

Contractor

HE EXTERNAL COMBI 110

OIL-FIRED CENTRAL HEATING BOILER



TRIANCO

CE BED 92/42 EEC
EMC 89/336 EEC

USER, INSTALLATION, COMMISSIONING & SERVICING INSTRUCTIONS

Please read these instructions carefully before installing,
commissioning and using this appliance.

To be retained by the householder

HEALTH AND SAFETY INFORMATION

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 1998).

Trianco takes every reasonable care to ensure that these products are designed and constructed to meet these general safety requirements, provided they are properly installed and used.

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

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 which could be considered hazardous or harmful.

This appliance may contain some of the items below:

Insulation and Seals

Glass rope, mineral wool, insulation pads, ceramic fibre, glass insulation.

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

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

Glues, Sealants and Paints

Glues, sealants and paints are used in this appliance and present no known hazards when used in the manner for which they are intended.

Kerosene & Gas Oil Fuels (Mineral Oils)

Avoid as far as is possible any skin contact with mineral oils or with materials contaminated with mineral oils. The effects of mineral oils on the skin may vary according to exposure:

- 1) May remove the protective grease normally present on the surface of the skin, rendering it dry, liable to crack and more prone to damage caused by cuts and abrasions.
- 2) May result in skin rashes. Seek immediate medical attention for any rash, wart or sore developing on any part of the body, especially the scrotum.

Never breathe any mineral oil vapours. Do not fire the burner in the open (i.e. not properly situated in the boiler) as misfiring may result in unburned oil vapours.

When handling mineral oils, a suitable barrier cream containing lanolin is highly recommended, along with a strict routine of personal cleaning.

Under no circumstances should mineral oils be taken internally.

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1. USER INSTRUCTIONS

Please note, to assist Trianco in improving customer service, it is important that the guarantee/registration card is returned.

INTRODUCTION

The Contractor HE External Combi 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 designed to provide central heating and instantaneous hot water. It is supplied with an adjustable boiler temperature control thermostat and a manual-reset high-limit thermostat. The boiler will require an external programmer and room thermostat to control the heating system.

TO FIRE THE BOILER

Before firing the boiler, ensure that the system is full of water, that there is a sufficient level of oil in the storage tank, and that all isolation valves are fully open.

Check that the time-switch/programmer is **on** and that the room thermostat is calling for heat.

Set the boiler thermostat (**fig 1**) to the desired temperature.

Switch on the electrical supply; the burner will fire up and continue to run until the boiler reaches the temperature set on the boiler thermostat.

Turn on the hot water tap. The burner will fire and the boiler will produce hot water. Turning off the tap will cause the burner to stop.

Set the time-switch/programmer to the times and programme required.

The boiler should now operate automatically, cutting in and out according to the heat and hot water demand.

BOILER CONTROL THERMOSTAT

The boiler control thermostat allows you to adjust the central heating water temperature. It is calibrated between High and Low, in five intermediate settings, corresponding to a temperature range between 80°C (High) and 55°C (Low).

Experience will tell you which is the most economical setting to suit your household.

The thermostat must not be switched to its **OFF** position while the boiler is in normal operating mode, as this will affect the operation of the boiler.

HIGH-LIMIT THERMOSTAT

The high-limit thermostat is factory-set and requires no adjustment. Should the boiler thermostat malfunction and the water temperature rise to 110°C, the limit thermostat will take over and shut down the appliance.

The limit thermostat is located on the underside of the control box and can be reset by pushing in the red button. If the thermostat operates frequently, consult your service engineer, as there may be a fault in the system.

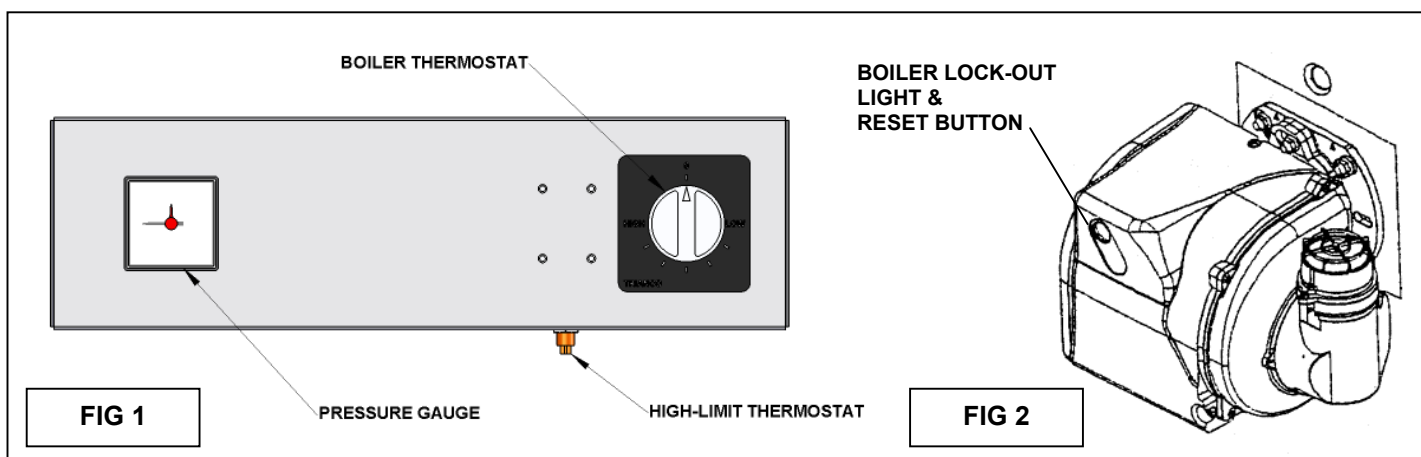
Note: the high-limit thermostat can only be reset when the water temperature has dropped by at least 20°C.

BURNER LOCK-OUT

If the burner fails to light for any reason, the boiler will go into lock-out mode, indicated by the illumination of the reset button on the burner control box (**fig 2**). To reset the burner, press this button. If the burner returns to lock-out, wait for one minute before pressing the button again.

If the burner still fails to light, follow the simple fault-finding guide (**page 5**), before switching off the electrical supply to the boiler and contacting your service engineer if the failure persists.

Important: do not attempt to reset the burner more than twice – constant attempts to do so may cause permanent damage to components within the burner.



SYSTEM CONTROLS

ROOM THERMOSTAT

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

FROST PROTECTION

If the boiler is to be fitted externally to the property being heated, the water in the system may be in danger of freezing and, as such, the boiler is protected by a factory-fitted frost thermostat, which will cause the boiler to fire should the temperature within the casings drop to below 7°C.

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

See **page 7** for flushing and water treatment.

SHUTTING DOWN FOR LONG PERIODS

If the boiler is shut down for any length of time, it is advisable to have it serviced and thoroughly cleaned as soon as possible to minimise corrosion of the heating surfaces.

OIL

The oil for your boiler is 28 sec. Kerosene class C2 to BS 2869.

Always ensure that the oil storage tank is topped up regularly; do not wait until the tank is nearly empty before refilling, as sludge and water could be sucked into the oil pipe, affecting the operation of the burner and potentially reducing the life of the pump.

After a delivery of oil, it is recommended that it be allowed to settle in the tank for about half an hour before restarting the boiler.

Sludge and water caused by condensation should be drawn off at the drain-cock on the oil tank annually.

SIMPLE FAULT-FINDING

If the boiler fails to start for no apparent reason, carry out the following checks before calling your service engineer:

1. Check for failure in the electrical supply.
2. Check for a blown fuse. If the fuse has blown and the replacement subsequently blows again, switch off the mains electrical supply to the boiler and contact your service engineer.
3. Check that there is adequate oil in the tank and that all isolation valves are fully open.
4. Check for burner lock-out (see **page 4**).
5. Check for excess water temperature (see high-limit thermostat details, **page 4**, for further details).

Note: If the boiler has been shut down due to a failure of the power supply, it may be necessary to reset the time-switch or programmer to the correct time, unless the device has an in-built power reserve.

SERVICING

To ensure the efficient and reliable operation of the boiler it is essential that the burner be **commissioned** immediately after installation, and prior to first use. The boiler requires an annual service thereafter.

IMPORTANT NOTES

1. Only an OFTEC-trained and registered engineer can carry out commissioning and service work.
2. Electrical safety checks should be carried out by a qualified electrical engineer.
3. It is the responsibility of the installer to ensure that the boiler is commissioned immediately after installation.
4. It is a requirement of the guarantee and any extended warranty that an annual service is carried out.
5. The system water **must** always be protected by a corrosion inhibitor.

AFTER-SALES SERVICE INFORMATION

A qualified field service engineer is available to attend a breakdown or manufacturing fault occurring while the appliance is under guarantee.

The appliance must be made available for service during normal working hours, Monday to Friday.

Please note, upon attendance by a Trianco field service engineer, a charge will be made on-site where:

- The field service engineer finds no fault with the appliance
- The cause of the appliance is due to lack of oil, or a fault in the oil supply
- The cause of a breakdown is due to other parts of the system not manufactured by Trianco
- The cause of the breakdown is due to incorrectly fitted spare parts, or third-party spares not designed for specific use with the appliance
- The appliance has not been correctly installed as recommended in these instructions, or by unqualified persons
- The breakdown occurs outside the guarantee period
- The appliance has not been maintained correctly
- The breakdown occurs due to use of the appliance not sanctioned by these instructions
- The breakdown occurs as a direct result of unauthorised third-party work on the appliance

Important:

Invoices for attendance and repair work carried out on this appliance by any third party will not be accepted unless authorised *in advance* by the Trianco service centre.

TECHNICAL ASSISTANCE

A team of trained technical advisors are available to discuss any problem with the appliance which may occur. In many cases, the problem may be solved over the telephone, eliminating the need for a service visit.

HOW TO REPORT A FAULT

Step 1:

Contact your installer or service engineer, who should thoroughly check all recent work before the attendance of our field service engineer is requested.

Step 2:

If your appliance has developed an in-guarantee fault, contact the Trianco service centre for assistance. You will be provided with the name and contact details of our local service agent.

If your own installer/service engineer is unavailable, contact the Trianco service centre. Please be aware that a charge may be made for any visit not covered by the appliance guarantee.

Before contacting either the Trianco service centre or the technical advice line, please have the following information ready:

- 1) Appliance serial number, or your unique customer identification number (issued upon registration of the appliance with Trianco)
- 2) Description of fault
- 3) Date of installation

Boiler Serial No.: _____

Cust. ID No.: _____

Installation Date: ___/___/___

Corrosion Inhibitor Fitted: YES: ___ NO: ___

SERVICE CENTRE AND TECHNICAL SUPPORT

Tel: 0114 257 2300 Fax: 0114 257 2338

Hours of Business

Monday – Thursday: 8:30 – 16:45

Friday: 8:30 – 14:30

INSTALLATION INSTRUCTIONS

2. INTRODUCTION

The Contractor HE External Combi has been designed to conform to European Directive/Standards BED 92/42 EEC LVD EN 73/23 EEC EMC 89/336/EEC.

The matched pressure-jet burner is exceptionally quiet in operation and ensures clean and efficient combustion, with low NOx emissions.

The boiler is designed for sealed systems up to a working pressure of 3 bar, with the appropriate sealed system safety equipment.

To ensure that the boiler is operating at maximum efficiency, the central heating return temperature should be 55°C or above. Maximum performance will be achieved by maintaining a differential of 10°-30°C between the flow and return water temperatures.

This appliance is suitable for sealed, fully pumped systems only.

Routine servicing can be carried out from the front of the boiler, but space should be left to enable the removal of the top casing, to allow future access to the pipework and hydraulic assembly.

The boiler is fully automatic in operation and incorporates all necessary safety controls to ensure safe and reliable running.

The boiler is supplied with the burner set for 28 sec. Kerosene Class C2 to BS 2869 fuel to meet the Building Regulation requirements for low-level flue discharge.

The boiler is supplied with its own integral flue, which can terminate from the left, right or rear of the appliance.

FLUSHING AND WATER TREATMENT

The performance of the appliance could be impaired by system debris or the effects of corrosion. New systems must be thoroughly flushed to remove metal filings, solder, machining oils and any other fluxes or greases before connecting the boiler.

When fitting the appliance to an existing system, it is advisable to clean the system by using an appropriate flushing and descaling agent. Refer to BS 7593 [1992] for guidance.

System additives - corrosion inhibitors and all flushing agents/descalers should be suitable for steel boilers and comply with BS 7593 requirements. It is strongly recommended that a suitable anti-freeze product is applied to the system after flushing.

Always refer to manufacturers' instructions.

Failure to flush and add inhibitors to the system will invalidate the appliance warranty.

The appliance is designed to be fitted to fully-pumped systems only. Failure to do so will invalidate the warranty.

The boiler must not be run without water in the system.

If the appliance is to be fitted where the temporary hardness of the water supply is high, then a salt-based water softener must be fitted to reduce the hardness to below 150ppm (or 10.5° Clarke). Water testing strips are supplied with the appliance. If in doubt, however, contact your local water authority to obtain the temporary hardness figure.

Under no circumstances should the boiler be installed if the end user is unaware of this requirement.

Depending on the total water content of the system, an additional expansion vessel may be required. Refer to page 11 for sizing details. Failure to ensure the correct vessel size could result in premature failure of the vessel and other system components (such as the diverter valve and circulating pump).

IMPORTANT NOTICE:

To comply with regulations in force, the boiler must be installed and commissioned by an OFTEC-registered engineer. The installation must comply with all requirements of current *Building Regulations, Part L*.

Failure to meet the terms of these requirements may invalidate the guarantee.

THE PERSON(S) WHO INSTALLS THIS APPLIANCE, SERVICES OF CARRIES OUT ANY REMEDIAL WORK, i.e. ELECTRICAL FAULT-FINDING, MUST HAVE THE SUITABLE ENGINEERING QUALIFICATIONS.

3. TECHNICAL INFORMATION

ALL DIMENSIONS IN mm.
ALL UNUSED TAPPINGS ARE TO BE PLUGGED OFF.

