

This information refers to the following products

Rayburn 460K

Rayburn 480K

Rayburn 499K

**Mk 2 Open flue models
(1996 - 1997)**

Please note that some original pages may not appear in original numerical order, but have been rearranged for clarity or deleted if not appropriate.

WARNING

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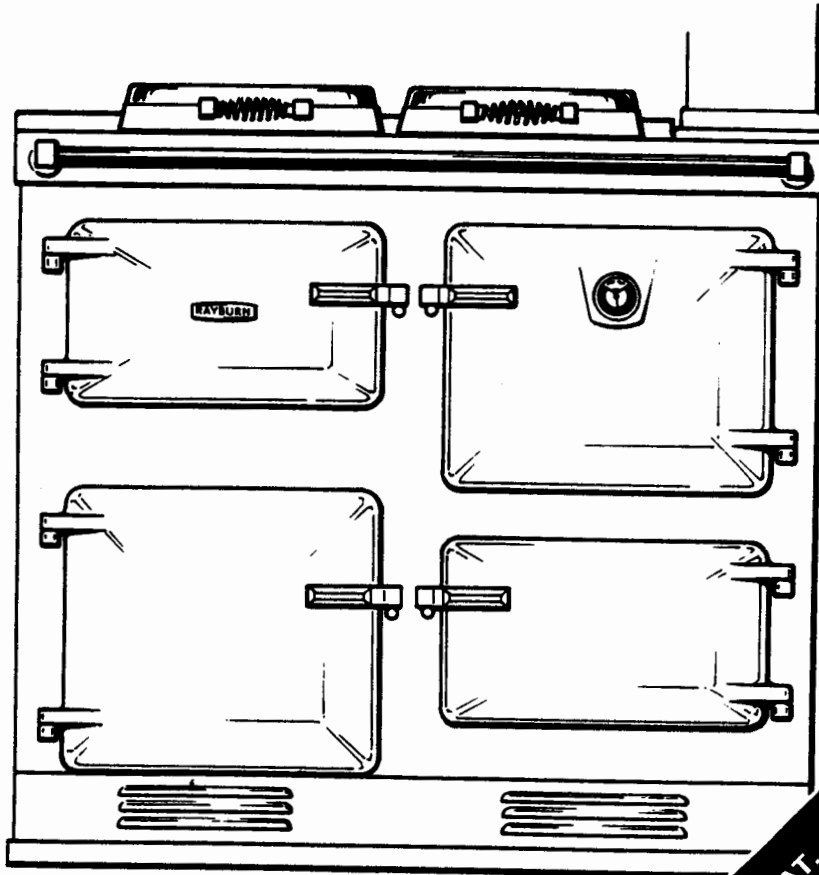


Installation Instructions

Home on the Range.

460/480/499K

For use in GB and IE



DESN 510517

PAT. APP 2 280 747
AND OTHER GB & IE
PATENTS PENDING

PLEASE READ THESE INSTRUCTIONS BEFORE INSTALLING THIS APPLIANCE

Consumer Protection

As manufacturers and suppliers of cooking and heating products. We take every care to ensure, as far as is reasonably practical, that these products are so designed and constructed as to meet the general safety requirement when properly used and installed. To this end, our products are thoroughly tested and examined before despatch.

IMPORTANT NOTICE: Any alteration that is not approved by Aga-Rayburn could invalidate the approval of the appliance, operation of the warranty and could affect your statutory rights.

Health & Safety

This appliance may contain some of the materials that are indicated. It is the Users/Installers responsibility to ensure that the necessary personal protective clothing is worn when handling where applicable, the pertinent parts that contain any of the listed materials that could be interpreted as being injurious to health and safety, see below for information.

Firebricks, Fuel beds, Artificial Fuels

When handling use disposable gloves.

Fire cement

When handling use disposable gloves.

Glues and Sealants

Exercise caution - if these are still in liquid form use face mask and disposable gloves.

Glass Yarn, Mineral Wool, Insulation Pads, Ceramic Fibre

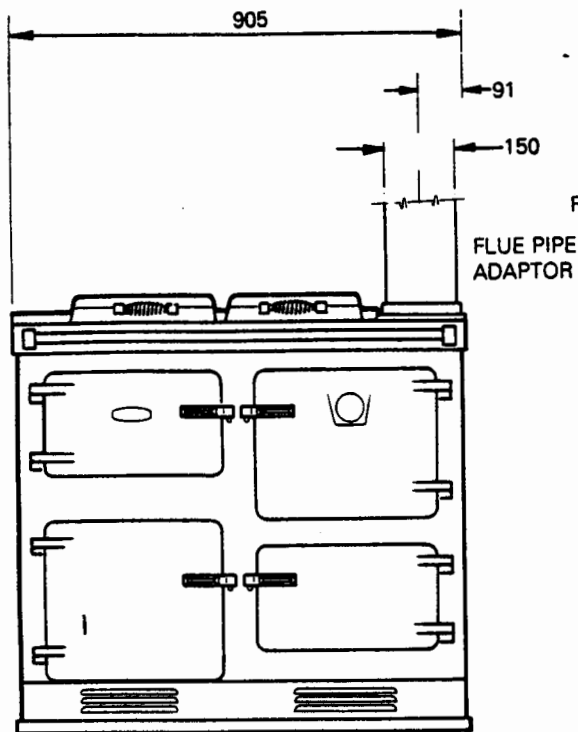
May be harmful if inhaled. May be irritating to skin, eyes, nose and throat. When handling avoid contact with skin or eyes. Use disposable gloves, face-masks and eye protection. After handling wash hands and other exposed parts. When disposing of the product, reduce dust with water spray, ensure that parts are securely wrapped.

Kerosene and Gas Oil (mineral oils)

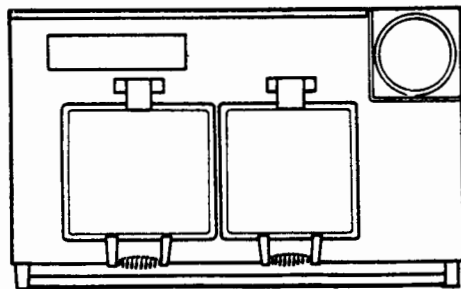
1. The effect of mineral oils on the skin vary according to the duration of exposure.
2. The lighter fractions also remove the protective grease normally present on the surface of the skin. This renders the skin dry, liable to crack and more prone to damage caused by cuts and abrasions.
3. 'Oil acne' is recognised by the presence of skin rashes. The arms are most often affected, but may occur where there is contact with oil or oily clothing.
 - Seek medical attention for any rash.
 - Avoid skin contact with mineral oil or clothing contaminated with mineral oil.
4. Inhalation of mineral oil vapours must be avoided. Never fire the burner in the open as unburnt oil vapours are likely to occur.
5. Use a suitable barrier cream which will give protection against mineral oil, lanolin based hand creams are usually very effective.
6. Never syphon mineral oils by use of the mouth. If accidentally swallowed, call a doctor, do not induce vomiting.

NOTE: SMOKE/SMELL EMITTED DURING INITIAL USAGE

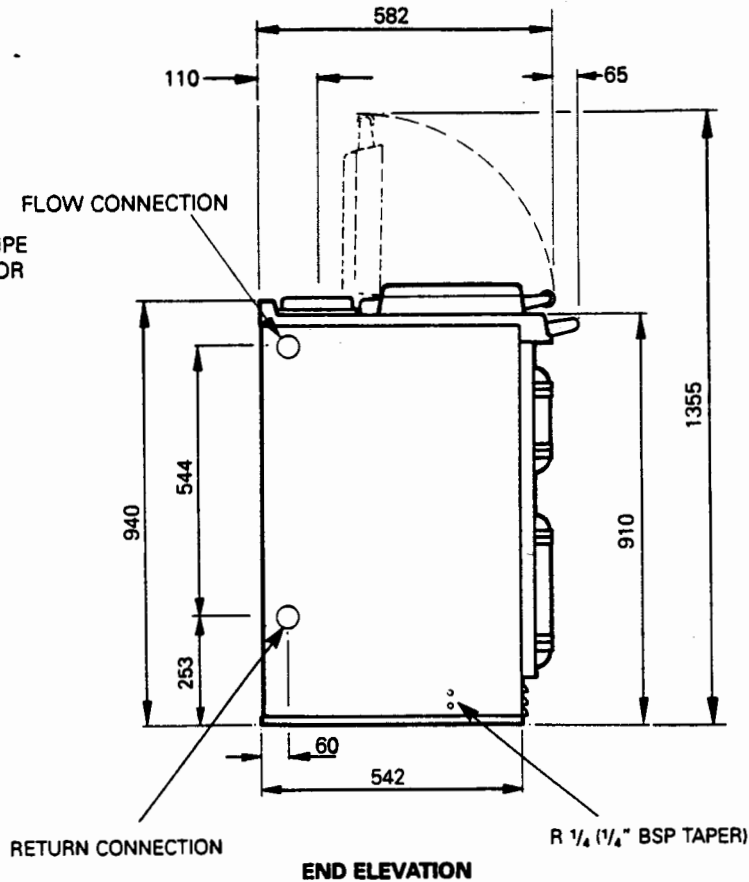
Some parts of the cooker have been coated with a light covering of protective oil. During initial operation of the cooker, this may cause smoke/smell to be emitted and is normal and not a fault with the appliance, it is therefore advisable to open doors and windows to allow for ventilation. Lift the lids to prevent staining the linings.



