

Camray

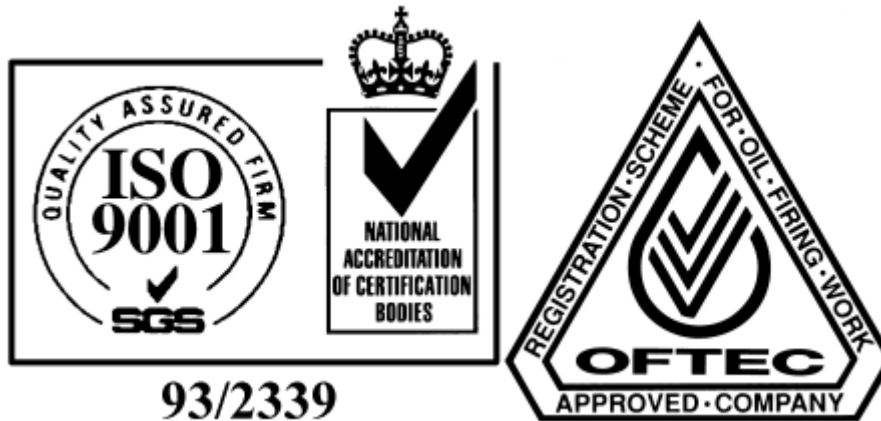
COMBI

**OPERATING, INSTALLATION &
MAINTENANCE MANUAL**
for
CAMRAY 5 COMBI
Oil Fired Boilers (55, 70A & 90A)

Manual Part No PL50000

Issue No. 5

Date of Issue February 2003



**Boulter
Buderus**

HEALTH AND SAFETY

INFORMATION FOR THE INSTALLER AND SERVICE ENGINEER.

Under the Consumer Protection Act 1987 and the Health and Safety at Work Act 1974, it is a requirement to provide information on substances hazardous to health (COSHH Regulations 1988).

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

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

This appliance may contain some of the materials below.

When working on the appliance it is the Users/Engineers responsibility to ensure that any necessary personal protective clothing or equipment is worn appropriate to parts that could be considered as being hazardous to

health and safety.

INSULATION & SEALS

Glass Rope, Mineral Wool, Insulation Pads, Ceramic Fibre, Fibre Glass Insulation.

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

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

GLUES, SEALANTS & PAINT

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

KEROSENE & GAS OIL FUELS (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 rendering the skin dry, liable to crack and more prone to damage caused by cuts and abrasions.
3. Skin rashes (oil Acne). Seek immediate medical attention for any rash, wart or sore developing on any part of the body, particularly the scrotum.
4. Avoid as far as possible any skin contact with mineral oil or with clothing contaminated with mineral oil.
5. Never breath any mineral oil vapours. Do not fire the Burner in the open i.e. out of the Boiler as a miss fire will cause unburnt oil vapours.

Barrier cream containing lanolin such as Rosalex Antisolv, is highly recommended together with a strict routine of personal cleansing.

Under no circumstances should mineral oils be taken internally.

OFTEC Code of Practice OCP/1: 1995 For the Safe Installation, Commissioning, Maintenance and Fault Rectification of Oil Firing Equipment should be consulted.

BOULTER BUDERUS

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Due to a policy of continual development reserves the right to alter or amend the design of its products without prior notice.

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1:1 INTRODUCTION

Thank you for choosing the Camray Combi manufactured in the UK by Boulter Buderus who are renowned oil-firing specialists.

To obtain the best possible performance and trouble free operation from your Boiler, it is important that you read section 1 of this manual carefully.

All Camray appliances are the result of many years of research, development and experience. Whilst our Boilers are designed with simplicity of operation in mind, there are certain features and benefits which only become obvious when you thoroughly understand how best to use your new Camray product.

We trust that you will enjoy many years of reliable service from your new Camray Boiler and, once again, thank you for choosing Camray.

1:1.1 Manual

This Manual covers Safety, User Instructions, Installation, Commissioning and Maintenance of the Camray

Combi Boiler.

1:1.2 Timer Programmer

An optional Programmer is available which will enable you to time both your Central Heating and Domestic Hot Water (store) requirements.

1:2 USEFUL INFORMATION

Your Installer will help you complete this where necessary.

Information can be found on appliance data label located inside the left hand side panel of the casing. Also on the front cover of your installation manual.

Boiler Model	<input type="text"/>
Serial Number	<input type="text"/>
Burner Type	<input type="text"/>
Fuel Type	Kerosine C2
System Pressure	Dynamic <input type="text"/> bar
	Static <input type="text"/> bar
Installer	<input type="text"/>
	<input type="text"/>
Installation Date	<input type="text"/>
Service Engineer	<input type="text"/>
	<input type="text"/>
Oil Tank Capacity	<input type="text"/> litres
Oil Supplier 1	<input type="text"/>
Oil Supplier 2	<input type="text"/>

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1:3 IMPORTANT SAFETY NOTES

To obtain the best possible performance and trouble free operation from your Boiler, it is important that you read these instructions carefully. Your Camray Boiler has built-in safety features, which are detailed in the

relevant section of this manual.

1:3.1 Please Note

The heating system must comply with the latest editions of British Standard 5410 and The Building Regulations.

Please note: It is essential in the interest of the Boiler efficiency and reliable performance that once the Boiler has been installed it is first commissioned by preferably an O.F.T.E.C.* registered engineer. It is the responsibility of the installer to ensure that the Boiler is commissioned.

If an engineer is not known, Boulter Buderus will be pleased to provide details of a commissioning and servicing engineer from their register.

*The Oil Firing Technical Association for the Petroleum Industry - Banstead, Surrey 01737 373311.

IMPORTANT

- If it is known or suspected that a fault exists on the Boiler, it **MUST NOT** be used until the fault has been corrected by a competent engineer (see [Failure to Start](#)).
- It is essential that the instructions in this manual are strictly followed for safe and economic operation of the Boiler. Failure to observe these instructions may invalidate your right to free breakdown cover during the guarantee period.
- We recommend that you keep these instructions in a place near your appliance for easy reference.

1:3.2 Air Supply to Boiler Conventional Flue

Where your Boiler is used on an open conventional flue system, a permanent air supply is required for combustion. Clearances provided at the sides and rear of the appliance for air entry must be kept free of obstruction. For further explanation please refer to [section 4](#) of this manual.

1:4 CONNECTIONS

Your Camray Boiler should be connected to an electrical supply complying with the Electrical Wiring Regulations (BS7671): as well as an oil supply complying with BS5410; and an appropriate flue system.

- ALWAYS SWITCH OFF THE ELECTRICAL SUPPLY before removing any of the covers for cleaning.
- If any part of the Boiler or its flue is modified, then the guarantee/warranty will be invalidated.

1:5 INSTALLATION & COMMISSIONING

After your Camray Boiler has been installed it **MUST** be commissioned preferably by an O.F.T.E.C. Registered Engineer. Commissioning involves testing the Boiler to ensure that it is working correctly, and also setting the Burner correctly to ensure the most efficient operation and use of fuel. If the Boiler has not been commissioned, it may not be operating at the maximum efficiency possible for your heating system, and may also invalidate the guarantee.

READ HEALTH AND SAFETY INFORMATION ON INSIDE OF THIS MANUAL.

IMPORTANT

Should you wish to remove or dismantle any covers or parts of the boiler for cleaning or maintenance ALWAYS FIRST SWITCH OFF THE

ELECTRICITY SUPPLY.

1. On no account should any part of the Boiler or its Flue be modified with the exception of flues which require adjusting to length to suit site conditions, as detailed in this manual.

1. The wiring of the control panel should be as the wiring diagrams included in this Manual. Wiring should not be tampered with, modified or changed for any reason.

3. Only use Boulter replacement parts.

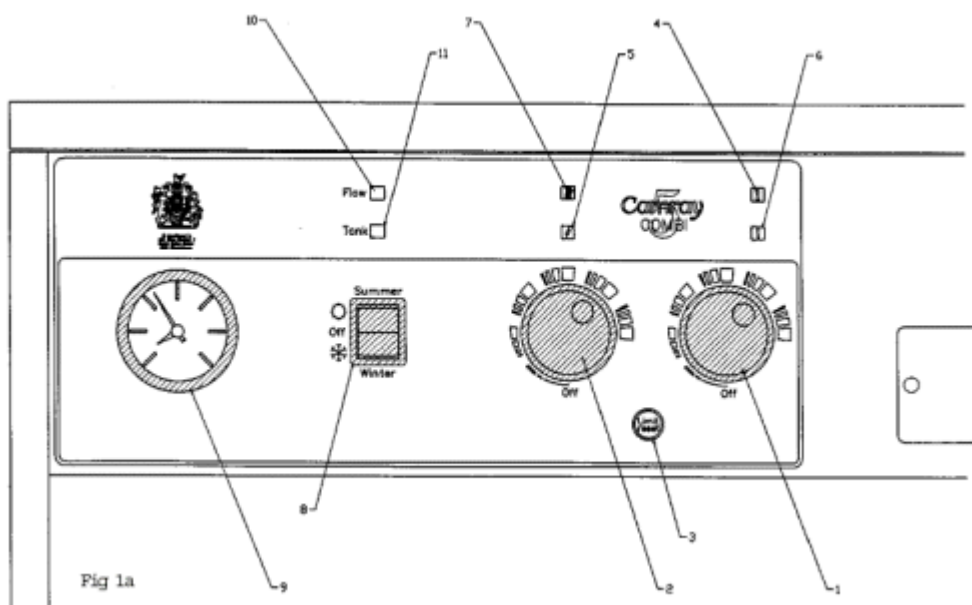
Non-compliance with the above will invalidate the Guarantee.

NOTE

Due to the high efficiency of DHW production in certain circumstances i.e. very low flow rates, the temperature of the hot water at the tap can be high. **If this temperature is likely to cause nuisance or discomfort your installer should be able to advise on a suitable temperature blending valve.**

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1:6 BOILER CONTROL PANEL



Boiler Control Panel (see [fig 1a](#))

1. Boiler Control Thermostat
2. Hot Water Tank Thermostat
3. Boiler Overheat/Limit Thermostat Reset Button
4. Lockout indicator light-Red
5. Mains indicator light-Green
6. Limit indicator light-Red
7. Heating On indicator light -Green
8. Summer/Winter Switch
9. System pressure indicator dial

10. Domestic water flow indicator light-Green

11. Tank heating indicator light-Green

Items 10 & 11 are diagnostic indicators which are not visible with the front panel on.

1:6.1 Boiler Control Thermostat

The Boiler Control Thermostat controls the water temperature in the boiler.

The recommended setting is shown in [Fig 1a](#) This thermostat automatically switches the burner ON & OFF to maintain the selected temperature. The burner is lit by an automatic ignition system and therefore there is no pilot flame.

The boiler should not be operated below 60 C, as this will cause corrosion which will reduce the life of the boiler.

1:6.2 Hot Water Tank Thermostat

This thermostat controls the water temperature in the tank. Guidance on its use is given in [Section 1:7](#) of this manual.

1:6.3 Summer/Winter/Off Switch

Use this 3 position switch to select the required mode:

SUMMER	for domestic hot water only.
WINTER	for domestic hot water & heating.
OFF	to switch the boiler off.

1:6.4 Boiler Overheat/Limit Thermostat

This thermostat will interrupt the power supply to the burner and shut it down completely in the unlikely event of overheating.

Should this occur, the green indicator light on the control panel will illuminate. Wait for the boiler to cool, and reset the thermostat by depressing the limit thermostat reset button located on the control panel - see [Fig 1a](#) If this problem recurs, turn the boiler off and consult your installer.

1:6.5 Lockout Lamp

In the unlikely event of a burner malfunction or you run out of oil it will automatically shutdown, and the red lockout indicator on the control panel and the lamp on the burner will illuminate. Wait 45 seconds before attempting to restart the burner. To restart the burner, remove the front boiler panel and depress the lockout reset button on the front of the burner control box (see [Fig 1b](#)). If the burner locks out again wait 3 minutes and repeat the operation again.

If the problem occurs again, turn the boiler off and consult your installer.

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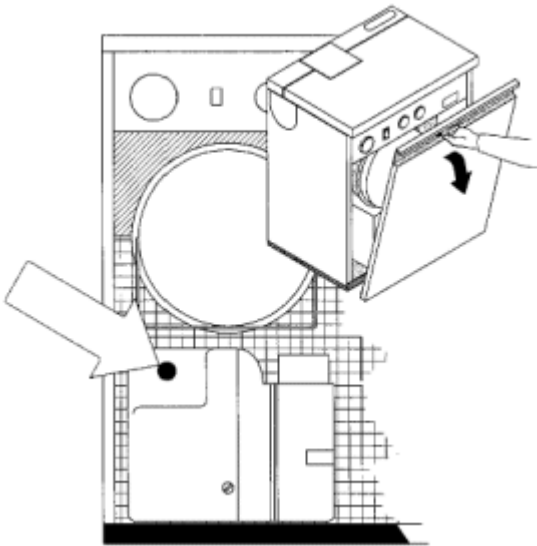


Fig. 1b Lockout Reset

1:7 OPERATING FEATURES AND INSTRUCTIONS

1:7.1 How does your boiler work?

Hot Water

1 If the Programmer is set for Hot Water only or the Summer/Winter switch is set to Summer :-

- a) The boiler will operate until the hot water tank reaches the temperature you have set on the Hot Water Tank Thermostat. From cold, this will take approximately 18 minutes. To obtain the maximum temperature and quantity of hot water (ie for a bath) set this to maximum.
- b) When any hot water tap is turned ON to give a flow rate in excess of 2.5 litres/minute, the boiler will operate during the draw of hot water. When the tap is turned OFF the boiler will continue to operate until the hot water tank reaches the temperature set on the Hot Water Tank Thermostat. The period of operation to replenish the energy used depends on the quantity of hot water drawn.
- c) As the rate of water is increased by opening the hot water tap, the water temperature reduces and the tap should be adjusted to give the desired temperature.
- d) If the Programmer is OFF (ie during the night period) hot water may be drawn but is limited to the energy stored in the tank. During the period of draw off the circulating water pump will operate but not the boiler. Providing the tank has not discharged just prior to the Programmer switching off there is normally adequate hot water for occasional use of wash basins.
- e) For day time use of hot water, set the Programmer (if fitted) to give Hot Water ON at least 18 minutes prior to normal anticipated use.

Heating and Hot Water

2 If the Programmer is set for Heating and Hot Water or the Summer/Winter switch is set to Winter :

- a) The boiler will operate until the temperature in the boiler reaches the temperature you have set on the Boiler Control Thermostat or until your Room Thermostat is satisfied.
- b) Provision of Domestic Hot Water takes priority over Central Heating, so that during the period when the hot water tap is turned on or when the hot water tank is being recharged (only a matter of minutes) the central heating is automatically but only temporarily turned off. Central Heating is restored when the hot water tank has fully recharged and when the hot water tap is turned off.

1:7.2 Switching the Boiler Off - temporarily

The Boiler may be stopped by switching the Summer/Off/Winter switch to the OFF position on the standard Control Panel, or the programmer switch to the OFF position on the optional programmer.

1:7.3 Sealed System Central Heating

Your Camray 5 COMBI Boiler may only be used on a SEALED SYSTEM.

It is important that the correct operating system pressure is maintained. If the System Pressure Gauge, in the Control Panel, should indicate low pressure i.e. below the marker, contact your Installer.

1:7.4 Frost Protection

If there is any danger that your Boiler may freeze up during severe weather conditions, it is recommended that you consult your installer who will be able to advise you on an appropriate course of action, either by installing a frost thermostat or the addition of system anti-freeze.

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1:7.5 Oil Delivery

Where possible, it is advisable to temporarily switch the Boiler off when your oil supply is being replenished. This is to allow any sediment to settle and not be drawn into the Boiler. If not this could result in an inconvenient break down.

We advise that you keep your Boiler off for one hour after the oil is delivered to your tank. Please ask your supplier, or the driver to notify you before the oil is discharged.

1:8 MAINTENANCE

For normal cleaning of the outside casing, simply wipe with a dry cloth. To remove stubborn marks and stains, wipe with a damp cloth and finish off with a dry cloth. DO NOT use abrasive cleaning materials.

The Boiler must be serviced at regular intervals by a qualified service engineer. Failure to will invalidate the guarantee/warranty.

THE BOILER SHOULD BE SERVICED AT TWELVE MONTHLY INTERVALS.

If your boiler has a conventional flue, make sure that air intake entries on the casing panels are never obstructed. This could lead to premature failure.

1:9 FAILURE TO START

If the Burner fails to start, adopt the following procedure:-

1. Check that there is oil in the tank and that the supply valve is open.
2. Check the programmer or Summer/Winter switch to ensure that it is operating and set to the correct time to be "ON".
3. Check that the Boiler Control Thermostat is set high enough to be "ON" or calling for heat.
4. Check whether the limit light on the control fascia is glowing, if so it indicates an overheat situation. Press the reset button once the temperature has dropped sufficiently.
5. Check whether the red LOCKOUT lamp on the Control Panel and Burner Control box are glowing. This indicates that the Burner has attempted to start but has not fired successfully. Press the reset button on the Burner Control box, when released, the lights will go out and the Burner will again attempt to start. If the

Burner does not run and again goes to lockout with red indicators glowing:-

- Wait three minutes.
- Repeat the procedure by pressing the button.
- Failure to start on the second attempt indicates a fault requiring attention.
- Switch off the mains supply and call your service engineer.

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2:1 INTRODUCTION

The Camray 5 Combi is:

1. Designed for producing Hot Water and Central Heating.
2. Suitable for sealed Central Heating systems which are within the maximum permitted working pressure. All Boilers are supplied with a manual reset limit thermostat.
3. Suitable for new installations and for replacing existing sealed system Boilers.

CAMRAY Boilers offer greater freedom to select the most suitable position for siting and the opportunity to install the boiler in a suitable outbuilding if required.

All models are supplied for connection to a conventional chimney or any of the available Camray 5 Combi Balanced Flue options.

NOTE: Right hand low level flue not available.

IMPORTANT

To achieve the high flow rates specified there must be dynamic working pressures as specified in the performance graph* at the cold feed to the Boiler. If this is not achievable DO NOT INSTALL THE BOILER.

*(see [section 3.8](#))

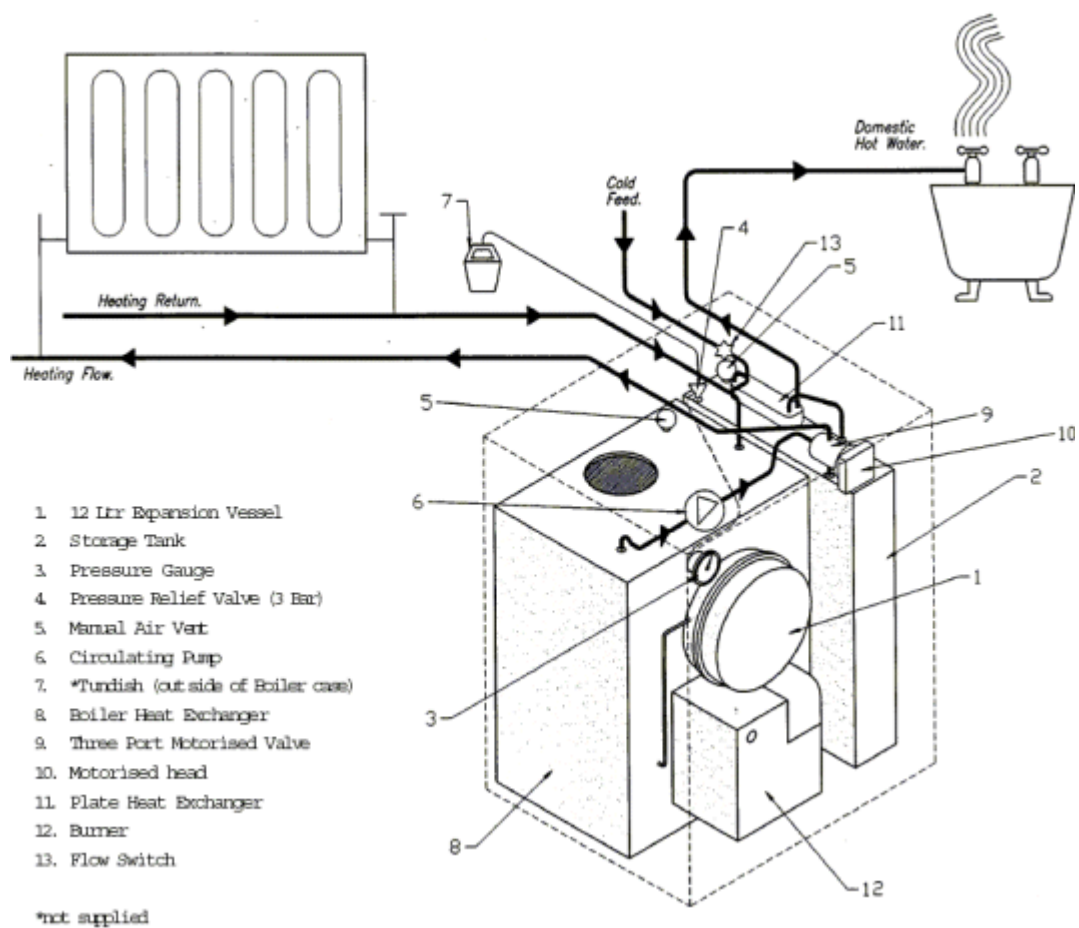


Fig. 2a Schematic Diagram Camray 5 Combi

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2:2 HYDRAULIC CIRCUITS

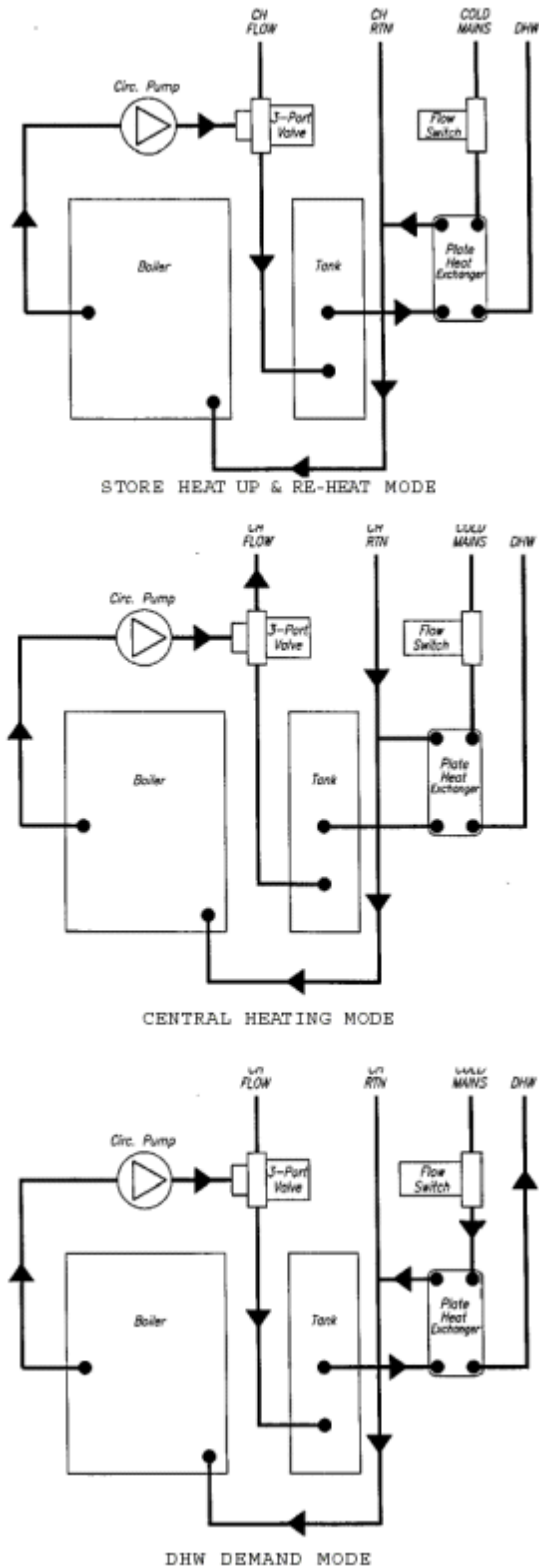


Fig. 2b Hydraulic Circuits

2:3 FLUE OPTIONS

CAMRAY Boilers are designed to operate with high efficiency, clean combustion and low noise level. They offer unique versatility and can be used in the following modes:

1. Low level rear outlet balanced flue.
2. High level rear outlet balanced flue.

3. Vertical outlet balanced flue. (Insulated balanced draught chimney).
4. Low level left hand side outlet balanced flue only.
5. High level side outlet balanced flue (RH or LH).
6. For connection to a conventional chimney.
7. Other options may be available. Please contact Boulter.

