliance falls outside the guarantee period.
- d) The appliance has not been correctly installed as recommended within these instructions.

**Unauthorised invoices by third-party service engineers not agreed by Trianco will not be accepted.**

## SERVICE CENTRE AND TECHNICAL SUPPORT

Tel: 0114 257 2300 Fax: 0114 257 2338

Hours of Business Monday to Thursday: 8:30am - 4:45pm

Friday: 8:30am - 2:30pm



## **FAULT-FINDING**

### **FAULT: 1<sup>st</sup> Red Light Permanently Illuminated**

#### **1) High Limit Thermostat Has Operated**

The high limit thermostat is fitted to the front-top of the heat exchanger and is secured in position by 2 retaining clips. The thermostat will shut the boiler down if the temperature reaches 100°C (60°C if the underfloor heating limit stat is utilised).

To reset, press the button in the centre of the stat. The stat may have tripped due to one of the following: *faulty circulation pump, isolation valves closed on system, air trapped in system, no water in system, faulty PCB settings, faulty high limit thermostat.*

Check all electrical connections on the thermostat and PCB. Using a multi-meter, check for continuity across the thermostat terminals. If found to be faulty, replace.

#### **2) Thermistor Failure**

The thermistor cable is fitted to the front-top of the boiler heat exchanger, secured in place by use of a retaining clip. The other end of the cable terminates with a white two-pin connector onto the PCB.

Check the connections on the PCB for breakages, and make sure device is correctly fitted. Inspect thermistor cable for any broken wires. Replace if necessary.

#### **3) Mains Inlet Wiring**

The mains supply to the terminal block at the top-left of the boiler may be incorrectly wired. Check against wiring diagrams on **pages 6/7**. Rectify any incorrect wiring.

#### **4) PCB Failure**

The PCB may have been damaged during transit or installation. Inspect the LED connections and temperature control adjuster for damage. Check all connections to the PCB are secure and in good condition. If found to be faulty, replace.

#### **5) Voltage Drop**

If the area is subject to voltage fluctuations, the supply to the boiler may have dropped to below **207v**. Resetting the boiler will restore normal operation. If the problem persists, contact the electricity supplier for rectification.

### **FAULT: Power is Present, but No Lights Illuminated**

The fuse on the PCB may have blown. Replace as necessary. The fuse is located above the PCB transformer and is rated at 630mA. The fuse may have blown if the 'call' terminal has been used to supply power to the ancillary controls.

### **FAULT: 1<sup>st</sup> Red Light Flashing**

#### **1) Poor Electrical Connections**

The electrical connections between the element and the PCB may be faulty. Check for loose or broken cables and for damaged terminals on both the heat exchanger and PCB. Replace cables, PCB or heat exchanger as necessary.

#### **2) Element Failure**

To check the elements for failure, disconnect the element cables and check for continuity across the terminals of each element. If continuity is present, the element is in good working condition.

A continuity check should also be made between any of the element terminals and the heat exchanger body. If continuity is present in this case, the element is faulty.

If either fault is found, the heat exchanger should be replaced.

#### **3) High PCB Running Temperature**

The PCB controller has an in-built temperature control sensor which protects the PCB from overheating by shutting down operation until the temperature has returned to acceptable levels. The boiler will then resume operation and work normally. However, the red light will continue to flash to indicate that a problem occurred.

To reset, switch off the the mains power supply to the boiler for at least 30 seconds, before switching back on.

Check ventilation around the appliance and make sure the good flow of air into the casing is not impeded by towels, linen, etc.

### **FAULT: 2<sup>nd</sup> Red Light Permanently Illuminated**

#### **1) Low Pressure**

The system pressure may have fallen to below 1 bar. Check reading on pressure gauge and re-pressurise the system as necessary. Check wiring to pressure safety switch and indicator light. If no pressure change is indicated on pressure gauge, replace gauge.

If problem persists, check all joints and connections on system for leaks.