FRONT ELEVATION



PLAN



END ELEVATION

DIMENSIONS IN MM

PLEASE NOTE: IT IS ADVISABLE TO CHECK THE ACTUAL SIZE/WIDTH OF YOUR APPLIANCE BEFORE FINALLY FIXING ANY KITCHEN UNITS SINCE ENAMELLED CAST IRON CAN VARY IN SIZE.

DESN 510518

GENERAL SPECIFICATIONS

Boiler Water Connections

Flow (one) Rp 1 (1in.BSP Int)
Return (one) Rp 1 (1in.BSP Int)

Both connections are located towards the rear edge of the appliance L.H. side panel.

Oil Inlet R1/4 (1/4" BSP Taper Ext)

Electrical Supply 230V ~ 50Hz 3 amp Fused

Flue Outlet 150mm

CO₂% - BOILER 11.0/11.5
- COOKER 11.0

Max. Water Temp. 82°C

Water Capacity of Boiler 25.5 litres

Weight of Appliance 420kg

Max. Operating Pressure of Boiler 2 bar (20m)

Fuel - Kerosene SG

Technical Data

460K	BOILER BURNER	COOKER BURNER
BURNER NOZZLE (US g/h)	0.55 @ 80°S	0.40 @ 80° SF
OIL PRESSURE Bar (psi)	9.0 (130)	9.0 (130)
OIL BURNING RATE cc/m	38	28.5
HEAT INPUT kW	21.7	17.6
BOILER OUTPUT kW	17.5	0.8 MAX
TOTAL OUTPUT kW	18.2	3.1

480K	BOILER BURNER	COOKER BURNER
BURNER NOZZLE (US g/h)	0.65 @ 80°S	0.40 @ 80°SF
OIL PRESSURE Bar (psi)	9.0 (130)	9.0 (130)
OIL BURNING RATE cc/m	47.5	28.5
HEAT INPUT kW	29.3	17.6
BOILER OUTPUT kW	23.5	0.8 MAX
TOTAL OUTPUT kW	24.7	3.1

499K	BOILER BURNER	COOKER BURNER
BURNER NOZZLE (US g/h)	0.85 @ 60° H	0.40 @ 80° SF
OIL PRESSURE Bar (psi)	9.0 (130)	9.0 (130)
OIL BURNING RATE cc/m	58	28.5
HEAT INPUT kW	35.2	17.6
BOILER OUTPUT kW	29.3	0.8 (MAX)
TOTAL OUTPUT kW	29.5	3.1

INTRODUCTION

The Rayburn is a floor standing combined cooker and central heating boiler. It gives independent operation for space heating, domestic hot water and cooking.

The appliance is fired by two independent pressure jet oil burners. Either burner can be independently operated under the programmer control if required.

The boiler is designed for use on a fully pumped low pressure hot water circulation system, with a pumped over run facility or alternatively on a sealed system limited to 2 bar.

IMPORTANT

- This appliance must only be used with Kerosene SG.**
- An Indirect Cylinder to BS1566: Part 1 must be fitted.**
- If the heating circuits are controlled in such a way that both heating and cylinder circuits can be closed off at the same time then a PERMANENTLY OPEN BYPASS LOOP should be fitted.**
- A Fire Valve MUST be fitted in the oil supply line.**
- The supplied in line filter MUST be fitted.**

REGULATIONS

The appliance must be commissioned by a competent engineer such as an OFTEC approved or commissioning engineer as shown on the Rayburn list.

The installation of the appliance must be in accordance with the relevant requirements of the current Building Regulations BS7671: 1992 (formerly IEE Wiring Regulations), and the bylaws of the local Water Undertaking. It should also be in accordance with the relevant current British Standard Codes of Practice.

BS5410 Installation of oil fired appliances for space heating and hot water supply purposes. Part 1 Boilers of rated output not exceeding 45kW.

BS5449 Central Heating for domestic purposes, Part 1. Forced circulation hot water system.

Building Regulations England & Wales. Part J. Heat producing appliances.

Building Standards Scotland - Technical Standard Part F. Heat producing appliances and storage of liquid and gaseous fuel.

Building Regulations Northern Ireland - Technical Booklet to Part L. Heat producing appliances.

The Control of Pollution (Oil) Regulations.

LOCATION

Appliance Hearth. The surface temperature of the floor below the appliance does not exceed 100°C. The constructional hearth described in Section J does not apply. However, this appliance must be installed on a solid floor of incombustible material which is capable of supporting the total weight.

The location chosen for the appliance must permit the installation and the provision of a satisfactory flue and an adequate air supply. The location must also provide adequate space for servicing and for air circulation around the appliance. See "Installation of the Appliance".

The space in which the appliance is to be fitted must have the following minimum dimensions.

Between wall and LH side of appliance - 3mm
Between wall and RH side of appliance - 10mm
Above the raised insulating cover handle - 60mm

In addition, adequate clearance must be available at the front of the appliance to enable it to be operated and serviced. Flue pipes and fittings must not be closer than 25mm to combustible materials and where passing through a combustible partition such as ceiling or roof, must be enclosed in a non-combustible sleeve providing an air space of at least 25mm.

Space around flue pipes passing through walls or floors should be sealed against the passage of smoke and flame.

Where the cooker is to stand in a recess or against a wall which is to be tiled, **in no circumstances should the tiles overlap the cooker top plate.**

Site requirements

OIL PIPE LINE

SEE FIG. 1

The oil supply connection between the storage tank and the oil pipe should be run in copper or steel pipe with a minimum diameter of 10mm. Galvanised pipes and fittings should not be used. Annealed copper pipe is preferred with flare type manipulative fittings. Capillary fittings with soft solder should not be used. Steel pipes should be joined using taper threads.

All pipe work and fittings must be completely air tight. Only oil resistant compounds and PTFE tape should be used when making joints. Pipe work must be protected against damage whether fitted above or below ground.

The size and arrangement of pipe work will depend upon the distance and height of the oil storage tank in relation to the oil pump inlet.

The oil line from the storage tank to the appliance must be fitted with a remote acting fire valve operating at 150°F, fitted with an appropriate length of capillary to enable the valve body to be located externally at the point where the oil line enters the building. The sensing pilot of the fire valve MUST be fitted to the clips located behind the terminal strip.

The 5-10 micron oil filter supplied with the appliance must be fitted on the oil pipe and stop valve must be fitted as close to the cooker as possible in an accessible position.

A flexible pipe connection, approximately 500mm long, is supplied to fit between the oil supply pipe and the oil pump for ease of burner removal.

OIL STORAGE

The minimum recommended oil tank size is 1400 litres and the code of practice governing its installation are covered by BS 5410: Part 1. Mild Steel tanks should be to BS 799: Part 5 and plastic tanks to OFTEC Standard OFS T100.