Balanced flues are supplied in a carton which includes ALL parts for balanced flue installation. With conventional flue leave gap of 15mm at rear of boiler for air entry.

2:4 COMMISSIONING

The heating system must comply with the latest editions of British Standard 5410 and The Building Regulations.

Please note: It is essential in the interest of the Boiler efficiency and reliable performance that once the Boiler has been installed it is first commissioned by a competent and preferably an O.F.T.E.C.* registered engineer. It is the responsibility of the installer to ensure that the Boiler is commissioned.

If an engineer is not known, Boulter Buderus will be pleased to provide details of commissioning and servicing engineers from their register.

*The Oil Firing Technical Association for the Petroleum Industry - Banstead, Surrey 01737 373311.

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2:5 SAFETY

READ HEALTH AND SAFETY INFORMATION ON INSIDE FRONT COVER OF THIS MANUAL.

IMPORTANT

Should you wish to remove or dismantle any covers or parts of the Boiler for cleaning or maintenance ALWAYS FIRST SWITCH OFF THE ELECTRICITY SUPPLY.

1. On no account should any part of the Boiler or its Flue be modified except as specified in this manual.
2. The wiring of the Control Panel should be as the wiring diagrams included in this Manual. Wiring should not be tampered with, modified or changed for any reason.
3. Only use Boulter replacement parts.

Non compliance with the above will invalidate the Guarantee.

3:1 LIQUID FUELS

The Camray 5 COMBI Boiler will burn liquid fuels complying with BS2869 Part 2 1988 Class C2 specified in the Code of Practice for Oil Firing BS5410 Part 1.

Class C2 (Kerosene)

This fuel is suitable for Camray 5 COMBI. Burners are supplied with the appropriate nozzle and pump pressure as standard for this fuel.

3:2 TECHNICAL DATA

Heat Input (Full load based on Net efficiency of 91%)	
Heat Output (Full load)	
Maximum Boiler working pressure	3 bar Class 2 - 30.6m water head
Minimum return water temperature	60 ⁰ C
Maximum side panel temperature	<35 ⁰ C above room temperature
Conventional flue - Minimum flue draught	0.09mbar (0.035"w.g.)
Conventional flue - Maximum flue draught	0.38mbar (0.152"w.g.)
Range of Boiler Control Thermostat	65 - 85 ⁰ C
Maximum Temperature of Boiler Control Thermostat	85 ⁰ C+/-2 C
Boiler Limit Thermostat Setting	110 C+/-6 C
Maximum Emissions Limit (Class 1)	Nox 250mg/kWh CO 125mg/kWh
Exit Flue Gas Mass Flow	13.5 Kg/secx10 ³
Mean DHW temperature @ 20 l/min (flow) to provide 90 litres capacity (10 ⁰ C Cold Water inlet)	50 ⁰ C
Store Capacity	40 litres
Storage recovery time (between draw offs)	approx 5 to 12 mins depending on boiler size.
Boiler weight empty	175 kg
Boiler and store water content	63.5 litres
Water resistance (Heating)	295mbar with 15 ⁰ C Boiler temperature rise

3:3 BURNER DETAILS

Pressure Jet - Riello RDB supplied as standard. Burner type - 483T50 Manually adjustable air regulator.

For further details of the burner, refer to the burner data sheets supplied in the literature envelope.

As the burner has been specifically matched to this Boiler, the information in the Boiler manual takes precedence.

3:4 ELECTRICS

IMPORTANT

The Electrical Installation of this appliance must be performed by a suitably qualified electrical engineer / installer.

Electrical Supply 230v., 1 Ph., 50Hz.

All wiring to supply and all system components external to boiler must comply with the latest edition of

BS7671 :2001 formerly IEE Wiring Regulations.

This appliance must be effectively earthed and connection to the supply must be through a double pole isolating switch fused 5 amp.

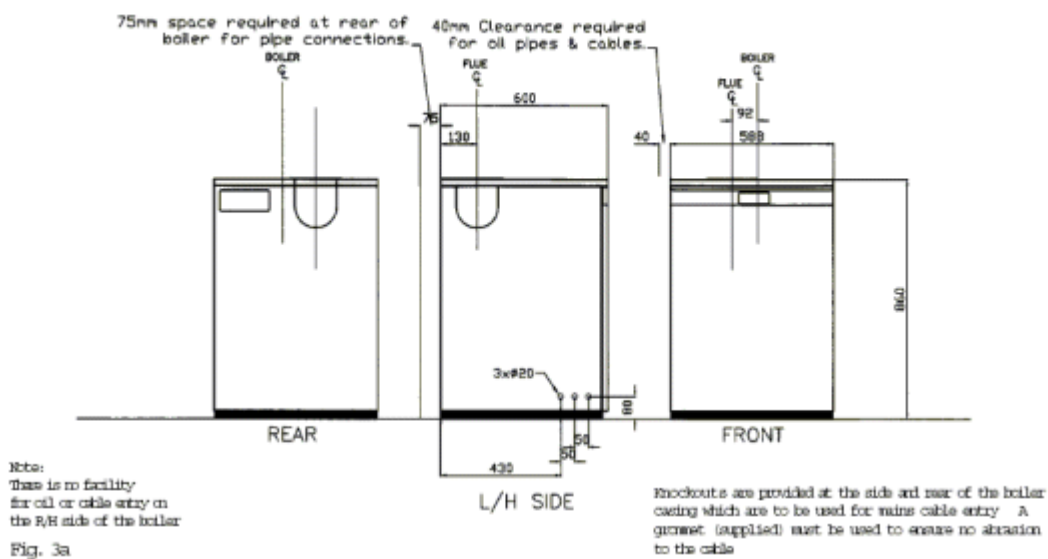
The isolating switch must have all pole contact separations at least 3mm.

90A	70A	55
29kW	22.5kW	17.7kW
26.4kW	20.5kW	16.1kW

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3:5 DIMENSIONS

Camray 5 COMBI



3:6 TUNDISH POSITION

A Tundish must be fitted to provide a visual indication of water flowing from the Pressure Relief Valve of the Boiler.

Installation of the Tundish must be located in a position clearly visible to the householder i.e. to comply with Part G of the Building Regulations -typically as [fig.3.b](#)

The Tundish should be positioned on the right hand side of the appliance.

The Tundish should be positioned on the right hand side of the appliance.

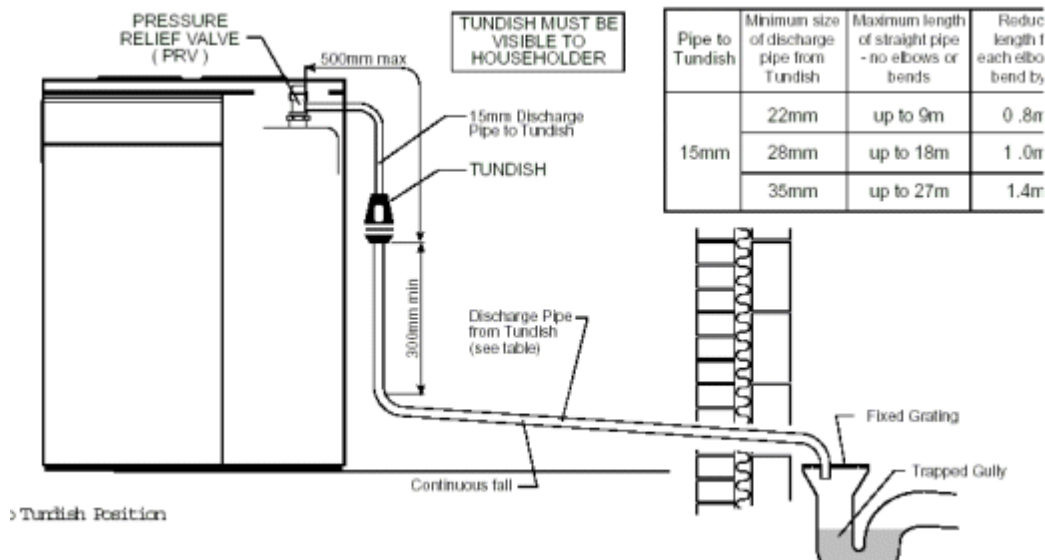


Fig. 3b Tundish Position

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3:7 COMMISSIONING DATA

3:7.1 Class C2 Kerosene Oil

Model	Output		Riello Burner Type	Danfoss Nozzle	Pump Pressure		Fuel Rate Kg/h	CO ₂ %	Smoke No.	Flue Exit Temp °C Gross	Boiler Test Point Temp °C
	kW	Btu/h x1000			BAR	psi					
90A	26.4	90	RDB 483T50	0.85x60°W	8	115	2.57	12	0-1	204	335
70A	20.5	70	RDB 483T50	0.65x60°W	7.6	110	2.0	12	0-1	188	280
55	16.1	55	RDB 484T50	0.50x60°W	8	115	1.57	11	0-1	200	280

1. There are two columns in the table for combustion gas temperature:-
FLUE EXIT temperature, and
BOILER TEST POINT temperature.

2. Where possible CO₂, smoke and flue gas temperatures should be sampled from the FLUE EXIT (i.e. external balanced flue discharge, or from the test point provided in the conventional flue adaptor)

3. These figures may be used to calculate combustion efficiency.

4. Alternatively (where the forgoing is impractical such as vertical BF) gases can be sampled at the BOILER TEST POINT inside the casing.

Because the gas temperatures at this point are significantly higher it should **not** be used to calculate or measure efficiency.

5. If the BOILER TEST POINT temperature agrees with the data in Table 3:7.1, then use the appropriate FLUE EXIT temperature from the table to calculate the combustion efficiency.

6. On conventional flue only - flue draught should be measured at the flue exit test point.

3:8 PERFORMANCE DATA

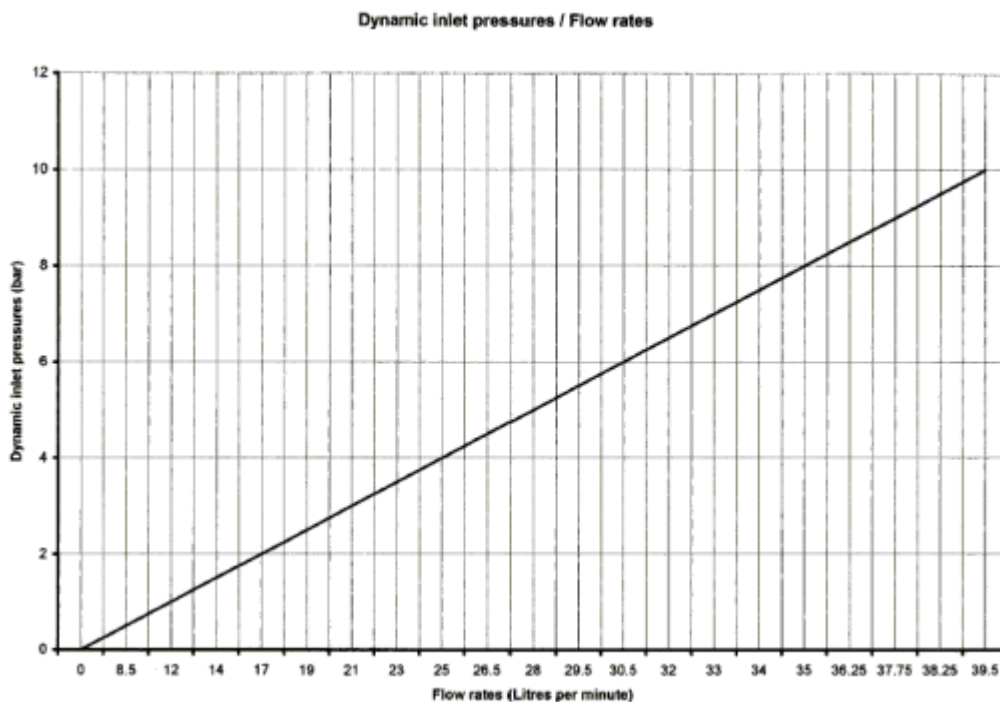


Fig. 3c Performance Graph

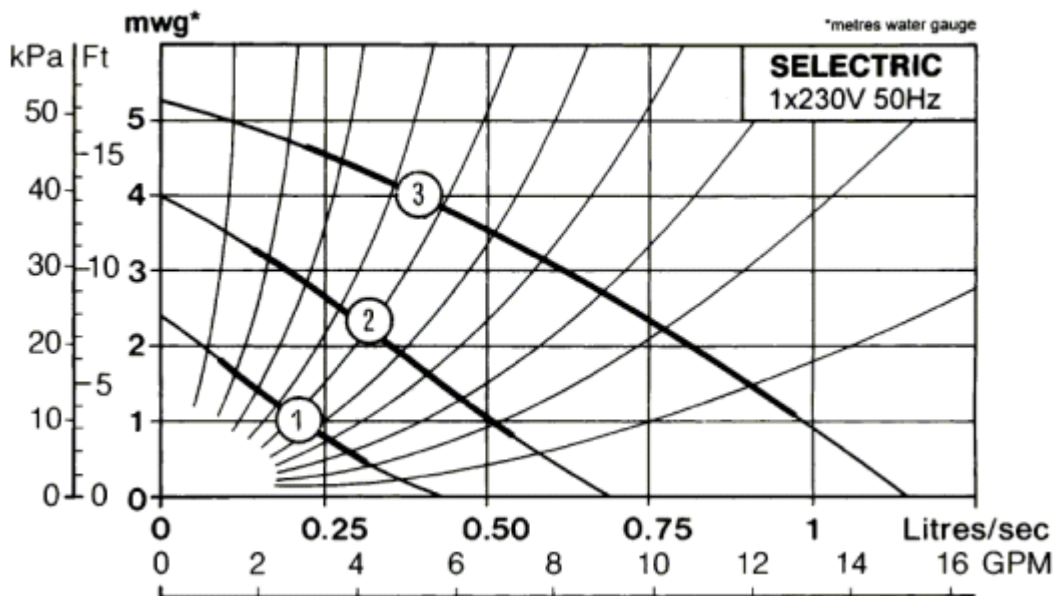


Fig. 3d Pump Head Graph

4:1 STANDARDS & REGULATIONS

The installation of the Boiler must comply with latest edition of :

BS 5410 Oil Installations Pt 1 under 44kW;

BS 5449	Forced circulation hot water central heating systems for domestic premises.
BS 4543	Pt. 1 & 3 Factory made insulated chimneys.
BS 7074	Pt 7 Codes of Practice for Sealed Systems.
BS 7671	Electrical Wiring Regulations.

BUILDING REGULATIONS.

Part J	England and Wales
Part F	Section III Scotland
Part G	Section III
Part L	Northern Ireland

The Control of Pollution (Oil) Regulations

OFTEC

Oil boilers should be installed in accordance with good practice as recommended by OFTEC (Ref. [2:4 COMMISSIONING, page 8](#)).

4:2 THE HEATING SYSTEM

This should be installed in accordance with current good practice as advised by HVCA. It is not the purpose of the manual, nor is it possible, to adequately deal with the subject in this manual.

On existing heating systems where a Boiler is replaced, ensure that the system is chemically cleaned, consult a reputable manufacturer.

The system should contain clean water and be free from leaks. Suitable inhibitors against limescale and corrosion should be added to the system.

Kettling and system noises can be avoided by suitable pre-treatment at the onset.

4:3 SITING & POSITIONING

The noise level from Camray Boilers is quite low and kitchen installations have not given rise to complaints. Consideration must be given however, to the following points.

1. Noise may be accentuated by the installation in small rooms or recesses with hard or hollow stud wall surfaces. Due consideration to the siting of Boilers should be given.

Further advice from BOULTER should be sought where any doubt exists.

2. Some individuals may be particularly sensitive to even low noise levels and this should be discussed before installation.

3. The type of chimney, position relative to the Boiler and whether a draught stabilizer is to be fitted may affect sound level in the room.

4. The Camray 5 Combi Boiler model is serviced from the front and top. A space of 450mm (18) in front and above the Boiler should be available. (On CF a 15mm gap at the rear must be provided for air entry).

5. Any kitchen work top above the Camray 5 Combi Boiler must be made removable for service access or replacement of parts.

6. Boiler installation in bedrooms or living rooms should be avoided if possible.

4:4 THE HEARTH

The Camray 5 Combi has a Hearth Temperature of less than 85°C. The Boiler require a level hearth on which to stand which should comply with the Building Regulations.

If the Boiler is to stand on a floor made of combustible material then protection between the Boiler and the floor should be provided by means of non combustible material.

Consideration should be given to the weight of the Boiler see Fig. 3:2.

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4:5 BOILER ARRANGEMENT

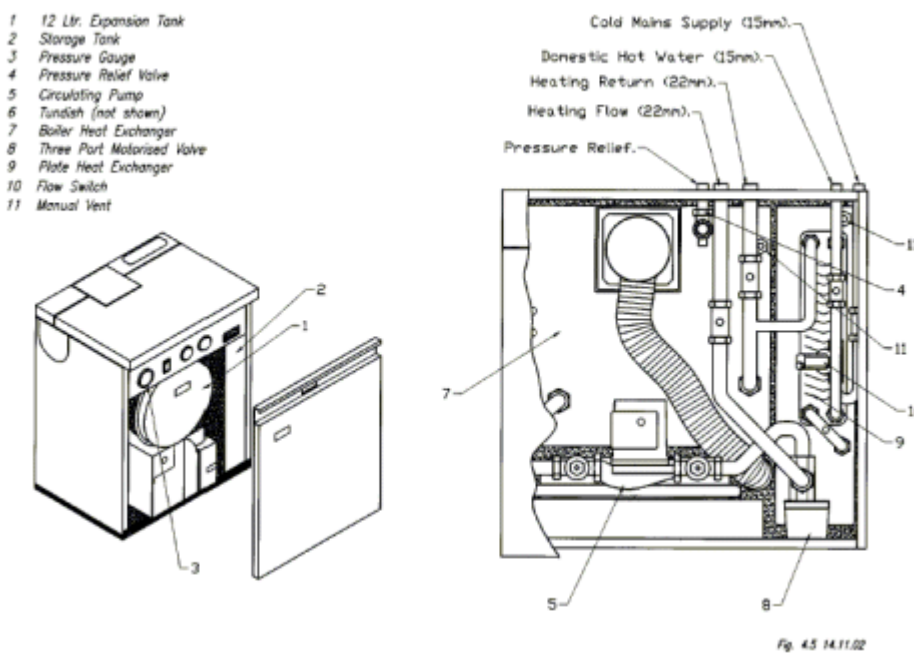


Fig. 4.5 Camray 5 Combi Boiler Arrangement

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4:6 SEALED SYSTEM DETAILS

1. 12 litre Expansion Vessel

The Expansion Vessel is suitable for systems with a static head of up to 5 metres (16.5ft) i.e. the vertical distance between Expansion Vessel and highest point of system, usually the top of bedroom radiators. If the static head is greater than 5 metres, then the charge in the vessel must be increased to equal this higher static pressure. The pressure can be increased if required by simply pumping up the vessel with a standard air type pump and checking the pressure with a tyre gauge with the system at zero pressure. A Schrader type valve is provided on the vessel for this purpose (see note below).

NOTE: The air charge should not exceed a pressure of 1.5 Bar (22 p.s.i.)

Expansion Vessel Requirements

Vessel Charge and Initial System	bar	0.5	1.0	1.5
----------------------------------	-----	-----	-----	-----

Pressure	psi	7.3	14.5	21.8
Expansion Vessel size supplied	Total water content of system including 40 litre tank using expansion vessel supplied.			
12 litres	litres	150	110	75
	gallons	33	24	16.5
For systems having a larger capacity multiply the total system capacity by the factor o obtain the total minimum expansion vessel capacity required.		0.08	0.11	0.16

2. Storage Tank

An insulated tank providing storage for heated water that is used via the Plate Heat Exchanger for domestic hot water production.

3. Pressure Gauge

The Gauge (0-6 Bar) (mounted on the Control Panel) is provided as a visual indication of the water pressure within the system.

A pressure below the set Cold Fill Pressure indicates the system requires "topping up".

4. Pressure Relief Valve (3 bar)

Supplied fitted on the Storage Tank.

5. Manual Air Vent

A Manual Air Vent is supplied on the Boiler Primary Heat Exchanger and the storage tank.

Routine venting of radiators is still advised.

6. Circulating Pump

The pump is fitted to the Flow Pipe as a circulating pump for the Heating System and the Domestic Hot Water Plate Heat Exchanger.

7. Tundish (not supplied)

Provides a visual indication of water flowing from the Pressure Relief Valve.

8. Boiler Primary Heat Exchanger

Insulated steel Heat Exchanger with combustion chamber and access cover at front for servicing.

9. Three Port Motorised Valve

Normally open to Storage Tank.

When heating is in demand the valve diverts hot water to the radiators.

When hot water is demanded the supply to the radiators is closed.

10. Flow Switch

When a hot water tap is opened to discharge at least 2.5 litres/min, the flow switch energises other controls to divert stored hot water to the plate heat exchanger.