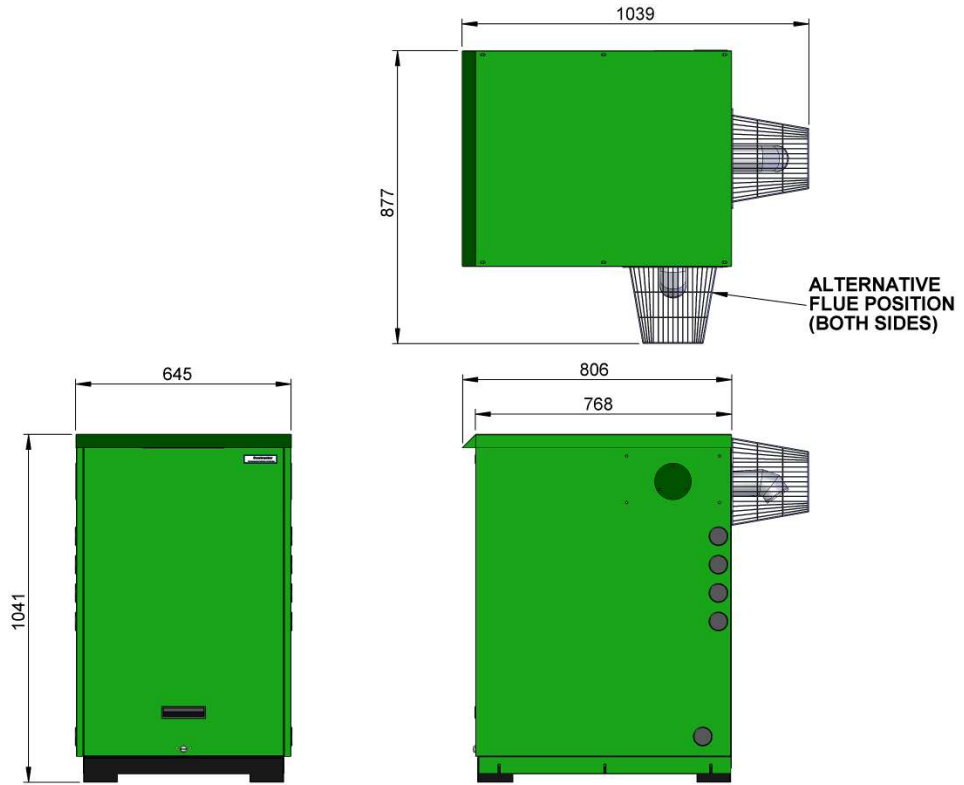
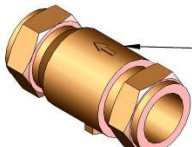


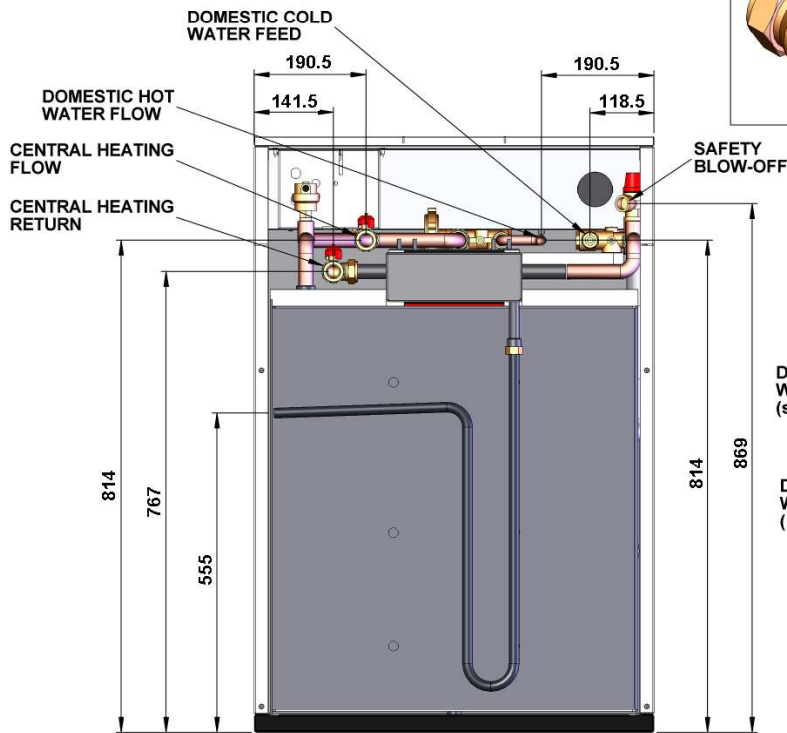
FIG 3
OUTLINE DIMENSIONS



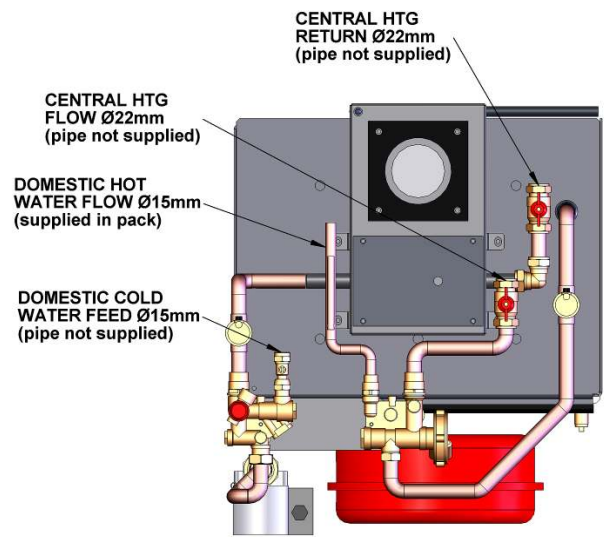
TO PREVENT THE GRAVITY CIRCULATION OF WATER INTO THE HEATING SYSTEM FROM THE HOT WATER CIRCUIT, THE CHECK VALVE (SUPPLIED) MUST BE FITTED CLOSE TO THE BOILER ON THE CENTRAL HEATING FLOW PIPE.

THE ARROW SHOULD BE AIMED AWAY FROM THE APPLIANCE, TOWARDS THE HEATING CIRCUIT.

FAILURE TO FIT THE VALVE MAY RESULT IN THE INCORRECT OPERATION OF THE BOILER.

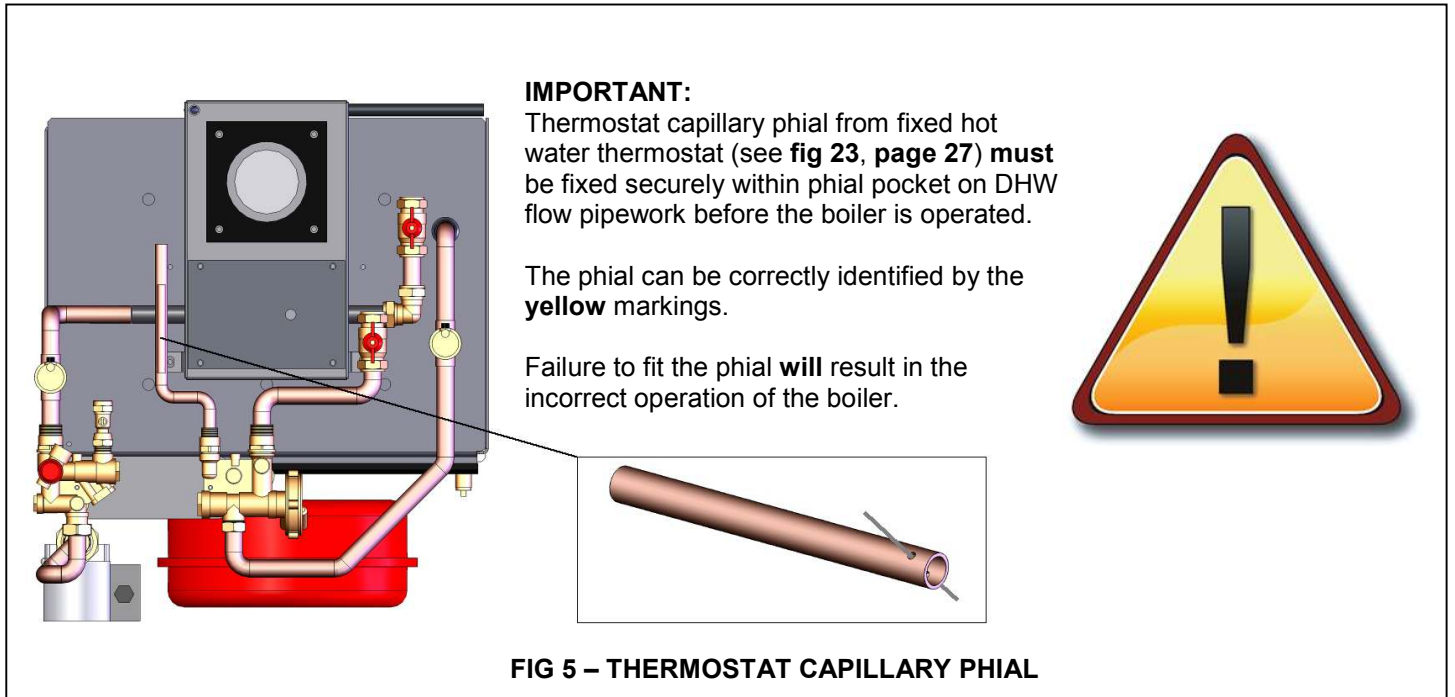


REAR VIEW



TOP VIEW

FIG 4
PIPEWORK CONNECTIONS



IMPORTANT:
Thermostat capillary phial from fixed hot water thermostat (see **fig 23, page 27**) **must** be fixed securely within phial pocket on DHW flow pipework before the boiler is operated.

The phial can be correctly identified by the **yellow** markings.

Failure to fit the phial **will** result in the incorrect operation of the boiler.

FIG 5 – THERMOSTAT CAPILLARY PHIAL

TECHNICAL DATA

Input (net)	118,000 Btu/h (34.6kW)
Output (net)	112,000 Btu/h (32.8kW)
SEDBUK Rating	B
Burner	See Burner Details Leaflet
Weight (empty)	200kg
Water Content	40 litres
C/H Flow & Return	22mm
DHW Inlet & Outlet	15mm
Max. Operating Pressure (HTG)	3 bar (43.5 psi)
Test Pressure	4.5 bar (65.3 psi)
Starting Current	3.5
Running Current	0.77
Electrical Supply	230/240v – 50Hz 220W 5amp
Fuse	Fused at 5 amp
Max. C/H Flow Temp.	80°C
Flow Rate (at 40°C rise)	11.5 litres
DHW Minimum Pressure	1 bar
DHW Maximum Pressure	6 bar
Fuel	Kerosene 28s BS 2869 Class C2
Heating Control Thermostat	Adjustable
Hot Water Thermostat	Factory-set at 60°C
Overrun Thermostat	Factory-set at 80°C
High Limit Thermostat	Factory-set at 110°C (manual reset)
Casing Finish	Galvanised steel, stove-enamel painted green
Thermal Insulation	Boiler shell and casings insulated with glass fibre

4. INSTALLATION

REGULATIONS

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

BS 5410: Part 1 – Code of Practice for Oil-Firing.

BS 5449 – Forced Circulation Hot Water Central Heating Systems.

Building Regulations - Part J (England and Wales)
 - Part F sect. 111 (Scotland)
 - Part L

The Control of Pollution (Oil) Regulations
Current I.E.E. Regulations
Local Water Undertakings Bylaws
OFTEC Installation Requirements for Oil-Fired Boilers and Oil Storage Tanks, OFST 100 & OFST 200.

HEALTH AND SAFETY AT WORK ACT

The installer should be aware of his responsibilities under the Act and provide, where necessary, appropriate protection for all persons carrying out the installation.

In the interests of safety, it is required that the appliance is installed, commissioned and serviced by and OFTEC registered technician. A guide to safe working practices for oil-firing technicians is available from OFTEC.

The installer of the boiler should be registered as a competent UDHWS installer.

Electrical work should be carried out in accordance with BS 7671:2001 by a qualified electrical engineer.

SITING THE BOILER

Sound Levels

Despite the low sound levels of the boiler, the following factors should be taken into consideration before installation:

- (a) Some people are particularly sensitive to low noise levels – discuss with the householder.
- (b) A chimney passing through a bedroom will sometimes transmit noise.
- (c) Low-level flue terminals produce some exhaust noise, so care should be taken when siting adjacent to neighbouring property, patios and play areas. Refer to flue details (**page 22** onwards).
- (d) Due to the condensing nature of the boiler, a plume of water vapour will be discharged from the flue. This should be taken into account when siting the flue terminal. Refer to section on flue systems.

Hearth

The boiler **must** be fitted on a suitable non-combustible base, which is level and capable of supporting the installed weight of the boiler, including its full water content. The base level of the boiler should be above ground level to avoid water damage.

Clearance and Service Access

When siting the boiler, ensure adequate clearance is allowed for making water and flue connections. Allow 1m at the front for servicing, and enough clearance to allow removal of the top casing for access to the pipework and hydraulic assembly.

COMBUSTION AND VENTILATION AIR

The provision of an adequate supply of combustion air is essential for the efficient and safe operation of the boiler. The combustion air inlet is located at the top of the front panel and under no circumstances should be covered or blocked.

HEATING AND DOMESTIC HOT WATER SYSTEMS

The heating system should be installed in accordance with current HVCA Codes of Practice and BS 5449 Part 1 – Forced Circulation Hot Water Central Heating Systems.

Maximum water temperature is 76°C.

The appliance is supplied with two isolation valves (flow and return), terminating in 22mm compression fittings. The appliance also incorporates a pump (fitted to the return side of the boiler), expansion vessel (10 litre capacity, pre-charged at 0.5 bar), pressure gauge and pressure relief valve (3 bar).

Some typical system schematics are shown on **page 12**.

A drain-off cock is fitted to the front of the boiler. However, one should always be fitted to the lowest point on the heating circuit.

Flush out the system to remove any residue before filling the system.

To achieve the maximum system efficiencies, the heating system should be designed to the following parameters:

Boiler Flow Temperature	- 50°C to 80°C
Flow Differential Temperature	- 10°C to 30°C

ANTI-GRAVITY CIRCULATION CHECK VALVE

To prevent the gravity circulation of water into the heating system from the hot water circuit, the check valve (supplied) **must** be fitted close to the boiler to the central heating flow pipe. See **page 8** for details.

Expansion Vessel Requirements

The boiler is supplied with a 10 litre expansion vessel, capable of coping with a total system water content of 90 litres at a cold fill of 1 bar. An additional expansion vessel will be required if the water content exceeds this.