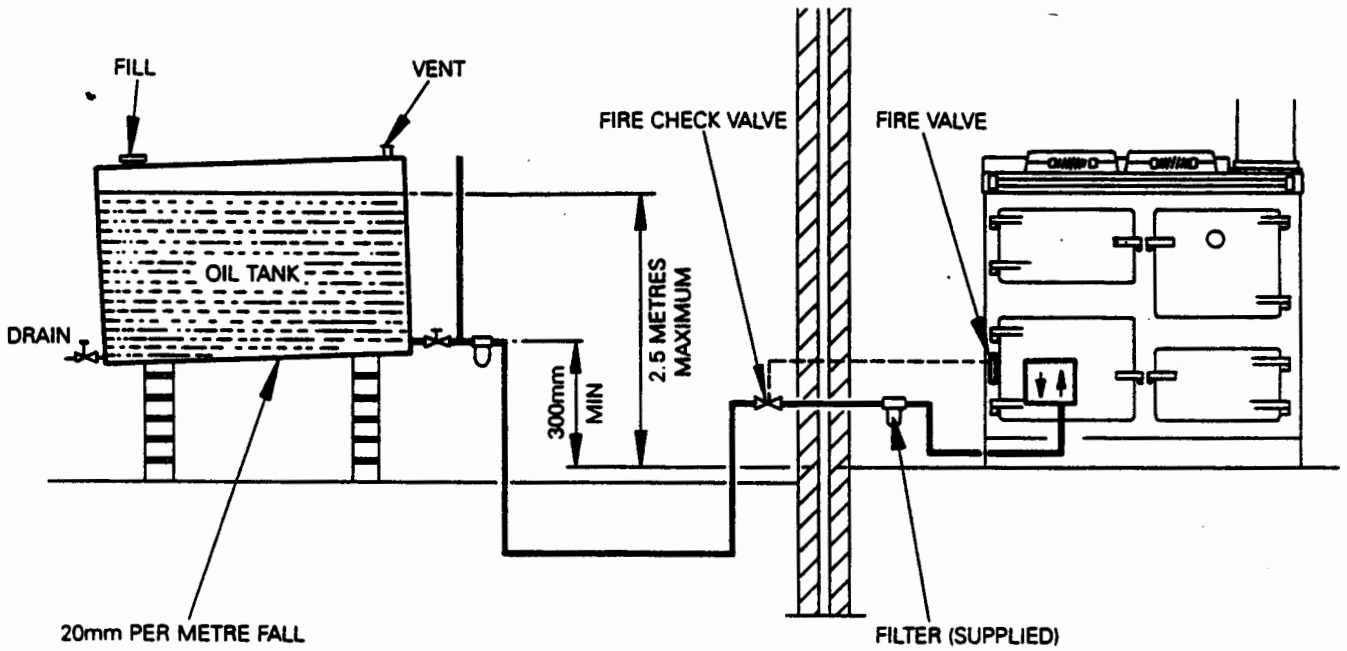


FIG. 1

Site requirements

FLUE SYSTEM

SEE FIG. 2

The flue system must be installed with the regulations in force.

Information

Maximum flue gas temperature 260°C

(Both burners on)

Minimum flue gas temperature 125°C

(Boiler Burner on only)

The appliance requires a minimum chimney draught of 1.0mm (0.04" WG) with both burners on.

Maximum chimney draught 6.0mm WG (0.23" WG).

Draughts in excess of this figure will require a draught stabilizer, fitted either in the chimney or flue pipe and in the same compartment.

Flue gas mass flow (Both burners on) 480K - 111.5 kg^h⁻¹

460K - 95.5 kg^h⁻¹

499K - 185 kg^h⁻¹

Detailed recommendations for flueing in England & Wales are given in Part J of the Building Regulations. For Scotland in Technical Standard F to the Building Standards and in Northern Ireland in Technical Booklet L to the Building Regulations. Guidance is also given in BS 5410: Part 1.

Due to the range in flue gas temperatures a brick chimney should be fitted with a suitable multifuel stainless steel flexible liner. Where it is necessary to avoid condensation, such as an exposed end gable insulation; such as vermiculite, should be back filled between the flexible liner and the full length of the brickwork

NOTE: TO ACHIEVE THE OPTIMUM OPERATION SOUND LEVELS FROM THE APPLIANCE IT IS RECOMMENDED THAT CAST IRON FLUE PIPE IS USED WHERE POSSIBLE.

Chimneys

The chimney may also be constructed from 150mm minimum diameter, moisture and acid resistant lined BS 1181 with rebated or socketed joints upper most

Chimney Termination

All chimneys should terminate at least 600mm above roof level in accordance with current Building Regulations and statutory requirements as outlined in BS 5410: Part 1 and BS 6461: Part 1 and BS 7566 Parts 1 to 4.

Chimney Cleaning

Ensure there are accessible airtight flue cleaning doors in order to obtain cleaning access to the complete chimney. Providing the appliance is operating correctly, an annual chimney flue cleaning will suffice, but if in doubt arrange for a half yearly clean, preferably at the beginning/end of the heating season.

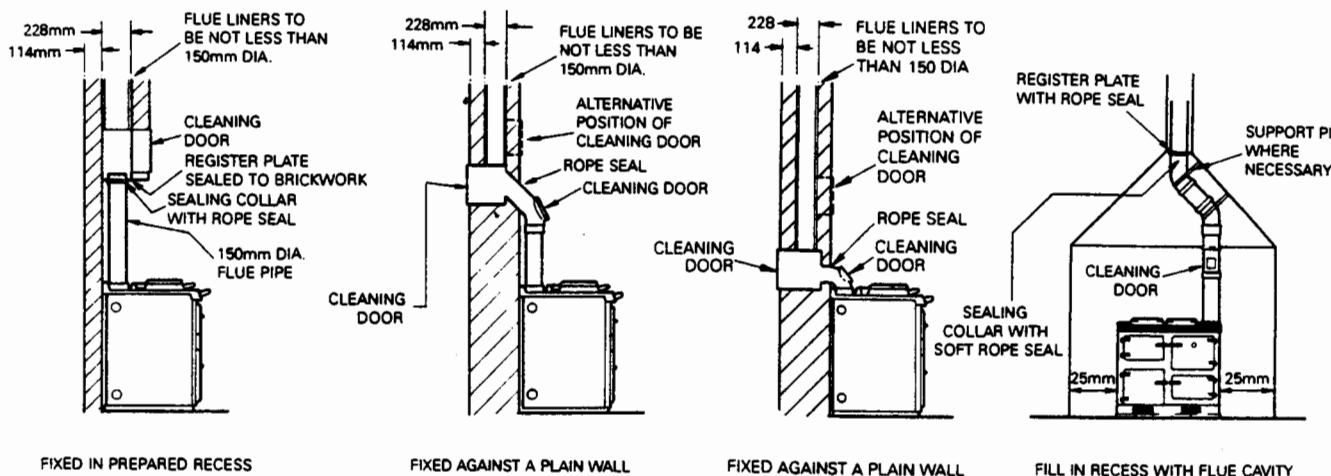


FIG. 2

DESN 510521

AIR SUPPLY

The appliance can only be installed in a room which meets the ventilation regulations in force. But, in any event the room must have a permanent vent of minimum free air area, see below.

MODEL	MIN. AIR REQUIREMENT
460K	146.9 cm ²
480K	179.2 cm ²
499K	211 cm ²

IMPORTANT: THE LOUVERED AIR INTAKE AT THE BOTTOM FRONT OF THIS APPLIANCE MUST BE KEPT CLEAR OF ANY OBSTRUCTIONS.

AIR SUPPLY

Detailed recommendations for air supply are given in the Building Regulations, and in BS 5410: Part 1. The following notes are intended to give general guidance.

1. Combustion and ventilation air supply to oil fired appliance has to comply with the Building Regulations and with BS 5410: Part 1. The air supply requirement for oil fired appliances is 550mm² per kW of maximum rated output above 5 kW. These requirements are illustrated in OFTEC Technical Book No. 3.

2. The combustion air supply to open flued appliances should normally be provided at high level into a room where it will not cause discomfort by creating a cold draught across the floor.

3. If combustion air is supplied through an under floor duct the grilles at each end should be positioned in the vertical plane to reduce the risk of blockage. Ducts should be sized so as to reduce resistance to air flow.

4. The ventilation requirement for kitchens in Part F of the Building Regulations is for mechanical extract at the rate of 60 litres per second or 30 litres per second if the fan is incorporated in a cooker hood. The amount can be reduced if the spillage of flue gases might be caused by the outflow of air from the room.

Background ventilation is also required, either by producing a constant mechanical extract rate of one air change per hour or by having ventilation openings of not less than 4000mm².

5. Extract fan should be positioned as far away from the open flue as possible and should have a sufficient dedicated air supply. To undertake a test the oil fired appliance should be set in operation and the doors and windows of the room containing it should be closed. The extract fan should then be run at its maximum setting. The oil fired heating appliance should be observed to operate satisfactorily both before and after the fan is switched on.

6. It is preferable for the air supply for an extract fan to be located where it can serve the fan without the air stream passing close to the oil fired pressure.

7. Oil fired appliances must not draw the combustion air from a garage.

Site requirements

WATER CIRCULATION SYSTEM

Space and water heating systems should be in accordance with the relevant recommendations of BS 5410: Part 1.

In a combined central heating and domestic hot water system, the hot water storage vessel must be of the indirect cylinder type to BS 1566: Part 1. The hot water storage vessel should be insulated with not less than 75mm. thick mineral fibre or its equivalent.

Cisterns and pipework should be situated in areas which may be exposed to freezing conditions should be insulated.

Draining taps must be located in accessible positions which permit the draining of the whole system, including the heat storage vessel. Draining taps should be at least 1/2in. BSP nominal size and be in accordance with BS 2879.

The appliance boiler section should be connected to a cistern water supply, subject to a maximum head of 18.25m. The heating system must be designed (and adjusted if necessary) to give temperature differential across the boiler at full output of 10-14°C. When horizontal runs are used the pipes should rise upwards in the direction away from the appliance.

