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CAMRAY QUARTET

**INSTALLATION &
MAINTENANCE MANUAL**
for
CAMRAY QUARTET
and
CAMRAY UTILITY
Oil Fired Boilers

Model

Serial No.

Oil Burner

.....

Type

Class of Fuel (C2 or D)

.....

Preheater Fitted Y / N

Manual Part No. PL26000

Issue No. 4

Date of Issue June 1997



93/2339



BOULTER BOILERS

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 despatch.

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.

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

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A member of the Bullough Group of Companies

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

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1:1 INTRODUCTION

This Manual covers Installation, Commissioning and Maintenance of the Camray Quartet and Camray Utility Boilers.

For operating instructions see separate Owners Handbook.

The Camray Quartet and Camray Utility are:-

1. Designed for Central Heating and Hot Water.
2. Suitable for conventional open vented Central Heating systems.
3. Suitable for sealed Central Heating systems which are within the maximum permitted working pressure. All Boilers are supplied with a manual reset limit thermostat.
4. Suitable for new installations and for replacing existing 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 as standard with low level horizontal firing Oil Burner, they are suitable for connection to a conventional chimney or any of the Camray Quartet/Utility Balanced Flue options. Note: The nozzle on this appliance is only covered by a 1 year guarantee.

1:2 PATENTS

The internal baffling system is subject to pending Patent Application No. GB 9409095.8

1:3 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 side outlet balanced flue.
5. High level side outlet balanced flue.
6. For connection to a conventional chimney.
7. Other options may be available. Please contact Boulter Boilers.

The tested balanced flue terminals and connections afford an adequate supply of air for

combustion and equalization of pressure between exhaust and intake as required for operation under unfavourable wind conditions.

Balanced flues are supplied in a carton which includes ALL parts for balanced flue installation.

The horizontal terminals are designed to avoid the possibility of staining outer walls through which they pass.

1:4 COMMISSIONING

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 Boilers will be pleased to provide details of an OFTEC* approved commissioning and servicing engineer from their list of approved engineers.

See Section 6 for Commissioning Procedure.

IMPORTANT

It is the responsibility of the installer to ensure that the boiler is commissioned by an OFTEC* Registered Commissioning Engineer.

*The Oil Firing Technical Association for the Petroleum Industry, Banstead, Surrey

☎ (01737) 373311.

1:5 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 with the exception of flues which require cutting to length to suit site conditions, as detailed 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.

2:1 LIQUID FUELS

The CAMRAY QUARTET and CAMRAY UTILITY Boilers will burn liquid fuels complying with BS2869 Part 2 1988 Classes C2 and D as specified in the Code of Practice for Oil Firing BS5410 Part 1.

Class C2 (Kerosine)

This fuel is suitable for all Quartet and Utility models. Burners are supplied with the appropriate nozzle and pump pressure as standard for this fuel. They are set for mid-range output. Details of all nozzle sizes and pump pressure for all outputs are shown on page 5.

Class D (Gas Oil)

All models Quartet and Utility can be adapted to burn Class D, and can be supplied from the factory fitted and tested at a nominal charge if requested at the time of ordering the Boiler. The adaption requires the essential fitting of a nozzle line pre heater and timer control (reference page 5).

Model 40/60 is restricted in output on Class D to a range of 50/60,000 Btu/h.

Model 60/80 is restricted in output on Class D to a range of 70/80,000 Btu/h.

The use of Class D (Gas Oil) for low level discharge of combustion gases is **NOT** permitted under any circumstances (ref. Oftec Technical Book 1).

2:2 BOILER TECHNICAL DETAILS

Maximum Boiler working pressure	3 Bar (Class 2) - 30.6m Water Head			
Minimum recommended return water temperature	60°C			
Maximum hearth temperature	less than 85°C.			
Maximum side panel temperature	less than 35°C above room temperature.			
Minimum Conventional flue draught at boiler flue outlet	0.035"w.g. (8.75N/m ²).			
Maximum Conventional flue draught at boiler flue outlet	0.15"w.g. (37.5N/m ²).			
Water Resistance	40/60	60/80	90/110	110/150
	w.g.	w.g.	w.g.	w.g.
	37mm.	58mm	47mm	114.3mm
	with 11°C temperature rise across the boiler.			