Use the chart below to calculate the additional expansion vessel requirement:

Vessel Charge/ System Pressure	0.5 bar	1.0 bar	1.5 bar
Multiplication Factor to Give Total Expansion Required	0.08	0.11	0.16

Example:

A system to be filled to 1 bar (cold fill) with 40 litres of stored water in the boiler and 100 litres in the heating system requires a total expansion level of:

$$40 + 100 = 140 \text{ litres.}$$

Multiply by 0.11 (from chart) = 15.4 litres

This is the total expansion required. The supplied vessel has a capacity of 10 litres. Therefore:

15.4 litres – 10 litres = 5.4 litres. This is the size required for any additional expansion vessel.

Note: if the appliance pressure gauge indicates a rise of pressure to 2.6 bar or higher with the radiator circuit operating at full boiler output, an additional expansion vessel will be required.

System Filling

A sealed system must only be filled by a competent person, using one of the approved methods shown on **page 13**. The system should incorporate the connections appropriate to one of these methods.

Use only a WRAS-approved filling loop. The connection to the mains water supply should have the approval of local water company.

The system and the appliance must be fully vented. Repeated venting loses water from the system, which must be replaced. This make-up connection must be close to the appliance in the heating return pipe, through an approved non-return valve. If using a make-up vessel, this should be higher than the top of the system.

The appliance is designed for connection to sealed central heating water systems. **Fig 8** shows a typical system design.

Before commissioning the appliance, it is essential to clean the installation in accordance with the procedures set out in BS 7593. This involves the application of a cleanser, allowing it to circulate around the system for a set period of time, before flushing to a drain.

It is recommended that an inhibitor is added to protect the system. This should be added at the time of final fill, in accordance with manufacturers' instructions. See **page 7** for further details.

Domestic Hot Water

Connection to the domestic hot water supply is made via the 2 x 15mm connections on the back of the boiler. The domestic hot water flow pipe is included in the fittings pack. Refer to **fig 4, page 8**.

IMPORTANT: The fixed hot water thermostat capillary MUST be fitted into the pocket supplied on the domestic hot water flow pipe. Failure to do so will result in the incorrect operation of the boiler. See fig 5 for details.

The mains supply pressure should be between 0.2 and 6 bar. If in excess of 6 bar, a pressure reducing valve must be fitted before the inlet valve. The final 600mm (24") of the mains water supply pipe to the boiler must be copper.

When using plastic pipes on the heating system, the first 600mm (24") from the boiler connections must be copper.

A salt-based water softener may be required (see **page 7**).

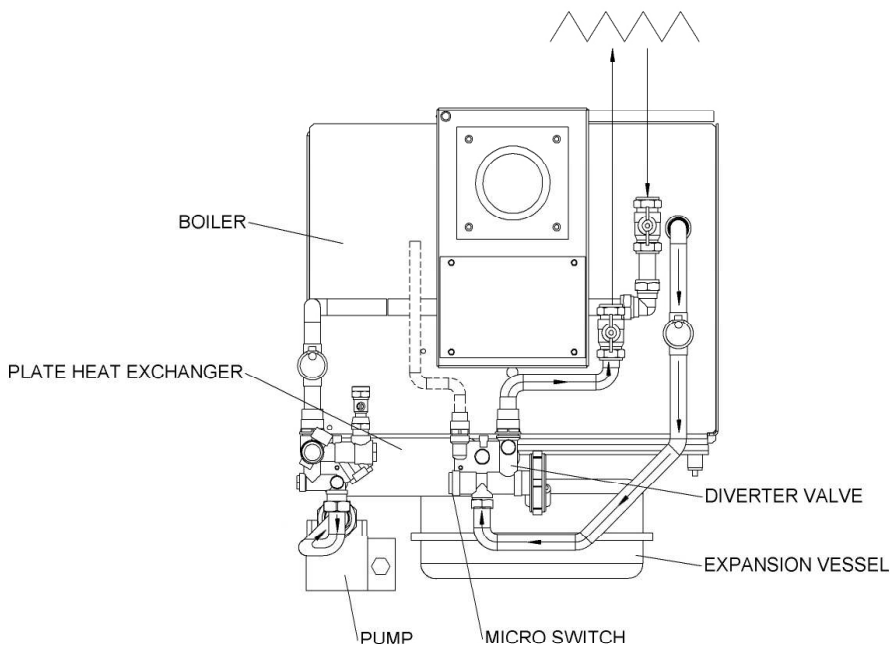
For specific information relating to fittings (e.g. showers, washing machines, etc.) in the DHW circuit, consult the Local Water Authority.

All domestic hot/cold water supply taps and mixing taps designed for use at mains pressure are suitable. Any mains pressure showers or bidets complying with Local Water Authority Bylaws are suitable.

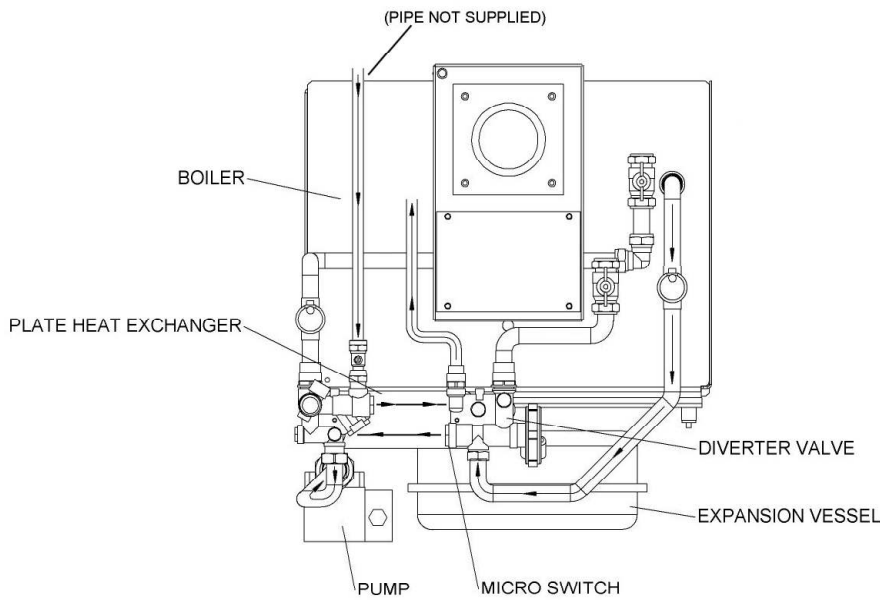
Heating

Connection to the heating circuit is made via the 2 x 22mm connections on the back of the boiler. The central heating flow pipe is included in the fitting pack. Refer to **fig 4, page 8**.

Using not less than 15mm copper pipework, the pressure relief valve must be piped to a tundish, in accordance with section G3 of the Building Regulations 1991 approved document. See **fig 10**.

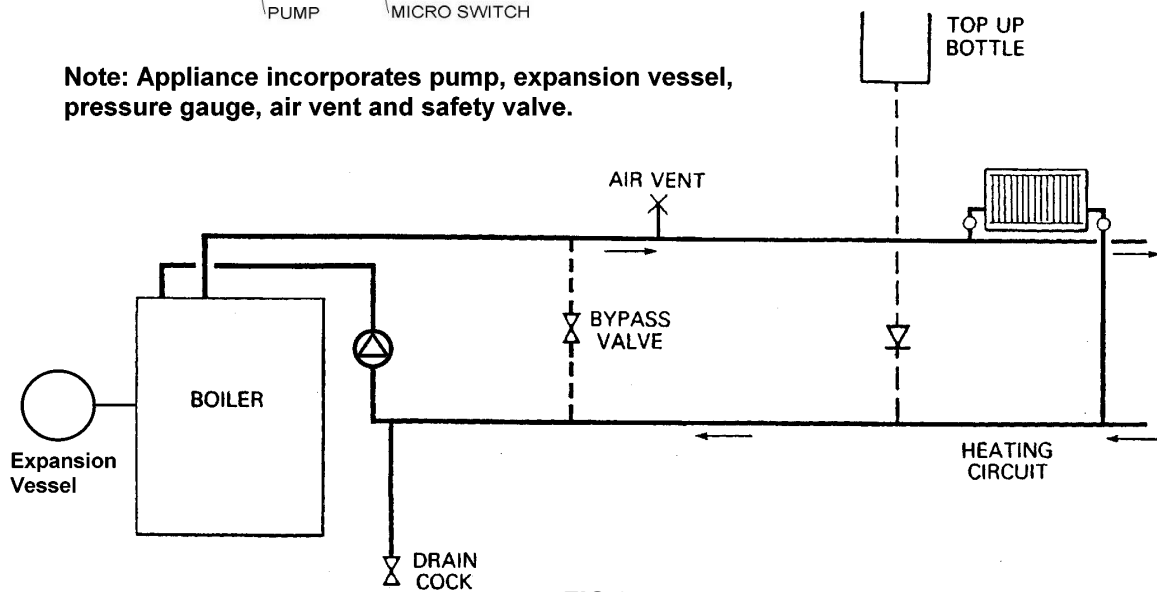


**FIG 6
SCHEMATIC LAYOUT
- CENTRAL HEATING MODE**



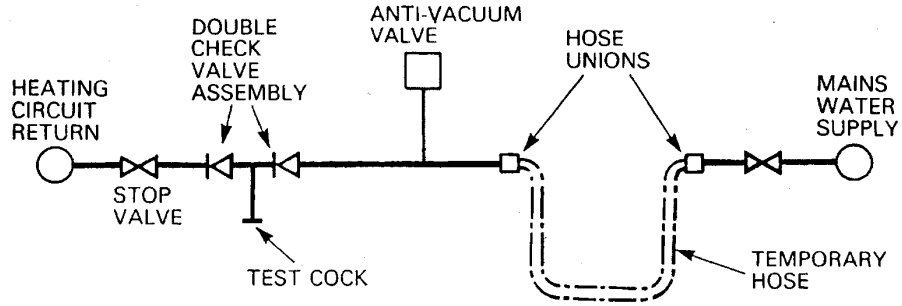
**FIG 7
SCHEMATIC LAYOUT
- DOMESTIC HOT WATER**

Note: Appliance incorporates pump, expansion vessel, pressure gauge, air vent and safety valve.

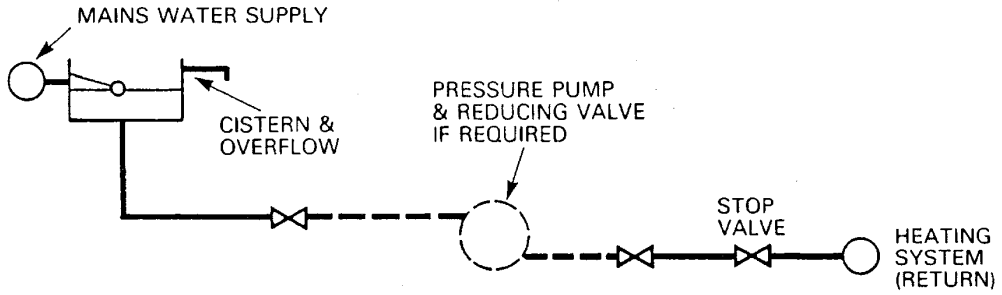


**FIG 8
SEALED SYSTEM PIPING SCHEMATIC DIAGRAM**

METHOD A



METHOD B



METHODS OF FILLING A SEALED SYSTEM

FIG 9

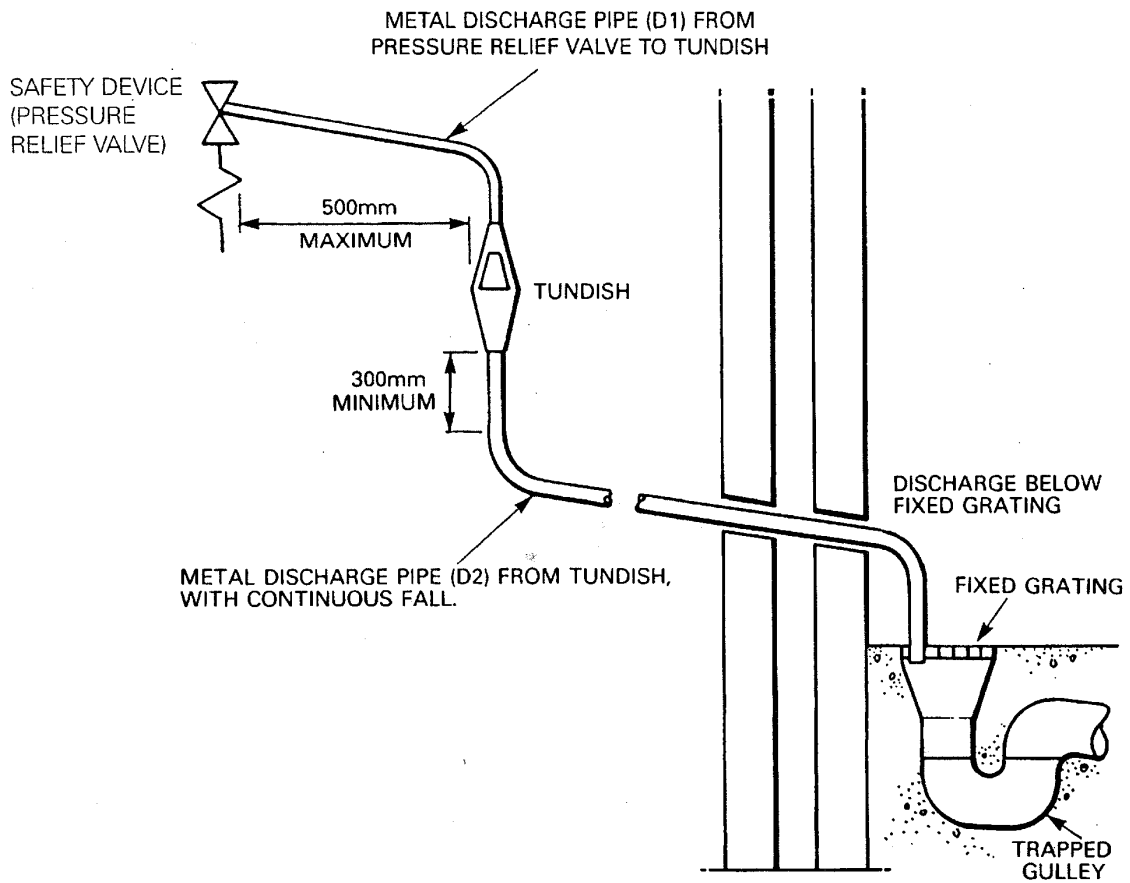


FIG 10

TYPICAL DISCHARGE PIPE ARRANGEMENT

CONDENSATE DRAIN CONNECTIONS

The condensate pipe can be run to either the left or the right side of the boiler and for ease of installation should be fitted before the boiler is positioned. Remove the boiler back casing before installing the condensate pipework. Replace once complete.