Circulating Pump

It is recommended that the selected pump be sized to suit the boiler pressure loss (see Fig. 3) and therefore adequate to give the required temperature differential between the flow and return.

The pump should be able to meet the requirements of the system design and fitted in a readily accessible position.

Isolating Valves

Isolating valves (preferably of the keyless type) must be fitted to the inlet and outlet of the circulating pump to facilitate service and replacement of pump without draining the system.

Inhibitor

It is recommended that a corrosion inhibitor is added to the heating to protect the heat exchanger and pipework.

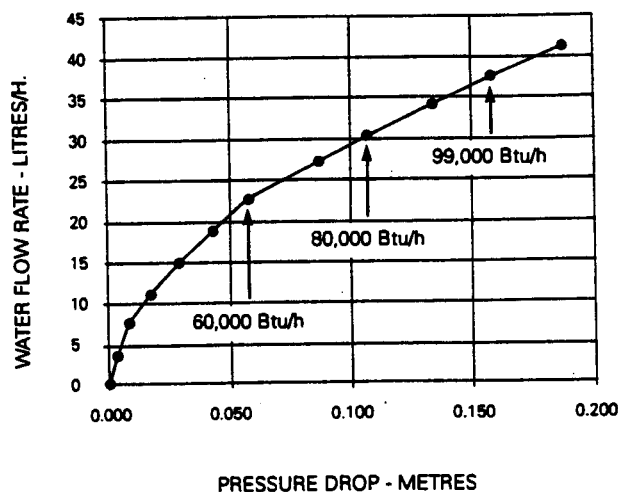


FIG. 3

HEATING CONTROLS

Internal temperature and time controls are supplied. These provide control of cooking and hot water temperatures. The cooker is supplied with 2-channel programmer:-

Channel 1 supplies hot water - Marked "BOILER".
Channel 2 controls the cooker burner - Marked "COOKER".

A separate switch in conjunction with the hot water channel gives priority to either the domestic hot water or the supply of hot water for central heating/DHW (if external controls are fitted).

It is recommended that independent temperature controls are provided for comfortable room temperatures, for economic operation and for control of the domestic hot water flow to the cylinder.

Consideration should be given to fitting a frost thermostat which should be set to operate at a temperature of approximately 4°C

Site requirements

ELECTRICAL SUPPLY

Wiring external to the appliance must be installed in accordance with current National Wiring Regulations and any local regulations which apply. The appliance is supplied for 230 Volt ~ 50Hz and a fuse rating of 3 amps. The method of connection to the mains supply should facilitate complete electrical isolation of the appliance, by the use of a fused double pole switch having a contact separation of at least 3mm serving only the appliance. The point of connection to the mains should be readily accessible and adjacent to the appliance. The installation should be protected by a 30mA Residual Current Circuit Breaker (RCCB).

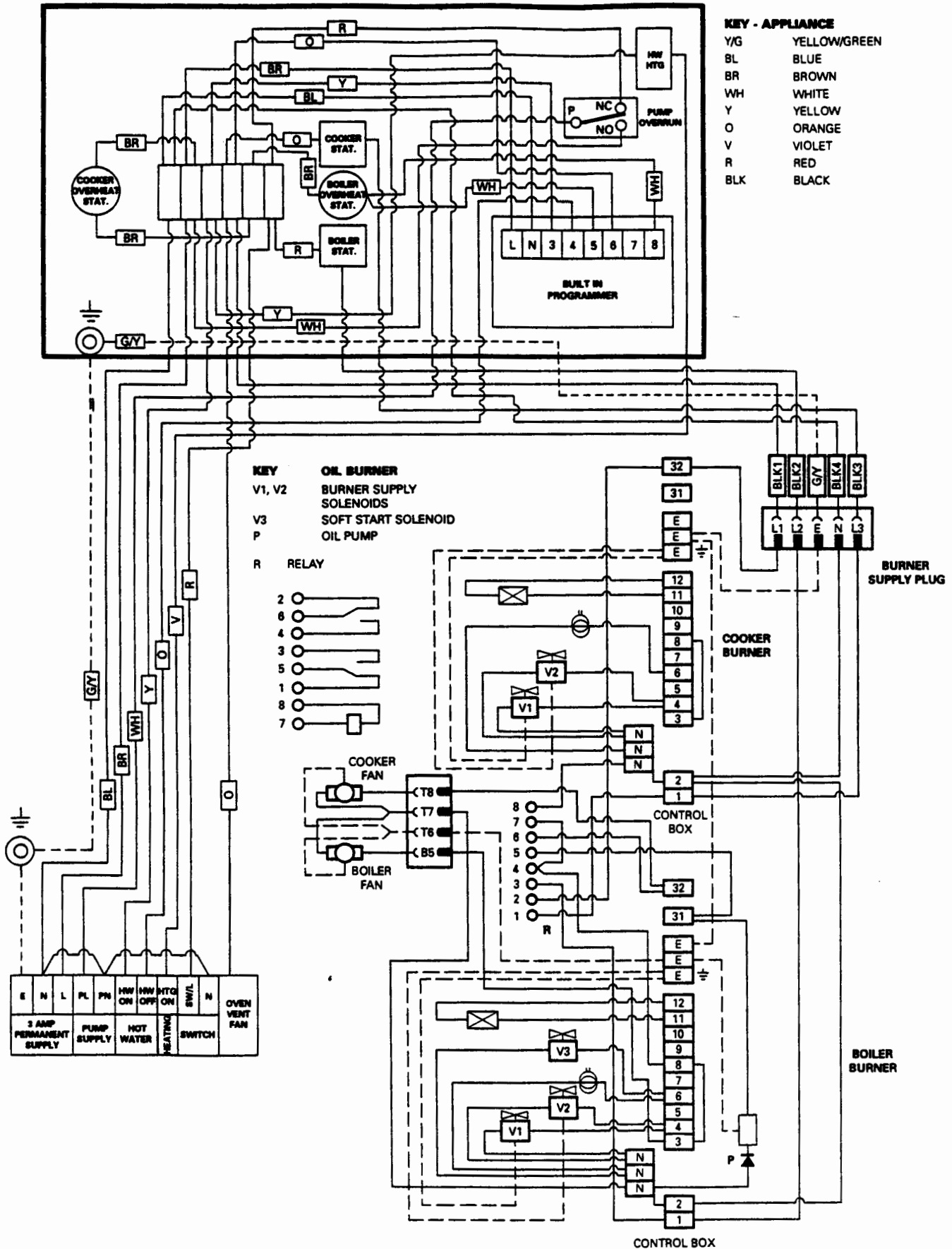
The minimum requirement for the power cable is that it should be a 3 core PVC sheathed flexible cord (85°C min) at least 0.75mm² (24 x 0.2mm) to the relevant standard.

WARNING THIS APPLIANCE MUST BE EARTHED

In the event of an electrical fault after installation of the appliance, preliminary electrical system checks must be carried out i.e. earth continuity, short circuit, polarity and resistance to earth.

For wiring instructions see wiring diagrams.

The circulating pump must be connected to PL and PN on the terminal block (see Fig. 4) and the cables clamped and passed through the grommet in the left hand side panel.