2:3 BURNER DETAILS

Burner type - 422T55, 436T55, 443T55 or 459T55.

Pressure Jet - Riello 40 supplied as standard.

Manually adjustable air regulator.

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

2:4 ELECTRICS

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

All wiring to supply and all system components external to boiler must comply with the latest edition of BS7671:1992 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.

2:5 DIMENSIONS

CAMRAY QUARTET (SHOWN)
CAMRAY UTILITY

*15mm Clearance required for
Conventional Flue. See 3.b.

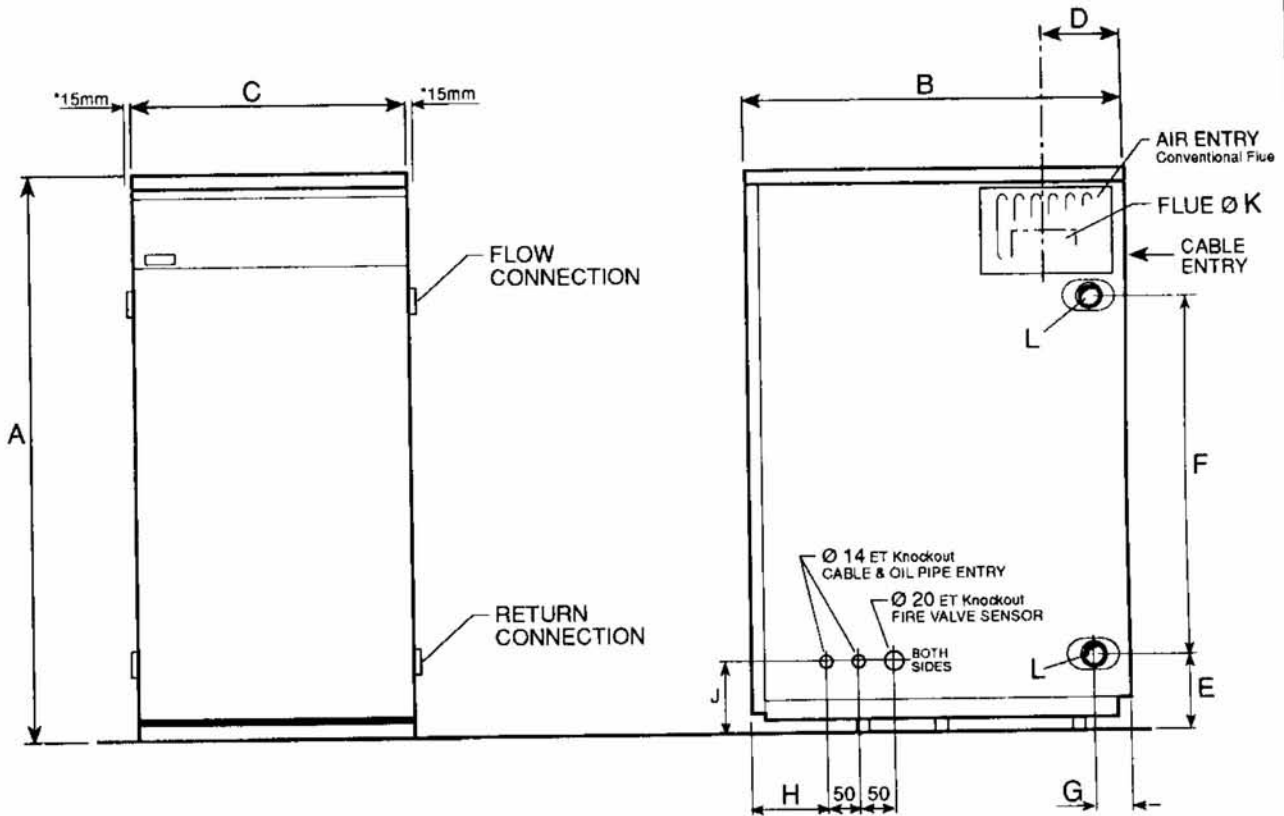


Fig. 2:5a Dimensions

Model	Output		A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	J mm	Flue K* Ø ins.	L Ø ins.	Weight Empty Kgs.	Water Content Litres	Filled Weight Kgs.
	kW	Btu/h x 1000														
40/60	12/17.5	40/60	860	556	408	124	110	550	50	107	93	4	1 BSP	97	22.8	120
60/80	17.5/23.4	60/80	860	595	445	124	110	550	50	107	93	4	1 BSP	109	26.9	136
90/110	26.3/32.2	90/110	1000	704	508	150	138	640	56	112	113	5	1¼ BSP	171	29.8	200
110/150	32.2/44	110/150	1000	704	508	150	138	640	56	112	113	5	1¼ BSP	179	32.8	211