To install the condensate pipe/trap, after deciding the direction in which it should run, attach the long end (with the connecting nut) to the drain connector on the back of the condensing unit, ensuring a watertight seal is made.

Where possible, connect the condensate pipework to an external waste drain.

If the boiler is to be fitted in a position where the external ground level is higher than the boiler, and there are no internal drains, a condensate pump can be fitted (refer to manufacturers' instructions).

The drain pipe must be installed to allow the condensate to drain naturally from the boiler, on a minimum fall of 1:20.

The drain from the boiler must be 22mm diameter pipework.

The pipework from the condensate trap to the external drain is not supplied with the boiler.

Upon successful installation of the condensate pipework, fill the trap with water via the port at the rear of the condensing unit. Examine the condensate pipework for any resultant leaks and rectify accordingly.

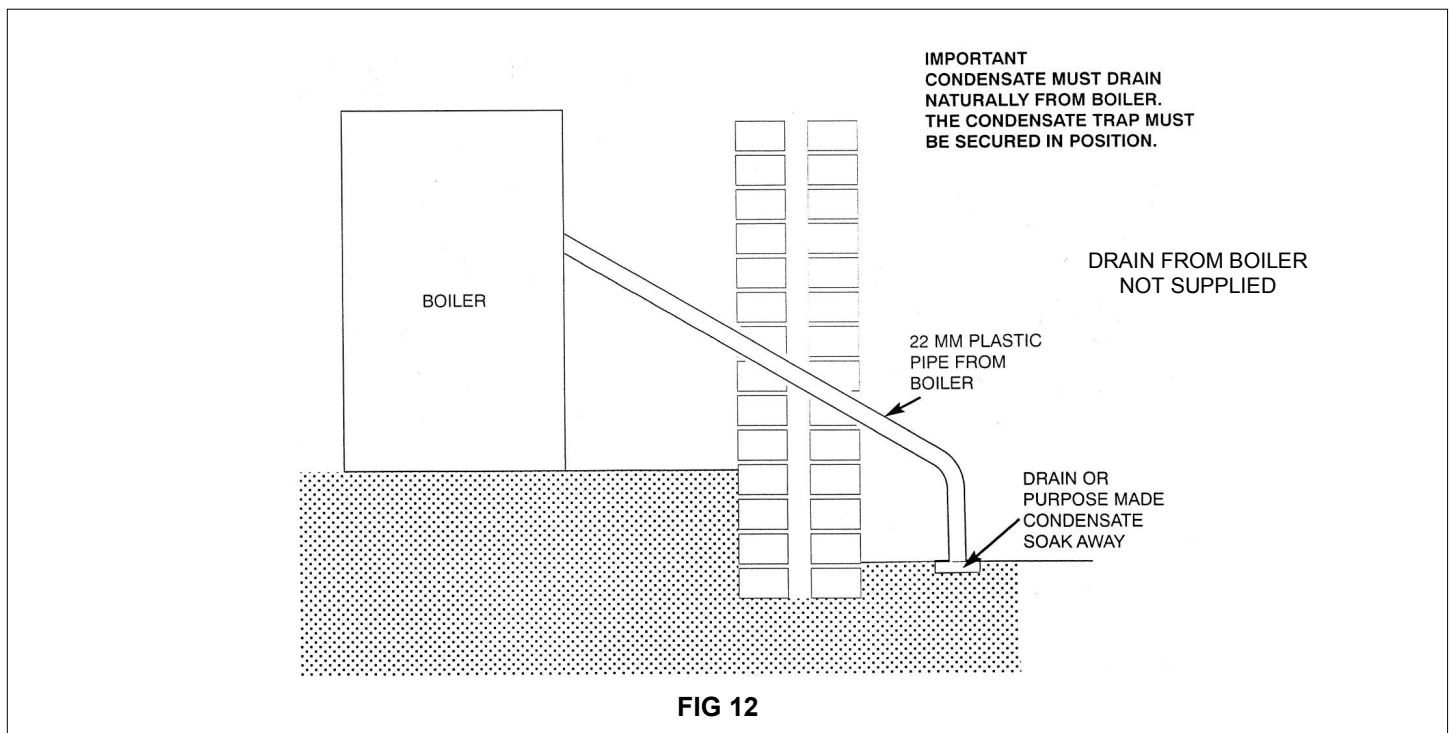
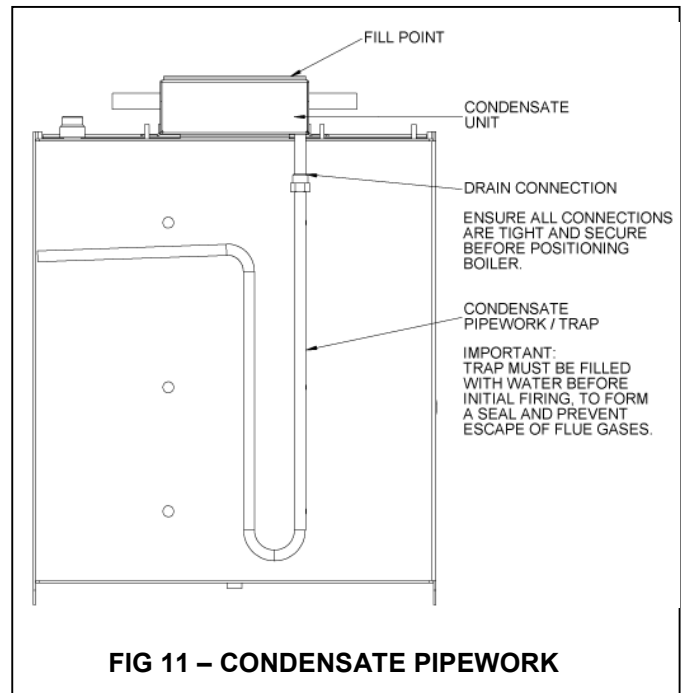
Failure to fill the trap with water before firing the boiler may result in damage to the drainage pipework and potentially allow the escape of flue gases. Any damage caused as a result of not filling the trap will not be covered by the appliance guarantee.

IMPORTANT NOTES:

When running any external pipework from the trap to the drain, it is essential that the pipework is kept to a minimum and is insulated to prevent the condensate from freezing.

MAINTENANCE

The trap should be inspected at regular intervals to ensure correct operation, and should be checked as part of the annual service schedule.



5. OIL SUPPLY

OIL

The burner is factory-set to burn 28 sec. Kerosene Class C2 to BS 2869.

Trianco makes no guarantee as to the satisfactory operation of the boiler using fuels other than that which is stated above.

STORAGE TANK

The tank should be fitted with weather-protected fill and vent connections, a drain-off cock, and an oil level indicator.

Size and Location of Tank

The tank should be large enough to allow for economic deliveries and be located in an unobtrusive position, having regard to the need for safety, filling, maintenance, and head of oil required (see **figs 13, 14, 15**).

Steel Tanks

Steel tanks must comply with the requirements of BS 799 Part 5: 1987 and should be mounted on brick or block piers, with a waterproof membrane fitted between the piers and tank.

Plastic Tanks

Polyethylene tanks may be used, having several advantages over traditional steel tanks:

- (a) Pier supports are not required; the tank may be fitted directly onto a flat surface.
- (b) They do not corrode; therefore never require repainting.
- (c) They are easier to handle because of lower weight.
- (d) They are generally supplied with a 10-year manufacturer's guarantee.

Fire Protection

Whilst it is highly unlikely that a fire could start from a domestic oil tank, protection is required from a fire which may originate elsewhere. The tank should be at least 1.8 metres from a building and 750mm from a site boundary. Where it is not feasible to adhere to these limits, the building wall must not have any openings other than those for ventilation, the wall must have at least a half-hour resistance to fire, and must extend 1.8 metres from any part of the tank.

Alternatively, a non-combustible radiation barrier can be employed, which meets all the requirements of BS 5410 Part 1. This standard applies to tanks up to a capacity of 3,500 litres.

See current OFTEC regulations for further details.

To comply with OFTEC regulations, a CD/10 form must be completed and left with the appliance upon installation.

To comply with Building Regulations, **section J5**:

1. Where the tank is close to a dwelling, fire protection must be provided to the eaves, if less than 1.8 metres from the top of the tank.
2. Cladding must extend at least 300mm beyond the tank.
3. The tank must be fitted on a non-combustible base.

Pollution Protection

To comply with Building Regulations, **section J6**, the tank must be bunded (double-walled) if:

1. The tank is less than 10m from a stream
2. The tank is less than 50m from a well, spring, or other source of drinking water.
3. The tank cannot be viewed from the point of delivery.
4. There is risk of oil reaching a manhole cover or drain in the event of a leak.
5. The tank capacity exceeds 2,500 litres.

SUPPLY

A long-life flexible oil hose is supplied with the boiler. A filter and shut-off valve are also required. These should be fitted as shown on **figs 13, 14, 15**.

All oil line joints must be completely sealed and the total pipe run should be flushed thoroughly before connection is made to the burner. No soldered joints are permitted in the oil line.

Fire Valve

A remote-operated fire valve must be fitted in the oil supply line, externally to the boiler, with the sensing phial located at a point within the boiler casings, above the burner.

Single-Pipe Oil Supply (fig 14)

Where the lowermost part of the tank is above the level of the burner, a single-pipe gravity system can be used. The oil supply pipe should be connected to the suction port on the burner pump via the flexible hose supplied.

Two-Pipe Oil Supply (fig 15)

Where the lowermost part of the tank is below the level of the burner, a two-pipe suction lift is necessary.

When using the two-pipe system, it is important to convert the fuel pump on the burner to operate as such: remove the end cover and filter, then remove the bottom screw and the 'U' washer. Replace the screw, making sure it is fully inserted. See the burner details leaflet for further information.

A spring-loaded non-return valve must be fitted in the suction line to prevent the oil running back to the tank. No valves are permitted in the return line.

An additional flexible oil line will also be required.

OIL SUPPLY (cont.)

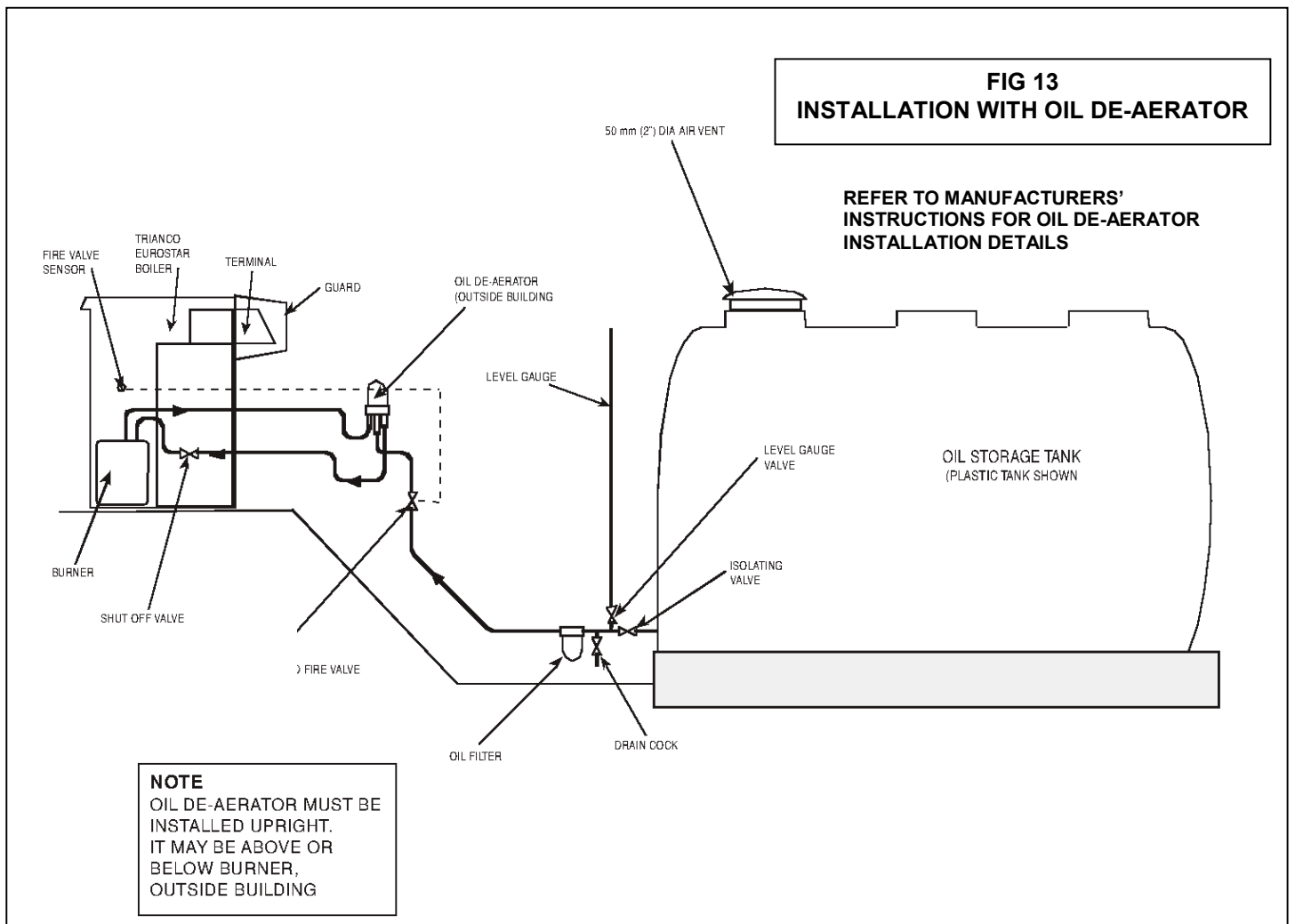
Notes:

1. The pump suction should not exceed 0.4bar, as dissolved gas may be released from the oil, affecting combustion.
2. The return pipe must end at the same level as the suction outlet to prevent loss of prime.
3. The outlet from the tank should be approximately 75mm (3") above the bottom to prevent sediment and water being drawn into the supply line.