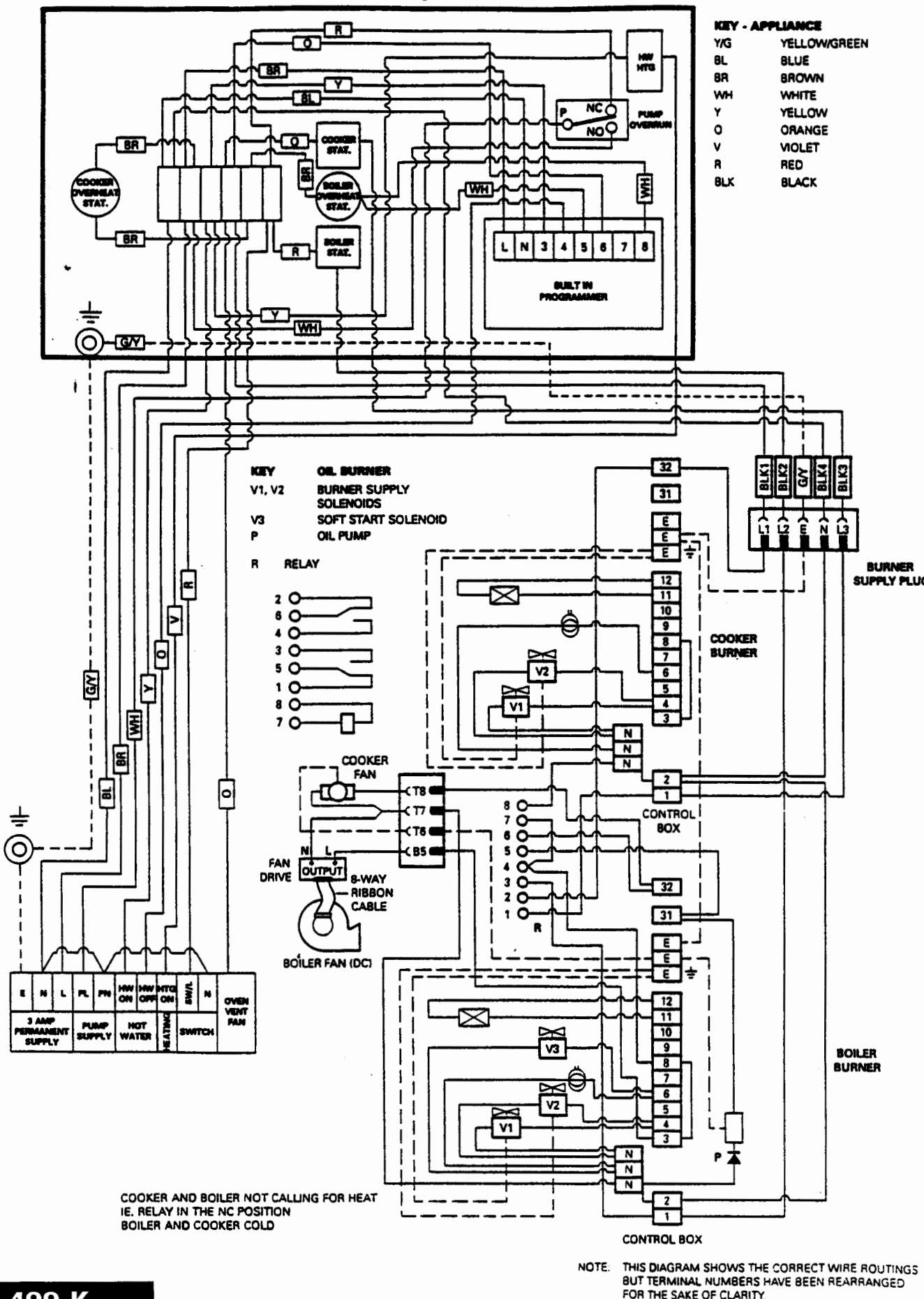
COOKER AND BOILER NOT CALLING FOR HEAT
IE. RELAY IN THE NC POSITION
BOILER AND COOKER COLD

NOTE: THIS DIAGRAM SHOWS THE CORRECT WIRE ROUTINGS
BUT TERMINAL NUMBERS HAVE BEEN REARRANGED
FOR THE SAKE OF CLARITY.

460/480 K

FIG. 4

Site requirements



499 K

FIG. 5

CLEARANCES

The appliance is floor mounted. The space in which the appliance is to be fitted must have the following minimum dimensions.

Between wall and LH side of appliance - 3mm
 Between wall and RH side of appliance - 10mm
 Above the raised insulating cover handle - 60mm
 In addition adequate clearance must be available at the front of the appliance to enable it to be operated and serviced.

PRELIMINARY INSTALLATION

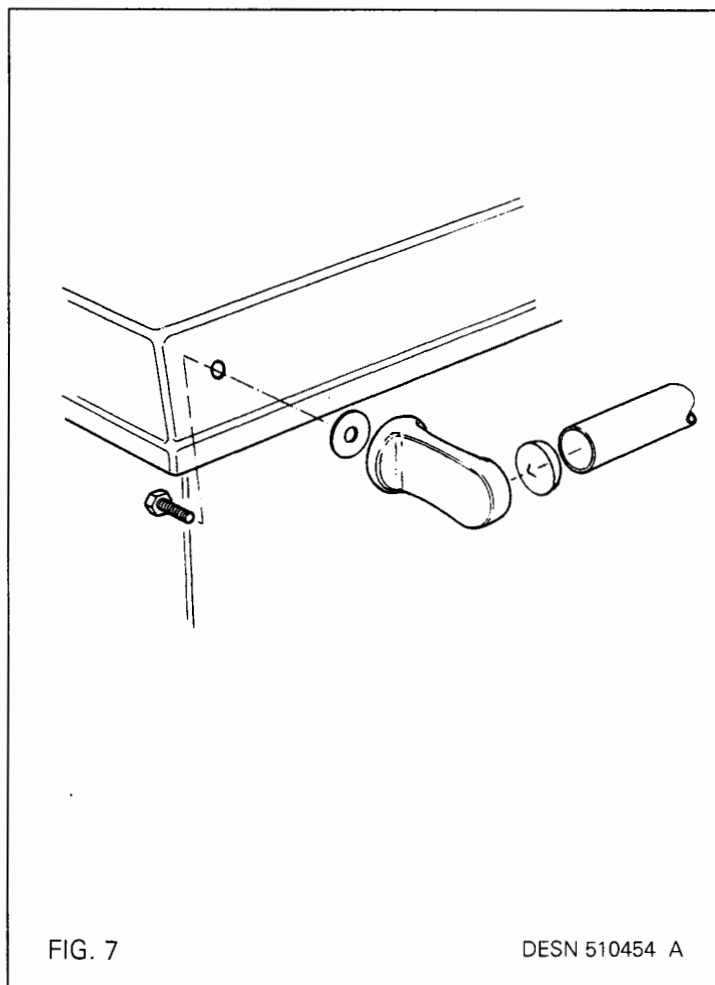
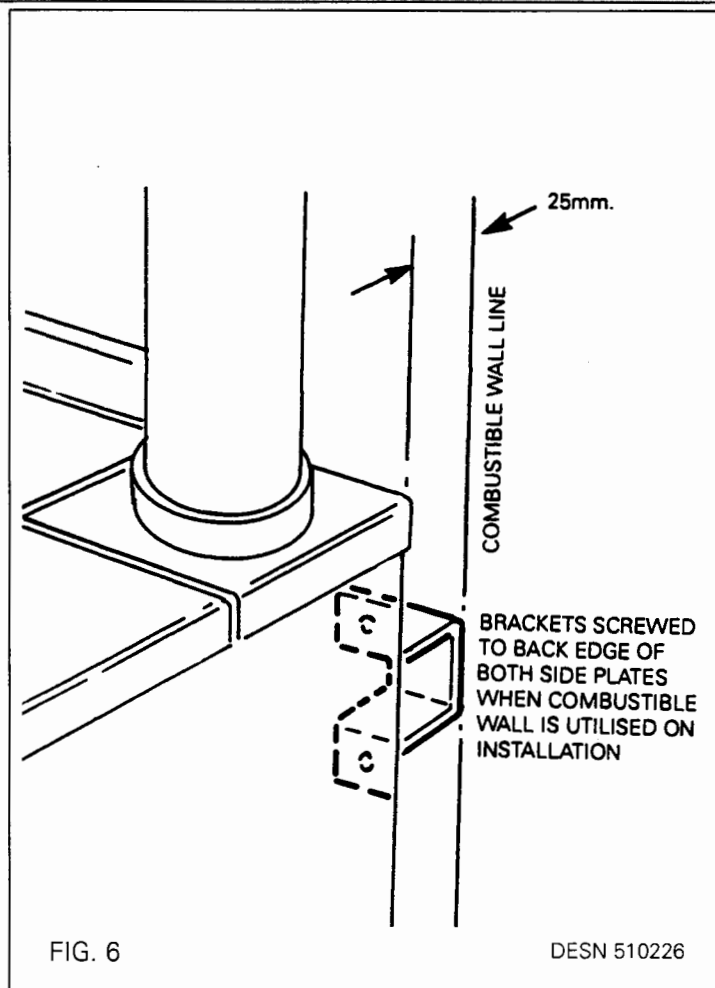
The appliance is delivered in a fully assembled condition with the exception of the following items which are supplied separately packed and require assembly:-

- The appliance rear distance bracket.
- The cooker handrail.
- The oil filter and the flexible oil feed pipe.

Appliance rear distance bracket: if the rear wall is of combustible material, there must be an air gap of 25mm between the wall and the rear of the cooker. Fit the rear distance brackets as shown in Fig. 6. Whenever possible it is recommended that the skirting board is removed for the width of the appliance to enable the rear edge of the appliance top plate to make contact with the vertical wall and avoid a rear gap. (Combustible wall excepted).

Where the cooker is to stand in a recess or against a wall which is to be tiled, **IN NO CIRCUMSTANCES SHOULD THE TILES OVERLAP THE TOP PLATE.**

The handrail brackets are held on the front edges of the cooker top-plate casting. Remove the travel nuts and replace with the handrail brackets ensuring the fibre protecting washers are in position. Insert the handrail with fitted endcaps into the brackets, positioning them correctly, and tighten the locating bolts (Fig. 7).