*Conventional Flue size

2:6 COMMISSIONING DATA - BASED ON 84% COMBUSTION EFFICIENCY

2:6:1 Class C2, Kerosine Oil RIELLO BURNER (Fitted with red cover)

Model QUARTET & UTILITY	Output		Riello 40		Nozzle Danfoss Delavan US/GPH	Pump Pressure		Air Shutter	Firing Rate l/h	CO2 %	Smoke No.	Flue Gas Temp. °C Gross
	kW	Btu/h x 1000	Type	Head Setting		Bar	psi					
40/60	12	40	422T55 G2Q	Fixed	0.4 x 80H	6.9	100	2.0	1.35	10	0 - 1	160
	15	50			0.5 x 80H	6.9	100	2.75	1.69	11	0 - 1	180
	17.5	60			0.6 x 60W	6.9	100	3.5	2.02	12	0 - 1	200
60/80	17.5	60	436T55 G3Q	Fixed	0.6 x 60W	6.9	100	3.2	2.02	11.5	0 - 1	195
	20.5	70			0.65 x 60W	8	115	3.5	2.36	11.5	0 - 1	207
	23.4	80			0.75 x 60W	7.6	110	6	2.7	12	0 - 1	214
90/110	26.3	90	443T55 G5Q	1	0.75 x 60W	9.5	140	2.25	3.04	12	0 - 1	195
	30	100		1	0.85 x 60W	9.3	135	2.6	3.38	12	0 - 1	200
	32.2	110		1	1.0 x 60W	8	115	2.9	3.71	12	0 - 1	215
110/150	32.2	110	459T55 G7Q	1	1.0 x 60W	8	115	2	3.71	12	0 - 1	165
	38	130		2	1.25 x 60W	7.2	105	2.75	4.39	12	0 - 1	193
	44	150		3	1.35 x 60W	8.3	120	3.1	5.06	12	0 - 1	204

2:6:2 Class D, Gas Oil

RIELLO BURNER (Fitted with red cover)

A Pre Heater is Essential on -

Quartet Models 40/60, 60/80, 90/110 & 110/150

Preheater Kit Codes as follows:-

G2Q/G3Q 3000947
G5Q 3000991 + 3006001
G7Q 3000992

Model QUARTET & UTILITY	Output		Riello 40		Nozzle Danfoss Delavan US/GPH	Pump Pressure		Air Shutter	Firing Rate l/h	CO2 %	Smoke No.	Flue Gas Temp. °C Gross
	kW	Btu/h x 1000	Type	Head Setting		Bar	psi					
40/60	15	50	G2Q	Fixed	0.4 x 80W	8	115	4	1.61	12	0 - 1	216
	17.5	60			0.5 x 60W	7.2	105	3.8	1.94	12	0 - 1	232
60/80	20.5	70	G3Q	Fixed	0.5 x 60W	10	145	3.25	2.26	11.5	0 - 1	200
	23.4	80			0.6 x 60W	9	130	5.5	2.58	12	0 - 1	220
90/110	26.3	90	G5Q	Fixed	0.75 x 60W	7.2	105	2.7	2.9	12	0 - 1	200
	30	100			0.75 x 60W	9	130	3.1	3.23	12	0 - 1	210
	32.2	110			0.85 x 60W	8.3	120	5.5	3.55	12	0 - 1	220
110/150	32.2	110	G7Q	2	0.85 x 60W	8.3	120	2.2	3.55	12	0 - 1	178
	38	130		2	1.0 x 60W	8.5	125	2.8	4.2	12	0 - 1	188
	44	150		4	1.1 x 60W	9.3	135	4	4.84	12	0 - 1	220

3:1 STANDARDS & REGULATIONS

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

BS 5410 Oil Installations

Pt 1 under 44kW;

Pt 2 over 44kW

BS 5449 Forced circulation hot water central heating systems for domestic premises.