Single-Pipe Oil Supply with De-aerator (fig 13)

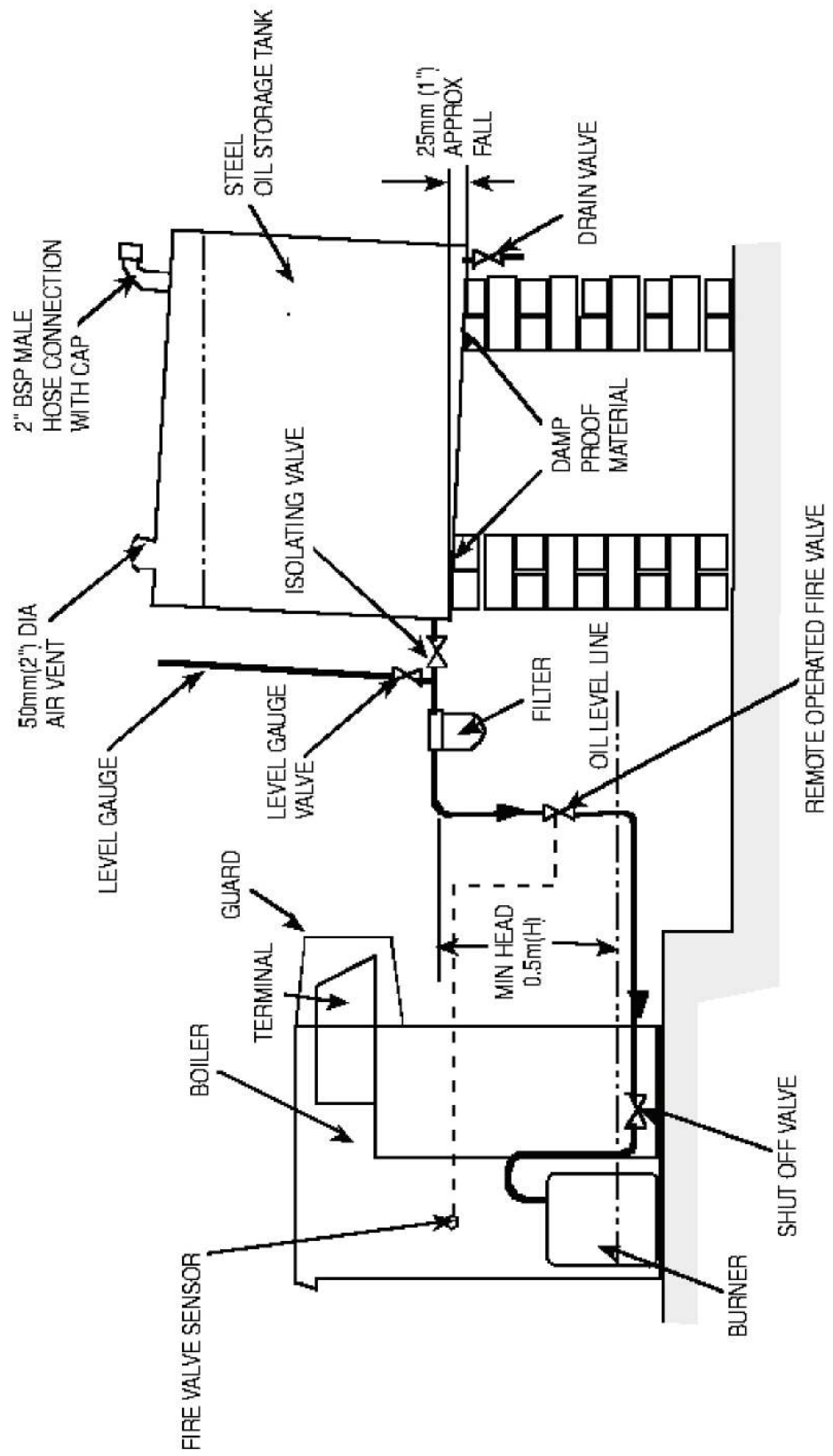
Where a two-pipe suction lift is required, but the return pipe requirement is too long, or impractical to run, an oil de-aerator can be used. The burner should be piped as for a two-pipe system, up until the de-aerator, when a single pipe can be taken the remaining distance to the storage tank. The de-aerator should be fitted at the closest point to the boiler, externally to the dwelling.

A non-return valve is not required with this system, but the 'U' washer must be removed in the same manner as a standard two-pipe system.



MAXIMUM OIL SUPPLY LINE LENGTH 'L'

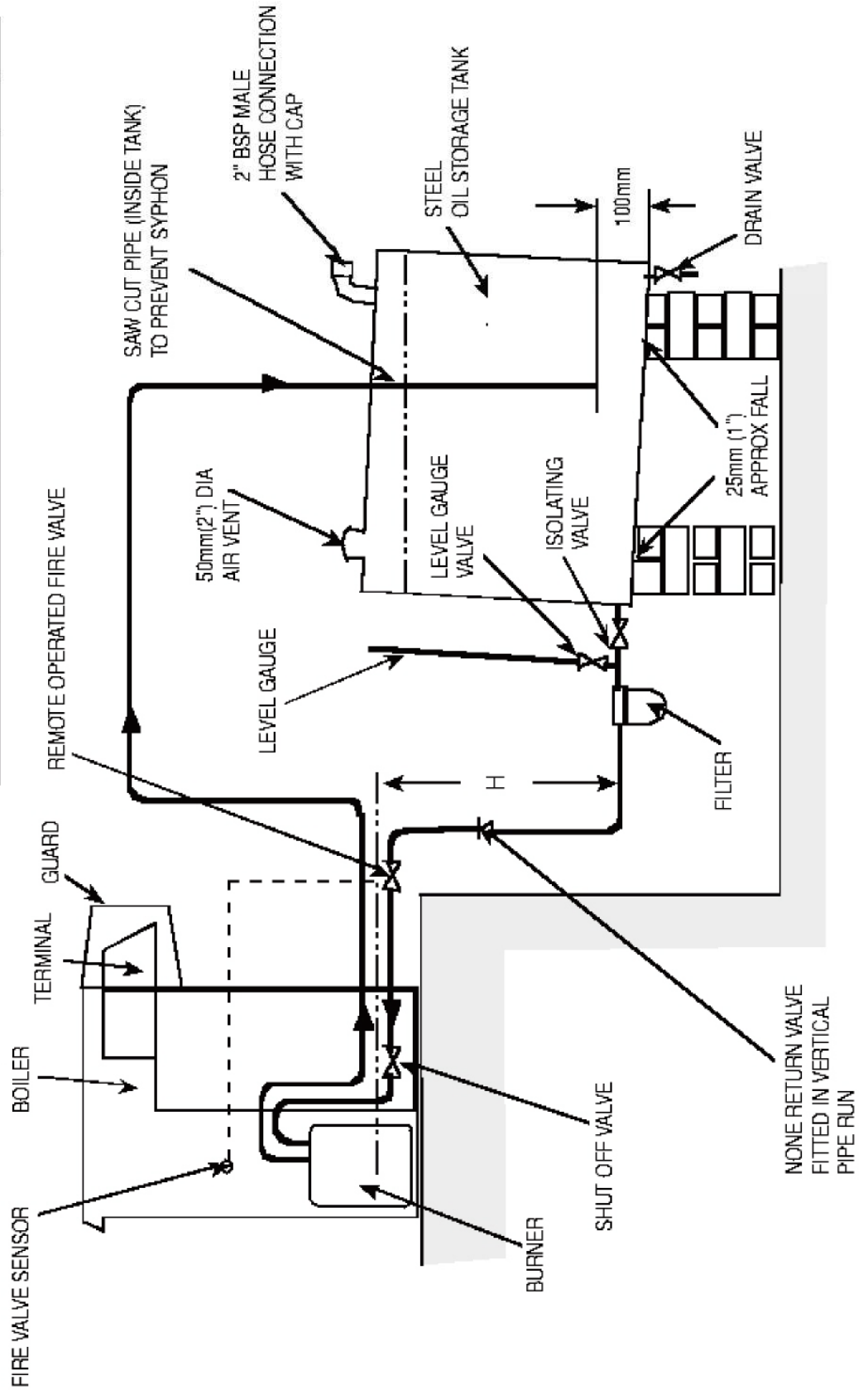
HEAD 'H' METRES.		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
PIPE 6mm ID	MAXIMUM LENGTH (METRES)	10	21	31	41	52	62	73	83
PIPE 8mm ID		33	66	98	100	100	100	100	100



**FIG 14
SINGLE-PIPE SUPPLY**

MAXIMUM OIL SUPPLY LINE LENGTH 'L'

LIFT 'L' METRES.		.0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
PIPE 6mm ID	MAXIMUM LENGTH (METRES)	48	42	36	30	24	18	11	5
PIPE 8mm ID		100	100	100	94	75	55	36	16
PIPE 10MM ID		100	100	100	100	100	100	88	40



**FIG 15
TWO-PIPE SUPPLY**

6. ELECTRICAL SUPPLY

230V single-phase 50Hz (fused 5 amp)

Note: this appliance must be earthed and the electrical supply cable must be of a greater length than the current-carrying conductor cables (i.e. live and neutral supply cables).

All electrical wiring must be carried out by a qualified electrician, in accordance with current I.E.E. Regulations and any local regulations which may apply.

The 230V – 50Hz electrical supply must be fused by a double-pole switch, with a contact separation of at least 3mm in both poles, and by a shuttered socket adjacent to the boiler (both devices must meet the requirements of BS 1363).

The minimum requirement for the power supply cable is PVC sheathed flexible cord, 0.75mm² (24x0.2mm, code designation H05 VV-F or H05 VVH2-F), as specified in table 16 of BD 6500.

All cables entering the control box must be secured in position by the use of the strain-relief bushes supplied. Any cables entering the boiler casing should be run via the back using the cable gland supplied (see **figs.16/16a** for fitting instructions).

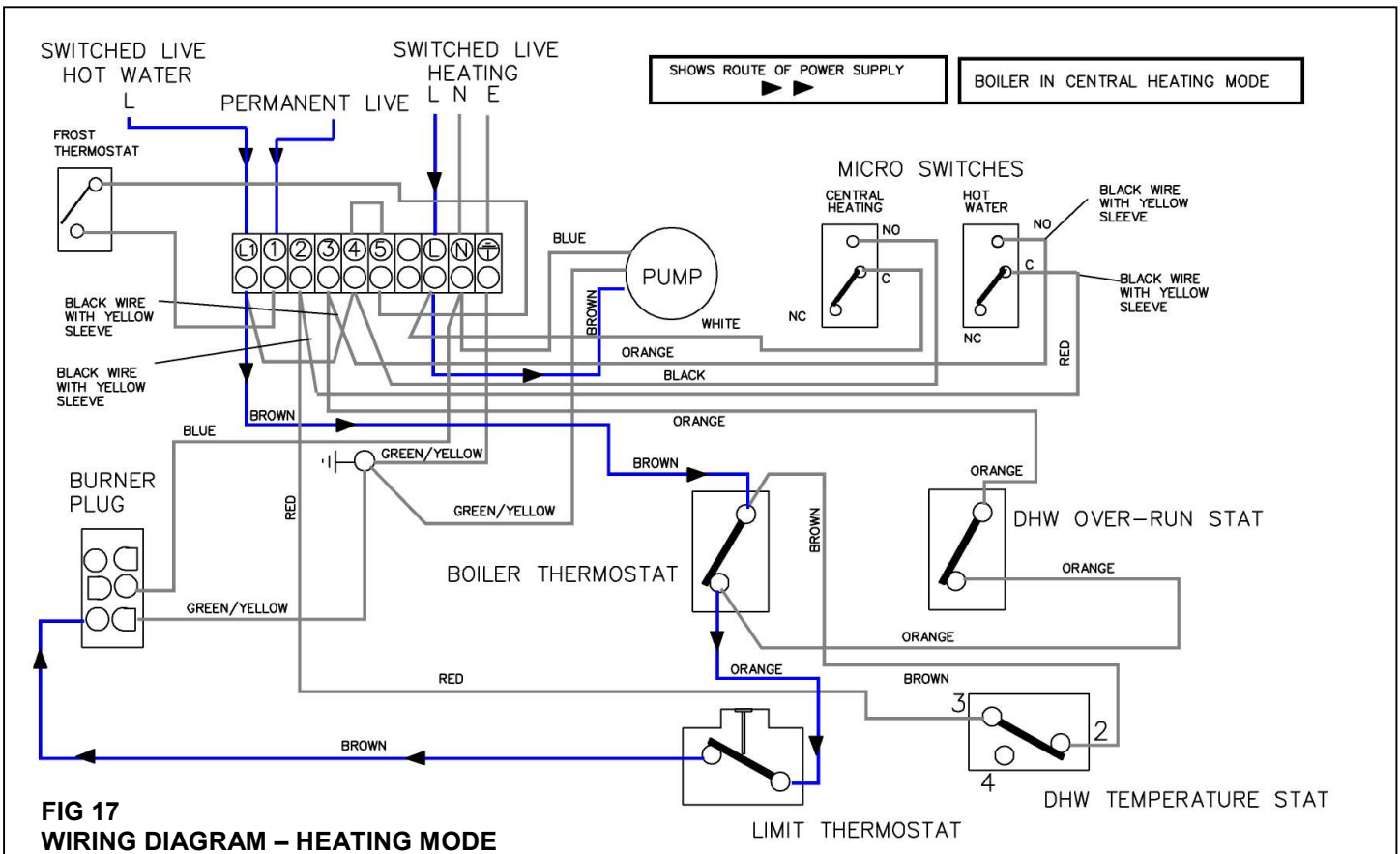
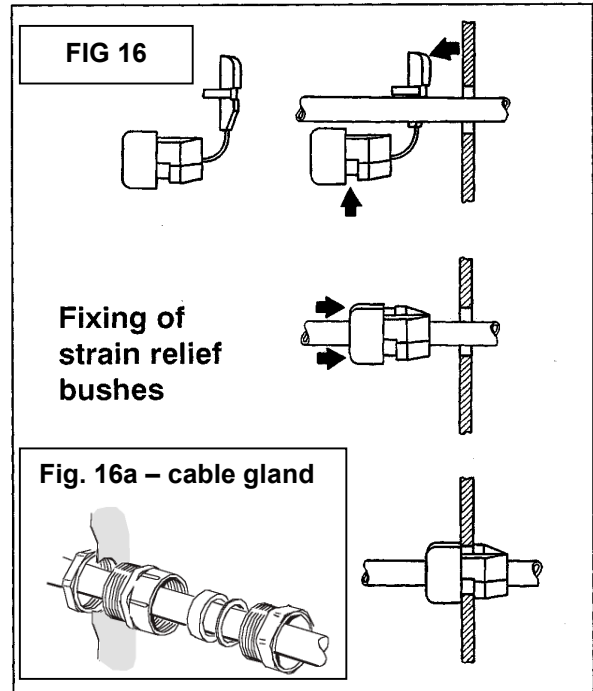
See wiring diagrams, **figs 17 & 18** for further details.