11. Plate Heat Exchanger

Uses the stored heated water to quickly produce domestic hot water.

12. Filling Loop

The filling loop is supplied for filling and topping up the system.

THE FILLING LOOP MUST BE DISCONNECTED FROM ONE OF THE FITTINGS WHEN NOT IN USE.

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4:7 THE DOMESTIC HOT WATER SYSTEM

The mains supply pressure should be between 1.0 and 10 bar, however reference should be made to [Fig. 3c](#) in section 3:8 to obtain the correct working pressure. This may require an approved pressure reducing regulator to be fitted before the inlet valve.

The final 600mm of mains water supply pipe to the Boiler must be copper.

All combination Boilers suffer performance degradation due to the effects of hard water (limescale build up on heat exchanger surfaces).

Boulter have taken particular care in the design of this Boiler to minimise this (hard water) effect but, strongly recommend that in areas where water temporary hardness (alkalinity) in excess of 150 mg/l is likely to be encountered, a water conditioner of the chemical dosing type is fitted. Your local water supply authority should be able to advise on hardness.

To achieve the flow rates specified at water outlets (taps), pipework over 3m in length from the Boiler must be dia 22mm.

For specific information relating to fittings e.g. showers, dishwashers, washing machines etc. suitable for connection to the Domestic Hot Water circuit, consult the local Water Authority if in doubt.

Domestic hot/cold water supply : All equipment designed for use at mains water pressure are suitable. The temperature of DHW depends on the water flow from the tap. To obtain a more even temperature a mixing valve can be fitted

Bidets : Subject to local Water Company regulations the supply of hot and cold mains water direct to a bidet is permitted if it is of the over-rim flushing type. The outlets should be shrouded and it should not be possible to temporarily attach a hand held spray. An anti-syphon device is unnecessary.

Fixed head showers : Thermostatically controlled showers are recommended for greater comfort and prevention of high temperatures. An anti-syphon device is unnecessary.

Flexible head showers : It must not be possible for the head to fall closer than 25mm above the top edge of the bath to prevent immersion in it, or the shower must be fitted with an anti-syphon device at the connection to the flexible hose.

4:8 CONNECTIONS TO THE BOILER

Connection to the Boilers 15mm and 22mm pipes should be made using compression fittings, either elbow or straight couplings can be used dependent on installation.

4:8.1 Cold Mains In

To achieve optimum flow rates the incoming cold should be 22mm pipe reduced to 15mm to suit the Boilers pipe.

4:8.2 Domestic Hot Water

To achieve optimum flow rates the 15mm domestic hot water flow from the Boiler should be increased to 22mm.

4:8.2 Heating Connection

The Boilers heating flow and return pipes are 22mm.

4:8.3 Pressure Relief Valve Connection

The Boilers Pressure Relief outlet pipe is 15mm. The installations connecting pipe work to a suitable Tundish must be in accordance with G3 Building Regulations (see Fig. 3b).

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4:9 THE CHIMNEY - (FLUE dia 4")

CONVENTIONAL CHIMNEY INSTALLATION ONLY.

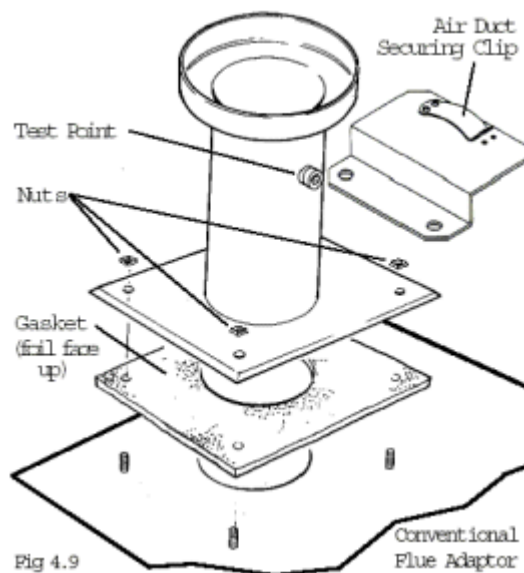
VERY IMPORTANT

All Camray 5 boilers are supplied in Balanced Flue Form.

To connect to a conventional chimney you must use The Conventional Flue adaptor Part No. FC4CF.

This includes all parts necessary to make the connection to the boiler. A test point is also provided for ease of installation and commissioning. Secure the air duct in the clip provided.

The use of this adaptor is essential for safe performance and is a condition of the guarantee that this must be fitted.



The boiler requires a minimum stable draught of 0.1 mbar (0.04w.g.).

If the chimney exceeds 6m (20 feet) in length, it may produce a draught exceeding 0.37 mbar (0.15 w.g.) and a draught stabiliser should be fitted.

The chimney should comply with the latest edition of the Building Regulations and BS 5410: Part 1.

Factory built chimneys must comply with the Building Regulations and BS 4543 Parts 1 and 3.

Compliance with the Building Regulations does not indicate that the chimney is satisfactory in respect of draught conditions, or is positioned so that down draughts will not occur.

Special pots and cowls which might restrict the flow of gases must not be fitted and should be removed.

A brick chimney must be fitted with a suitable stainless steel liner. Insulation between the liner and an exposed chimney may be necessary to avoid condensation.

A flexible liner should be the same diameter as the Flue Offtake size of the boiler - 4(100mm).

The Flue pipe, connecting the boiler to the chimney adaptor should be the same diameter as the Boiler Flue Offtake and should not be more than 1.8m (6-0) long. Flue Pipes when fitted should satisfy or be deemed to satisfy the Building Regulations.

Flue pipe bends - 90⁰ bends must not be used -use 135⁰ bends. Bends with soot doors should be used where necessary.

FOR BALANCED FLUE INSTALLATIONS SEE [SECTION 6](#).

4:10 AIR SUPPLY

CONVENTIONAL CHIMNEY INSTALLATION ONLY

A permanent adequate supply of air is required for combustion and correct operation of a draught stabiliser, if fitted.

This air enters the Boiler through the back panel. At least 15mm clearance is required at the rear of all boilers.

When the boiler is situated in a confined space or chamber a permanent adequate supply of air is required for ventilation to prevent over heating.

4:6.1 Opening Sizes

The clear opening required for combustion only should be based on a requirement of 550mm²/kW, (or 1in²per 4000 Btu/h) above 5kW

When a draught stabiliser is fitted to the flue pipe or chimney in the room in which the boiler is situated the clear air intake should be 1100mm²/kW.

When the boiler is situated in a confined space with Combustion or Ventilation air from outside - Allow 550mm²/kW at low level and in addition 550mm²/kW at high level;

When Combustion and Ventilation air is taken from a heated adjoining space the allowance should be 1650mm²/kW at low level and in addition 1100mm²/kW at high level. Ensure that the heated adjoining space itself has an adequate supply of air.

When the Boiler is installed in a basement or low level boiler house where air can enter only from high level, the incoming air supply for Combustion and Ventilation should be ducted to low level. A high level outlet should be provided for ventilation.

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4:11 OIL STORAGE

4:11.1 Oil Tank

Consideration to the access by fuel delivery lorries should be given when positioning the oil tank.

Tank positioning should be in accordance with BS 5410 Part 1 and OFTEC Technical Book 3.

In the interest of most economical deliveries the Oil Tank should be of 3,000 litres (600 gallons) capacity.

It should be complete with the following:

1. Sludge Cock - on steel tanks.
2. Outlet Valve.
3. Contents Indicator.
4. Screw fill connection and independent vent. The Fill and Vent should be suitably capped to prevent ingress of water or fitted with return bends.

4:11.2 Steel Tanks

Tanks should be mounted on suitable supports, if these are of brick or blocks, a damp proof membrane should be inserted between the tank and its supports.

Tanks should slope 20mm per 1m of length downwards from the Oil Outlet to the Sludge Cock situated at the opposite end.

4:11.3 Plastic Oil Tanks

Tanks made from plastic are now available. These should be UV stabilised for protection against sunlight, and coloured green. Plastic tanks do not need to stand on piers, but should be supported across the entire base area, ideally on 50mm thick garden slabs or a concrete base. As there is only one tapped outlet they are more suited to single pipe feed as gravity supply or with a Boulter 3K Oil Loop Deaerator where suction lift is required. (Part No. BS 03060)

4:12 OIL SUPPLY

The oil entry holes in the boiler casing are shown in the diagram in [Section 3:5](#) of this manual. Flexible Hoses supplied with the Boiler MUST NOT pass through these holes.

All joints in the Oil Lines must be oil tight and the Oil Line should be flushed clean before connecting to the burner.

Note that no soldered joints are permissible in the oil line.

4:12.1 Oil Filter

An Oil Filter is supplied with the Boiler. Connections are 1/4 BSP Female, see [Fig. 4.12](#).

It is essential for reliable operation that the Oil Filter is fitted in the Oil Pipe supplying Oil from the Tank to the Burner. It should be fitted as close to the Boiler as practicable, but NOT inside the Boiler casing.

It is a condition of the guarantees that the Filter is fitted correctly.

4:12.2 Fire Check Valve (Not Supplied)

A Remote acting FIRE VALVE* must be fitted in the suction line at the time of installation - see BS 5410: Part 1.

The valve must be fitted external to the Boiler, preferably at point where the Oil Pipe enters the building. The sensor should be located above the Burner in the clip provided, see [figs. 4.12a, 4.12c, & 4.12e](#).

The entry point for the Fire Valve Sensor should be through any of the 20mm ET knockouts located at the top of the rear casing, or side panels.

To prevent damage to the capillary always pass the sensor through the blind grommet (supplied), it will be necessary to cut across the diaphragm.

*Remote Acting Fire Valves are available from Boulter, through your merchant or installer e.g.

Ref:	Operating Temperature	Capillary Length
RAF9015C	90°C	1.5m
RAF9030C	90°C	3.0m
RAF9060C	90°C	6.0m
RAF9090C	90°C	9.0m

4:12 Single Pipe System

[Fig. 4.12a](#)

If the bottom of the Oil Tank is above the oil Burner, install a 10mm copper supply pipe to the Burner incorporating the correct Filter, Shut Off Valve and Fire Check Valve.

Ensure that the Burner Oil Pump is correctly set for Single Pipe operation. (See [4:13.2](#)).

4:12 Two Pipe System

[Fig. 4.12c](#)

When the bottom of the Oil Tank is below the level of the Oil Pump on the Burner it is necessary to install an additional 10mm return pipe.

The Oil Filter, Shut Off Valve, spring loaded Non-Return Valve and Fire Check Valve are always in the suction line supplying oil from the Tank to the Burner.

The Non-Return Valve must be fitted to allow the

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flow in the correct direction and prevent drain back to the Tank, see [Fig. 4.12c](#).

Ensure that Valves are NOT fitted in the Return Line. The Return Line must be unobstructed at all times.

Ensure that the Burner Oil Pump is correctly set for two Pipe operation. (See [4:13.1](#))

4:12.5 Deaerator Oil Pipe System

[Fig. 4.12e](#)

An alternative two pipe arrangement can be achieved using a 3K-Oil Loop Deaerator which removes the air from the oil feed on a single pipe lift. The Burner Pump is piped to the Deaerator, which should be positioned close to the burner, but NOT inside the Boiler Case. **A Non-Return Valve is not required in the return line.**

The advantage of this system is gained where a two pipe run from the oil supply tank is long or difficult to achieve.

Boulter 3K Deaerators are available as an optional extra from your merchant (Part No. BS 03060).

4:12.6 Water Separator Oil Filter

For changeover applications, the use of a Water Separator Oil Filter, available from BOULTER BOILERS is recommended (BS03052).

4:12.6 Flexible Oil Pipes

Camray 5 Boilers and 3K Deaerator Fitting Kits are supplied with long life Flexible Oil Pipes.

The Flexible Oil Pipes are fitted inside the Boiler casing and are of adequate length to enable the Burner to be removed without disconnecting. When fitted correctly the pipes should be curved round the Burner as shown in [Fig.4:12](#)

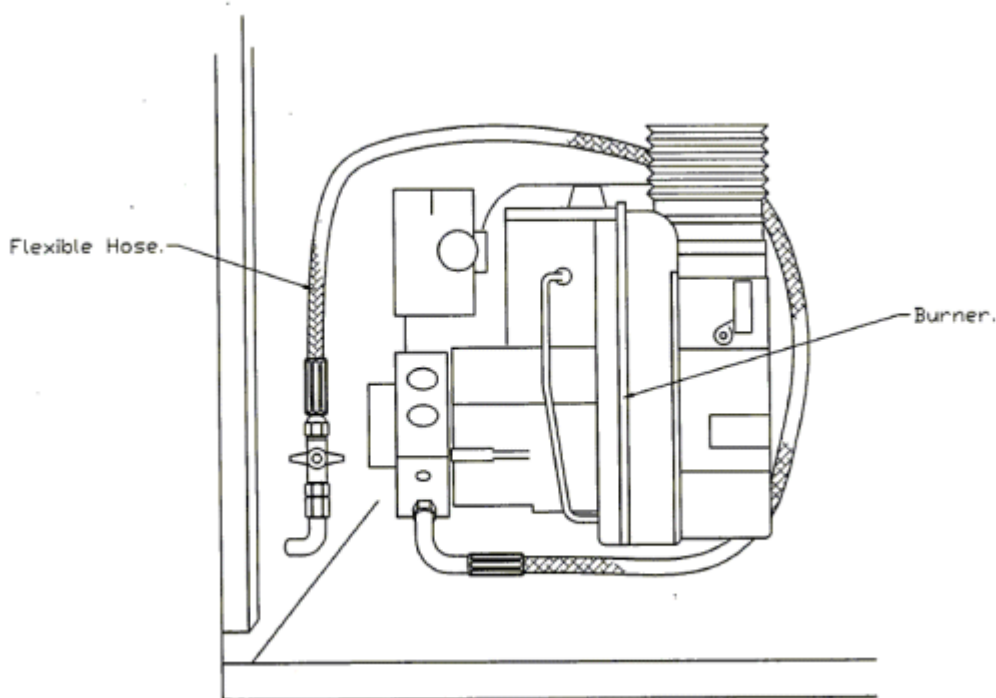


Fig. 4.12

Flexible Oil Pipes and Fire Check Valve

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SINGLE PIPE OIL SYSTEM - TANK OUTLET ABOVE BURNER

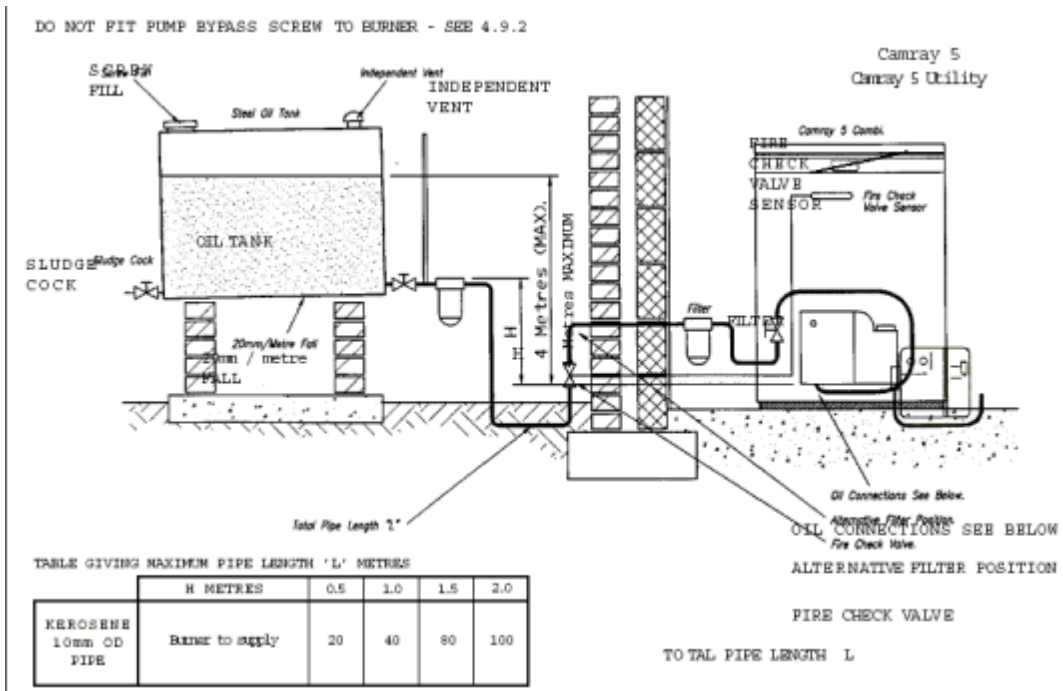
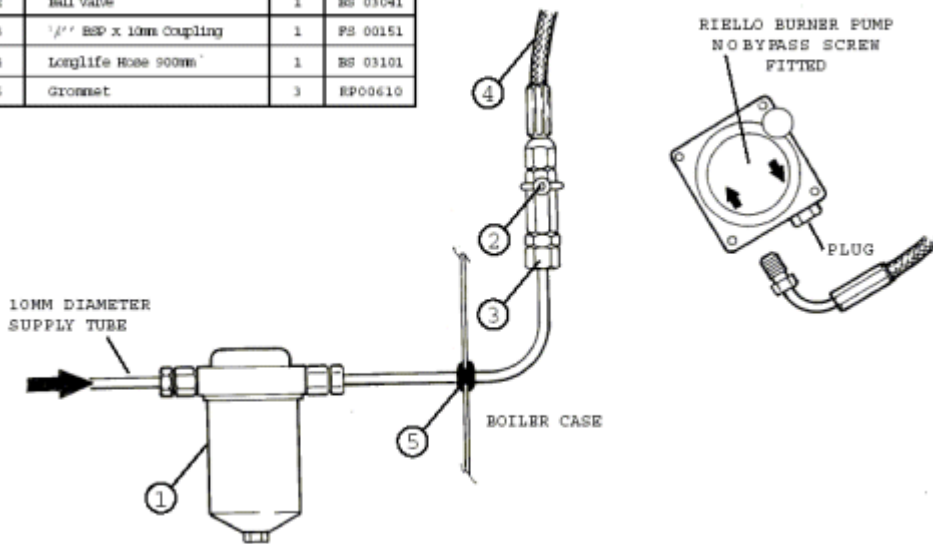


Fig. 4.12a Single Pipe Oil System.

SINGLE PIPE OIL SYSTEM - OIL CONNECTIONS

Items 1 - 5 supplied with Boiler

ITEM	PART	QTY	CODE
1	Filter 25l	1	BS 00496
2	Ball Valve	1	BS 03041
3	1/2" BSP x 10mm Coupling	1	PS 00151
4	Longlife Hose 900mm	1	BS 03101
5	Grommet	3	EP00610



LH FUEL ENTRY AVAILABLE
SCHEMATIC DIAGRAM FIT HOSE AS SHOWN IN FIG. 4.9a

Fig. 4.12b Schematic Oil Pipe Connectors

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TWO PIPE OIL SYSTEM - TANK OUTLET BELOW BURNER

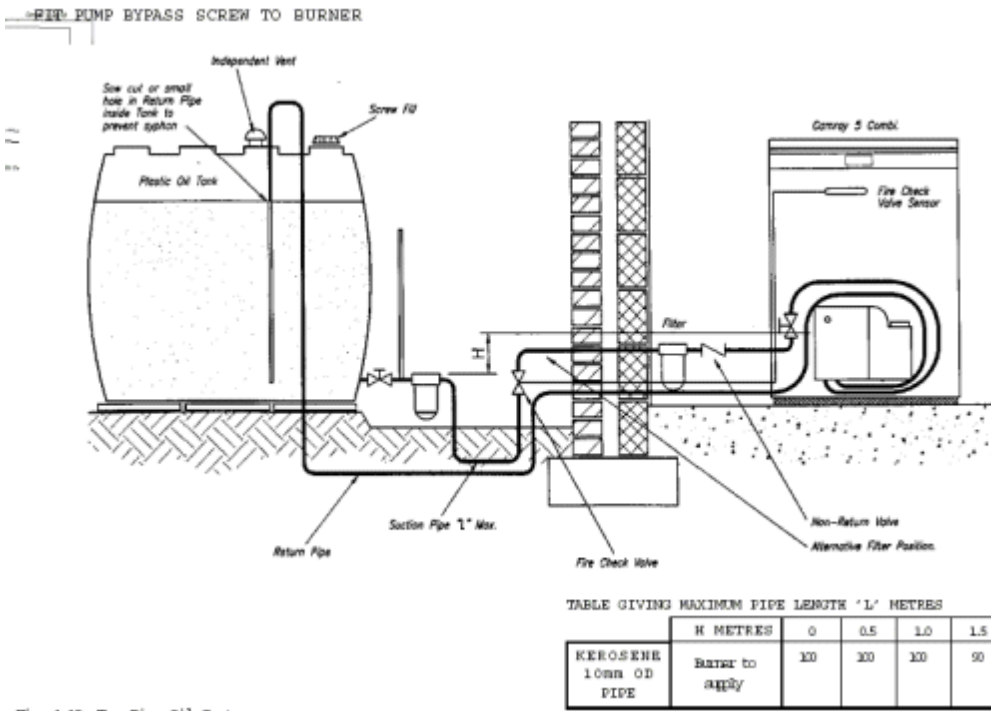


Fig. 4.12c Two Pipe Oil System.

TWO PIPE OIL SYSTEM - OIL CONNECTIONS

Items 1 -5 are supplied with the Boiler. See Fig 4:8c.

ITEM	PART	QTY	CODE
6	Non Return Valve	1	BS 00538
8	Longlife Hose 900mm	1	BS 03103
9	W ashers	2	PS 00159
10	3/4" BSP x 10mm Coupling	3	PS 00157

Items 6 -20 NOT supplied with boiler.