BS 4543 Pt. 1 & 3 Factory made insulated chimneys.

BS 7671 (1992) Electrical Wiring Regulations.

BUILDING REGULATIONS.

Part J England and Wales

Part F Section III Scotland

Part L Northern Ireland

The Control of Pollution (Oil) Regulations

Oil boilers should be installed in accordance with good practice as recommended by OFTEC (Ref. 1:4 page 3).

3:2 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.

When designing and installing the controls of the heating system, it must be remembered that if the control system is such that the water circulation through the boiler can be totally or substantially reduced whilst the oil burner can still fire, the water in the boiler will reach very high or boiling temperature before the boiler thermostat can sense it and switch off the Burner.

If this condition is likely wire the controls so that the electrical supply to the burner is switched off simultaneously with the stopping of circulating pumps or the closing of motorised valves.

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 (i.e. Chemical Cleaning) at the onset. This is essential when fitting a new boiler to an existing system.

3:3 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 BOILERS 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 40/60 & 60/80 Boiler models are serviced from the front. A space of 450mm (18") in front should be available.

5. The 90/110 & 110/150 Boiler models are serviced from the front and top. A space of 450mm (18") in front and above the Boiler should be available.

6. Any kitchen work top above the 90/110 & 110/150 Boiler must be removable for service access.

3:4 THE HEARTH

The Camray Quartet & Camray Utility have a Hearth Temperature of less than 85°C. The boiler requires 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 and the Building Regulations regarding floor loading.

The filled Boiler weight can be found in 2:5.

Advice should be sought from your local Building Control Office if there is any doubts regarding the floor supporting the Boiler.

3:5 THE CHIMNEY - (FLUE Ø 4" OR 5")

CONVENTIONAL CHIMNEY INSTALLATION ONLY.
FOR BALANCED FLUE INSTALLATIONS SEE SECTION 5.

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 stabilizer 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) or 5" (125mm).

The Flue pipe, connecting the boiler to the chimney 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 - 90° bends should be avoided - use 135° bends. Bends with soot doors should be used where necessary.

3:6 AIR SUPPLY

CONVENTIONAL CHIMNEY INSTALLATION ONLY

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

This air enters the Boiler through Air Entry Panel Plates, two on models 40/60 & 60/80 and three on 90/110 & 110/150. These Air Entry Plates must never be blocked off. At least 15mm clearance is required either at the side for models 40/60 and 60/80, or at the side and rear for models 90/110 and 110/150.

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.

3:6.1 Opening Sizes

The clear opening required for combustion only should be based on a requirement of 550mm²/kW, (or 1in² per 4000 Btu/h).

When a draught stabilizer 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, (or 2in² per 4000 Btu/h).

When the boiler is situated in a confined space with Combustion or Ventilation air from outside - Allow 550mm²/kW, (or 1in² per 4000 Btu/h) at low level and in addition 550mm²/kW, (or 1in² per 4000 Btu/h) at high level;

When Combustion and Ventilation air is taken from a heated adjoining space the allowance should be 1100mm²/kW, (or 2in² per 4000 Btu/h) at low level and in addition 1100mm²/kW, (or 2in² per 4000 Btu/h) 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.

3:7 OIL STORAGE

3:7.1 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. Hinged Fill and Vent Cover or a separate Fill connection and Vent. The Fill and Vent should be suitably capped to prevent ingress of water or fitted with return bends.

3:7.2 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.

3:7.3 Plastic Oil Tanks

Tanks made from plastic are now available. These should be UV stabilized 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)

3:8 OIL SUPPLY

The oil entry holes in the boiler casing are shown in the diagram in Section 2:5 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.

3:8.1 Oil Filter

An Oil Filter is supplied with the Boiler. Connections are ¼ BSP Female, see fig. 3:8c.

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.

3:8:2 Fire Check Valve (Not Supplied)

A FIRE VALVE must be fitted in the suction line - 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. 3:8a, 3:8b, 3:8d & 3:8f.

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 ensure the casing seal is maintained, always pass the Sensor through the blind grommet (supplied), it will be necessary to cut across the diaphragm.

3:8:3 Single Pipe System

Fig. 3:8b

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 3:9.2).