SITE LOCATION

SEE FIG. 8 & 9

1. Check that the hearth is level, then remove the appliance from its transit wooden pallet, and position it with its back against the wall and in its intended position for flue connection.
2. Locate and fit flue pipe into socket of flue pipe adaptor, sealing joint with fire cement.
3. Connect and terminate the flue system in accordance with the regulations in force.
4. Lift up the insulating covers and remove the hotplate using lifting hooks provided (See Fig. 8).

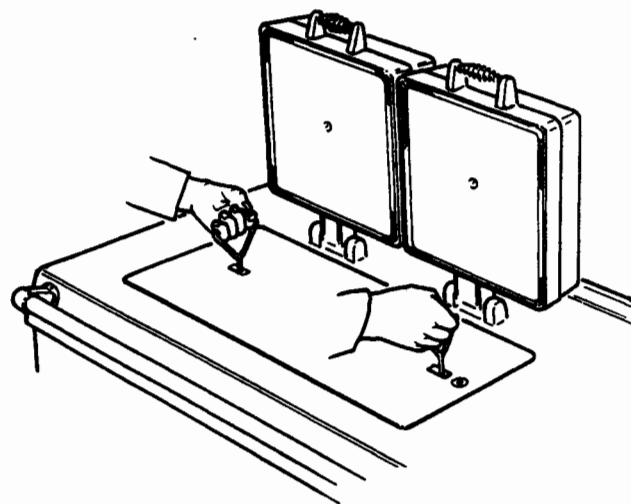


FIG. 8

DESN 510523

5. Remove the insulation pad (B).
6. Remove the 4 flue cleaning access door securing bolts and remove door.
7. Check the position of the boiler flueway baffles.
8. Replace door and refit bolts.
9. Replace insulation pad (B) and the hotplate ensuring that it seals around the edges.

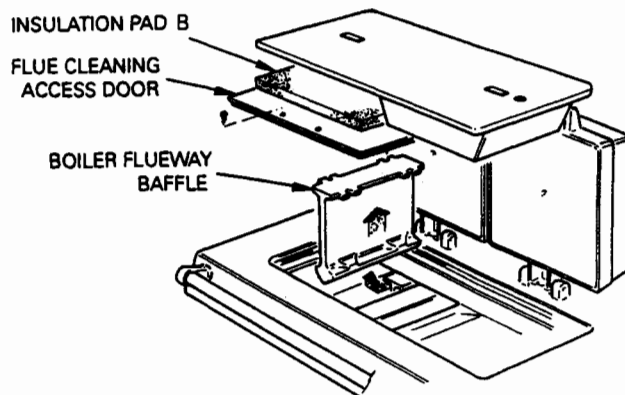


FIG. 9

DESN 511232

BURNER ACCESS

SEE FIG. 10.

- a. Open the burner access door. Remove door and put in a safe place.
2. Remove 4 inner panel securing screws and remove panel.
3. Remove the 3 plinth securing screws and remove plinth.

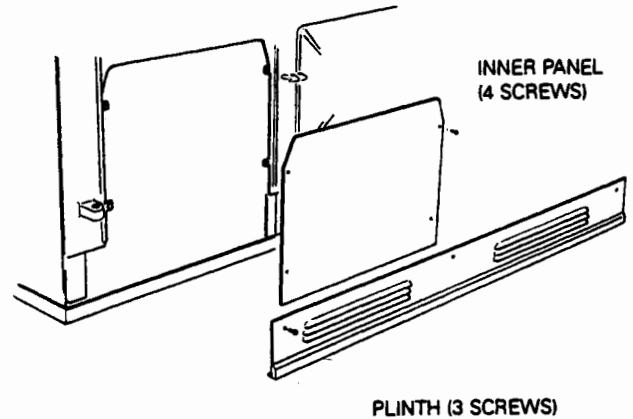


FIG. 10

DESN 511124

ELECTRICAL CONNECTION

SEE FIG. 11

1. Make electrical connections to terminal strip as wiring diagram (See Fig. 13).

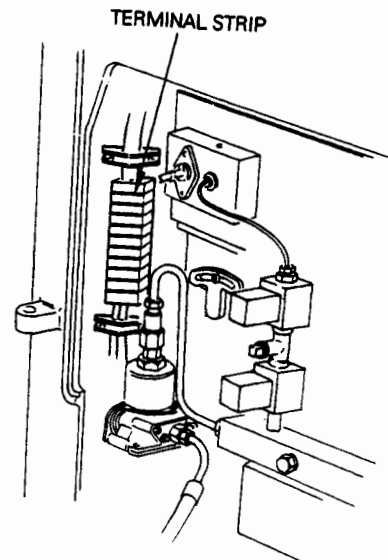


FIG. 11

DESN 511233

OIL PUMP

SEE FIG 12.

1. Bring the sensing phial of the fire valve through the grommet in the left hand side panel and locate in the clips provided.
2. Connect the flexible hose to the outlet pipe from the oil filter.
3. Before connecting the flexible oil pipe to the pump inlet, open the stop valve slowly and run off some of the oil into a receptacle to establish an air free supply to the pump. Make the connection onto the pump oil tight and leave valve open.

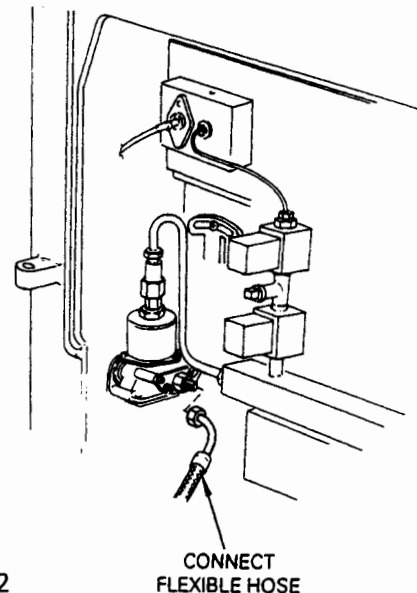
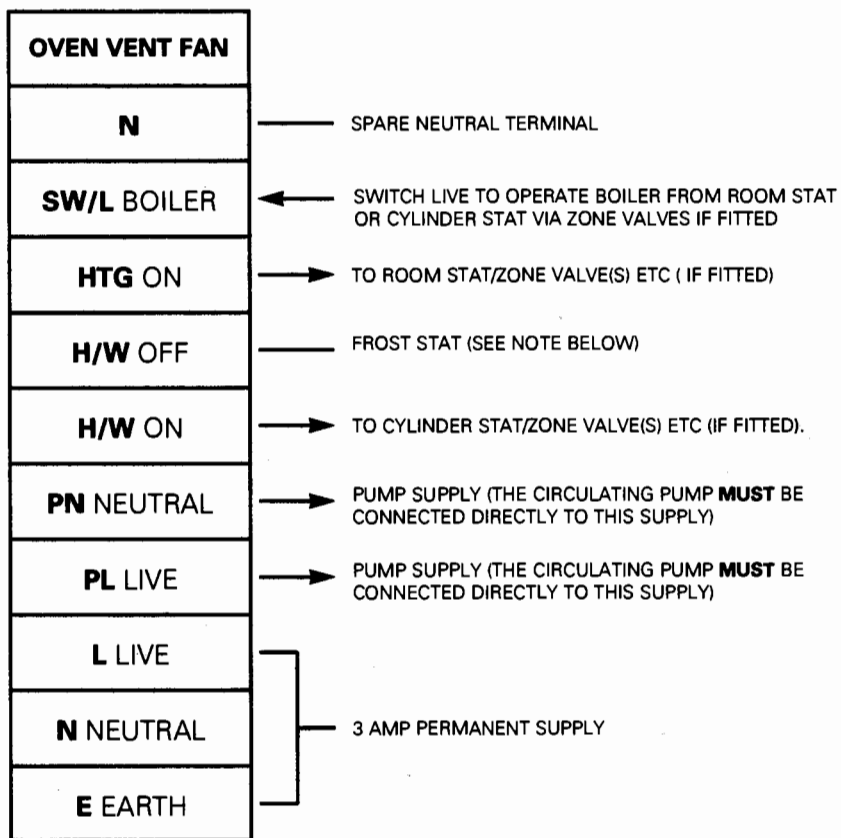


FIG. 12

DESN 511234

TERMINAL STRIP CONNECTIONS



NOTE:

If no Hot Water System Controls are used a link **MUST** be fitted between **H/W ON** and **SW/L BOILER**.

If no Central Heating System Controls are used a link **MUST** be fitted between **HTG ON** and **SW/L BOILER**.

If a Frost Thermostat is fitted it **MUST** be connected to **SW/L BOILER** and **H/W OFF**

FIG. 13

ELECTRICAL CHECK

Checks to ensure electrical safety should be carried out by a competent person.