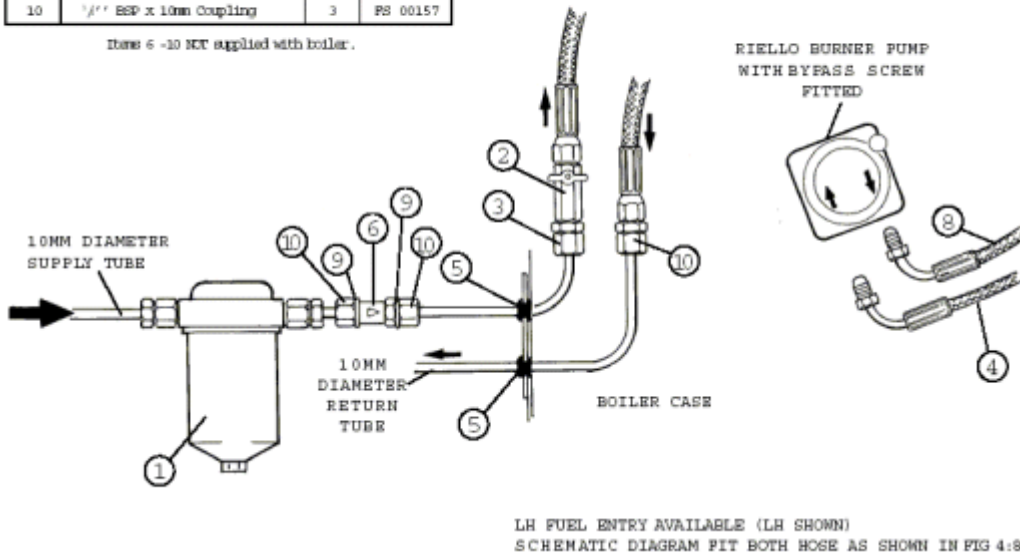
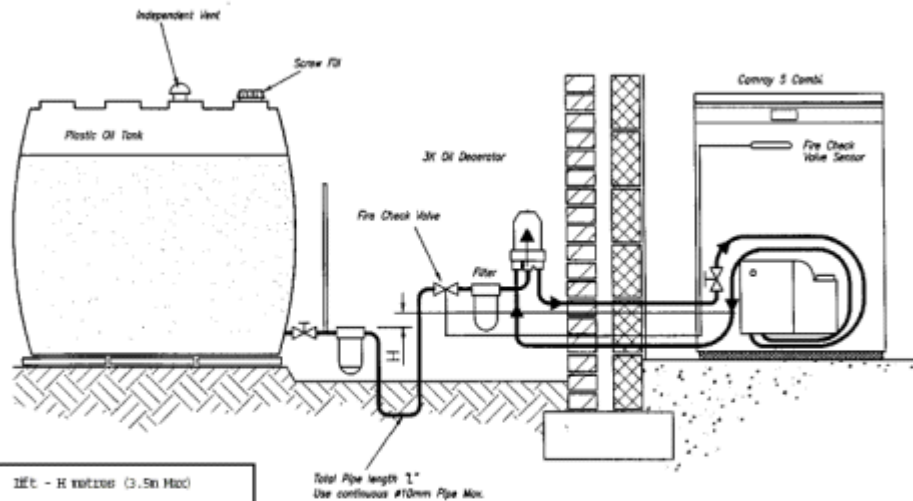


Fig. 4.12d Schematic Oil Pipe Connectors

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DEAERATOR OIL SYSTEM - TANK OUTLET BELOW BURNER

FIT PUMP BYPASS SCREW TO BURNER



Pipe Size W x H O/D	IEt - H metres (3.5m Max)							
	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
6	24	21	19	16	13	11	8	6
8	100	100	93	84	71	59	46	33
10	100	100	100	100	100	100	100	100

Total Pipe length 1"
Use continuous #10mm Pipe Max.

3K OIL DEAERATOR MUST BE INSTALLED UPRIGHT
OUTSIDE BUILDING.
DO NOT FIT NON-RETURN VALVE

Fig. 4.12e Deaerator Oil Systems

DEAERATOR PIPE OIL SYSTEM - OIL CONNECTIONS

Items 1-5 are applied with the boiler. See Fig. 4.9c

LH FUEL ENTRY AVAILABLE
SCHEMATIC DIAGRAM FIT BOTH HOSE AS SHOWN
IN FIG 4.9c

ITEMS 7, 8, & 10 ARE AVAILABLE AS A KIT NO. BS 03058C.

ITEM	PART	QTY	CODE
6	K Oil Tap	1	BS 03060
7	1/4" BSP x 10mm Coupling	3	FS 00151
8	Longlife Hose 900mm	1	BS 03103
10	1/4" x 10mm Coupling	1	FS 00157

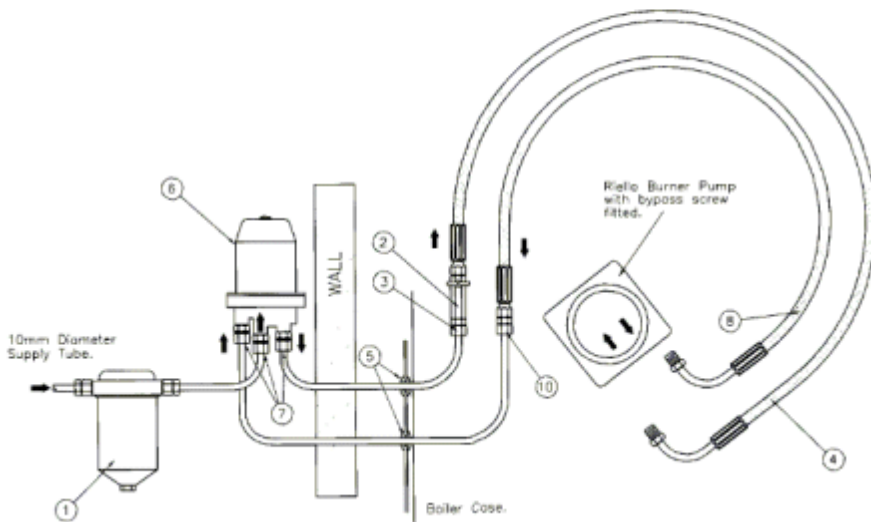


Fig. 4.12f Schematic Oil Pipe Connections.

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4:13 OIL BURNER

The Burner makers technical leaflet is supplied with this manual and provides supplementary information not included in this manual.

4:13.1 Burner Pump for Two Pipe and Deaerator System

For two pipe oil systems the Burner Oil Pump has to be fitted with the Bypass Screw supplied. Boilers are dispatched with the Bypass Screw in a labeled envelope attached to the Burner. This socket screw is inserted into the return port as shown in Fig. 4.13a.

ONLY USE BYPASS SCREW FOR ALLEN KEY (2.5MM).
DO NOT USE SLOTTED SCREW

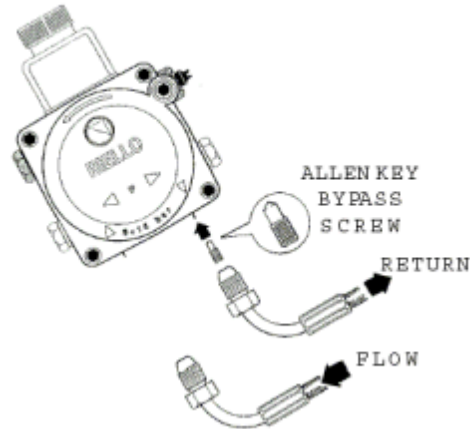


Fig. 4.13a Burner Pump for Two Pipe Operation

4:13.2 Burner Pump for Single Pipe System

The burner is supplied set for single pipe operation. The return port is plugged and the Bypass Screw is not fitted. See Fig. 4.13b.

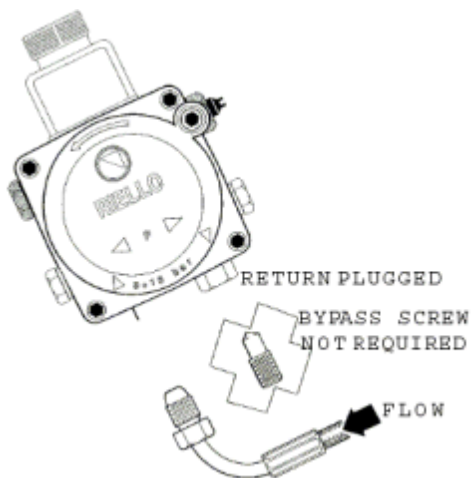


Fig. 4.13b Burner Pump for Single Pipe Operation

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4:14 CONTROL PANEL

The Control Panel is pre-wired and fitted to the Boiler ready for connection to the system wiring.

For operation of the Control Panel see [section 1 -User Guide](#).

4:14.1 Connecting Control Panel

Connect the mains electrical supply to the 3 pin male connector plug supplied and insert into female connector in control panel base.

4:14.2 Boiler Tank Phial Positions

Insert the Thermostat Phial into the relevant pockets as shown in Fig. 4.14

4:14.3 Room and Frost Thermostats

Connections for both thermostats are made through ET knockouts in the bottom of the control panel.

BLUE = DHW 95°C Stat
 ORANGE = Control Stat
 WHITE = PRV Gauge
 RED = 110°C Limit Stat
 YELLOW = Tank Stat

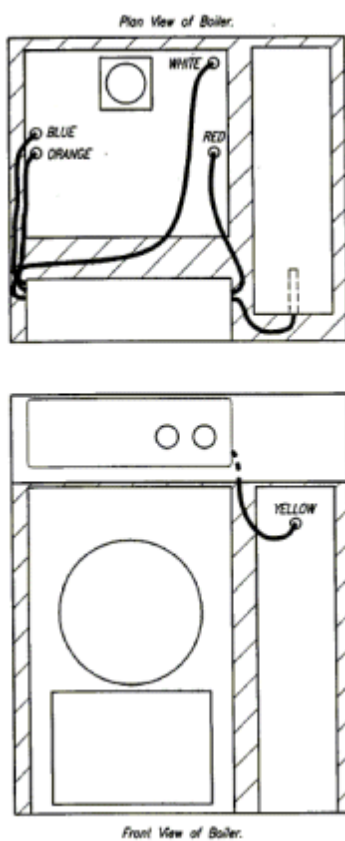


Fig. 4.14 Thermostat Phial Pocket positions

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4:15 FUNCTIONAL FLOW DIAGRAMS

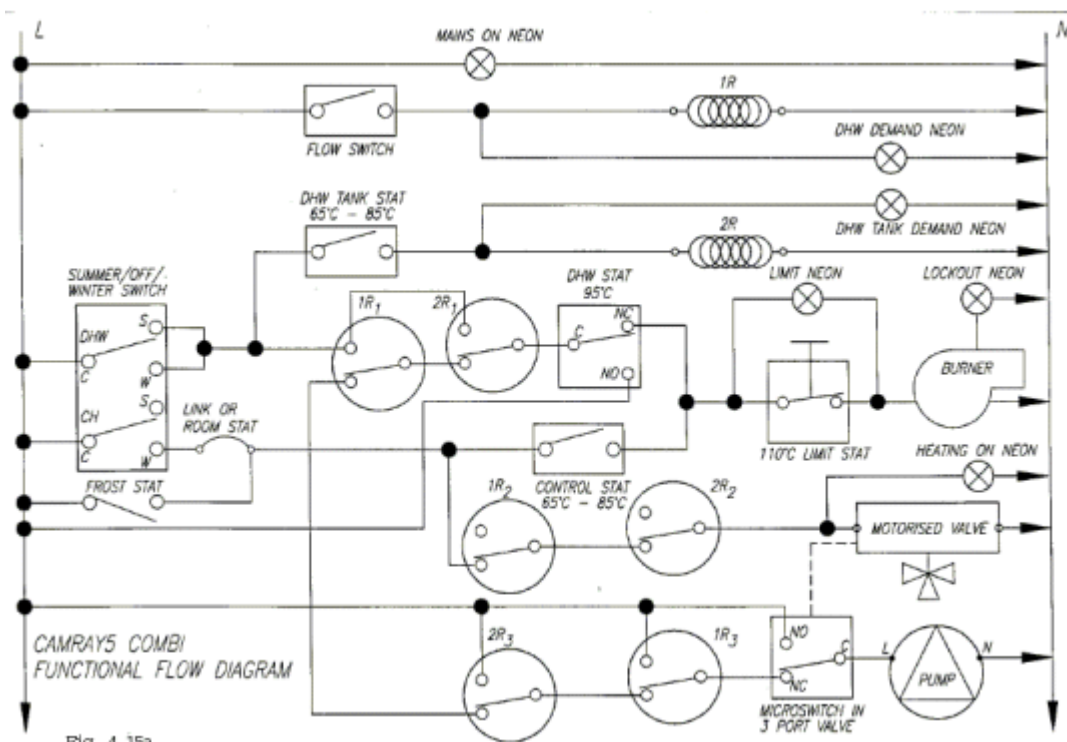


Fig. 4.15a

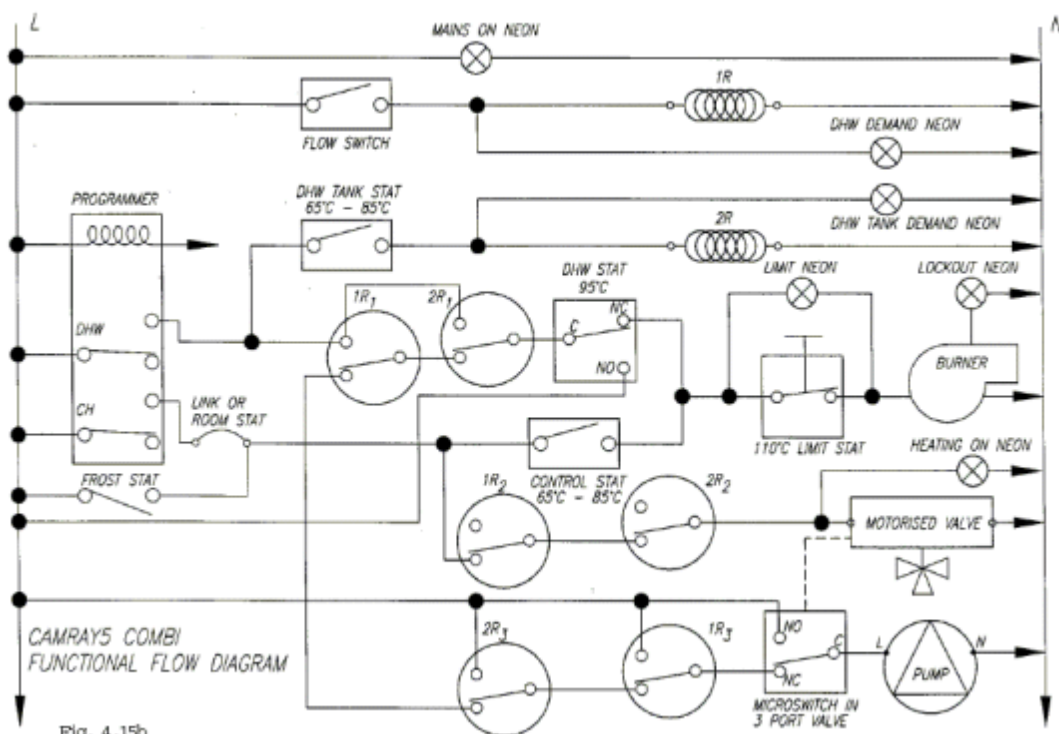


Fig. 4.15b

Wiring Colours:-
 BRN = Brown
 BLU = Blue
 GRN/YEL = Green/Yellow
 VIO = Violet
 BLK = Black
 WHT = White
 ORG = Orange
 GRY = Grey
 YEL = Yellow

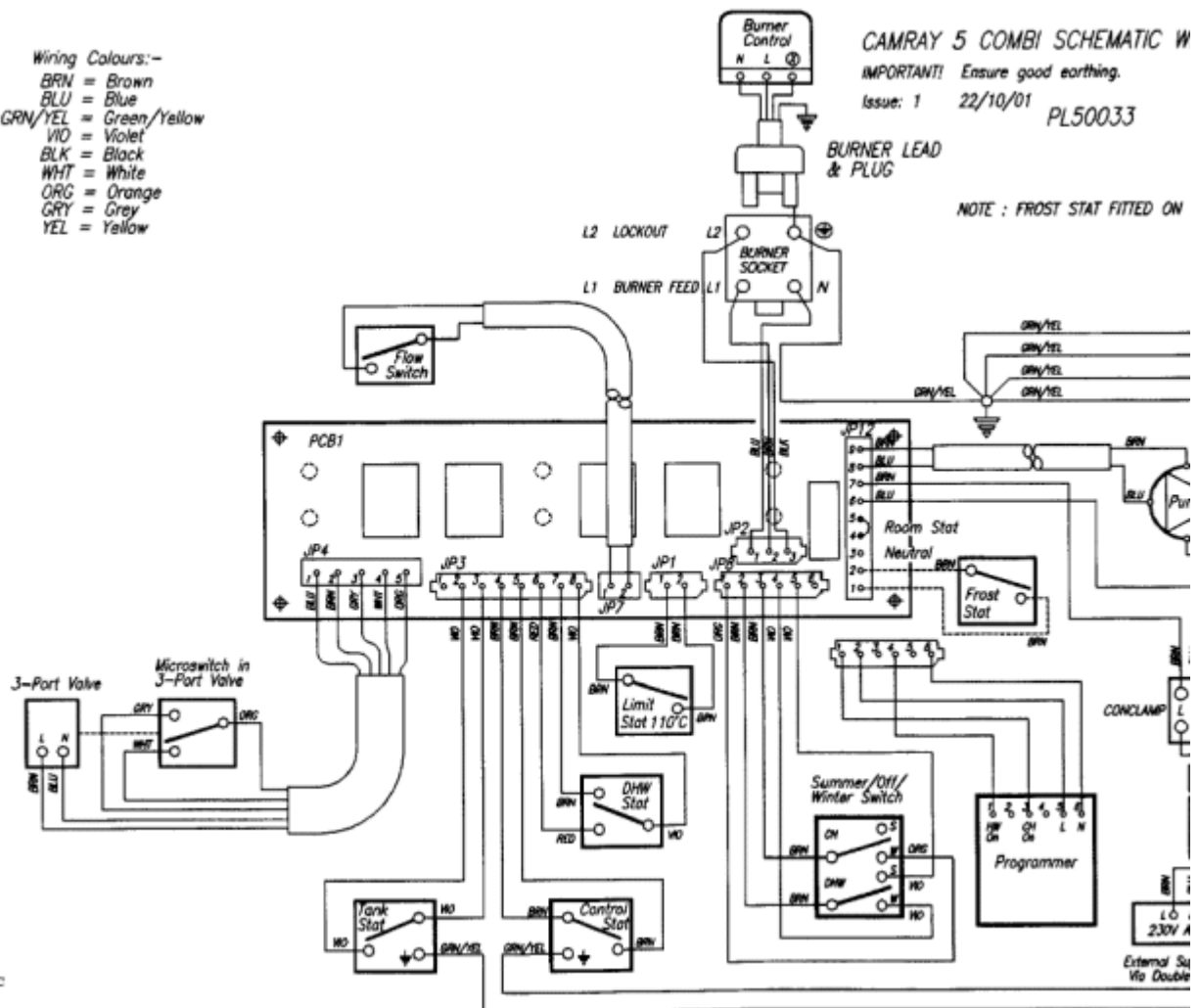


Fig. 4.15c

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4:16 FITTING PROGRAMMER**IMPORTANT**

The Electrical Installation of the programmer must be carried out by a suitably qualified electrical engineer / installer

1. Isolate Mains supply to boiler.
2. Remove Control Panel Cover.
3. Unplug the Summer/Winter switch from the PCB.
4. Remove the Summer/Winter switch and mounting plate together by:-
 - a) Using a sharp knife, cut through the fascia overlay around the mounting plate.
 - b) Strip corner tags to release plate.
5. Remove blue tag from rear of programmer for the correct operation of a fully pumped system.
6. Feed programmer wiring harness through the exposed aperture and push the programmer into the panel fascia.

7. Plug the wiring harness plug into the vacant socket on the PCB.
8. Replace the Control Panel Cover.
9. Restore mains electricity and follow the programmer instructions.

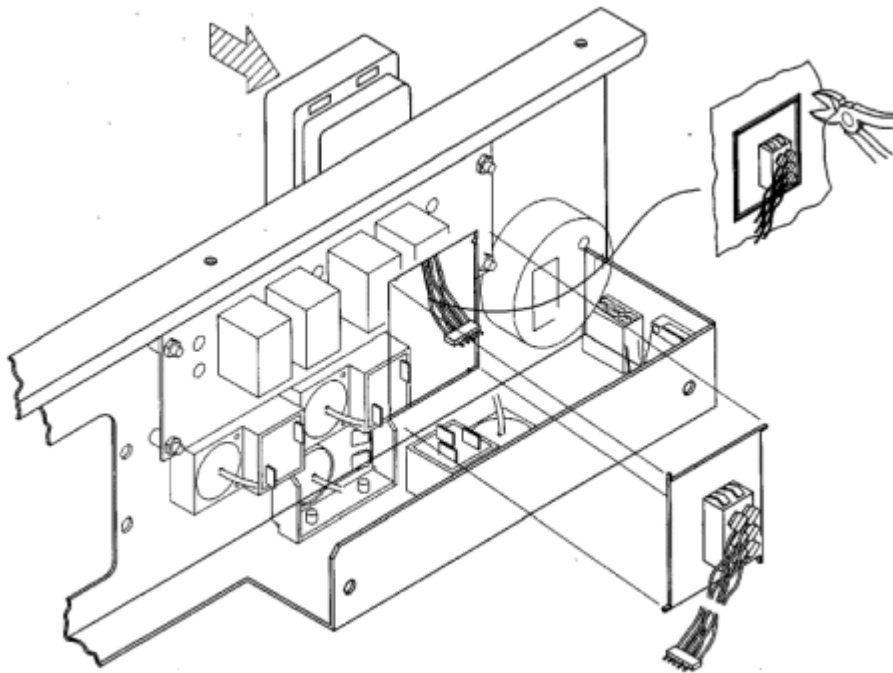


Fig. 4.16

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4:17 PROGRAMMER INSTRUCTIONS

4:17.1 INTRODUCTION

The Boulter Programmer is available in kit form as an optional extra for Boulter Buderus.

Fitting Instructions for the programmer are included in the Programmer Kit.

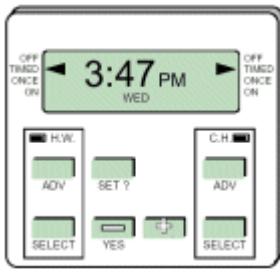
The Timer/Programmer is supplied pre-programmed with a 'Standard' set of times. These may be as required but can be easily changed if not. See 6 for Standard Time Settings.

4:17.2 OPERATION

The Timer/Programmer will automatically switch the heating and/or hot water ON and OFF once each day for three times each day, whichever is selected.

Any times can be programmed with different settings for the five weekdays and the two weekend days.

The unit has a recharging battery back-up system to protect the programme settings for up to 24 hours.



4:17.3 DAY TO DAY USE OF THE PROGRAMMER

The Programmer has 6 options to select for CH and HW, these are printed on the unit and the arrow on the display points to the option when selected using the SELECT button.



OFF	Off all the time
TIMED	On for three periods each day ON1 > OFF1 ON2 > OFF2 ON3 > OFF3
ONCE	On for one period each day ON1 > OFF3
ON	On all the time

The programmed switching times can be overridden using the Advance Button.

The Advance Button switches OFF to ON and ON to OFF without changing the normal switching times.

Certain heating installations do not allow for the Hot Water to be OFF whilst the Central Heating is ON.


The installer of the system should explain the relevant operations of the Timer/Programmer.


4:17:4 SETTING THE CLOCK

1. Switch ON the Electrical Supply to the Boiler - the Clock Display should come on.

2. Press and release  once.

Display > 

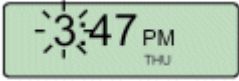
3. Press and release  once to answer. The Day on the Display will flash.