3:8:4 Two Pipe System

Fig. 3:8d

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 flow in the correct direction and prevent drain back to the Tank, see fig. 3:8e.

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 3:9.1)

3:8:5 Deaerator Oil Pipe System

Fig. 3:8f

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).

3:8:6 Water Separator Oil Filter

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

3:8.7 Flexible Oil Pipes

Camray Quartet Boilers and 3K Deaerator Fitting Kits are supplied with a 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.3:8a.

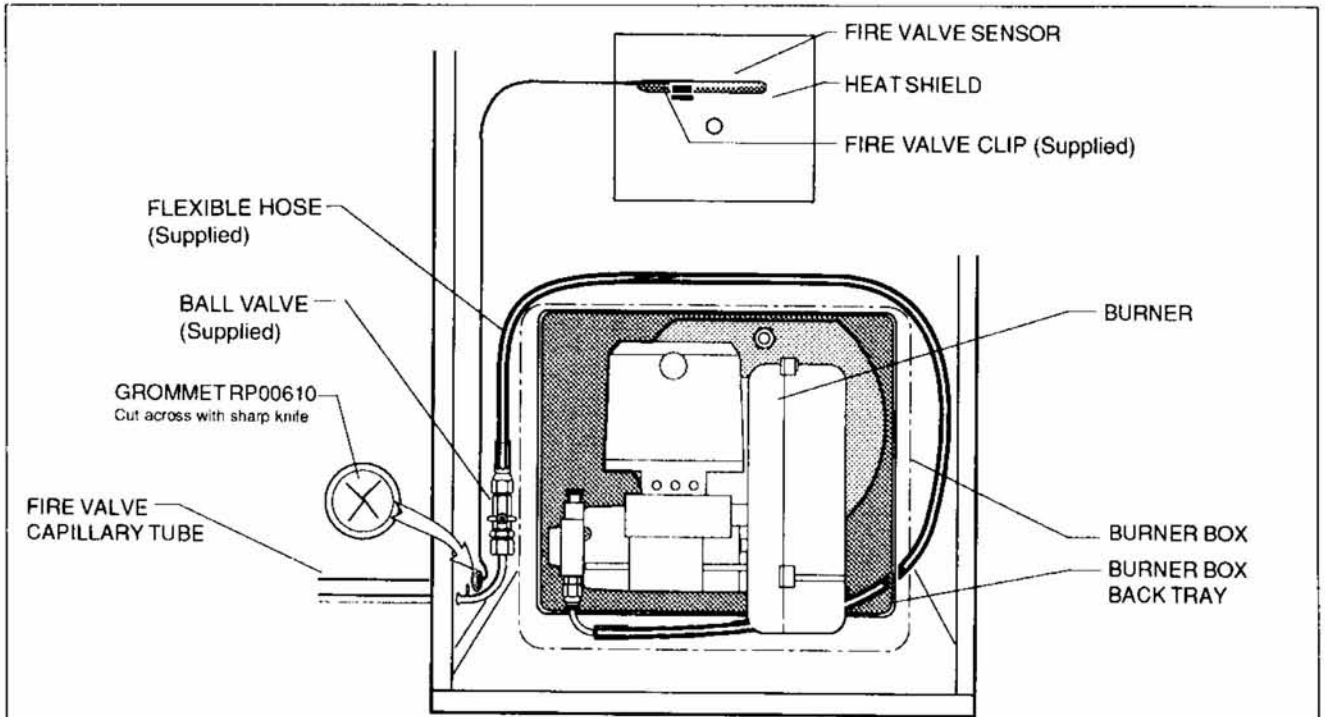


Fig. 3:8a Flexible Oil Pipes and Fire Check Valve

TYPICAL ARRANGEMENT SHOWN.

Fire Valve Tube and Oil Pipe may enter other Entry Points - see Fig 2:5a

SINGLE PIPE OIL SYSTEM - TANK OUTLET ABOVE BURNER

DO NOT FIT PUMP BYPASS SCREW TO BURNER - SEE 3:9.2.