FIT PRESSURE GAUGE

- SEE FIG. 14

Remove the bleed screw from the manifold and fit an oil pressure gauge with R1/8 connection to check the pump output pressure.

Switch on the Electricity

Set the boiler burner time clock switch to continuous and turn the boiler thermostat to maximum. The boiler burner should run on pre-purge for 7 to 15 seconds, with the ignition spark energised. The oil solenoid valve should then open allowing the burner to fire.

Until all the air from the oil pump is flushed out there may be some flame instability resulting in the burner locking out.

This will be shown by the burner stopping and the illumination of the signal light in the reset button of the control box (see Fig. 15). In this event, **wait at least one minute**, then press the re-set button to restart.

VENT OIL PUMP

- SEE FIG. 14

Whilst the burner is running, vent air from the pump by slackening the pressure gauge connection sufficient to allow air to bleed out. When bubble free oil seeps out retighten.

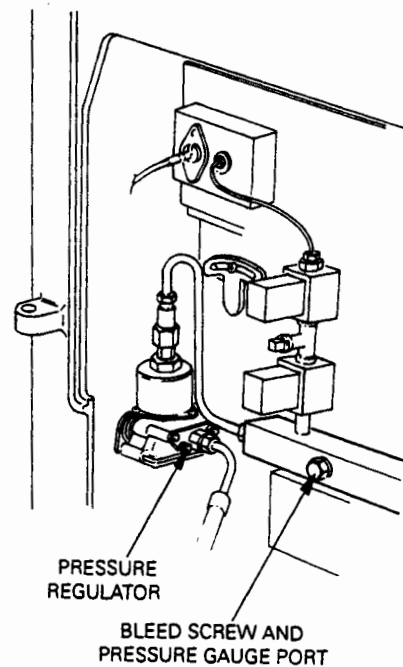


FIG. 14

DESN 511235

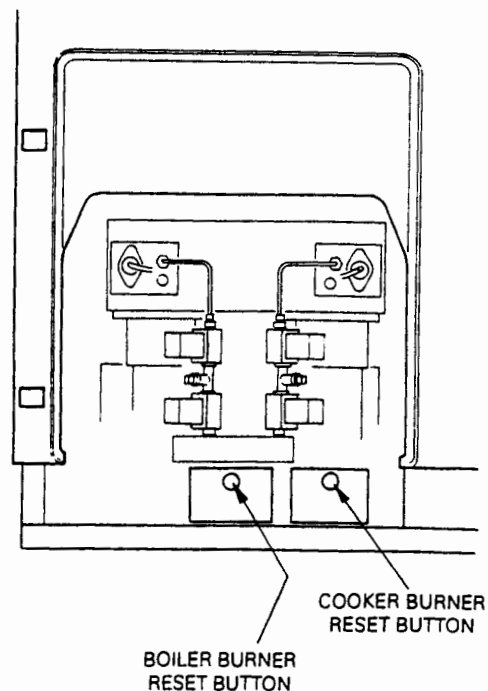


FIG. 15

DESN 511236

Commissioning Instructions

ADJUST OIL PRESSURE

- SEE FIG. 14

Whilst the burner is running check the oil pressure on the pressure gauge. With the boiler burner, wait for 30 seconds after ignition, for the burner to establish full firing rate.

If the pressure gauge is not indicating the correct reading then adjust the pressure by turning the pressure regulator clockwise to increase or anti-clockwise to decrease the pressure until the pressure gauge reads 9.0 bar (130 lb/in²).

Switch off the burner, remove the pressure gauge and refit the bleed screw.

SET COMBUSTION AIR

- SEE FIG. 16 & 17

The air controls of the burners are factory pre-set, however small adjustments may be necessary to suit the site conditions (See Fig. 16).

IMPORTANT: Ensure that the bottom louvered plinth is in place during combustion setting procedures.

Turn boiler burner on.

After 15 minutes remove the enamelled top cover panel (behind the L.H. insulating cover) and remove the insulation pad A. Remove the plugging screw and insert the sensing end of a portable indicator to check the CO₂ (Carbon Dioxide) level. Adjust the boiler burner air intake until a reading of 11.0/11.5% CO₂ is recorded on the indicator.

Check Smoke

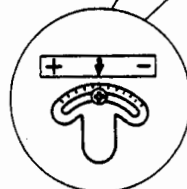
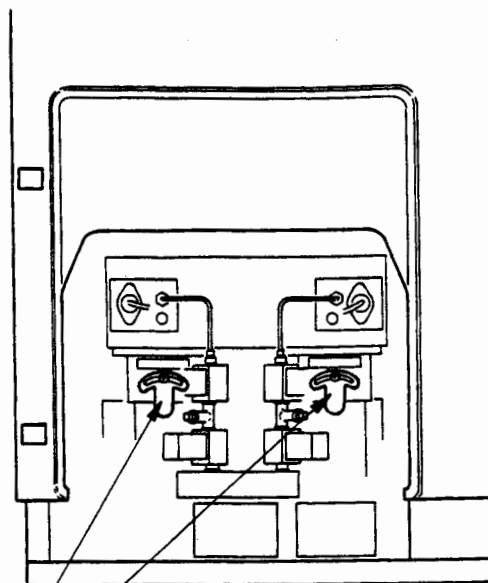
Remove the CO₂ sampling tube and using the same hole for flue sampling insert the sensing end of a Baccarach Smoke Pump and check that the smoke in the boiler flue ways does not exceed No. 2 on the scale. Replace the plugging screw, insulation pad and cover panel.

Cooker Burner

Switch off the boiler burner and repeat the procedure with cooker burner. After 15 minutes running sample the flue gases from the cooker burner. Lift up the R.H. insulating cover and remove the countersunk headed screw in the hotplate. The cooker burner should be set to 11.0% CO₂ with a maximum Smoke No. of 2. Replace the countersunk headed screw on completion ensuring that it will not interfere with any pots and pans placed on the hotplate.

When satisfied with combustion check refit burner door inner panel.

Refit outer burner door.



BURNER AIR INTAKE DAMPER CONTROLS

IMPORTANT: ALWAYS LOCK IN POSITION AFTER SETTING

FIG. 16

DESN 511237

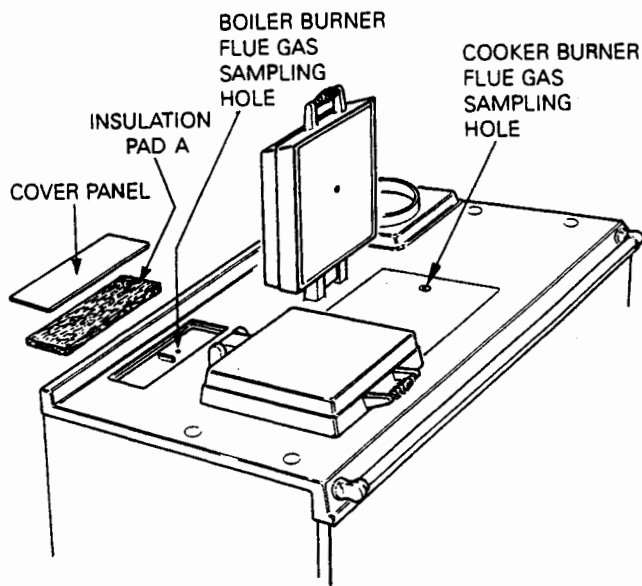


FIG. 17

DESN 510531

ANCILLARY CONTROLS CHECK

Before leaving the site, check the operation of programmer, control thermostats are working correctly and are capable of controlling the burners correctly. Check the operation of both burner control boxes.

In the event of a flame failure the control boxes should cut off the oil supply by closing the solenoid valves. The reset buttons will then be illuminated.

WAIT 1 MINUTE BEFORE RESETTING THE CONTROL BOX.

BOILER CONTROL CHECK

Check that:-

1. The boiler system is full of water and all the valves are fully open.
2. The programmer is set to continuous heating and the heating switch set to heating.
3. Ensure that the electricity supply is ON, that the pump, is running and the boiler thermostat is ON.
4. Allow the pump adjuster to maintain a boiler "flow and return" temperature differential of 10°C - 14°C.

Checks must be made by the installer to see that this differential is obtained after the boiler 'Flow' temperature is stabilised.

The system should be balanced by regulating the water flow rate through individual heat emitters to ensure a satisfactory water temperature at each emitter.

5. When the water system reaches working temperature check that the boiler thermostat operates satisfactorily.
6. Examine the system for water soundness. The system should then be turned off and rapidly drained whilst still hot. The system should again be filled and cleared of all air locks. Whilst refilling the system it is recommended that a corrosion inhibitor is added to the feed water.