Display > 

4. Use  or  to select Day.

5. Press and release  once.

6. The Hour on the display will flash.



Use the or to change Hour.

The Clock is a 12 hour display - check the AM and PM.

7. Press and release the once.

8. The Minutes on the display will now flash.



Display >

Use the or to change Minutes.

9. Press and release four times to revert to operating mode.



Display >

For Programming refer to [section 4:16.8](#)

HELP!!

If during resetting Clock or Programme you get confused and wish to start again - Press and at the same time for a moment. The unit will revert to 12:00am (midnight) and the 'Standard' Programme.

4:17.5 NOTES ON PROGRAMMING

1. If no button is pressed for 1 to 2 minutes during programming, the unit will revert to normal operating mode.
2. The + and - buttons are used to change times. Press and release for small changes. Press and hold to skip through quickly.
3. The 6 switching times ON1 OFF1, ON2 OFF2, ON3 OFF3 must be in time order. The unit will not accept times if they are not correct.
4. The first switching time ON1 must be set after 12:00am (Mid-night).
5. The last switching time OFF3 can be set after 12:00am (Mid-night).
6. The longest time from ON1>OFF3 is 23hrs 50mins.

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4:17.6 PROGRAMMES

STANDARD PROGRAMME	MON - FRI PROGRAMME	SAT & SUN PROGRAMME

		HW	CH	HW	CH
FIRST PERIOD	ON 1	6:30am	6:30am	7.00am	7.00am
	OFF 1	8:30am	8:30am	9.00am	9.00am
SECOND PERIOD	ON 2	12 noon	12 noon	12 noon	12 noon
	OFF 2	12 noon	12 noon	12 noon	12 noon
THIRD PERIOD	ON 3	4:30pm	4:30pm	4.00pm	4.00pm
	OFF 3	10:30pm	10:30pm	11.00pm	11.00pm



Pencil in your own programme below for reference

CUSTOM PROGRAMME		MON - FRI PROGRAMME		SAT & SUN PROGRAMME	
		HW	CH	HW	CH
FIRST PERIOD	ON 1				
	OFF 1				
SECOND PERIOD	ON 2				
	OFF 2				
THIRD PERIOD	ON 3				
	OFF 3				


4:17.7 PROGRAMMING SEQUENCE

MONDAY to FRIDAY		SATURDAY & SUNDAY	
1. ON1	- CH ON	13. ON1	- CH ON
2. OFF1	- CH OFF	14. OFF1	- CH OFF
3. ON2	- CH ON	15. ON2	- CH ON
4. OFF2	- CH OFF	16. OFF2	- CH OFF
5. ON3	- CH ON	17. ON3	- CH ON
6. OFF3	- CH OFF	18. OFF3	- CH OFF
7. ON1	- HW ON	19. ON1	- HW ON
8. OFF1	- HW OFF	20. OFF1	- HW OFF
9. ON2	- HW ON	21. ON2	- HW ON
10. OFF2	- HW OFF	22. OFF2	- HW OFF
11. ON3	- HW ON	23. ON3	- HW ON
12. OFF3	- HW OFF	24. OFF3	- HW OFF

4:17.8 PROGRAMMING PROCEDURE

To create a programme the same method is used as for setting the Clock.

With the Timer/Programmer in the operating mode and the Display showing the correct Time and Day.

Display > 


Press  twice


Display > 

Press  to answer


Display > 

Press  to change ON1 in sequence or -


Press  to continue through sequence

Display >  (after )

Use  and  to change time by 10 min intervals.

Press  - time is now set.

Continue through sequence pressing  to change setting and  to continue.

On completion Press  three times to return to operating mode.



4:17.9 TEST

The Test facility is a unique feature of the Boulter Programmer. Test enables a quick review of the 7 day programme.


TO USE 'TEST' With the Timer/Programmer in the operating mode and the Display showing the correct Time and Day.

Press  three times.

Display > 

Press  - then press and hold  and the display will 'run' and pause for 2-3 seconds on the first ON time of the day you are at. The On indicator lights will illuminate and heating/hot water circuits will be energised. Releasing the YES button will stop the display running.

Continue pressing  button to run through the 7 days of the programme pausing at each switching time.

Press  twice to cancel Test and return to operating mode.

4:17.10 HOLIDAY



The Holiday Setting is a unique feature of the Boulter Programmer. This enables a period of days to be set (up to 99) during which time the Heating System is OFF. When the Holiday Period is over the Programmer reverts back to the normal programme. Each count through mid-night = 1 day.

TO SET 'HOLIDAY MODE'

With the Timer/Programmer in operating mode and the Display showing the correct Time and Day

Press  four times and  once.

Display > 

Use  and  to set number of holiday days.

Press  once

Display > 

The Programmer is now in 'Holiday Mode' for the period set.
Have a Good Holiday!

To cancel 'Holiday Mode' press any button.

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5:1 BALANCED FLUE BOILERS

A range of Balanced Flue Kits are available as optional extras for Camray 5 Boilers.

Balanced Flues permit considerable choice of siting of the Boiler. Boilers may be installed in situations where no chimney exists, where the chimney is unsatisfactory or in outhouses.

It is important that care is exercised in choosing a suitable location for the Boiler and Flues. It is to be expected that with the help of this manual and the application of caring engineering experience and common sense unreasonable liberties will not be taken.

It is a mandatory requirement that:-

1. The terminals of balanced flues which can be touched are to be fitted with a guard.

Any proposed installation which deviates from the details provided or gives rise to any doubt should be referred to BOULTER BUDERUS LTD. who will be pleased to consider and discuss it.

5:1.1 Balanced Flue Types

Three types are available

- | | |
|------------------------------------|-----------------|
| 1. Low Level Horizontal | - Rear & Side |
| | - Discharge L |
| 2. High Level Horizontal | - Rear & Side |
| | - Discharge L/R |
| 3. Vertical (Flat or Pitched Roof) | |

Only Kerosene fuel may be used when the Low level Horizontal flues are installed.

5:1 HORIZONTAL FLUE BOILERS

The Terminals of Horizontal Balanced Flues should be installed on a plain surface of wall preferably not less than 900mm from internal corners of the building and away from any recesses and any projections on the wall face that could affect wind flow across it.

Listed are the general restrictions as to the positioning of Horizontal Balanced Flue Terminals. Refer to [Fig 5.4](#).

1. Positions should be avoided where the exhaust of combustion products could cause nuisance.
2. Terminals must be situated more than 600mm distance from any opening in the building.
3. Avoid close proximity to internal corners where products of combustion may not freely disperse and may enter the air intake to the boiler.
4. Avoid positions such as narrow passageways, especially with a closed end, where easy dispersion could be adversely affected.
5. Avoid positions where the terminal may be discharging close to and in the direction of a near neighbouring dwelling or exhausting immediately over adjoining property.
6. Avoid positioning immediately under openable windows.
7. Care should be taken to ensure that there is clearance between the outer surface of the flue and any combustible material.
8. Positioning the Flue terminal within a CAR PORT is not recommended.

5:3 VERTICAL BALANCED FLUES

Vertical Balanced Flues enables boilers to be installed in single storey outhouses or utility rooms where it may not be convenient for it to be sited near an outer wall. It may also be employed to exhaust vertically to avoid nearby windows or doors.

Vertical Balanced Flues may also be preferred in cases where close proximity to adjoining houses or property dictates minimum exhaust noises.

5:3.1 Positioning of Vertical Flues

Listed are general restrictions as to the positioning of Vertical Balanced Flues. Refer to [Fig. 5.4](#).

1. Avoid positions where Vertical Flues will exhaust adjacent to a higher wall. The minimum distance for operation from a higher vertical wall must be 600mm.
2. Ensure Vertical Flues do not exhaust below the level of any openable window less than 2300mm horizontally from the terminal (see BS5410:1).
3. Care should be taken to ensure that there is clearance between the outer surface of the flue and any combustible material.

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5:4 POSITIONING THE BOILER

Read Sections 5:2 & 5:3

Some combustion noise occurs at the Exhaust Terminal of Balanced Flues and care should be exercised to ensure that the position of the exhaust is not near doors or opening windows of the house it serves, or doors or windows of any neighbouring house.

RECOMMENDED FLUE TERMINAL POSITION

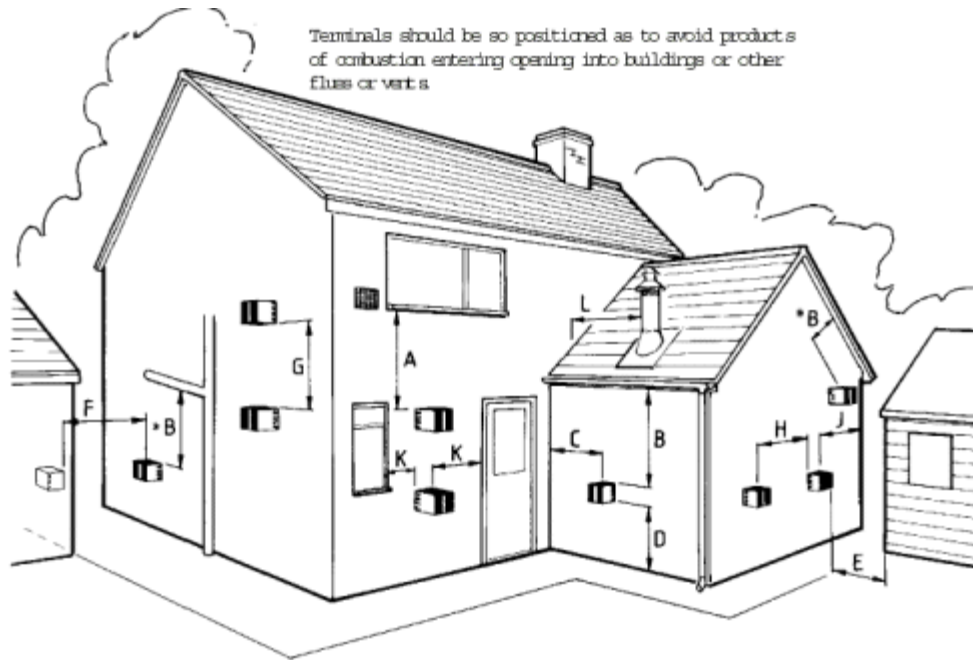


Table to above Flue Terminal Positions - MINIMUM dimensions

REF	DESCRIPTION	DISTANCE IN MM	
A	Directly below an Opening, Air Brick or Window	600	
B	Below a Gutter, Sanitary Pipework or Eaves	75	(600*)
C	From any Internal Corner	300	(900)
D	Above Ground	300	(600)
E	From a surface facing the Terminal	600	(1200)
F	From a Terminal facing a Terminal	1200	
G	Vertically between Two Terminals on the same wall	1500	
H	Horizontally between Two Terminals on the same wall	750	(1200)
J	From any External Corner	300	(600)
K	Horizontally from any Opening, Air Brick, Window or Door	600	
L	Vertical Flue from Wall (Flat or Pitched Roof)	750	

*Where the terminal is within 1m of any plastic material, such material should be shielded from the effects of the combustion products of the flues

NOTE:- Whilst the dimensions in BS 5410 are shown in the table, it is stressed that possible variances in local site conditions may not always be obvious and that if in any doubt the dimensions in brackets should be observed.

BOULTER BUDERUS would be pleased to advise on any difficult positioning

Fig. 5.4 Balanced Flue Terminal Positions

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5:5 TERMINAL GUARDS

When the terminal is positioned where there is the possibility of accidental contact by persons, or of damage to the terminal, an approved guard is necessary (Boulter Code FL26160).

Generally, exhaust 2 metres above ground level alleviates the necessity for a guard.

A suitable guard is available from BOULTER BUDERUS as shown below.

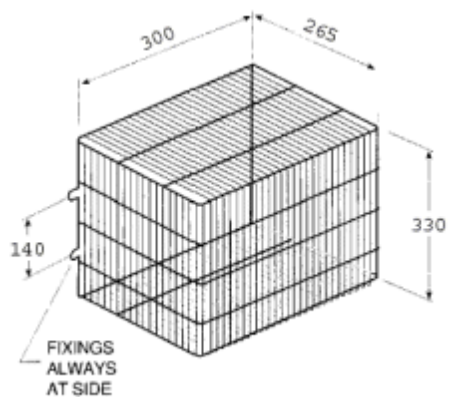


Fig. 5.5

5:6 HORIZONTAL FLUE TERMINAL

The Terminal for Horizontal Balanced Flue is secured to the wall by means of four screws. The indexing plate should have its four edges siliconed to the outside wall to provide a weather seal.

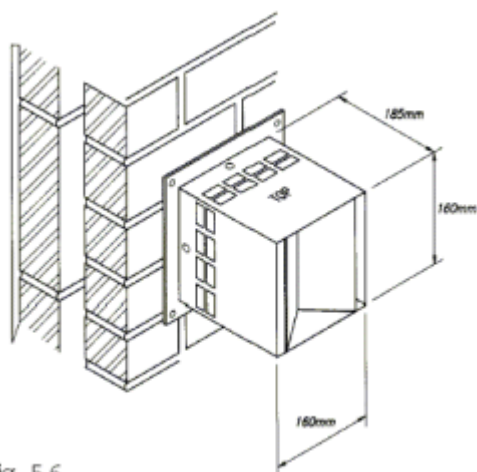


Fig. 5.6

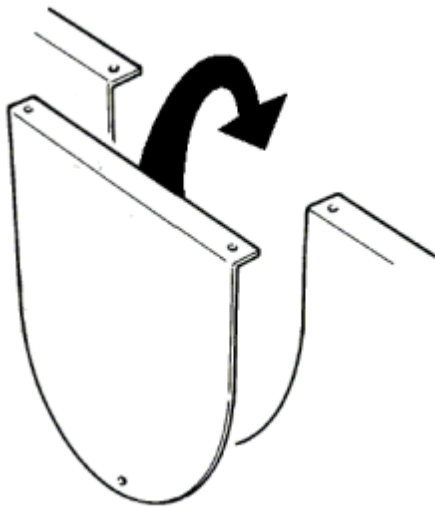


Fig. 5.7a Side Panel Blanking Plate

5:7 BLANKING PLATES

The Boiler is supplied in Balanced Flue form. With full side/rear blanking plate and one top blanking plate.

The blanking plates should be fitted to prevent access to hot surfaces and to maintain the efficiency of the boiler.

For low level side outlet - remove the blanking plate and swap it with the rear arched bracket.

For high level vertical or conventional flue remove and discard the top blanking plate, replacing the plastic studs in the fixing holes.

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6:1 NOTES ON INSTALLATION

LOW LEVEL AND HIGH LEVEL BALANCED FLUES

1. The Terminal must be slightly angled down to ensure correct operation of the boiler. Due to the efficiency levels of Camray 5, plumbing from the terminals may occur under certain conditions. Any condensation may be acidic due to the fuel characteristics and it is advisable not to install the flue in any position where the condensation could cause damage to paint surfaces etc.
2. The Terminal index plate should be sealed to the external wall using silicon sealant or other impervious material to prevent water ingress.
3. Ensure that the outlet of the Terminal points downward (TOP upper-most and Boulter correct way up).
4. Ensure that the boiler to offtake gasket is fitted (foil face upwards) and the clamp is made with four nuts and washers securely fixed.
5. Ensure that the Sealing Rings are fitted in the correct groove. Use a mild detergent as a lubricant to ease assembly.
6. The Flue is telescopic and no cutting of the flue pipes is necessary.
7. 500mm and 1000mm flue extension kits are available. Do not exceed the maximum flue lengths stated in this manual.
8. The flexible air duct is an integral part of the appliance and must be used on all balanced flue kits. Ensure

that it is not damaged and that either end is connected via the jubilee clip provided to ensure correct boiler operation.

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6:2 LOW LEVEL HORIZONTAL FLUE

6:2.1 Rear

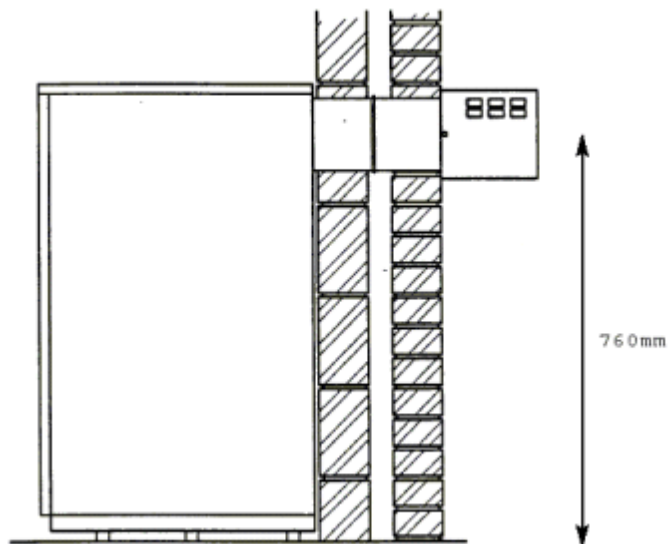


Fig. 6.2a Low Level Horizontal Rear

6:2.2 Side - Left hand only

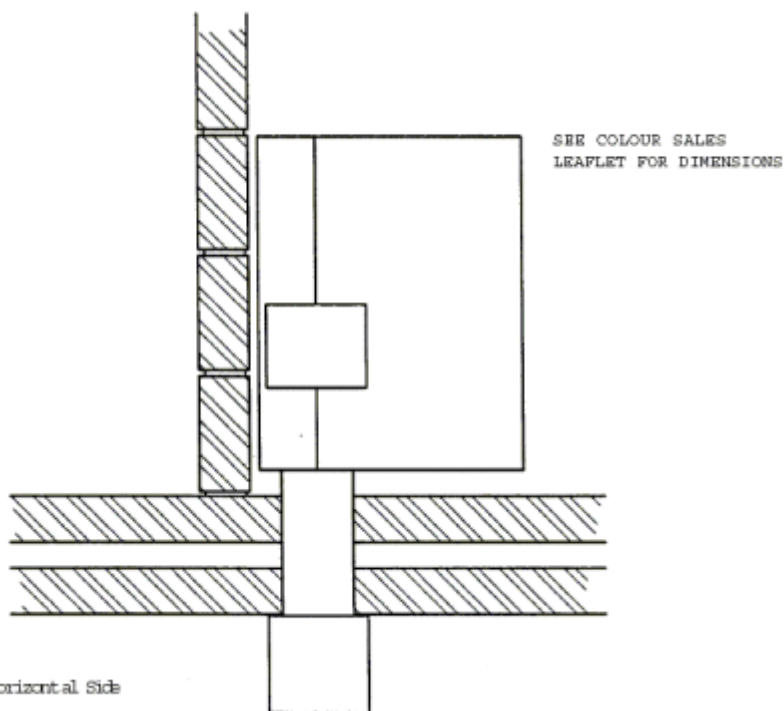


Fig. 6.2b Low Level Horizontal Side

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6:2.3 Low Level Assembly

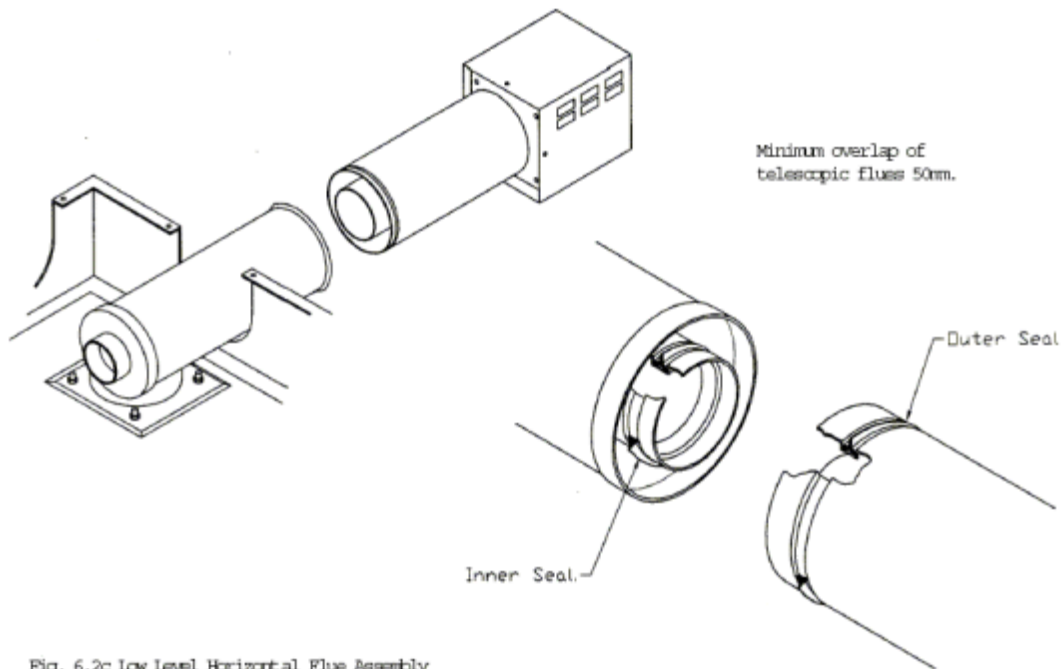


Fig. 6.2c Low Level Horizontal Flue Assembly

LOW LEVEL FLUE INSTALLATION

Site conditions will dictate to a certain extent the best method of assembling low level balanced flues.

The illustration shows a typical rear outlet flue.

Assemble the flue generally as follows:

1. Position boiler check that water connections and flue proposed is according to clearances specified.
2. Mark flue position.
3. Move boiler away from the wall and using a diamond tipped core drill, drill a 6 (150mm) hole, ensuring the hole is horizontal.
4. Remove rear top panel of boiler and identify flue outlet (rear or LH side). Move blanking plate to appropriate position using nuts and washers.
5. Ensure flue exhaust seal is in position and in good condition, ie undamaged. Lubricate with a mild detergent.
6. Place boiler offtake gasket in position on top of boiler (foil face upwards).
7. Lay internal flue in appropriate position in boiler and offer up to hole in wall.
8. Secure internal flue to boiler via four nuts and washers as supplied.
9. Remove outer terminal 4 screws and put terminal to one side.
10. Taking outer air duct ensure Seal is fitted and in good condition. Lubricate with a mild detergent.
11. Ensuring that there is no wall debris present in either ducts slide outer air duct into inner air duct.

12. Using the four holes on the external wall plate as a guide drill four fixing holes into the external wall.

13. Replace the outer air duct and pushing firmly home screw into position (4 screws). Weather seal all edges.

14. Taking the terminal end keeping it square to the external flange push home over the internal flue exhaust pipe until the four holes on the flange align. NB Ensure that TOP is on the upper most surface of the terminal and Boulter is upright.

15. Secure the terminal to the flange using the four screws.

16. Fit an approved terminal guard if in an accessible position. Available from Boulter Buderus.

17. Inside:

Using the clips supplied fix the flexible air duct to the burner spigot and flue offtake securely.