Important Note:

After wiring in the electrical supply, care must be taken when closing the control box lid to ensure no cables are trapped between the lid and the box.

High and Low Voltage Warning

In certain areas of the country, where there is a known risk of high or low voltage fluctuations, the burner should be prevented from starting by the use of a voltage-sensitive device if the voltage drops or increases sufficiently to endanger the installation.



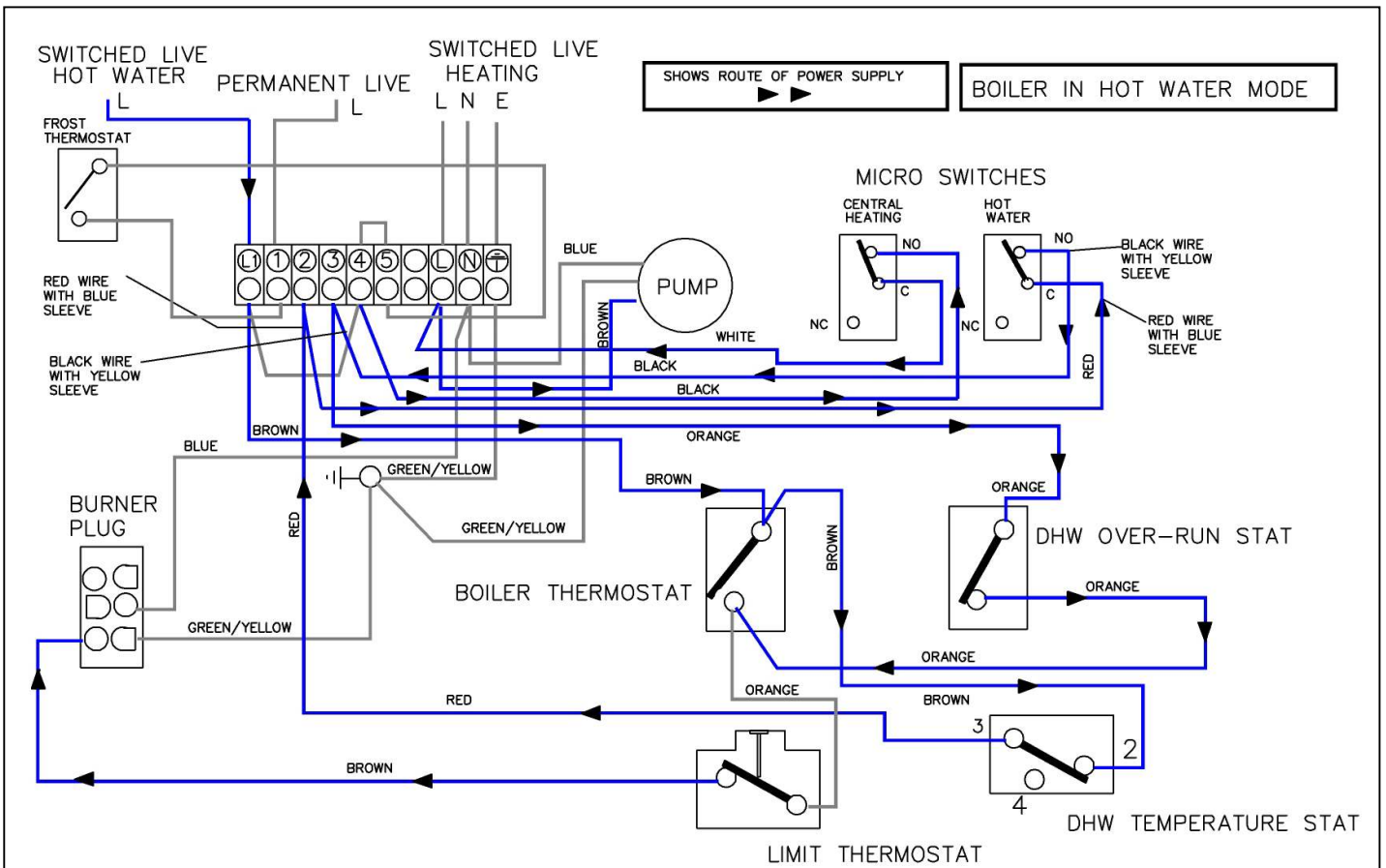
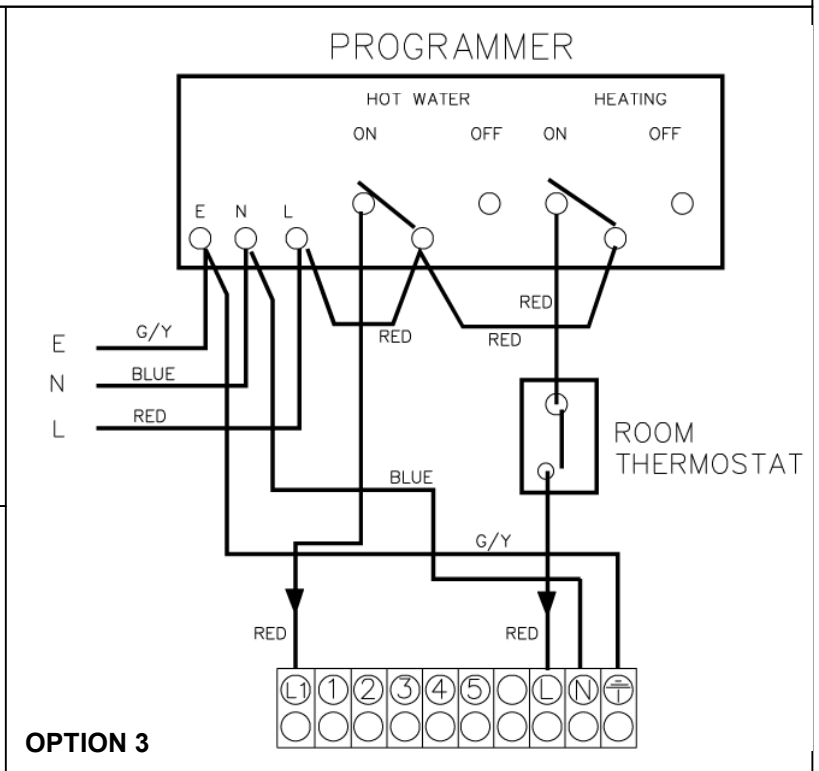
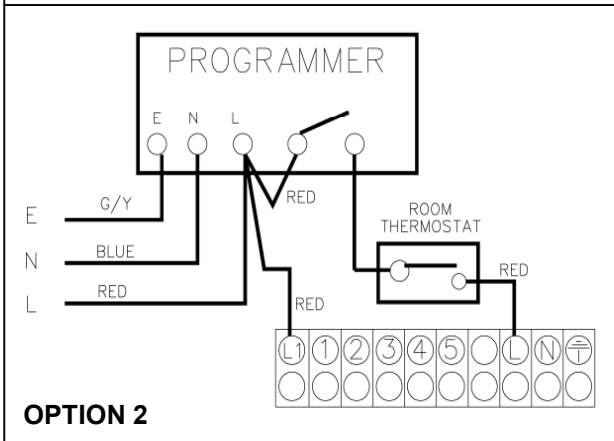
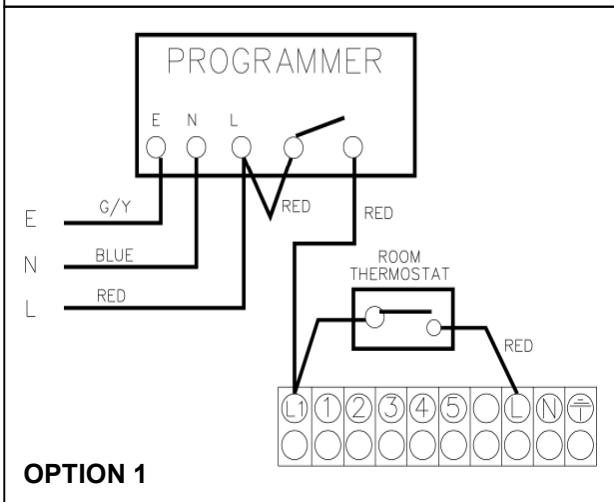


FIG 18
WIRING DIAGRAM - HOT WATER MODE



- OPTION 1: SINGLE CHANNEL PROG. (TIMED C/H & H/W)
- OPTION 2: SINGLE CHANNEL PROG. (TIMED C/H & 24HR H/W)
- OPTION 3: TWIN CHANNEL PROG. (INDIVIDUALLY TIMED C/H & H/W)

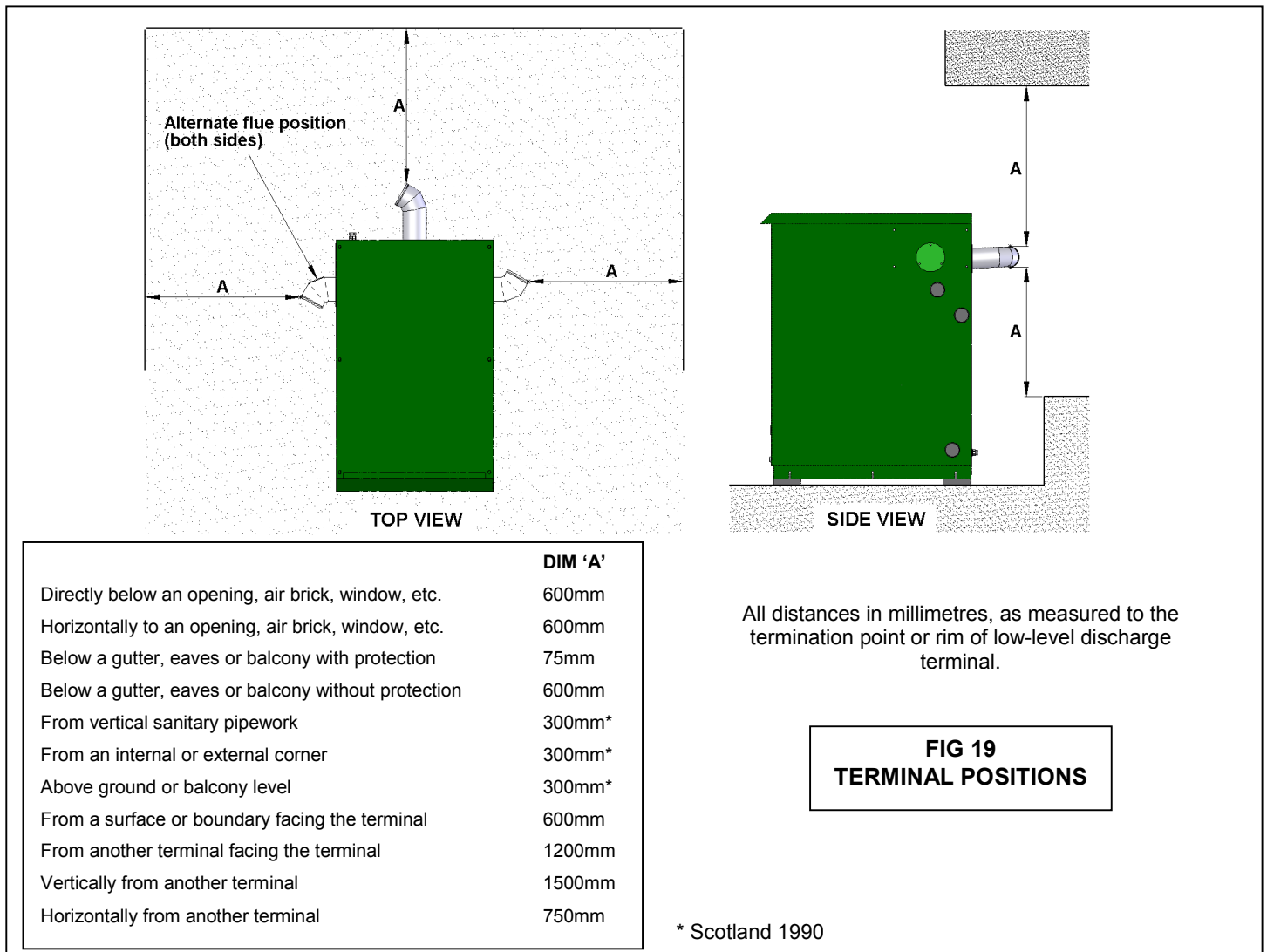
7. FLUE DISCHARGE

To evacuate the products of combustion safely and thoroughly, the boiler has a highly efficient integral flue system and there is no need to fit the boiler to a separate flue. See **page 22** for flue fitting instructions.

INSTALLATION NOTES

- a) Trianco condensing boilers operate at high efficiencies with low flue gas temperatures. The flue system used on this boiler is suitable for low flue gas temperatures and condensation.
- b) Ensure that all the joints on the flue system are adequately sealed, and that no condensation can escape. It may be necessary to apply a thin bead of silicone sealant or other lubricating substance around the flue joints and 'o'-ring seals before assembling the flue.
- c) Only 28 sec. Kerosene class C2 to BS 2869 is permitted for boilers using low-level flue discharge.
- d) Positioning of flues under balconies and carports is to be avoided
- e) Modern low-level flue boilers are designed to operate at low noise levels. However, when positioning your boiler, it is not recommended to have the terminal facing a neighbour's property or patio, etc.
- f) The boiler should also be positioned to avoid the products of combustion entering the building. A distance of at least 600mm must be allowed between the terminal and any window, door or other opening into the building (see **fig. 19**) for recommended terminal positions.
- g) At certain times during operation, a plume of condensation will be produced from the terminal. When positioning the boiler, this should be taken into consideration to ensure that it does not cause a nuisance to neighbouring properties.
- h) Keep the terminal clear of infra-red sensing devices, such as those used to control security lighting.

The terminal must be protected by the guard supplied.