### **FAULT: Green Light Illuminated, But Boiler Not Functioning**

Check all external controls are wired correctly and are calling for heat. If no controls fitted, check wiring against diagrams on **pages 6/7**. Check link wire 'A' is fitted in correct position.

## SERVICING

To ensure the continued safe and reliable operation of the boiler, it is recommended that it is serviced at least once a year

Please note that the person(s) who carries out any remedial work, e.g. electrical fault-finding, should have suitable engineering qualifications.

## PROCEDURE

- 1) Isolate the mains supply to the boiler.
- 2) Check that all electrical connections to and from the PCB and heat exchanger are secure and clean.
- 3) Check electrical insulation on wiring.
- 4) Ensure all air grilles are clean and free from any obstruction.
- 5) Check water pressure and re-pressurise as necessary.

## PARTS REPLACEMENT

**IMPORTANT:** Isolate mains electricity supply to the boiler before carrying out any maintenance work. All electrical connections should be checked as loose connections can cause problems.

## FRONT CASING REMOVAL

Remove the 2 x screws from the top of the boiler and the single screw on the underside. The door can then be removed safely.

## PCB REPLACEMENT (Fig. 19)

- 1) Ensure the electrical supply to the boiler is isolated.
- 2) Remove the front casing as described above.
- 3) Unscrew the 2 x fixing screws holding the PCB mounting bracket in position, allowing the unit to be pulled forward.
- 4) Holding the PCB assembly firmly in one hand, disconnect the thermistor plug, pump and call plug on the left hand side and the high limit thermostat plug on the right hand side.
- 5) Taking care not to damage the PCB, pull the assembly out a little further and disconnect the remaining mains and element cables from the PCB.
- 6) Remove the 4 x fixing screws securing the PCB onto the mounting bracket and replace with the new PCB unit.
- 7) Re-fit in reverse order, taking care to replace all cables back into their original positions. Refer to wiring diagrams on **pages 6/7** for assistance.