Continue on with the rest of the installation.

NOTE: Ensure that there is a minimum of a 50mm overlap at all telescopic flue joints.

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6:3 HIGH LEVEL HORIZONTAL FLUE

6:3.1 Rear

Minimum overlap of
telescopic flues 50mm.

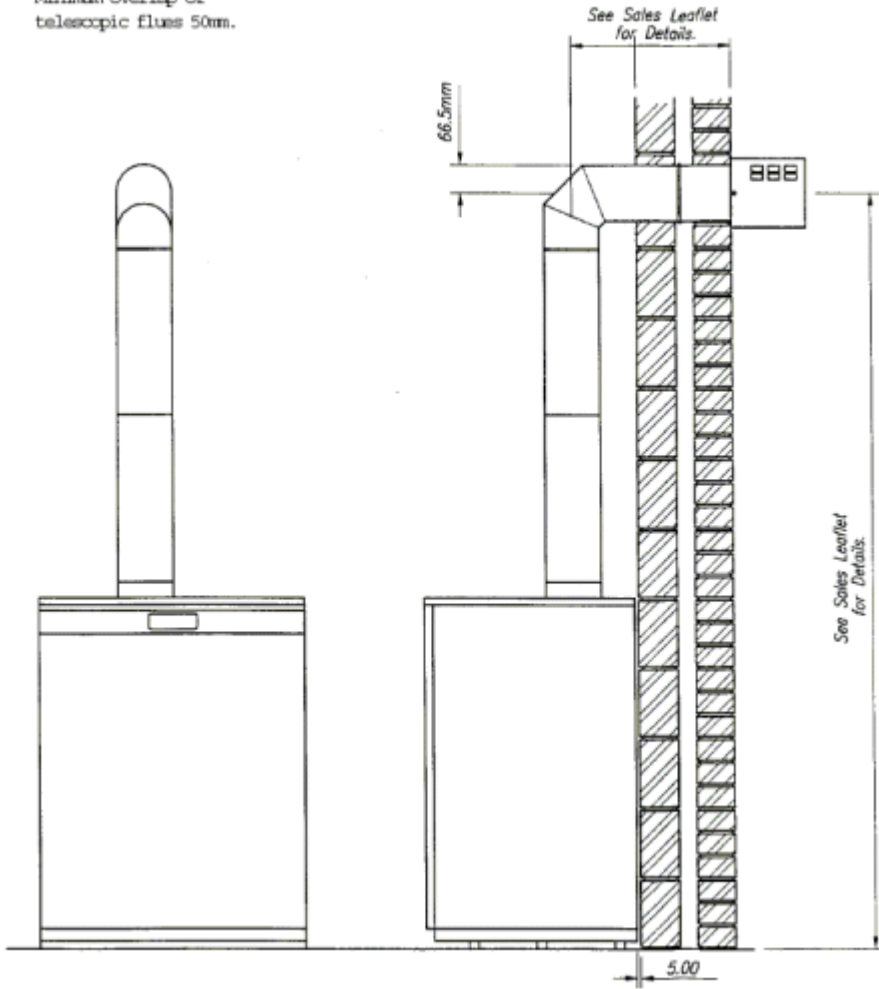


Fig. 6.3a High Level Horizontal Rear

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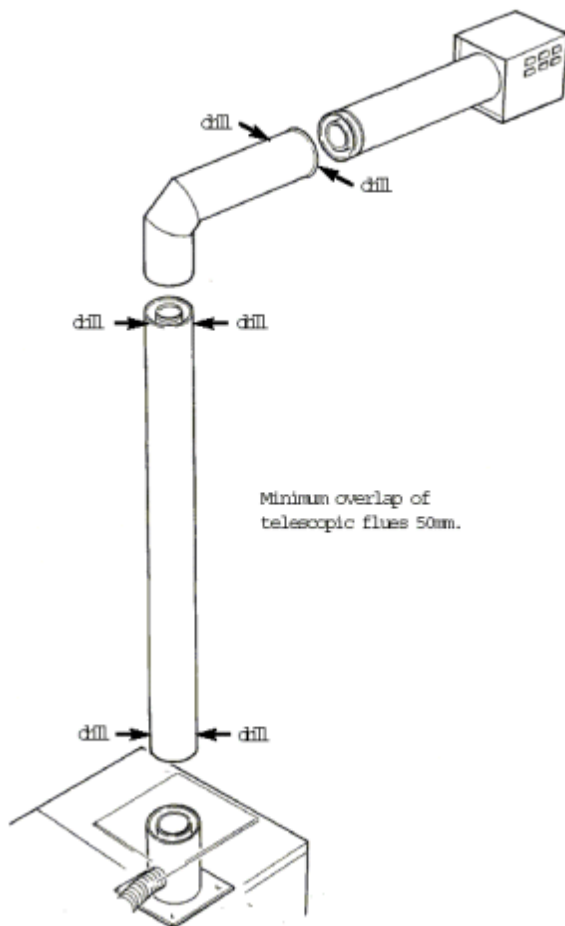


Fig. 6.3b Low Level Horizontal Flue Assembly

HIGH LEVEL SIDE & REAR INSTALLATION

Assemble the flue generally as follows:

1. Position boiler check that all water connections and proposed flue position are according to clearances specified.
2. Mark the flue position on the wall.
3. Move the boiler away from the wall and using a diamond tipped core drill, drill a 6 150mm hole in the wall ensuring the hole is level.
4. Remove the top panels of the boiler and fit the appropriate blanking plate to rear panel using the nuts and washers provided.
5. Fit the boiler offtake gasket to the four studs and fit offtake spigot with the four nuts and washers provided.
6. Ensure the flue exhaust seal is in position and undamaged. Lubricate with a mild detergent.
7. Fit the vertical flue offtake plate to the rear top panel of the boiler and fit the assembly into position over the vertical offtake spigot.
8. Take the 1000mm vertical extension and fit an O Ring seal to the outer duct, lubricate with a mild detergent and ensure that the flue exhaust seal is fitted to the inner duct undamaged and in the correct orientation.
9. With the seals fitted slide the extension into the offtake socket external seals end first.

10. Take High Level elbow fit larger seals to short arm, lubricate with a mild detergent and ensure flue exhaust seal is fitted to the inner duct undamaged and in the correct orientation.

11. Ensuring there is no debris in the wall place longer arm through drilled hole and slide into second extension being careful not to scratch metal work.

The high level elbow must be slightly sloped downwards.

12. Drill 6 holes as indicated on the drawing and secure with the self tapping screws supplied.

13. FROM OUTSIDE

Remove the outer terminal four screws and put terminal to one side.

14. Taking outer air duct ensure Seal is fitted and in good condition.

15. Check wall cavity for debris and remove if necessary. Slide the outer air duct into the inner air duct until home.

16. Using the four holes on the external wall plate as a guide drill four fixing holes into the external wall to suit those supplied.

17. Replace the outer air duct and pushing firmly home screw into position (4 screws). Weather seal all edges.

18. Taking the terminal end, keeping it square to the external flange push home over the internal flue exhaust pipe until the four holes on the flange align.

NB. Ensure that TOP is on the upper-most surface of the terminal and BOUTLER is upright. 19. Secure the terminal to the flange using the four screws.

20. Fit an approved terminal guard if in accessible position. Available from Boulter Buderus.

21. INSIDE

Use the clips supplied to fix the air duct to the burner spigot and vertical flue offtake spigot Continue with the rest of the installation.

NOTE: Ensure that there is a minimum of a 50mm overlap at all telescopic flue joints

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6:3.2 Side - Right or Left Hand

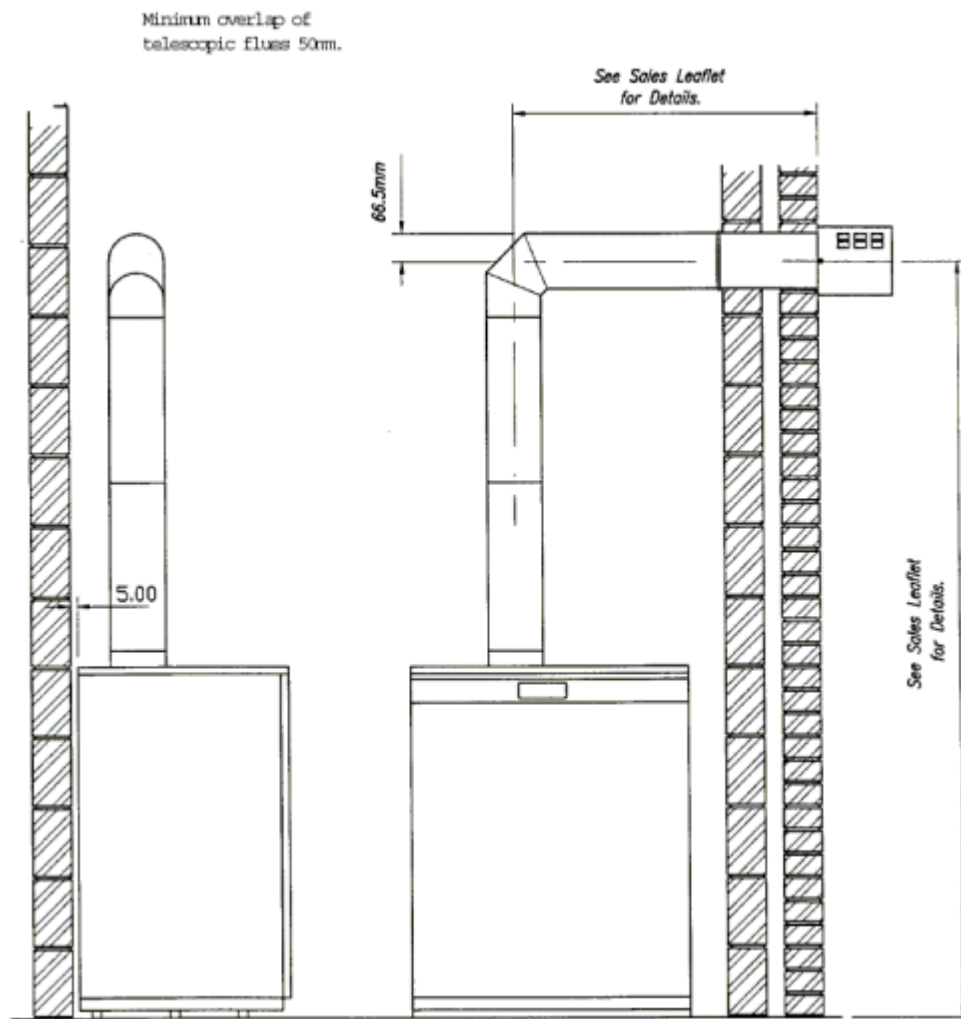


Fig. 6.3c High Level Horizontal Flue Side

6:3.3 HIGH LEVEL FLUE LENGTH ALTERATION

There is a certain amount of adjustment available on the vertical height and horizontal length.

This is attained by pushing two telescopic flues together until the desired dimension is obtained. Secure any vertical lengths by using a drill and 4 self tapping screws supplied.

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6:4 VERTICAL FLUE FLAT ROOF INSTALLATION

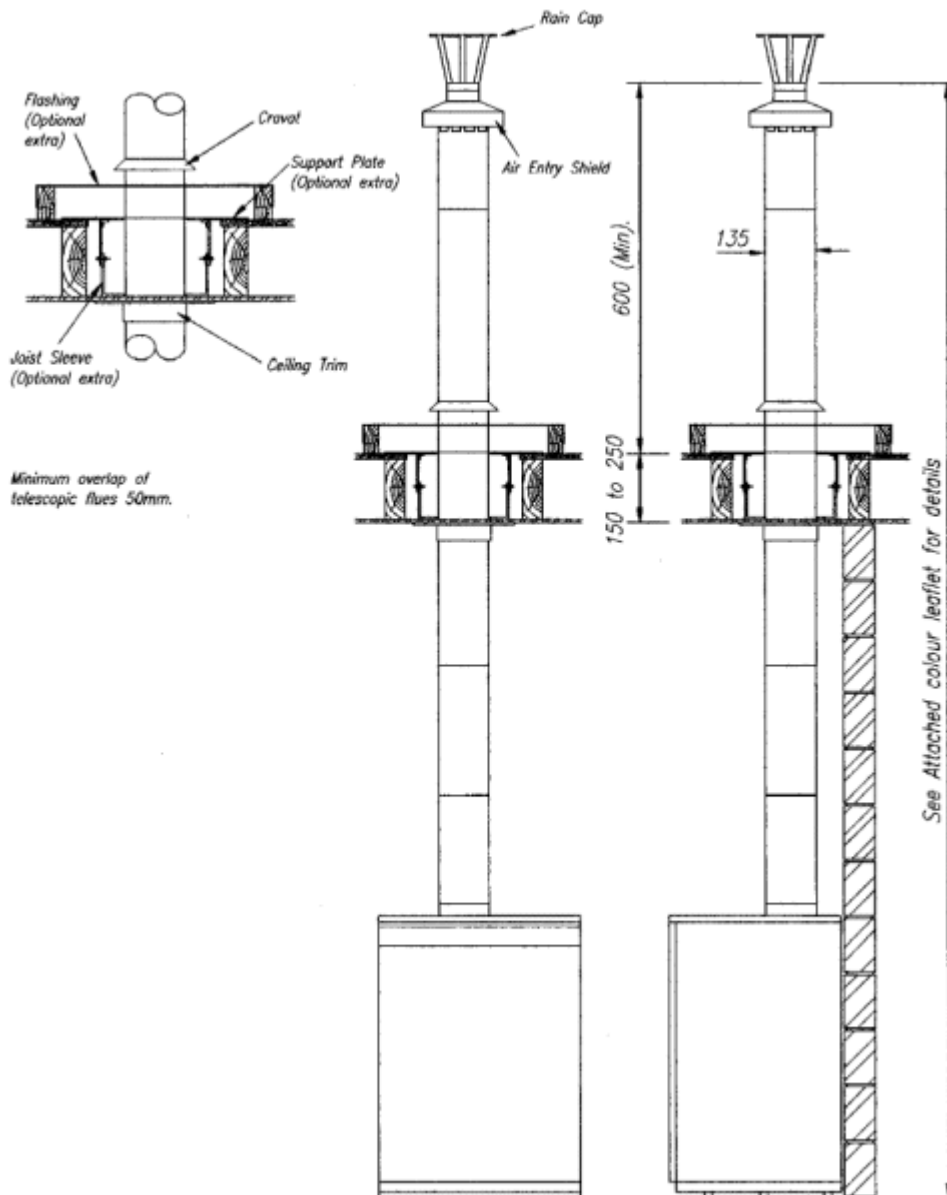


Fig. 6:4a Vertical Flue - Flat Roof

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6:4 VERTICAL FLUE FLAT ROOF INSTALLATION - CONTINUED

6:4.1 Notes on installation

Site conditions will dictate the best method of assembling the Vertical Balanced Flue.

The following illustrations show boilers up against a rear wall as an example. It is not essential for the boiler to be positioned this way; As long as the joists are capable of supporting the flue via the support plate supplied in the kit.

The Vertical Flue is telescopic to allow for various ceiling heights.

To increase the height additional 500mm or 1000mm extensions can be added up to the maximum number indicated.

To reduce the height push the sections down to the desired height and lock in place using the screws provided.

IMPORTANT WARNING

Where a flue system passes through a joist frame, it is essential that the integrity of the ceilings fire barrier is retained. This can be achieved by ALWAYS using the support plate and firestop ceiling trim.

We would also recommend strongly the use of the Adjustable Joist Sleeve (optional) to complete the fire stop.

Alternatively this can be achieved by following the requirements of Section J of the current Building Regulations.

NOTE:-

1. Joints in the Flue Pipe must not be situated within the joist space.
2. Joints in the Flue Pipe must be a minimum of 150mm below the ceiling.

Flat Roof Assembly Procedure:

Generally where conditions allow, the simplest assembly procedure is as follows:-

1. Position the Boiler, check water connections are possible.
2. Mark Flue position on ceiling.
3. Move Boiler away from position and cut the ceiling neatly, keeping the opening size in the plaster board as close to the round Ducts of the Flue Terminal as practicable (say 10mm all round).
4. Cut the opening in the flat roof, allowing more than 50mm clearance on all sides from the timber joists.
5. Create 3-4 sided timber framed box for the Support Plate (S).
6. Bolt Joist Sleeve (R) (optional) to Support Plate (S) and screw onto timber frame.
7. Slide Flue Terminal (V) down into position, having previously removed the Rain Cap, Air Entry Rain Shield and Cravat so that its support cone rests on the Support Plate (S).
8. Screw the Ceiling Trim (C) to the Joist Sleeve (R), or ceiling if Joist Sleeve (R) is not used.
9. Remove the top rear panel of the boiler and fit the appropriate blanking plate to the rear panel using the nuts and washers provided.
10. Fit the boiler offtake gasket to the four studs and clamp it in place with the vertical offtake spigot with the four nuts and washers provided. Ensure the combustion test point screw remains accessible.
11. Ensure the flue exhaust seal is in position and undamaged.
12. Fit the vertical flue offtake plate to the rear top panel of the boiler and fit the assembly into position over the vertical offtake spigot.
13. Take one of the 500mm vertical extensions or 1000mm, fit a Seal to the outer duct, and ensure that the flue exhaust seal is fitted to the inner ducts undamaged and in the correct orientation. Lubricate all seals with a mild detergent.
14. With the seals fitted slide the extension in to the offtake socket external Seal end first.
15. Repeat steps 13 & 14 above for next section. Slide ceiling trim over the next section before engagement. Fix the ceiling trim in position.
16. Drill 6 holes to secure sections to adjacent ones and secure with the self tapping screws supplied.

17. Fit flashing plate and cravat. Seal joint between Cravat and Flue with a suitable weatherproof sealant. Keep Cravat as low as possible onto flashing plate to prevent entry of animals, birds or insects.

18. Inside:

Using the clips supplied fix the air duct to the burner spigot and vertical flue offtake spigot.

Continue with the rest of the installation.

NOTE: Ensure that there is a minimum of a 50mm overlap at all telescopic flue joints

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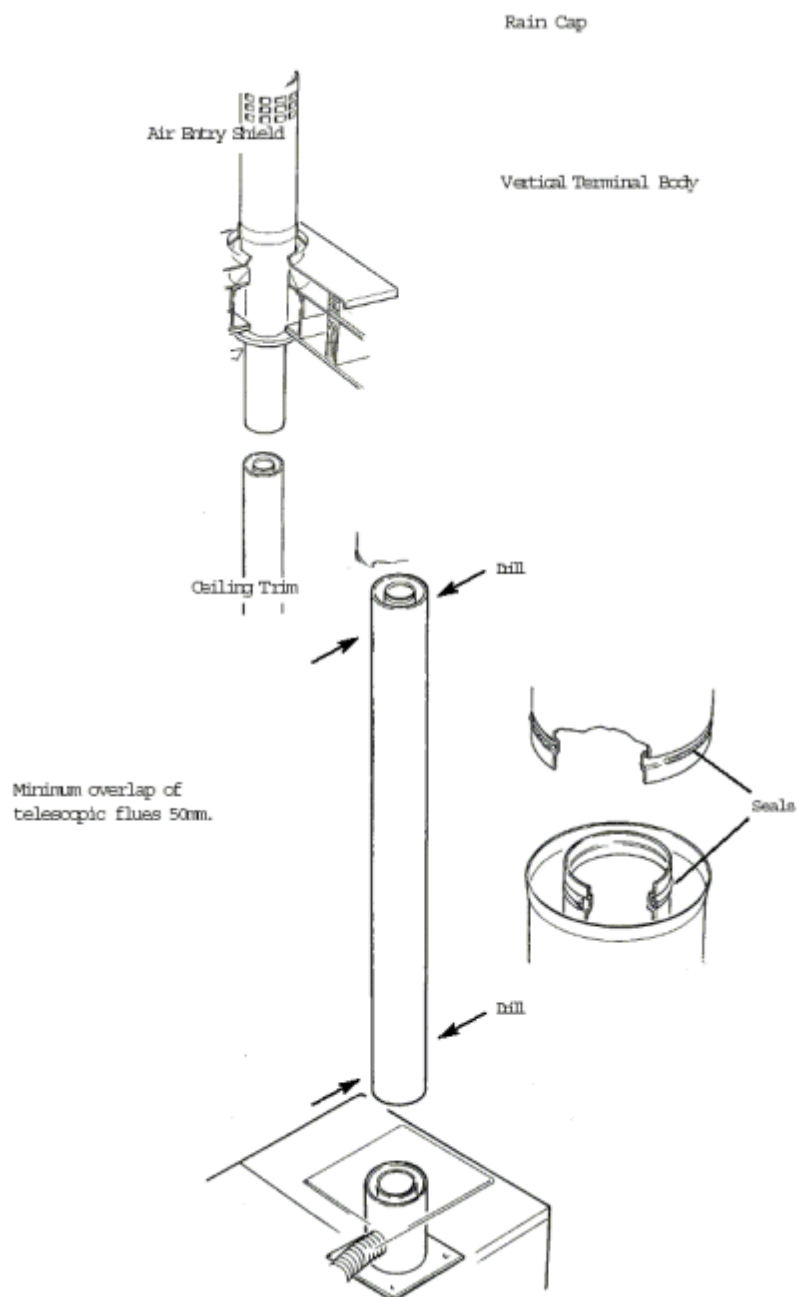


Fig. 6:4b Vertical Flue - Flat Roof Assembly

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6:5 VERTICAL FLUE PITCH ROOF INSTALLATION

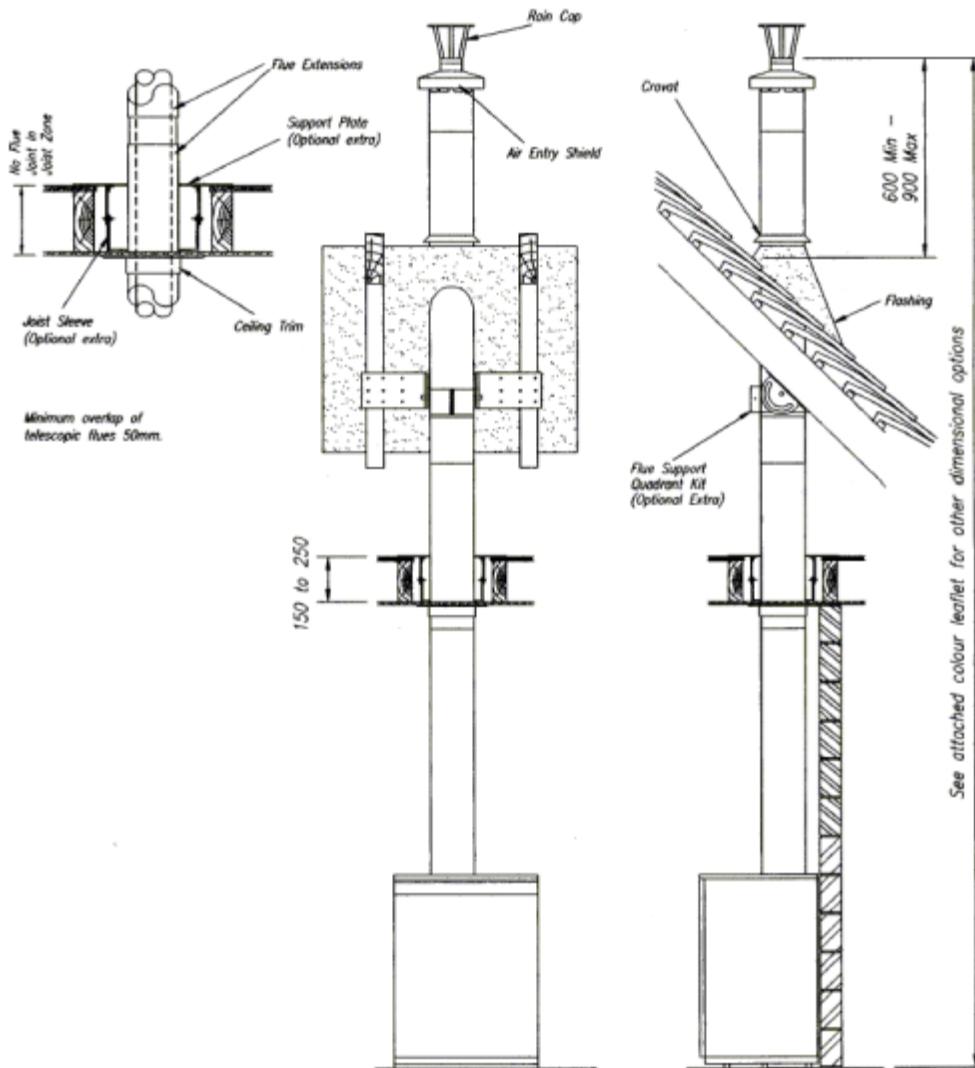


Fig. 6:5a Vertical Flue - Pitched Roof

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6:5 VERTICAL FLUE PITCHED ROOF INSTALLATION - CONTINUED

6:5.1 Notes on installation

Site conditions will dictate the best method of assembling the Vertical Balanced Flue.