INSTRUCT THE USER

1. Advise the User of the precautions necessary to prevent damage to the heating system and to the building in the event of the heating system being inoperative during frost conditions.
2. Advise the User that, for continued efficient and safe operation of the appliance, it is important that adequate servicing is carried out at regular 12 monthly intervals.
3. Hand the Operating Instructions to the User and demonstrate the correct operation of the appliance and system controls.
4. Leave the Installation and Servicing Instructions with the User.

SEALED SYSTEM REQUIREMENTS

See Fig. 18.

- a. The installation must comply with the requirements of BS 6798 and BS 449. Maximum water 82°C + 3°C.
- b. The safety valve set to operate at 2 bar (30lbf/in²) be fitted in the flow pipe close to the boiler. There must not be any valves between the safety valve and the boiler. The valve should be positioned on a discharge pipe fitted to prevent any discharge creating a hazard to occupants or cause damage to electrical components and wiring.
- c. A pressure gauge covering at least the range 0 to 4 bar (0 to 60 lbf/in²) shall be fitted in the system.
- d. A diaphragm type expansion vessel, to BS 4814, shall be connected at a point in the return pipe close to the boiler. The vessel must be chosen to suit the volume of water in the system and the charge pressure must not be less than the static head at the point of connection. Further details can be obtained from "Materials and Installation Specification for Domestic Central Heating and Hot Water" published by British Gas and BS 7074:1.

Sizing table:

Air or Nitrogen charge pressure (bar)	0.5		0.5	
Pre-Pressurisation pressure (bar)	None 1.0		None 1.5	
Expansion vessel volume (litres)	Ax 0.07	Ax 0.120	Ax 0.088	Ax 0.160

A = System volume litres

- e. The hot water cylinder shall be either the indirect coil type or a cylinder fitted with a calorifer.
- f. Water lost from the system shall be replaced from a make-up vessel and non-return valve, mounted higher than the top of the system on the return side of the cylinder or radiators. Where access to a make-up vessel would be difficult make-up can be provided by pre-pressurisation of the system.
- g. The system can be filled from the mains via a temporary hose connection from a draw-off tap supplied from a service pipe under mains pressure, provided that this pressure is acceptable to the local water authority. See Fig. 20.

The following fittings should form from a permanent part of the system and fitted in the order stated (See Fig. 18 & 19)

- (i) a stop valve complying to the requirements of BS1010: 2.
- (ii) an anti-vacuum valve of a type approved by the National Water Council.
- (iii) a non-return valve of an approved type.

h. Fill the system until the pressure gauge registers 1.5 bar (22lbf/in²). Examine for leaks and rectify where necessary. Refer to the commissioning instructions, switch on the boiler burner and allow the system to reach its maximum working temperature. Examine for leaks then turn off the boiler. Drain the system while it is still hot. Refill, vent and adjust the cold fill pressure to the required value. Whilst, refilling the system it is recommended that a corrosion inhibitor is added to the feed water.

COMMISSIONING

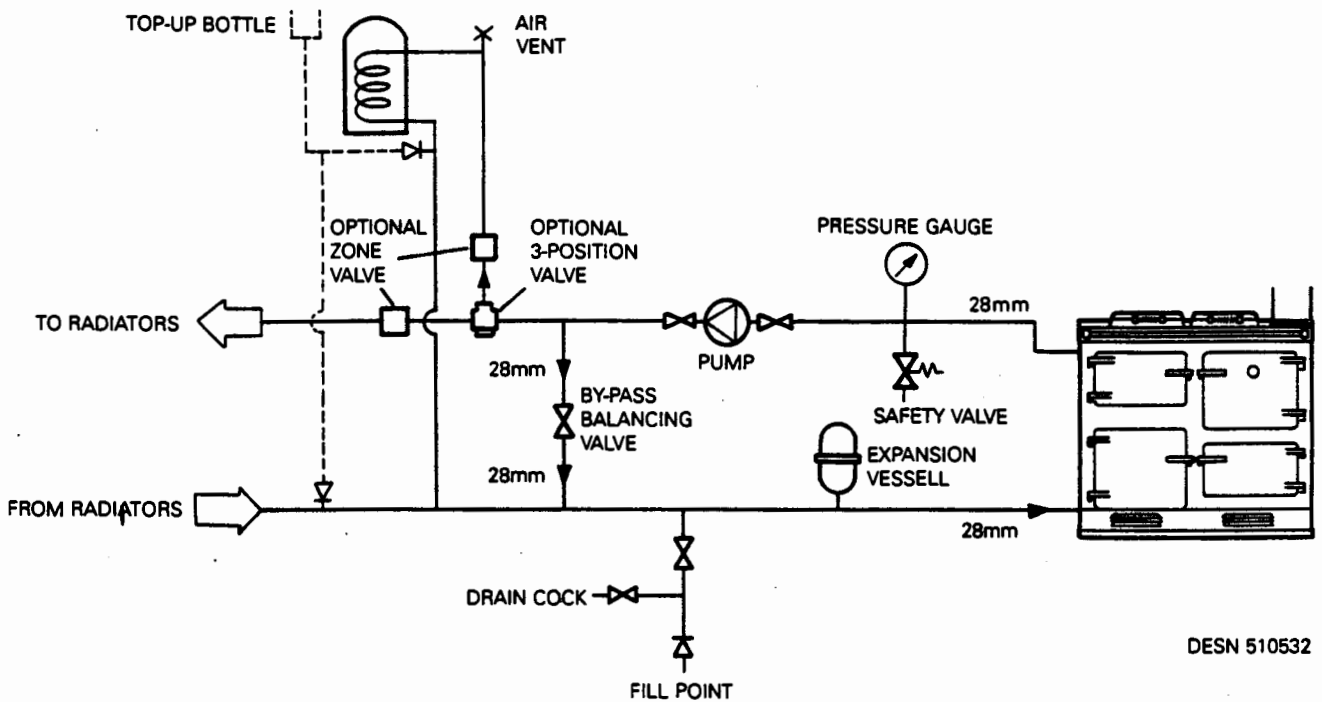
Follow the commissioning instructions as for open vented systems. See section Commissioning Instructions. with the following additions:-

Fill the system until the pressure gauge registers 1.5 bar (22lbf/in²). Clear any airlocks and check for water soundness.

Check the operation of the safety valve, by allowing the water pressure to rise until the valve opens. The valve should open within ± 0.3 bar (±0.43 lbf/in²) of the pre-set pressure. If this is not possible conduct a manual check and test.

Release cold water to initial filling pressure.

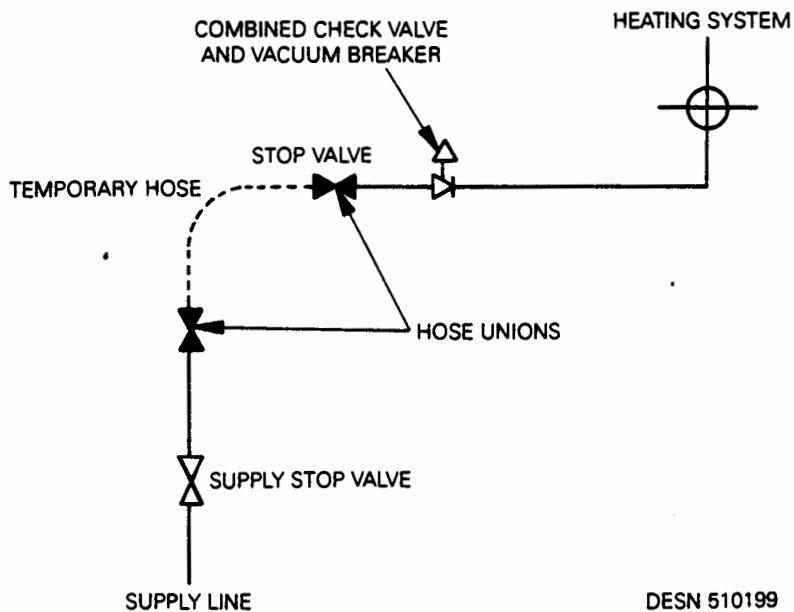
Any set pointer gauge should be set to coincide with the recommended filling pressure.



THE BYPASS BALANCING VALVE SHOULD BE OF A TYPE NON-ADJUSTABLE BY THE HOUSEHOLDER AND MUST HAVE AT LEAST 2.5 METRES OF 28mm PIPE EACH SIDE BETWEEN IT AND THE COOKER BURNER.

ALTERNATIVELY THE BYPASS LOOP CAN INCORPORATE A TOWEL RAIL, CONTROLLED BY A NON-ADJUSTABLE BALANCING VALVE.

THE BYPASS LOOP MUST NOT BE INSULATED



MAINS FILLING METHOD

FIG. 18 & 19