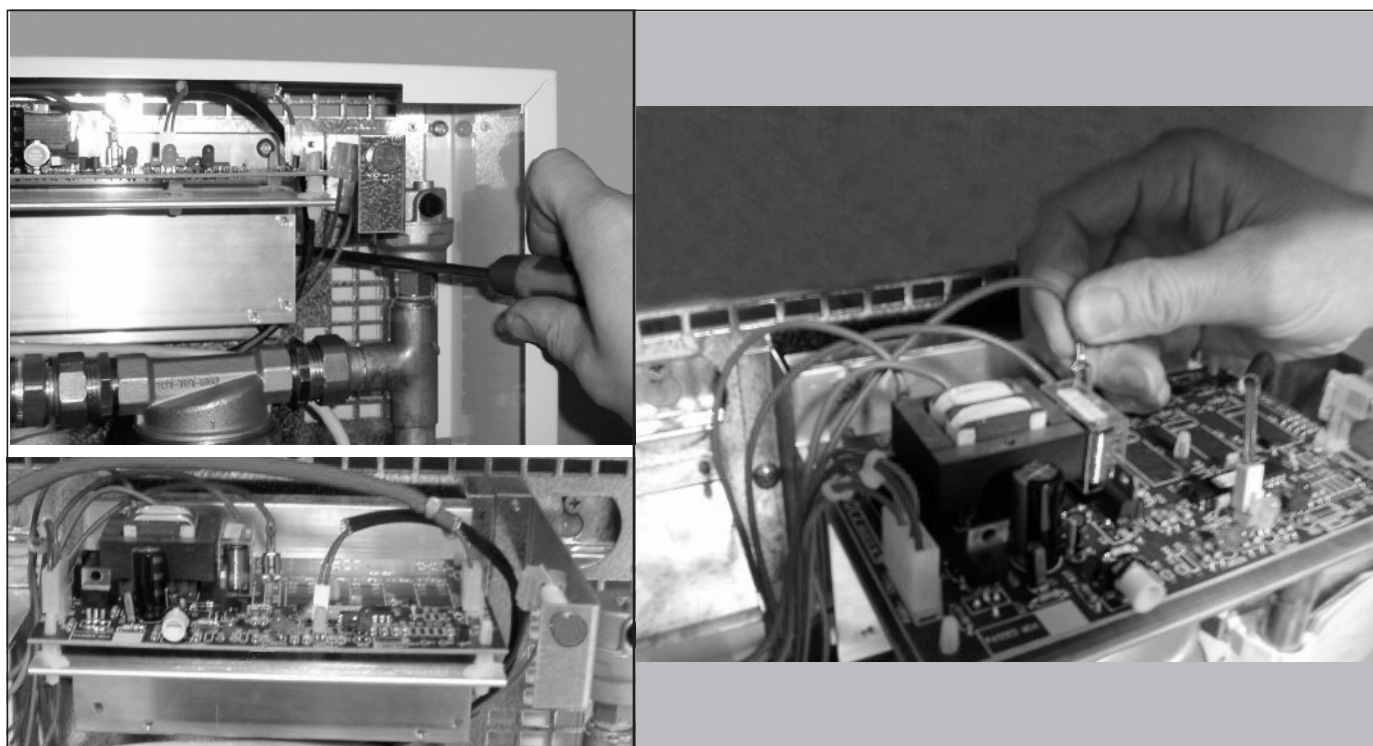


FIG. 19 - PCB CONTROLLER

## PARTS REPLACEMENT (cont.)

### HIGH-LIMIT THERMOSTAT REPLACEMENT (Fig. 20)

- 1) Ensure the electrical supply to the boiler is isolated.
- 2) Remove the 2 cable ends from the thermostat.
- 3) Loosen the retaining clips slightly, and slide the thermostat out.
- 4) Replace with new thermostat and re-fit in reverse order, using a suitable heat-transfer paste.

**Note:** High-limit thermostat must be fixed tightly to ensure accurate sensing of temperatures.

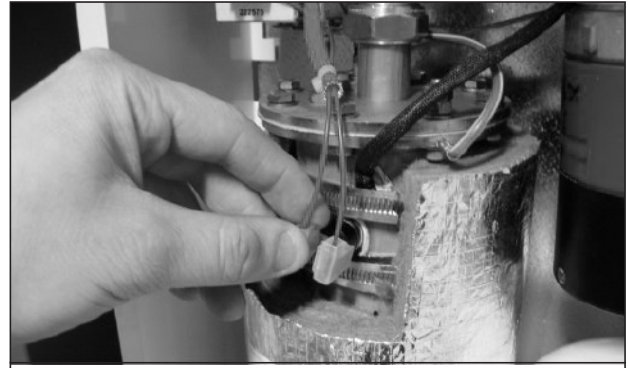


FIG. 20 - HIGH LIMIT THERMOSTAT

### THERMISTOR REPLACEMENT (Fig. 21)

- 1) Ensure the electrical supply to the boiler is isolated.
- 2) Loosen the retaining clip slightly and slide cable end out from underneath.
- 3) Disconnect remaining end from PCB.
- 4) Replace thermistor and re-fit in reverse order, using a suitable heat-transfer paste.

**Note:** Thermistor must be fixed tightly in position to ensure accurate sensing of temperatures.



FIG. 21 - THERMISTOR

### HEAT EXCHANGER REPLACEMENT (Fig. 22)

- 1) Ensure the electrical supply to the boiler is isolated.
- 2) Close the isolating valves to the boiler (if fitted).
- 3) Drain system via drain/fill point on front of manifold.
- 4) Disconnect element cables, earth cable and thermistor cable. Remove pump cable from terminal block.
- 5) Disconnect compression fittings at bottom of heat exchanger on left-hand side and flow pipe at right-hand side. Remove the fixing screw from the underside of the heat exchanger and unclip the retaining clips from the flow pipework.
- 6) Taking care not to damage any components, remove the whole hydraulic assembly from the manifold.
- 7) In a secure position, disconnect the compression fittings holding the heat exchanger in place. Remove the limit stat, insulation and thermistor. Replace with the new unit, refitting parts in reverse order.
- 8) Re-fill the system as described on **pages 7/8**, and open isolating valves.