The following illustrations show boilers up against a rear wall as an example. It is not essential for the boiler to be positioned this way. As long as the joists are capable of supporting the flue via the support plate supplied in the Kit or the Flue support quadrant kit (optional).

The vertical flue kit is telescopic to allow for various ceiling heights.

To increase the height additional 1000 or 500mm extensions can be added up to the maximum number indicated.

To reduce/adjust the height push the section down to the desired height and lock in place using the screws provided.

IMPORTANT WARNING

Where a flue system passes through a joist frame, it is essential that the integrity of the ceilings fire barrier is retained. This can be achieved by ALWAYS using the support plate and firestop ceiling trim.

We would also recommend strongly the use of the Adjustable Joist Sleeve (optional) to complete the fire stop.

Alternatively this can be achieved by following the requirements of Section J of the current Building Regulations.

NOTE:-

1. Joints in the Flue Pipe must not be situated within the joist space.
2. Joints in the Flue Pipe must be a minimum of 150mm below the ceiling

Pitched Roof Assembly Procedure:

Generally where conditions allow, the simplest assembly procedure is as follows:-

1. Position the Boiler, check water connections are possible.
2. Mark Flue position on ceiling.
3. Move Boiler away from position and cut the ceiling neatly, keeping the opening size in the plaster board as close to the round Ducts of the Flue Terminal as practicable (say 10mm all round).
4. Cut the opening in the roof, allowing more than 50mm clearance on all sides from the timber joists.
5. Create 3-4 sided timber framed box for the Support Plate (S).
6. Bolt Joist Sleeve (R) (optional) to Support Plate (S) and screw onto timber frame.
7. Cut opening in the pitched roof allowing more than 50mm clearance on all sides from timber.
8. Remove the top rear panel of the boiler and fit the appropriate blanking plate to the rear panel using the nuts and washers provided.
9. Fit the boiler offtake gasket to the four studs and clamp it in place with the vertical offtake spigot with the four nuts and washers provided. Ensure the combustion test point screw remains accessible.
10. Ensure the flue exhaust seal is in position and undamaged.
11. Fit the vertical flue plate to the rear top panel of the boiler and fit the assembly into position over the vertical offtake spigot.
12. Take the extension, fit seals to the outer duct and ensure that the flue exhaust seal is fitted to inner ducts undamaged and in the correct orientation. Lubricate all seals with a mild detergent.
13. With both seals fitted slide the 1st extension into position.
14. Add extensions until the joint nearest the ceiling is 150mm away. Slide the ceiling trim onto this last extension ensuring it is the correct way up (screws at the top).
15. Using a 3mm drill bit drill 2 holes per extension top and bottom and secure with self tapping screws supplied.
16. From within the roof space if space permits:

Fit next extension(s) in line with points 12 to 13

17. From outside lower Flue Terminal into roof opening having previously removed the rain cap, air entry Rain shield and Cravat.

IMPORTANT ENSURE ALL SEALS ARE IN POSITION

18. From within the roof space align the terminal with the extension beneath and push fully home.

19. Secure the terminal to the roof timbers with the optional Flue Support Quadrant Plate Assembly. Adjust the angle to suit the pitch of the roof.

20. Drill the outer air ducts to secure extension to extension by 4 self tapping screws.

21. Using the clips supplied fix the air duct to the burner spigot and vertical flue offtake spigot.

Continue with the rest of the installation.

NOTE: Ensure that there is a minimum of a 50mm overlap at all telescopic flue joints

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Minimum overlap of telescopic flues 50mm.

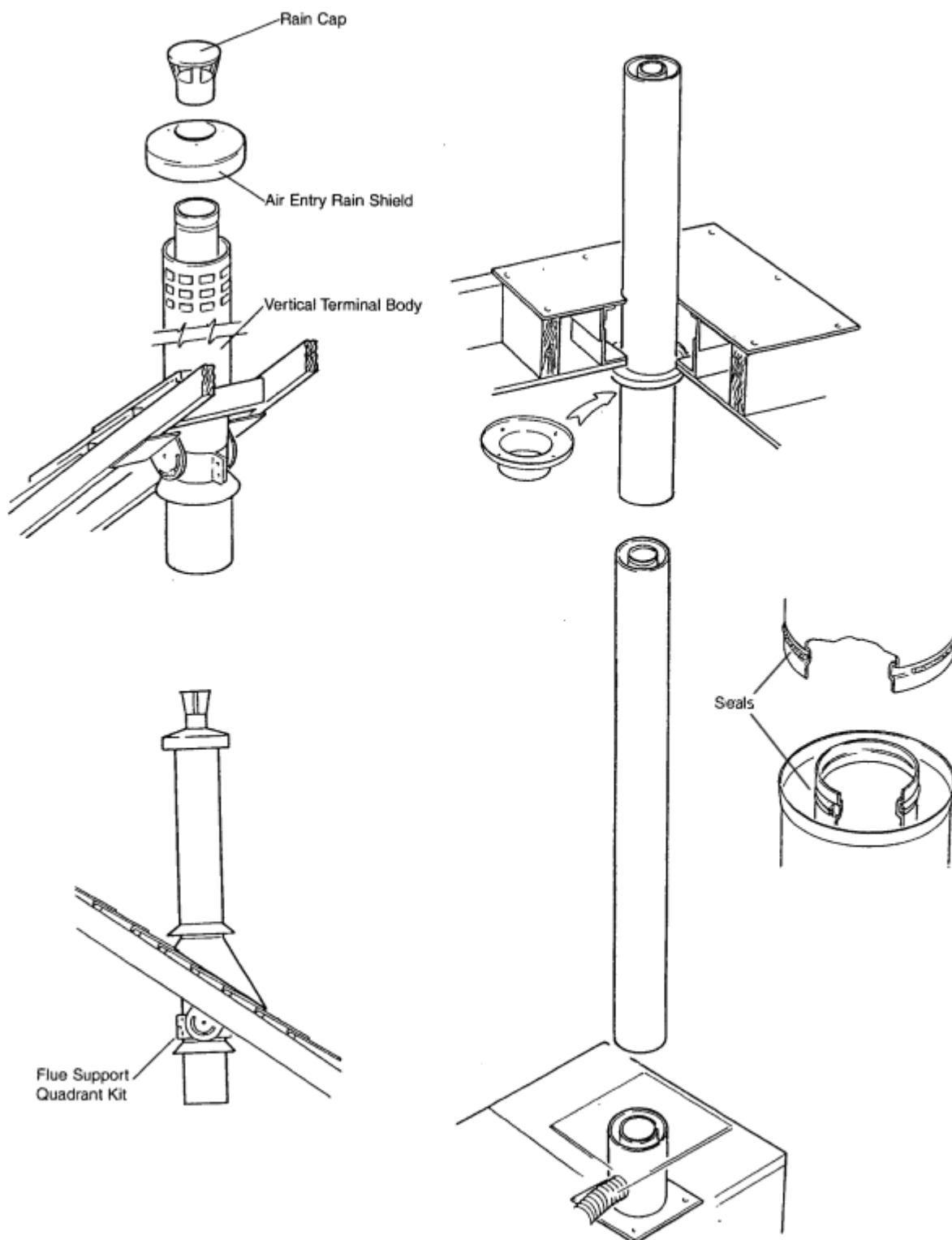


Fig. 6:5b Vertical Flue - Pitched Roof Assembly

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7:1 COMMISSIONING BOILER

It is essential in the interest of boiler efficiency and reliable performance that once the Boiler has been installed it is first commissioned by a qualified engineer.

If an engineer is not known Boulter will be pleased to provide details of a commissioning and servicing engineer from their register.

7:2 RESPONSIBILITY

It is the responsibility of the installer to ensure that the boiler is properly commissioned. It is essential that the commissioning procedures detailed in this manual are carried out preferably by a qualified OFTEC engineer using recognised test equipment.

It is recommended that the relevant section of BS 5410: Part 1: latest edition is carefully read.

7:3 REPORTING

It is recommended that you use a report sheet and check list. Make comments on the report where necessary, and give a copy to whoever has engaged your services, and retain and file your own copy. A suggested layout is shown over.

7:4 COMMISSIONING SEALED SYSTEM

IMPORTANT

It is the responsibility of the installer to ensure that the Boiler is commissioned by a competent engineer, preferably an OFTEC Registered Commissioning Engineer.

7:5 FILLING THE SYSTEM

1. Check that the manual Air Vents on the boiler and tank are loosened .
2. Check both drain cocks are turned off (closed).
3. Connect the Filling Loop Hose from the incoming mains supply to the Double Check Valve and open the Double Check Valve fully.
4. Open the Mains Isolating Valve partway to fill the system SLOWLY.
5. Flush system thoroughly and refill.
6. Vent radiator and any other manual Air Release Vents.
7. Check for leaks particularly on older system which may have operated on a lower pressure.
8. When the system is completely full and vented, close both Mains Isolating Valve and Double Check Valve and disconnect flexible Filling Loop Hose, catching water.
9. A suitable inhibitor against limescale and corrosion should be added to the system.

THE FILLING LOOP MUST BE DISCONNECTED WHEN NOT IN USE.

IMPORTANT

Do not allow water in Filling Loop to spill over the Burner or other electrical components.

10. Set the red pointer of the Pressure Gauge to the Cold Fill pressure. Refer to [4:6](#).

7:6 CHECK PRESSURE RELIEF VALVE OPERATION

This is checked by allowing the water pressure to increase until the valve operates - this should be between 2.7 and 3.3 bar.

Reduce the system pressure to achieve the initial cold fill pressure.

Ensure that the Tundish is fitted according to the latest edition of the Building Regulations.

7:7 EXPANSION VESSEL PRESSURE

When the system water is heated, the pressure will rise above the Cold Fill setting. If the pressure reaches 2.5 bar when the Boiler is operated at its highest temperature with all radiators in circulation, then an additional expansion vessel must be fitted in the system. Refer to [Section 4:6](#) and BS 7074 Part 1 for information on sizing of the additional expansion vessel.

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7:8 BOULTER RECOMMENDED COMMISSIONING CHECKLIST - SHEET 1 OF 2

Customer
Site Address
.....

Appliance Model
Serial No.....
Fuel.....

Tick off each item

OIL TANK

- Is there sufficient oil, and of the correct grade for the appliance?
- Is the tank adequately supported?
- Is a damp-proof membrane inserted between the tank and support? (Non plastic tanks).
- Does the tank slope at least 20mm per metre of length downwards towards the sludge cock? (Non plastic tanks).
- Is the tank painted or suitably protected externally?

Is the tank fitted with the following:

- Contents gauges
- Screw fill and independent vent cover or capped fill and vent pipes.

- Outer valve
- Filter
- Sludge cock (Non plastic tanks).

HEIGHT OF TANK

- Is the bottom of the tank above the oil pump if a single pipe system is installed?

OIL SUPPLY LINE

- Ensure that galvanised iron has not been used.
- If black iron has been used, is it protected against corrosion?
- Ensure that soldered connections on copper pipes have not been used.
- Is the size of the pipe adequate for the boiler rating?
- Are all joints leak proof? p Is a fire valve fitted? p Is a filter fitted?
- Is the oil line connected to the correct inlet connection of the pump?
- Is the oil supply clean and free of water or other contamination?
- Disconnect the oil supply as close to the burner as possible and drain approximately a gallon of oil into a very clear container. Inspect the oil for impurities and repeat the process if necessary.

Do not re-connect the oil line until water and all impurities have been removed from the oil supply.

IF NOT THIS MAY DAMAGE THE PUMP.

- Clear oil filters and de-sludge the tank if necessary.

TWO PIPE OIL SYSTEMS

- Is a spring-loaded non-return oil valve fitted in the suction line? (or a 3KOil Deaerator).
- Does the return oil line terminate in the tank at the same level as the suction outlet?

- Has an anti-syphon cut been made in the return oil line (inside the tank)?

BOILER

- Is the boiler standing on a level incombustible hearth?
- Are the thermostat phials inserted in the correct pockets?
- Are the baffles correctly located?
- Is the boiler set for the fuel being supplied?
- Has the system and boiler been filled with water and inhibitor as required?
- Is the boiler flueway inspection cover screwed down sufficiently firmly to form a seal?
- Is the flexible air duct connected correctly.

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7:8 BOULTER RECOMMENDED COMMISSIONING CHECK LIST- SHEET 2 OF 2

CASING PANELS

- Have grommets been fitted to relevant oil supply entry points (knockouts)?
- Does electrical cabling pass through a grommet to prevent chaffing?

BURNER

- Is the oil pump by-pass screw fitted, if applicable?
- Remove the burner. Is the correct nozzle fitted?

NOTE:- Burner operating instructions can conflict because they are intended for general guidance. Since the burner has been specifically matched to the particular boiler, the information in the Boiler manual takes precedence.

FLUE AND CHIMNEY

- Is the flue adequately sized for the appliance rating?
- Is the flue free of any obstruction?

- Has the chimney been adequately lined and insulated?

NOTE:- Lining the flue and back filling will help prevent condensate problems

BALANCED FLUE APPLIANCES

- Is the correct flue kit fitted?
- Is the Flue off take correctly secured to the boiler by four nuts and washers. Is the gasket provided fitted correctly?
- Has the rear Air Entry Plate been fitted with Blanking Plates where necessary?
- Can leakage from flues tubes or air ducts occur? All seals fitted correctly?

VENTILATION

CONVENTIONAL FLUED BOILERS

- Is the ventilation opening from the outside to the boiler room adequate?
- Is there sufficient clearance for air to enter the Boiler at the rear of appliance?
- Will any ventilation fans prevent adequate supply of combustion air?
- Is the CF adaptor fitted correctly to the boiler with all nuts and gaskets?
- Is the sampling test point resealed?

ELECTRICAL POWER SUPPLY

- Is the electrical supply to the appliance appropriate?
- Are the electrical input connections to the control panel correct?
- Is the supply fuse correct?
- Does the wiring comply with the latest IEE regulations?
- Does the power supply cable enter the casing through a grommet?

GENERAL

- Has the boiler been installed in accordance with manufacturers instructions?

WATER SUPPLY

- Is there sufficient water pressure for the appliance to operate in Domestic Hot Water mode?

- minimum 1 bar

- Is there sufficient system pressure? Record initial system pressure cold.

STATIC _____ bar

DYNAMIC _____ bar

- Has a chemical dosing type water conditioner been fitted to the water supply to the boiler?

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7:9 BOULTER BUDERUS RECOMMENDED COMMISSIONING TESTS

- Have the manufacturers on-site assembly instructions been followed?

7:9.1 COMMISSIONING TESTS - BOILER

BEFORE ATTEMPTING TO START THE BOILER PLEASE THOROUGHLY CHECK ALL ITEMS ON THE COMMISSIONING CHECK LIST. THIS WILL HELP TO AVOID UNNECESSARY CALL BACKS

ENSURE THAT THE BOILER IS MATCHED MOST CLOSELY TO THE HEATING SYSTEM REQUIREMENTS BY FITTING THE CORRECTLY SIZED NOZZLE AND/OR CHOOSING THE CORRECT OIL PRESSURE.

Fit combined air bleed manifold and 0-300psi (0-20 bar) pressure gauge to the appropriate oil pump connection, and replace burner.

- Set the boiler thermostat to between Summer and Winter positions, see [fig. 1](#).

Switch on the electrical supply to the boiler, checking that programmers are switched to the ON position, and that the room thermostats are calling for heat.

When the burner motor starts, on one pipe systems it may be necessary to temporarily open the air bleed screw on the test manifold.

If the burner locks out during the ignition attempt, wait 45 seconds before pressing the reset button on the control box. Several attempts on first firing may be necessary.

Once the burner is firing check and if necessary adjust the oil pressure.

CARRY OUT COMBUSTION CHECKS BY INSERTING PROBES INTO SAMPLING POINTS PROVIDED:

Low level balanced flue, rear or side - end of terminal.

High level balanced flue, rear or side - end of terminal, or TEST POINT in boiler.

Vertical balanced flue - TEST POINT in boiler.

Conventional flue - hole provided via screw in vertical offtake section.

Check the Smoke No., if clean wait 10 minutes and measure CO₂.

Adjust the air shutter if necessary, open to reduce CO₂, close to increase CO₂.

If the air shutter is adjusted, re-check the Smoke No.

Check the flue gas temperature.

The figures should agree with the Boiler Commissioning Data.

Check lockout function, either cover the photocell or remove solenoid coil, to simulate flame failure. Reinstall components and press lockout button.

Check the operation of the limit thermostat

Complete commissioning report and enter the details on to the guarantee form which should be returned to BOULTER BOILERS in the envelope provided.

Instruct the user on the operation of the appliance and leave this manual with the customer.

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7:9.2 COMMISSIONING TESTS SYSTEM

Isolate boiler electrically.

Check cold mains static and dynamic water pressures and record in spaces provided on [page 2](#).

Open largest HOT water tap (Usually the Bath tap) and check flow rate using a flow measuring device such as a combi cup or a stop watch and measuring container.

Locate farthest HOT tap from appliance and check that the flow rate has not dropped below the pre-set

flow rate of 16 l/min.

- Reinstate electrical supply, test boiler in summer mode.
- Adjust hot water control thermostat to maximum position, the tank heat up indicator should be illuminated until it reaches temperature.
- Turn bath hot tap on to demand HOT water (draw a normal bath full - 15-20 gallons), the flow indicator should be illuminated (proving the flow switch) this is extinguished once demand ceases. Check the bath water temperature at end of demand, (approximate temperature rise should be forty Degrees Centigrade above cold mains supply temperature - normally approximately 10°C).
- Allow boiler and tank to reach temperature again and switch to winter mode, adjust boiler control thermostat to maximum and repeat the last instruction.
- Continue with normal system checks.

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8:1 MAINTENANCE

A boiler fired with Class C Oil should only require attentions once each year.

8:1.1 General Inspection

With the Boiler operating, inspect for signs of unsatisfactory operation, i.e. leakage of combustion products, leakage of oil, or unusual noises from the pump or motor.

Check the commissioning list if it is your attendance to the appliance. Is there a reason why the Boiler might fail after you leave?

It is useful to measure the combustion data, i.e. CO₂, Smoke No. and flue gas temperature, and a check on the oil pressure, prior to carrying out maintenance work.

8:1.2 Maintenance Procedure

Switch off electrical supply at the MAINS ISOLATING SWITCH.

OIL TANK

De-sludge oil tank (if necessary), and draw off any accumulated water.

Check the correct grade of oil is being used.

FILTERS

Inspect and clean all oil filters. Change paper elements for new.

BURNER

Turn off the oil cock and disconnect the flexible oil hose from the oil cock. Disconnect flexible air duct.

Remove burner and clean thoroughly, the burner draught tube, the electrodes and generally the head

assembly. CHANGE the nozzle for one with the specified make, oil rate, spray pattern and angle.

Inspect the ignition electrodes for crazing in the porcelain. Replace if there are signs of deterioration.

A dirty fan impeller can impair the performance of a burner, inspect and clean if necessary.

Inspect photocell, if badly discoloured, change it.

Inspect the flexible oil hose for leaks or discolouration. Use only replacement flexible oil hoses that are detailed in the spare parts section of this manual.

BOILER

The Boiler is serviced from the front.

Remove flue inspection cover/s, and baffles, and clean all heat transfer surfaces and baffles. Replace any damaged or unserviceable parts with manufacturers proprietary parts.

Inspect flue and air ducts for deterioration of seals, and repair if necessary. Re-lubricate with a mild detergent when refitting.

Refit parts and inspect seals etc. which should be replaced if required.

COMBUSTION TESTS

Fit combined air bleed manifold and 0-300psi (0-20 bar) pressure gauge to the appropriate oil pump connection, and replace burner.

Switch on the electric supply to the boiler.

When the burner motor starts, on one pipe systems, it may be necessary to temporarily open the air bleed screw on the test manifold.

Once the burner is firing check and if necessary adjust the oil pressure.

Carry out combustion checks by inserting probes into sampling points provided or at the flue outlet.

Check the Smoke No., if clean wait 10 minutes and measure CO₂.

Adjust the air shutter (see [fig 8.2a](#)), if necessary, open to reduce CO₂, close to increase CO₂.

If the air shutter is adjusted, re-check the Smoke No.

Check the flue gas temperature.

The figures should agree with data in Boiler Commissioning Data, [Section 3](#).

FINAL CHECKS

Check lockout function, either remove photocell and cover it, or remove solenoid coil, to simulate flame failure. Reinstall components and press lockout reset button.

Check that the control thermostat is operating when the set temperature is reached.

Check the operation of the limit thermostat if possible.