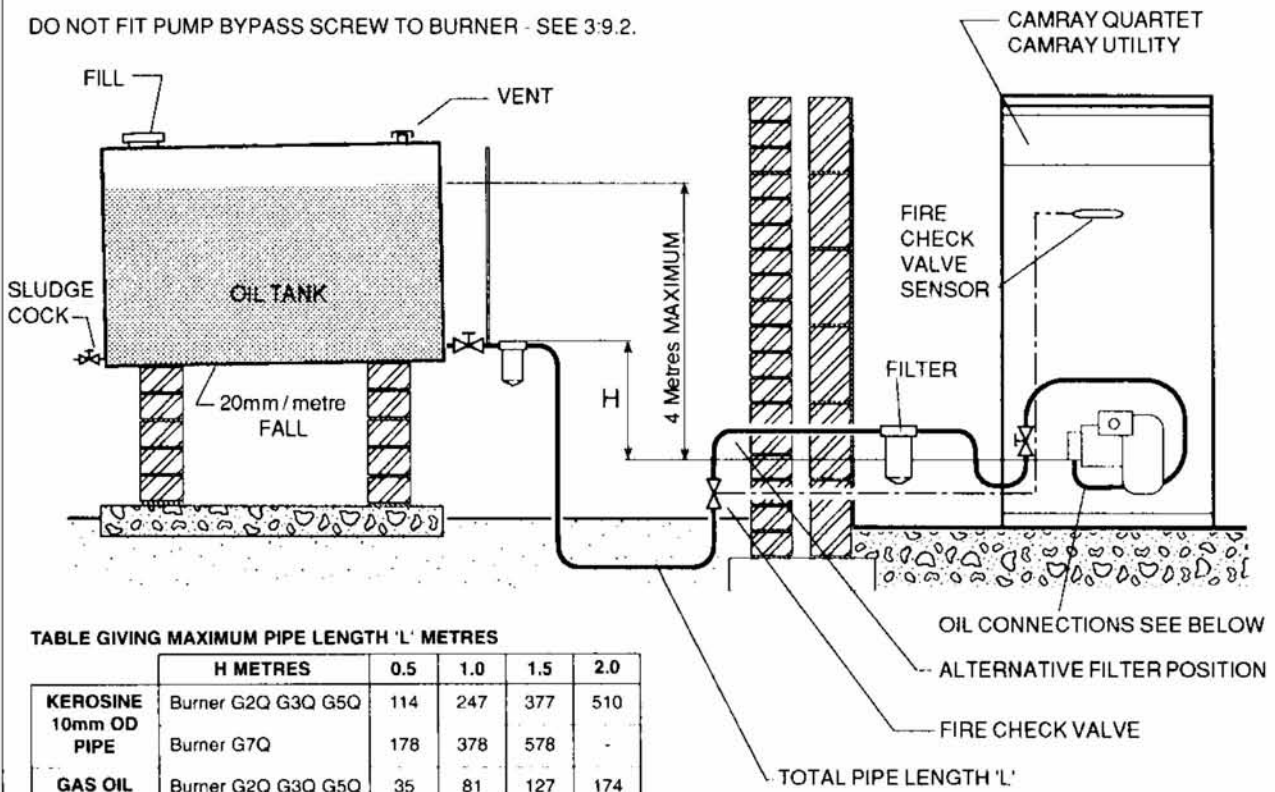


TABLE GIVING MAXIMUM PIPE LENGTH 'L' METRES

		H METRES			
		0.5	1.0	1.5	2.0
KEROSENE 10mm OD PIPE	Burner G2Q G3Q G5Q	114	247	377	510
	Burner G7Q	178	378	578	-
GAS OIL 10mm OD PIPE	Burner G2Q G3Q G5Q	35	81	127	174
	Burner G7Q	15	38	60	83