FLUE ASSEMBLY

The flue terminal pack (supplied) should contain the following items. Check all components are present before fitting:

- 1 x Flue Terminal Assembly
- 1 x Elbow & Sealing Plate Assembly
- 1 x 'O'-Ring Seal
- 1 x Tube of Silicone Sealant

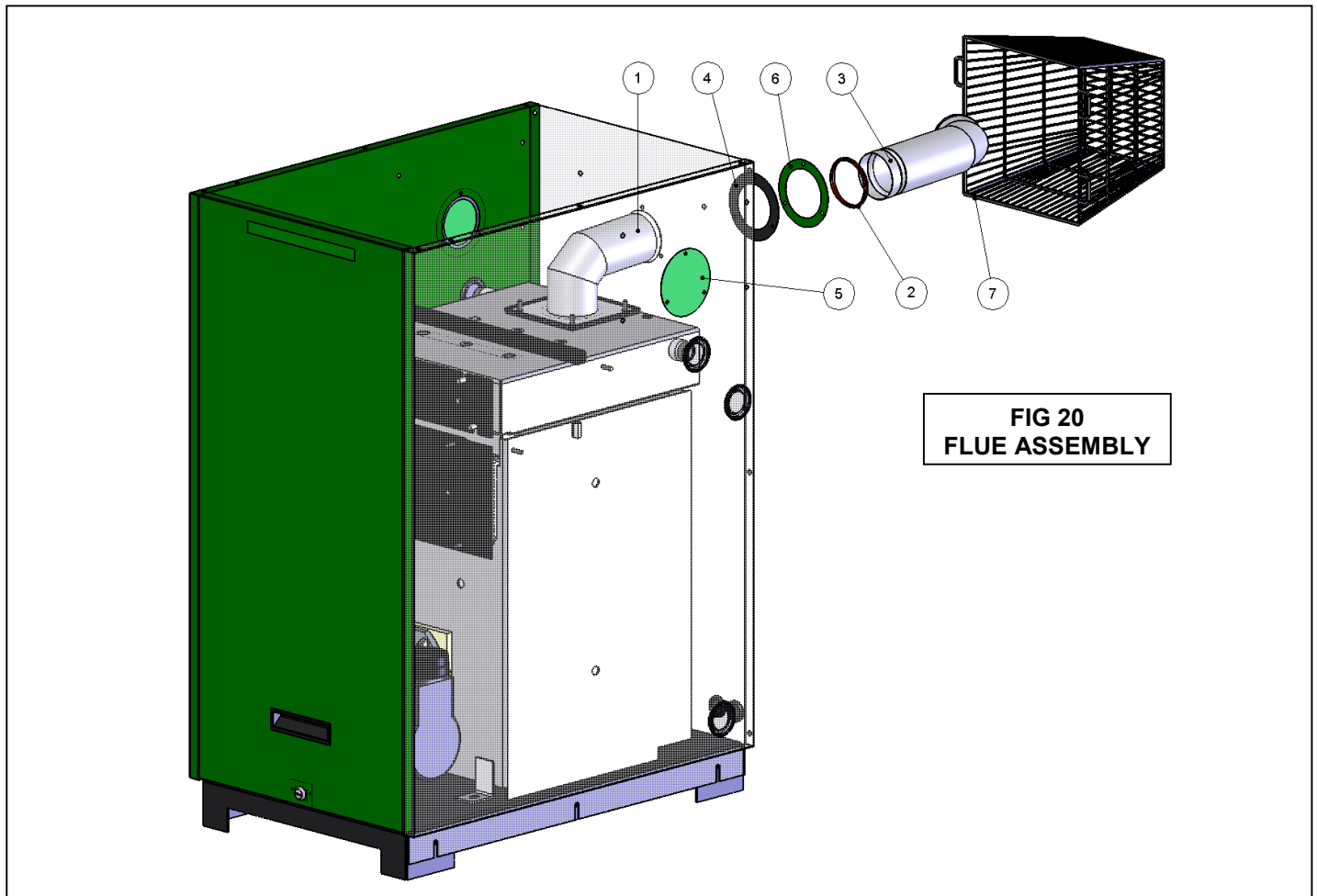
The flue may exit from the rear, right or left side of the boiler. The termination point is angled, and can be rotated to enable the combustion fumes to be directed away from areas where they could cause a nuisance.

FITTING INSTRUCTIONS

- 1) Decide which direction the flue is to be pointed. Remove the top panel and using the nuts provided, fit the elbow/sealing plate assembly (**item 1**) onto the rubber gasket on top of the boiler via the 4 x studs, ensuring that the open end is pointed in the direction required.
- 2) Fit the 'o'-ring seal (**item 2**) into the groove on the flue terminal (**item 3**), ensuring that the flat, ribbed face is to the inside.

- 3) Smear a thin bead of silicone sealant (supplied) around the 'o'-ring seal and slide the terminal into the elbow from the outside of the boiler casing, being careful to ensure that the 'o'-ring remains in place. The rotation of the terminal should be decided before applying the silicone sealant.
- 4) Place the terminal in the desired position and angle of rotation. Ensure that a minimum distance of 50mm is kept from the termination point to the face of the boiler casing.
- 5) Slide one of the sealing rubbers (**item 4**) over the terminal to meet the boiler casing, ensuring the holes line up with those in the casing.
- 6) Fit the collar plate (**item 6**) over the flue terminal and secure to the boiler casing with the screws provided, clamping the sealing rubber firmly in place.
- 7) Blank off the 2 x unused flue openings on the boiler casings with the remaining sealing rubbers and blanking plates (**item 5**).

Replace the top casing and fit the terminal guard (**item 7**) over the flue, securing in position with the screws provided.



8. COMMISSIONING

The burner **must** be commissioned by a qualified OFTEC-registered technician, and a CD/10 form completed.

It is the responsibility of the installer to ensure the boiler is correctly commissioned. Failure to do so will make the boiler's guarantee and any extended warranty null and void.

Although all burners are factory-tested before despatch, due to individual site conditions they will usually require further adjustment after installation to achieve the readings specified in the burner details leaflet.

PROCEDURE

1. Switch off electrical and oil supply and ensure boiler is full of water. Ensure all isolation valves are open.
2. Check that all baffles are correctly positioned (**fig 21**).
3. Disconnect oil line(s) from burner. Run off a small quantity of oil. Check for a clean, air-free supply and reconnect.
4. Check system controls are in the ON position. Ensure boiler stat and any room stats are calling for heat. Switch on the electrical supply; the burner should now start.

Note: the burner may lock-out upon first firing due to air in the pump. Should this occur, wait for one minute before pressing the burner reset button. Should lock-outs persist, the air can be driven out of the oil supply via the pressure gauge connection on the pump.

5. Start and stop the burner several times until the burner cuts out sharply; this will indicate that any remaining air has been expelled from the oil supply.
6. Allow the burner to run for fifteen minutes before using a flue gas analyser to take a CO₂ reading from either the sampling point on the baffle access cover, or the terminal. Compare with the readings specified in the burner details leaflet and adjust the air setting as necessary. Ensure the flue gases are smoke-free.
7. Switch off heating and turn boiler stat to full. When up to temperature, the boiler will switch off. Run the hot water tap and set the water flow rate to 11.5 litres p/m (adjust the valve on the DHW feed pipe). When set, turn off the tap and switch on the heating. Check to see if the radiators are getting warm.
8. If the system is not to be put into immediate operation, isolate the electrical and oil supplies. If there is a possibility of the water in the system freezing, this should be drained.

HANDING OVER

After satisfactorily completing the boiler installation and commissioning, a thorough check of the system should be made, and the use of any boiler and system controls demonstrated to the end-user. All instructions should be left on-site and advice given as to the need for an annual service.

9. SERVICING

IMPORTANT: ISOLATE THE ELECTRICAL SUPPLY TO THE BOILER BEFORE SERVICING.

Before carrying out the service, please read the health and safety information given at the start of this manual.

To maintain the boiler's high thermal efficiency and ensure reliable operation, the appliance should be serviced annually by a qualified OFTEC-registered technician. Electrical work should be carried out by a qualified engineer. A CD/11 servicing and commissioning form should be completed and left with the appliance on-site.

If the boiler is in use all year round, the best time for the service is before the start of the heating season. Where the boiler is shut down for the summer months, the service should be carried out as soon as is possible after the end of the heating season.

OIL TANK

Open the tank drain-off and allow any accumulated water and sludge to drain away.

LINE FILTERS

Turn off the oil supply and remove the filter bowl. Wash the filter clean with kerosene.

The following checks should also be carried out:

1. Ensure the flue terminal is not obstructed or blocked.
2. Ensure all external controls are working correctly.
3. Ensure ventilation opening is not obstructed.
4. Inspect all boiler connections for soundness.
5. Inspect the flexible oil line(s), and replace if necessary.

CONDENSATE PIPEWORK & TRAP

The condensate pipework and trap should be inspected as part of the annual service schedule.

Ensure there are no blockages within the condensate pipework and the 'U' trap.

When complete, recheck the integrity of the pipework joints by pouring a small amount of water into the condensate unit and looking for leaks. Some water should be retained within the 'U' trap.

Failure to ensure the retention of water will result in the incorrect operation of the boiler and potentially damage the condensate pipework.

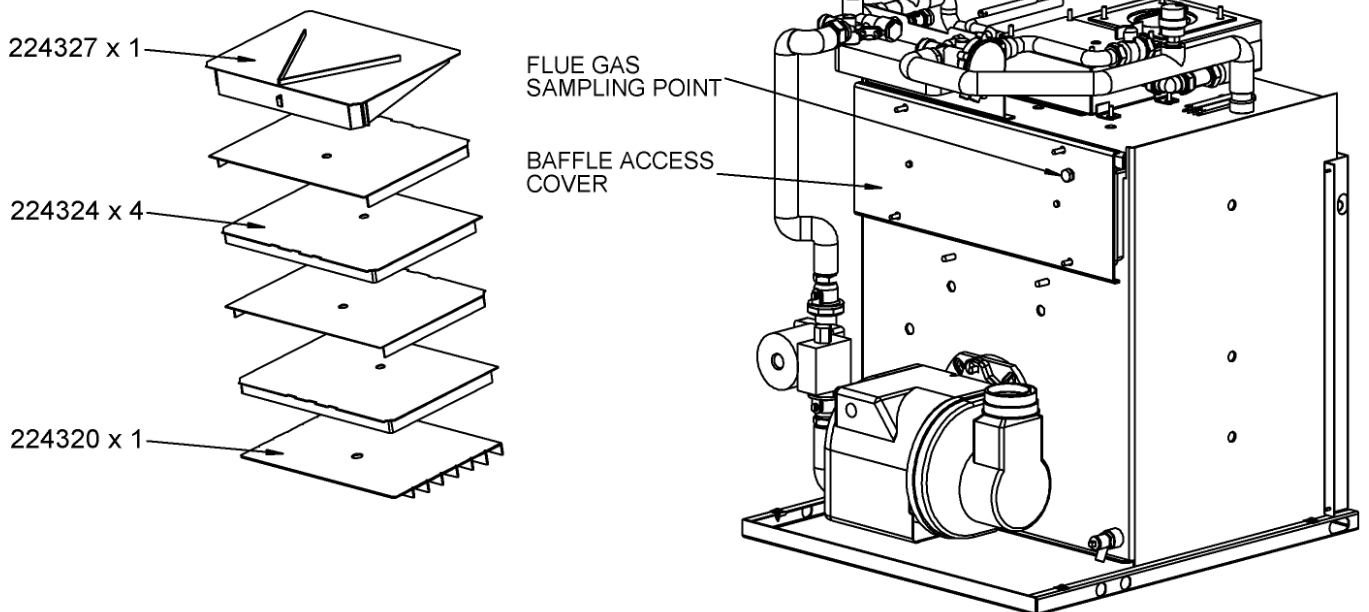
CASING

Check external surfaces for corrosion. If corroding, clean down and apply a suitable protective material.

SERVICE PROCEDURE

1. Switch off the electrical supply to the boiler. **Note: the appliance must be properly isolated. Switching the thermostat to the OFF position may still cause the burner to fire.**
2. Switch off the oil supply to the burner.
3. Remove the flexible air supply hose from the burner
4. Remove the burner. Ensure that if the oil supply line has to be disconnected there is no spillage of oil.
5. Remove the baffle access cover from the front of the boiler and lift out the baffles.
6. Brush all deposits from the baffles and clean the internal surfaces of the boiler.
7. Remove deposits from the floor of the combustion chamber with a vacuum cleaner.
8. Check the integrity of the access cover seal. Replace as necessary.
9. Remove the access cover from the top of the condensate unit and clean all accumulated deposits from within.
10. Check the integrity of the flue and burner gaskets. Replace as necessary.
11. Clean any deposits from the blast tube and replace the nozzle.
12. Using the diagram below, replace the flue baffles in the correct arrangement. **Failure to ensure the correct placement of baffles will result in incorrect combustion, reducing the efficiency of the boiler and invalidating the appliance warranty.**
13. Refit the baffle access and condensate unit covers, ensuring gas-tight seals are made using the wing-nuts and washers provided.
14. Refit the burner and secure the air supply hose back in position. If removed, refit the oil supply line.
15. Switch on the electrical and oil supplies to the appliance. Ensure that the external controls are calling for heat. The boiler should now fire.
16. Check the combustion settings given against those in the burner details leaflet and make any adjustments where necessary.
17. Check all water connections and inspect for leaks.

**FIG 21
BAFFLE CONFIGURATION**



IMPORTANT:

When refitting baffles, failure to ensure the correct placement will result in incorrect combustion, reducing the efficiency of the boiler and invalidating the appliance warranty.