Reset Limit thermostat once appliance temperature has dropped sufficiently.

Complete a maintenance report and give the customer a copy, retaining a copy for your records.

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8:2 AIR SHUTTER ADJUSTMENT

The Burner has a fixed Air Shutter with manual adjustment.

To adjust the CO₂ at the Air Shutter use a 3mm allen key as shown. To increase the setting turn the airshutter clockwise and to decrease turn anticlockwise.

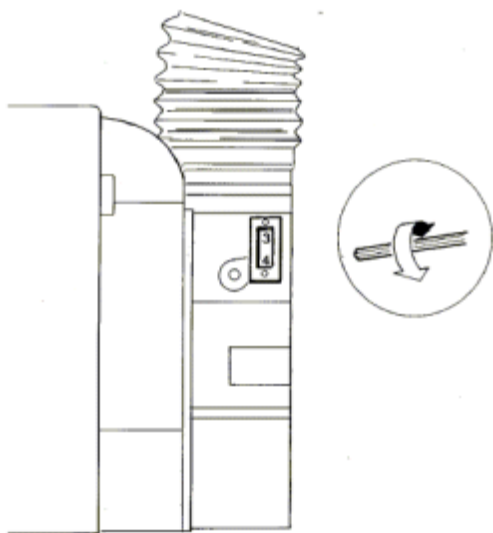


Fig. 8:2a Air Shutter Adjustment

8:3 BAFFLE ARRANGEMENT

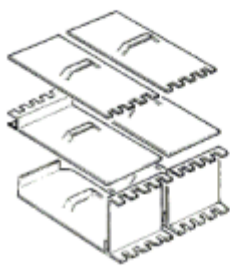
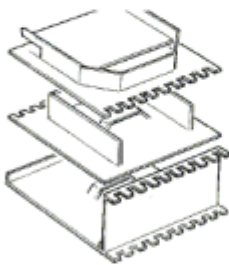
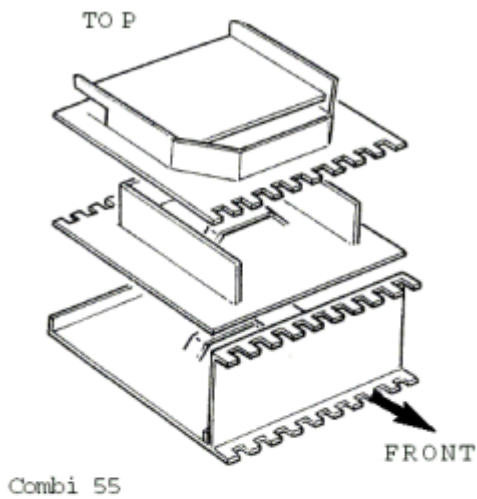


Fig. 8.3a Baffle Arrangement

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8:4 HEATING SYSTEM

During routine servicing, the system water should be topped up if necessary, using the Filling Loop when the system is cold. Refer to [7:5 Filling the System](#).

The following items should be checked on an annual basis at the very least.

1. System Pressure

The System Pressure should be checked periodically and increased as necessary using the Filling Loop.

Filling should be carried out on a cold system so that the pressure can be increased to the original cold fill design pressure (indicated by the red pointer on the system Pressure Gauge).

The Pressure Gauge should be watched carefully during filling and the Mains Isolating Valve opened slowly.

2. System Draining

The Boiler as well as the system, is under pressure and before disconnecting any components, the system pressure must be reduced. The Boiler and storage tank each have a drain to facilitate this.

After replacing the relevant parts, refill the system as described in [Section 7:5](#).

3. Pressure Relief Valve

This should be checked for operation during annual servicing by increasing the system pressure outlined in Section 7:6.

4. Expansion Vessel Pressure

Should be checked to be in accordance with the cold design pressure of the system.

The design of the Camray 5 COMBI enables the Pressure Vessel to be lifted and laid on to the floor whilst still connected to the Boiler, enabling full access to the Burner and Heat Exchanger.

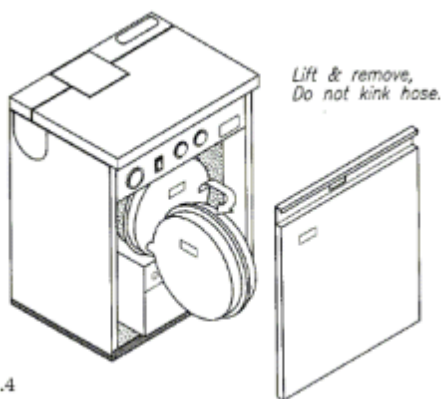


Fig. 8.4

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10:1 FAULT FINDING

If the Boiler fails to start, make the following checks before calling a service engineer:-

1. Is there sufficient fuel in the storage tank?
2. Are all fuel supply valves open (turned fully anti-clockwise) and ball valves open?
3. Is the mains electricity supply switched on?
4. Is the programmer (or Boiler Operating Switch) set to call for heat?
5. Are the Boiler Thermostats set to the desired temperatures?
6. Is the Lock-out Reset Button on the Control Box and Control Panel indicator illuminated? If so, press to reset Burner.
7. Check the fuse which should have been fitted to the mains electricity supply to the programmer/boiler operating switch. If the fuse has blown, replace it. If it blows again, call a Service Engineer.

IMPORTANT - Electrical Safety

IT IS ESSENTIAL THAT BEFORE ANY PANELS OR COMPONENTS ARE REMOVED FROM THE BOILER, THAT THE MAINS ISOLATOR IS SWITCHED OFF.

10:2 FAULT FINDING CHART - BOILER

	Trouble or Complaint	Possible Cause	Action
1.	Suspect oil supply	No oil in tank Supply valves closed Blockage in oil supply (Gravity head feed)	Check and arrange for tank to be filled if necessary Open all supply valves Shut off the burner isolating valve. Disconnect the oil supply at the pump entry. Place receptacle under the pipe. Slowly open the valve, note is the flow unrestricted, restricted or blocked?
2.	Burner will not start	Wrong grade of oil Water contamination Tank vent blocked Filter blocked Air locks in supply pipe Air lock in pump Interruption or absence of electrical supply at burner (Check this at Control Box mains terminal with test lamp) Control Box is locked out, refer to symptom 4 Photo-resistor receiving false light	Check for correct grade of fuel (see technical data) Open tank, drain valve and check Check Check for water or blockage Check for high points in main oil supply Bleed pump, check flexible oil line. Check mains switch on. Check fuse in switched spur or plug. Check that time switch or programmer contacts are closed. Check that the auxiliary stat is closed. Check boiler stat, cylinder stat, room stat are calling for heat. Press reset button on the burner box Check that the photo-resistor is fully home in its housing. Burner will not start with illuminated cell.
3.	Burner lights up but locks out after 15 seconds	Faulty control box No oil supply Photo-electric cell not receiving light from flame Photo-electric cell connections loose Control box photo-electric cell circuit faulty Flame instability	Replace. Check oil in the tank. Check that photo-electric cell is clean and fully home in housing Check and tighten if necessary. Replace control box. Check combustion setting out and reset if necessary.

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4.	Burner starts but will not light up	This can be due either to absence of oil ignition. Oil pump air locked (repeat air locking may be due to poor pipe joints or defective gland packings) Motor not driving pump shaft Blocked atomiser nozzle Oil pressure abnormally low Solenoid valve faulty	Pump should be self-venting with two pipe system only. If a one pipe gravity feed is employed it must be purged through the vent port. Check that flexible drive is functioning correctly and not slipping. Remove and replace nozzle. Check oil pressure on gauge and set to the correct pressure (see technical data). Break union at outlet to check presence of oil. Check that seat is clear. Check coil for continuity. Inspect coil feed wiring to control box.
----	-------------------------------------	--	--

		Pump rotation incorrect	Check.
		Ignition failure:	
		Electrodes dirty	Inspect and clean if necessary.
		Electrodes mis-set	Inspect and reset gap 3 to 4mm between tips. 2mm in front of nozzle face.
		Cracked electrode insulator.	Check and replace if cracked or crazed.
		Electrode leads	Check for proper connections
5.	Burner lights up, runs continuously and emits visible smoke or shows excess smoke on combustion check	Air shutter closed	Reset to correct position.
		Wrong nozzle	Check make, type and spray angle.
		Worn atomiser nozzle	Replace if necessary.
		Oversize nozzle fitted in error	Check size and replace with correct size of necessary.
		Nozzle incorrectly stamped	Replace with correct nozzle.
		Burner air supply inadequate	Inspect air intake and fan for fouling of impeller with dirt.
		Burner oil pressure excessive	Check pressure and reset to correct pressure (see Technical Data).
6.	Burner lights up, runs normally but flame cuts off slowly on shut down (possibly with smoke or pulsation)	Air in nozzle	Should self-correct; if air repeatedly present; for leaks on oil line and flexible. Inspect and replace if necessary.
		Magnetic valve not operating correctly	
		Shut off piston in pump sticking	Replace pump.
7.	Burner Pulsates (a) continuously	Air shutter setting incorrect or fan inlet blocked	Inspect and reset or remove blockage.
		Grossly oversized	Checked and replace with correct size and type nozzle (see Technical Data)
		Air supply inadequate	Check fan operation and cleanliness.

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7.	Burner pulsates (a) continuously	Worn nozzle with excess throughout or uneven spray pattern	Replace with nozzle of correct type and size (see Technical Data).
	(b) at initial firing	Air in supply line	Purge at pump to remove.
		Blocked flue ways	Clean boiler and flue.
8.	Burner locks out on morning starts then runs perfectly for rest of day	Localised low voltage supply in early morning	Check with local Electricity Board to fit recorder. Enlist aid of the Board.
		Air present in oil	Restart burner several times - press lockout reset supply button repeat 7(b) above.
		Bottom of oil tank below level of oil pump	Raise tank or install a two pipe oil supply from tank.
		Non-return valve faulty or air leak in two pipe oil supply system.	Renew non-return valve. Rectify air leak.
9.	Burner fails due to blown fuse.	Short circuit in wiring	Inspect wiring, sheathing and inter-component connections for broken or damaged leads. Replace if necessary.
		Motor seized	Check by hand and replace if necessary.
		Breakdown of insulation of motor windings	Replace motor.
10.	Burner runs normally but will not reach desired temperature	Oil throughput insufficient	Check nozzle size and pressure against rating
		Boiler has become undersized due to heating system expansion	Check with heating installer.
		Low efficiency and CO ₂	Check combustion readings, reset air.
		Low efficiency due to high flue gas temperature	Clean heat exchanger surfaces
		Faulty boiler stat. Partially	Replace, check and clean.

	blocked filter	
11. Poor combustion readings	Low CO ₂	Check: CO ₂ , oil pressure, nozzle size (see Technical Data)
	High CO ₂	Check: CO ₂ , oil pressure, nozzle size (see Technical Data)
	High smoke	Check: CO ₂ , oil pressure, nozzle size (see Technical Data) Check all Baffles are in place and correctly located.
	High flue gas temperature	Check: air shutter, nozzle size (see Technical Data), clean heat exchanger surfaces.
12. Oil odour	Leaking joints	Break all leaking joints and re-make

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13. High operating temperature	Control stat failed and operating on limit stat	Replace control stat and reset Limit Thermostat
14. Fumes in Boiler Room	Inadequate draught due to unsatisfactory chimney or blockage of boiler flue ways or flue pipe	Take necessary corrective action
15. Unstable flame, some puffing, ignition cuts in intermittently	Air damper on burner improperly adjusted or faulty nozzle or unsatisfactory draught conditions or fault in oil supply	Set up burner as for commissioning using oil pressure gauge, smoke pump, CO ₂ indicator and draught gauge, adjust settings as necessary, replace nozzle if necessary. See Commissioning Check List and Servicing Notes.

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10:3 FAULT FINDING SYSTEM SUMMER MODE (DHW ONLY)

SYMPTOM	FAULT	REMEDY
High limit thermostat tripped, no hot water only cold at taps	Circulating pump seized	Free off circulating pump or replace circulating pump
Boiler not firing, no hot water at taps. Tank LED not illuminated	Mains supply not on Tank control thermostat not functioning Relay/s failed	Reinstate mains supply check operation of tank control thermostat and/or replace change PCB
Boiler fired, tank at temperature, no hot water at taps. Flow LED not illuminated when DHW is demanded.	Flow switch not operating correctly Relay/s failed	Test function of flow switch, replace if faulty
Boiler fired, heated tank, tank LED indicator illuminated, boiler cycling	Faulty tank thermostat Faulty relay/s jammed in energised position	Test function of tank thermostat and replace Replace PCB
Boiler fired, heating tank, tripped manual reset limit thermostat	DHW thermostat failed in NC position	Test thermostat and replace
Boiler fires CH heats up when in summer mode, no DHW	Diverter valve seized in CH position	Inspect diverter valve body, replace if seized, check correct operation of actuator head replace if faulty
Boiler doesn't fire, circulating pump on, no DHW at taps only cold, both relay indicator neon's illuminated	DHW stat failed in NO position	Test functioning of DHW thermostat and replace if faulty
Boiler not firing in summer mode, no DHW at taps only cold, flow LED indicator illuminated	Tank control thermostat not switched on Tank thermostat failed in open circuit position	Switch tank control thermostat on, set at desired temperature Test thermostat, replace if faulty
Boiler fires, Flow LED indicator illuminated, boiler keeps firing with	Faulty flow switch Faulty relay jammed in energised position	Test function of flow switch replace if faulty

no DHW draw off		
Boiler fires, heats up tank, very low water pressure/flow at hot taps, cold tap pressure ok	Partially scaled up plate heat exchanger blockage on incoming mains to boiler	De-scale or replace plate heat exchanger disconnect cold mains to boiler and check for blockages
Boiler fires heats up tank, very low water pressure flow at hot and cold taps	Fault on cold mains supply to residence.	check stop cock fully open. contact local water supplier and report fault.
Boiler has been functioning correctly, loss of DHW temperature, water pressure/flow ok.	Air trapped in storage tank	Bleed air from storage tank using manual air vent positioned at the top of the tank at the rear on the right hand corner. Allow system to cool, check pressure in system and repressurise if required. Bleed air from boiler heat exchanger using manual air vent positioned on top of the boiler at the rear right hand corner and repressurise if required Bleed air from pipe and repressurise if required
	Air trapped in boiler heat exchanger	
	Air trapped in pipe between tank and plate exchanger	

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10:4 FAULT FINDING SYSTEM WINTER MODE (DHW & CH)

SYMPTOM	FAULT	REMEDY
Boiler not firing, no DHW or CH temperature, Tank LED indicator not illuminated.	Tank control stat and boiler control stat not switched on Tank control stat and or boiler control stat faulty	Turn both thermostats on and set to desired temperature Test thermostats for correct functioning, replace faulty thermostat/s.
Boiler fires, heats DHW tank, changes over to heat CH, DHW draw off - only cold water at taps boiler continues to heat CH, flow LED indicator not illuminated	Faulty flow switch Faulty relay/s Faulty diverter valve	Test correct functioning of flow switch, replace if faulty. Replace PCB Test correct functioning of diverter valve body and actuator replace faulty part
Boiler fires, heats tank, switches to CH - no heat to CH	Faulty diverter valve Room thermostat faulty or not calling for heat	Check correct functioning of diverter valve body and actuator replace faulty part. Turn thermostat up to call for heat to check correct functioning of room thermostat
Boiler fires, heats CH and not storage, tank LED indicator illuminated, boiler high limit manual reset thermostat tripped out.	Diverter valve seized in CH position	Check correct functioning of diverter valve body and actuator replace faulty part.
Boiler fires, heats tank, switches to CH - no heat to heating, boiler doesn't fire, heating indicator neon not illuminated	Control thermostat switched off or faulty - failed open circuit	Switch control thermostat on or check correct functioning of control thermostat, replace if faulty
Boiler fires heats up tank and heating, DHW draw off - low water pressure/flow from hot taps - cold taps ok.	partially blocked plate heat exchanger or partially blocked cold supply to boiler unit	Check cold supply to unit, check flow through plate heat exchanger if low - de-scale or replace plate heat exchanger
Boiler fires heats tank and heating up and trips boiler high limit manual reset stat.	Faulty control thermostat	Replace control thermostat
Boiler fires heats tank and heating, pressure relief valve discharges.	Faulty pressure relief valve Faulty pressure vessel - no air pressure in vessel or system may require extra pressure vessel to	pressurize system, P.R.V. should operate between 2.7 and 3 bar. Replace if faulty. Check air pressure in vessel set to correct pressure. if vessel does not hold charge then

expand into.

replace vessel. Fire boiler when tank and CH at temperature check on pressure gauge, if above 2 bar then extra vessel may be required.
Free off or replace circulating pump.

Boiler fires, high limit manual reset thermostat is tripped, no heat to tank or heating
Circulating pump seized

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10:5 PARTS REPLACEMENT INSTRUCTIONS

Note: Before attempting any parts replacement ALWAYS isolate appliance from mains electricity supply.

10:5. 1) To remove/replace circulating pump:

- a) Isolate pump union valves
- b) Remove black plastic electrical connections cover
- c) Depress each grey lever and remove each wire in turn (for safety during this operation it is advisable to insert each wire into a terminal block)
- d) Lift out cable complete with cable retaining clamp and move to a safe position
- e) Using a shallow tray or other means of collecting water release pump union valves from circulating pump
- f) Lift pump out of appliance and replace with new unit ensuring that new rubber sealing washers are used.
- g) Reassemble in reverse order insuring that pump head is inclined approximately 30 degrees to the horizontal
- h) Vent air from circulating pump via screw in pump head, check system pressure (topping up if necessary)
- i) Reinststate mains electricity supply and test correct operation of replacement pump.

10:5.2) To remove/replace motorised valve actuator head

- a) Remove control panel rear cover, note positions of motorised valve wires and remove. b) Release cable grip and ease cable from control panel. c) Remove access cover from front of control panel d) Remove two fixing screws from corners of valve actuator head and ease valve actuator head forwards and out of control panel e) Reassemble in reverse order and test correct functioning.

10:5.3) To remove/replace motorised valve body

- a) Remove access panel on front of control panel
- b) Remove two screws in valve actuator head and ease forwards off valve body and lay on control panel.
- c) Isolate heating circuit using valves on heating flow and return.
- d) Drain down top section of boiler, storage tank and pipework
- e) Remove Heating flow pipe (13) (BS50044C) between isolating valve and three port motorised valve body.
- f) Remove Pump To Three Port Valve Pipe (10) (BS50042)
- g) Remove both Elbow Fittings (9)
- h) Unscrew valve body from Storage Tank
- i) Replace with new unit and reassemble in reverse order using jointing tape and paste where necessary (ensure correct tapping orientation)
- j) Refill boiler, storage tank and pipework to correct system pressure, open heating isolating valves
- k) Test correct functioning of valve

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10:5 PARTS REPLACEMENT INSTRUCTIONS

10:5.4) To remove/replace plate heat exchanger

- a) Isolate heating using valves on heating flow and return
- b) Drain down top of boiler, storage tank and pipework
- c) Isolate cold mains supply using valve on cold mains pipe
- d) Remove heating flow pipe (13) (BS50044C)
- e) Remove tank to plate heat exchanger pipe (8) (BS50045C)

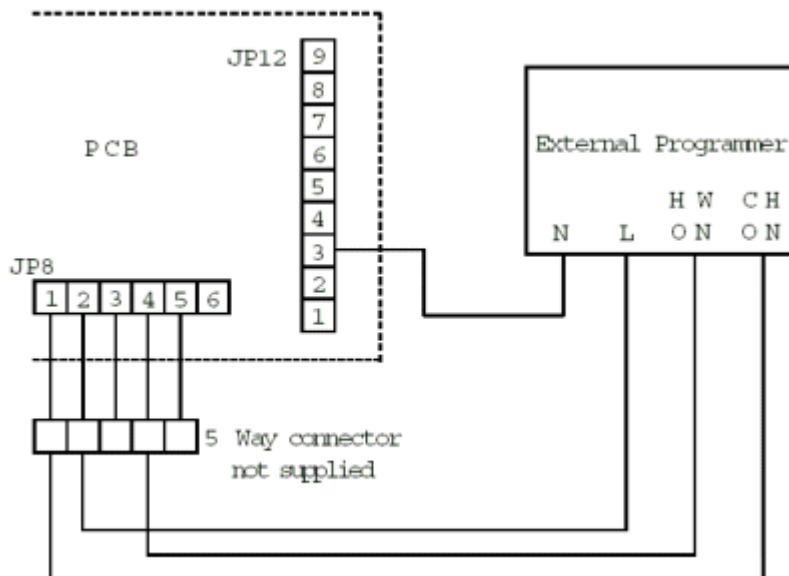
- f) Unscrew Flow switch actuator body and remove from brass body
- g) Remove cold mains supply pipe (7) (BS50048C)
- h) Remove DHW supply pipe (19) (BS50047C)
- i) Remove return manifold (14) (BS50046C)
- j) Remove & replace plate heat exchanger
- k) Reassemble in reverse order using new gaskets on plate heat exchanger joints (where necessary use jointing paste, NOTE: only use WRC approved jointing paste for joints containing potable water)
- l) Refill boiler, tank and pipework, pressurise to correct system pressure and open heating isolating valves
- m) Reinstate cold mains supply
- n) Check for leaks and function test appliance

10:5.5) To remove/replace flow switch actuator head

- a) Isolate cold mains supply using isolating valve on cold mains pipe
- b) Remove control panel rear cover
- c) Trace flow switch cable and disconnect from PCB
- d) Remove cable grip and ease cable from control panel
- e) Reassemble in reverse order, reinstate cold mains supply and test correct functioning of flow switch.

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11 INSTRUCTIONS FOR CONNECTING AN EXTERNAL PROGRAMMER



- 1) These instructions are ONLY for suitably qualified personnel.
- 2) When selecting a Programmer make sure that it is suitable for combi boiler applications.
- 3) Isolate electric supply.
- 4) Remove control panel cover.
- 5) Snip all 5 wires from the Summer/Winter switch, remove and discard tags from the Summer/Winter switch
- 6) Connect the 5 loose tails from JP8 on the PCB to a 5 way connector (not supplied) inside the control panel.
- 7) Bring the cable from the programmer through a spare knockout using a strain relief bush. Cable to have 4 wires and earth.
- 8) Connect as shown in the diagram, ie:-Programmer L to JP8-2 Programmer N to JP12-3 Programmer CH ON to JP8-1 Programmer HW ON to JP8-4

Connect earth wire (if supplied) to the control panel earth post, (not shown in the diagram).

9) Leave connections 3, 5 & 6 of JP8 unconnected.

10) Replace control panel cover.

11) Reinstate electric supply.

Note- Advise the customer that the Summer/Winter switch is inoperative. Alternatively remove the switch completely, but the vacated hole must be blanked off.

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Indicates changes from previous issue.

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Boulter Boderus policy is one of continuous research and development and this may necessitate alterations to this specification from time to time.

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