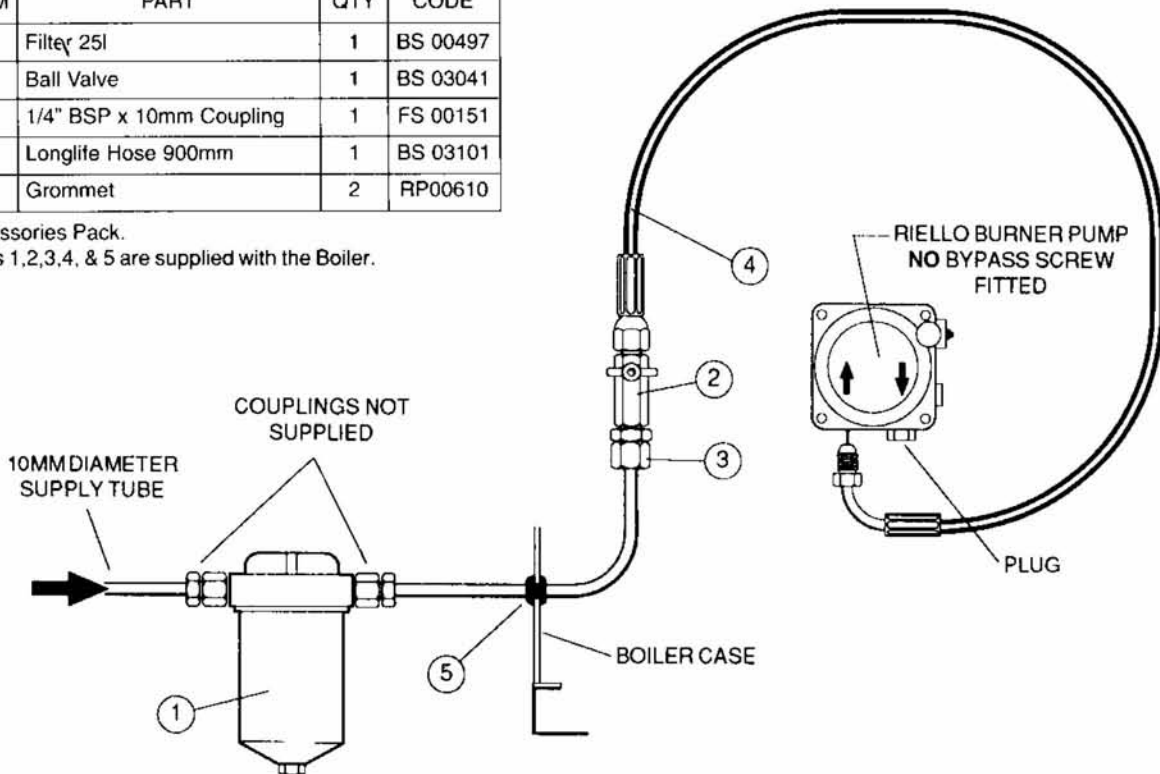
Fig. 3:8b Single Pipe Oil System.

SINGLE PIPE OIL SYSTEM - OIL CONNECTIONS

ITEM	PART	QTY	CODE
1	Filter 25l	1	BS 00497
2	Ball Valve	1	BS 03041
3	1/4" BSP x 10mm Coupling	1	FS 00151
4	Longlife Hose 900mm	1	BS 03101
5	Grommet	2	RP00610

Accessories Pack.

Items 1,2,3,4, & 5 are supplied with the Boiler.