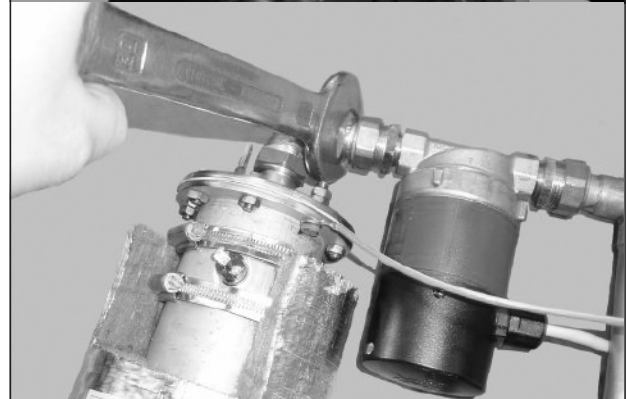


FIG. 22 - HEAT EXCHANGER

## PARTS REPLACEMENT (cont.)

### PRESSURE SAFETY SWITCH REPLACEMENT (Fig. 23)

- 1) Ensure the electrical supply to the boiler is isolated.
- 2) Close the isolating valves to the boiler (if fitted).
- 3) Drain system via drain/fill point on front of manifold.
- 4) Disconnect the three wires from the top of the pressure safety switch.
- 5) Unscrew pressure safety switch and replace with a new unit, re-fitting in reverse order.
- 6) Re-fill the system as described on **pages 7/8**, and open isolating valves.

**Notes:** Do not over-tighten connections to manifold as this could lead to thread damage.

Ensure a suitable thread sealant is used when screwing switch into position.

### EXPANSION VESSEL REPLACEMENT (Fig. 24)

- 1) Ensure the electrical supply to the boiler is isolated.
- 2) Close the isolating valves to the boiler (if fitted).
- 3) Drain system via drain/fill point on front of manifold.
- 4) Unscrew the expansion vessel and replace with a new unit, re-fitting in reverse order. Ensure a suitable thread sealant is used on all joints.
- 5) Re-fill the system as described on **pages 7/8**, and open isolating valves.

### PUMP HEAD REPLACEMENT (Fig. 25)

- 1) Ensure the electrical supply to the boiler is isolated.
- 2) Close the isolating valves to the boiler (if fitted).
- 3) Drain system via drain/fill point on front of manifold.
- 4) Disconnect the pump power supply cables from the terminal block and unscrew pump head.
- 5) Clean any deposits from the inside of the body and replace the 'o' ring seal, if necessary.
- 6) Replace the pump head with a new unit, re-fitting in reverse order.
- 7) Re-fill the system as described on **pages 7/8**, and open isolating valves.



FIG. 23 - PRESSURE SWITCH



FIG. 24 - EXPANSION VESSEL



FIG. 25 - PUMP HEAD

## SPARES LIST

Description	No. Off	2kW Model Part Code	4kW Model Part Code
Heat Exchanger/Element Assembly	1	222580	222629
PCB Controller	1	222558	222558
High-Limit Thermostat (100°C - for use with radiator heating systems)	1	221825	221825
High-Limit Thermostat (60°C - for use with underfloor heating systems)	1	222592	222592
Wiring Harness	1	222578	222630
High Limit Thermostat Wiring Harness	1	222576	222576
Thermistor & Cable	1	222548	222548
Pump	1	222557	222557
Expansion Vessel	1	222555	222555
Pressure Relief Valve	1	208069	208069
Pressure Safety Switch	1	222556	222556
Pressure Gauge	1	501808	501808
Automatic Air Vent	1	207296	207296
Door Casing Assembly (White)	1	222562	222562
Door Casing Assembly (Bronze)	1	222542	222542



By appointment to H.M. Queen Elizabeth  
The Queen Mother  
Manufacturers of Domestic Boilers



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