10. SPARES

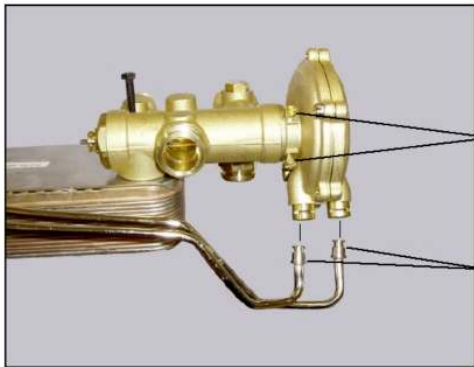
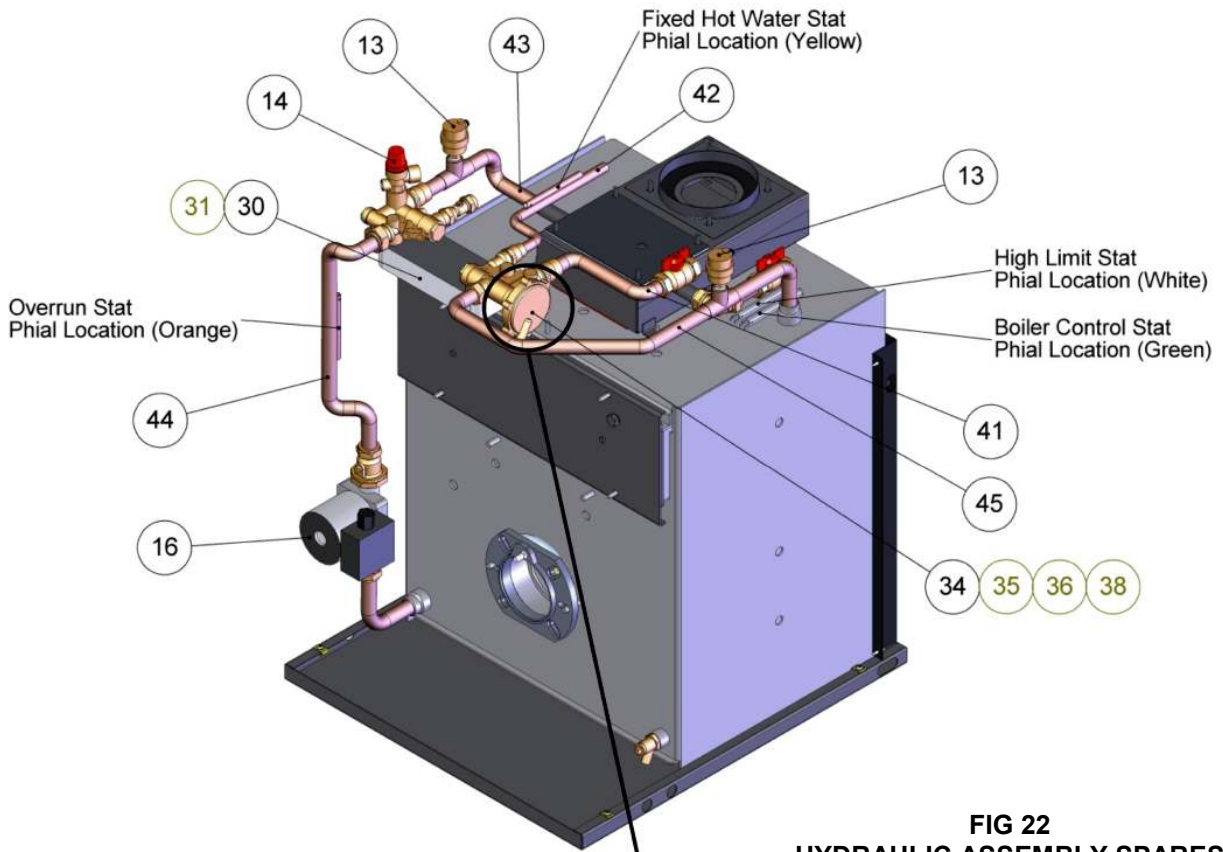
Item	Description	Part Number	Qty
1	Boiler Body	224341	1
2	Left Panel Assembly	224300	1
3	Right Panel Assembly	224303	1
4	Top Panel Assembly	224309	1
5	Front Door Assembly	224306	1
6	Back Panel	224312	1
7	Control Panel	224355	1
8	Control Box ¹	222967	1
9	Flue Cover	224230	1
10	Expansion Vessel	207291	1
11	Expansion Vessel Feed Hose	207292	1
12	Expansion Vessel Bracket	223164	1
13	Automatic Air Vent	207296	2
14	Pressure Relief Valve	221920	1
15	Pressure Gauge	221921	1
16	Circulating Pump	222972	1
17	Burner ²	224348	1
18	Burner Mounting Flange	223151	1
19	Burner Gasket	223108	1
20	Burner Cover Plate	223447	1
21	Burner Cover	223444	1
22	Air Intake Duct	209491	1
23	Condensing Unit	224270	1
24	Condensing Unit Access Cover	223898	1
25	Condensing Unit Access Cover Gasket	223899	1
26	Condensate Trap	223939	1
27	Top Baffle ³	224327	1
28	Middle Baffle ³	224324	4
29	Bottom Baffle ³	224320	1
30	Plate Heat Exchanger	222805	1
31	Plate Heat Exchanger Fixing Screws	222784	2
32	Microswitch	222785	1
33	Hydraulic Repair Kit ⁴	222786	1
34	Hydraulic Valve (full assembly)	222960	1
35	Valve Body	222782	1
36	Diaphragm Housing Unit	222794	1
37	Sensing Pipe 'o'-ring	222795	4
38	Hydraulic Valve	222787	1
39	Plate heat exchanger / valve 'o'-ring (large)	222788	2
40	Plate heat exchanger / valve 'o'-ring (small)	222789	2
41	Central Heating Flow Pipework	224219	1
42	Domestic Hot Water Flow Pipework	224218	1
43	Central Heating Return Pipework	224215	1
44	Return Pipework	224217	1
45	Flow Pipework	224214	1
46	Terminal Guard	223479	1
47	Flue Seal Clamping Collar	224844	1
48	Flue Sealing Rubber	223853	3
49	Blanking Plate	223842	2
50	Casing Grommet	210787	10
51	Flue Terminal	224380	1
52	Condensing Unit Gasket	223787	1
53	Drain Cock	99592	1
54	Condensing Unit Connection Spigot	223969	1

¹ See page 38 for control box spares.

² See burner details leaflet for burner spares.

³ See fig 21 (page 24) for baffle configurations.

⁴ Repair Kit contains Diaphragm and Seals for Hydraulic Valve (see page 26).

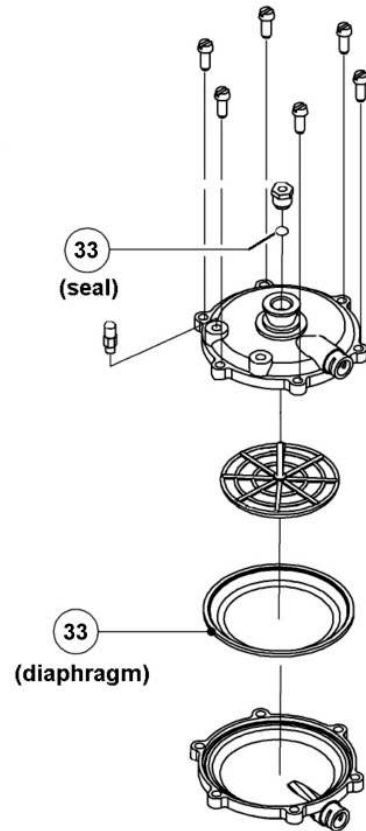


1) Undo Fixing Screws

2) Unclip Pipes



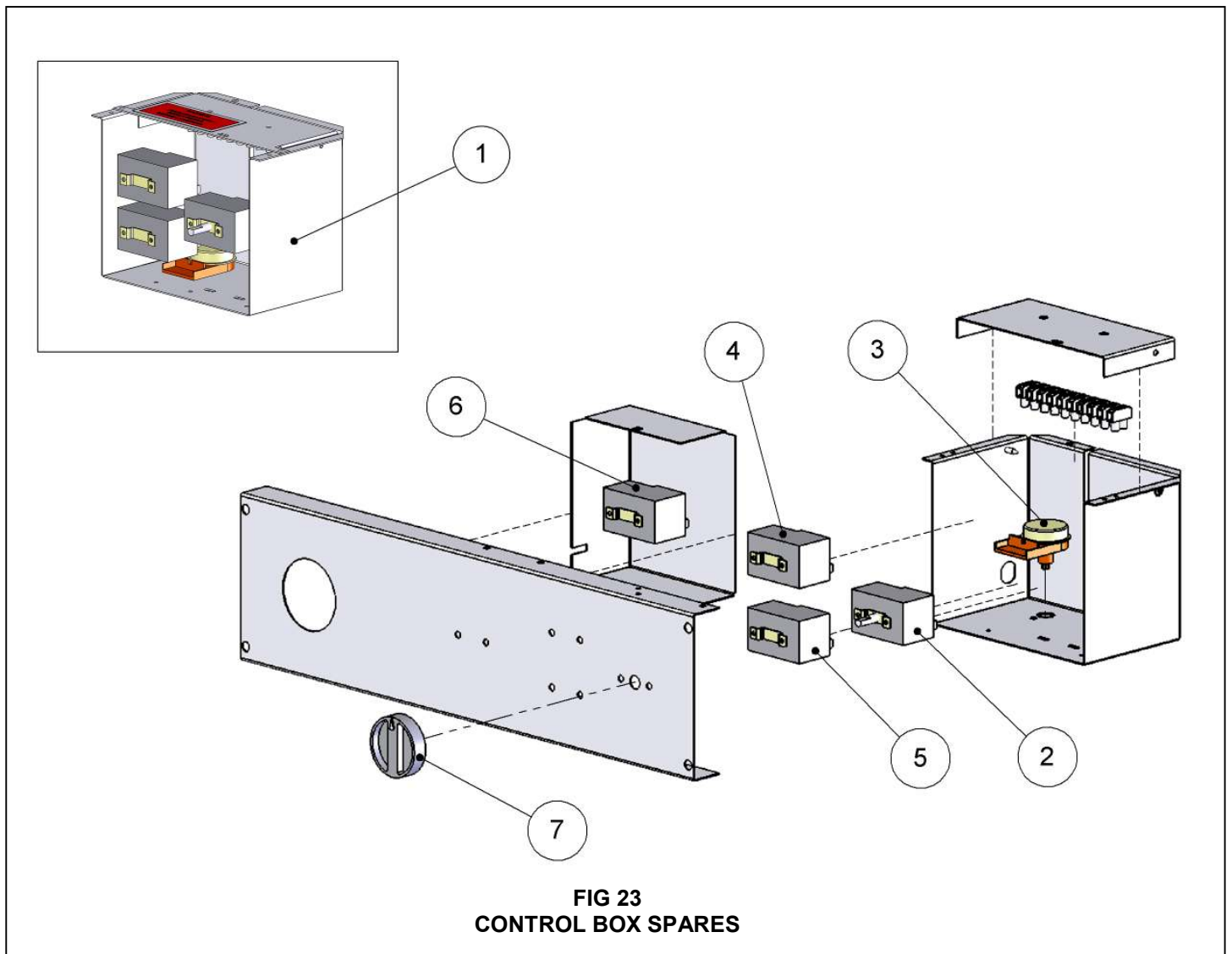
3) Release Diaphragm
Housing Unit



CONTROL BOX SPARES

Item	Description	Part Number	Qty
1	Control Box (complete)	222967	1
2	Boiler Thermostat (Green Capillary Phial)	221572	1
3	Limit Thermostat (White Capillary Phial)	206892	1
4	Fixed Hot Water Thermostat (Yellow Capillary Phial)	209850	1
5	Overrun Thermostat (Orange Capillary Phial)	500039	1
6	Frost Thermostat	209735	1
7	Control Knob	206897	1
8	Wiring Harness ¹	222811	1

¹ Not shown.



11. FAULT-FINDING

BURNER FAULT-FINDING

ELECTRICAL SAFETY - before making any electrical checks, switch off the mains supply to the boiler

FAULT	POSSIBLE CAUSE	ACTION
BURNER WILL NOT START	Control box locked out	Press orange reset button on front of burner. NB: ONLY TRY TWICE
	High limit stat tripped	Press red reset button (under control panel) and check function of boiler stat
	System controls satisfied	Ensure all controls are calling for heat
	Fuse blown	Fit new fuse (5A). If problem persists, check for short circuit in wiring
	Motor or pump seized	Check for rotation, replace as necessary
BURNER STARTS BUT FLAME NOT ESTABLISHED	No oil supply	Check oil level in tank, check oil supply for adequate flow
	Photocell not seeing flame	Clean photocell, ensure it is fully inserted
	Air trapped in pump	Bleed excess air via tapping on oil pump
	Solenoid valve faulty	Check coil for continuity, replace as necessary
	Nozzle blocked	Replace nozzle with one of same specification (see burner leaflet)
	Electrodes incorrectly set	Reset gap and position to settings shown in burner leaflet
	Electrode insulator cracked	Replace as necessary
	Ignition transformer or leads faulty	Check for spark, check condition of HT leads, replace as necessary
	Low oil pressure	Check pump pressure and adjust to settings shown in burner leaflet
FLAME ESTABLISHED BUT BURNER LOCKS OUT AFTER A FEW SECONDS	Oil contaminated with water	Run off oil at burner until free of water and drain condensation from tank
	Oil filter partially blocked	Wash filter clean with kerosene
	Photocell faulty	Clean photocell, ensure it is fully inserted, check for damage. Replace as necessary
	Low oil pressure	Check pump pressure and adjust to settings shown in burner leaflet

BURNER FAULT-FINDING (cont.)

ELECTRICAL SAFETY - before making any electrical checks, switch off the mains supply to the boiler

FAULT	POSSIBLE CAUSE	ACTION
MORNING START LOCKOUT	Faulty non-return valve or air leak in two-pipe system	Replace non-return valve, cure leak
	Low voltage to appliance	Check with local electricity board
	Combustion settings incorrect	Check combustion under normal running conditions, check against settings shown in burner leaflet
	Oil level in tank falling below burner	Raise tank or fir two-pipe system
DELAYED IGNITION (BURNER PULSATES ON STARTUP)	Nozzle partially blocked	Replace nozzle with one of same specification (see burner leaflet)
	Low oil pressure	Check pump pressure and adjust to settings shown in burner leaflet
	Flue blocked or damaged	Check flue and rectify/replace as necessary
	Fan slipping on shaft	Check fan and retighten/replace as necessary
	Pump coupling loose or worn	Check fan and rectify/replace as necessary
BURNER STARTS VIOLENTLY	Delayed ignition	Reset electrode gap and position to settings shown in burner leaflet
		Check electrodes for damage, replace as necessary
		Check condition of HT leads, replace as necessary
BURNER REPEATEDLY ATTEMPTS TO FIRE (balanced flue only)	Exhaust gas in combustion air	Remove air hose from boiler end of flue, leaving burner end in place. If burner starts normally, check flue for breakdown of seals and repair/replace as necessary
		If indeterminate, leaving hose attached, pierce a small hole in air hose and use flue gas analyser to check for carbon dioxide. If more than trace elements present, check flue for breakdown of seals and repair/replace as necessary
COMBUSTION FUMES SMELL	Baffle access cover not secure	Tighten wing nuts, securing door in position
	Baffle access cover seal damaged	Replace seal as necessary
	Burner incorrectly fitted, or fixing gasket damaged	Check burner fixing gasket, replace as necessary. Tighten burner mounting nuts
	Flue gasket damaged	Check gasket, replace as necessary. Tighten flue mounting nuts



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



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