LH & RH FUEL ENTRY AVAILABLE (LH SHOWN)
SCHEMATIC DIAGRAM FIT HOSE AS SHOWN IN FIG. 3:8a

Fig. 3:8c Schematic Oil Pipe Connections

TWO PIPE OIL SYSTEM - TANK OUTLET BELOW BURNER

FIT PUMP BYPASS SCREW TO BURNER SEE 3.9.1

SAW CUT OR SMALL HOLE IN RETURN PIPE INSIDE TANK TO PREVENT SYPHON

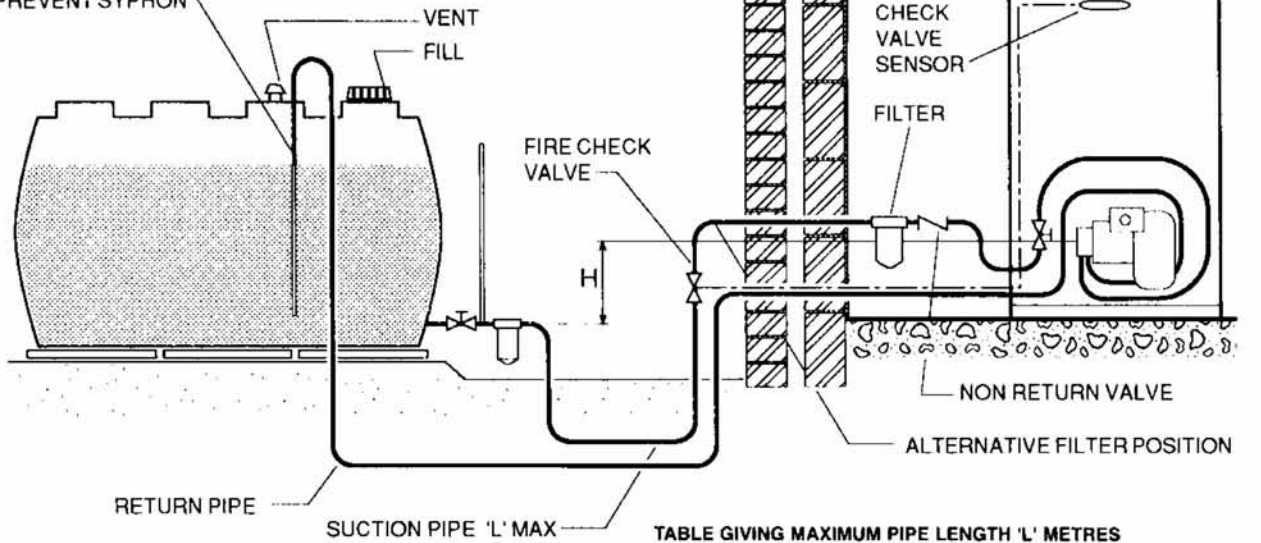


TABLE GIVING MAXIMUM PIPE LENGTH 'L' METRES

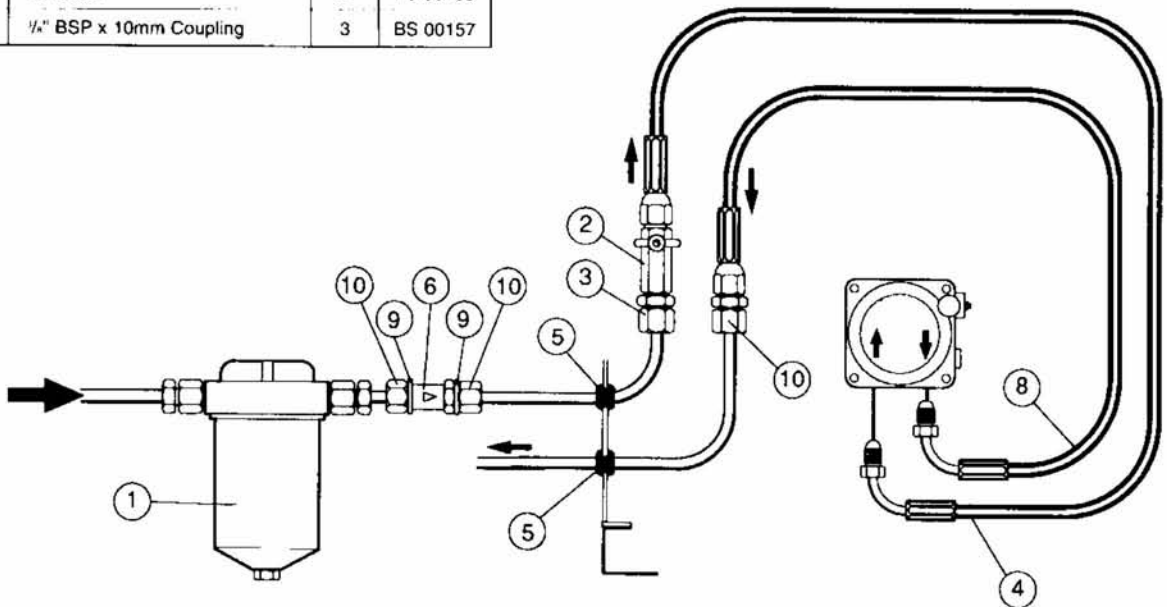
	H METRES	0.5	1.0	1.5	2.0
KEROSENE 10mm OD PIPE	Burner G2Q G3Q G5Q	176	151	129	103
	Burner G7Q	176	151	129	103
GAS OIL 10mm OD PIPE	Burner G2Q G3Q G5Q	39	32	25	21
	Burner G7Q	30	25	20	15

Fig. 3:8d Two Pipe Oil System.

TWO PIPE OIL SYSTEM - OIL CONNECTIONS

Items 1-5 are supplied with the Boiler. See fig. 3:8c.

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

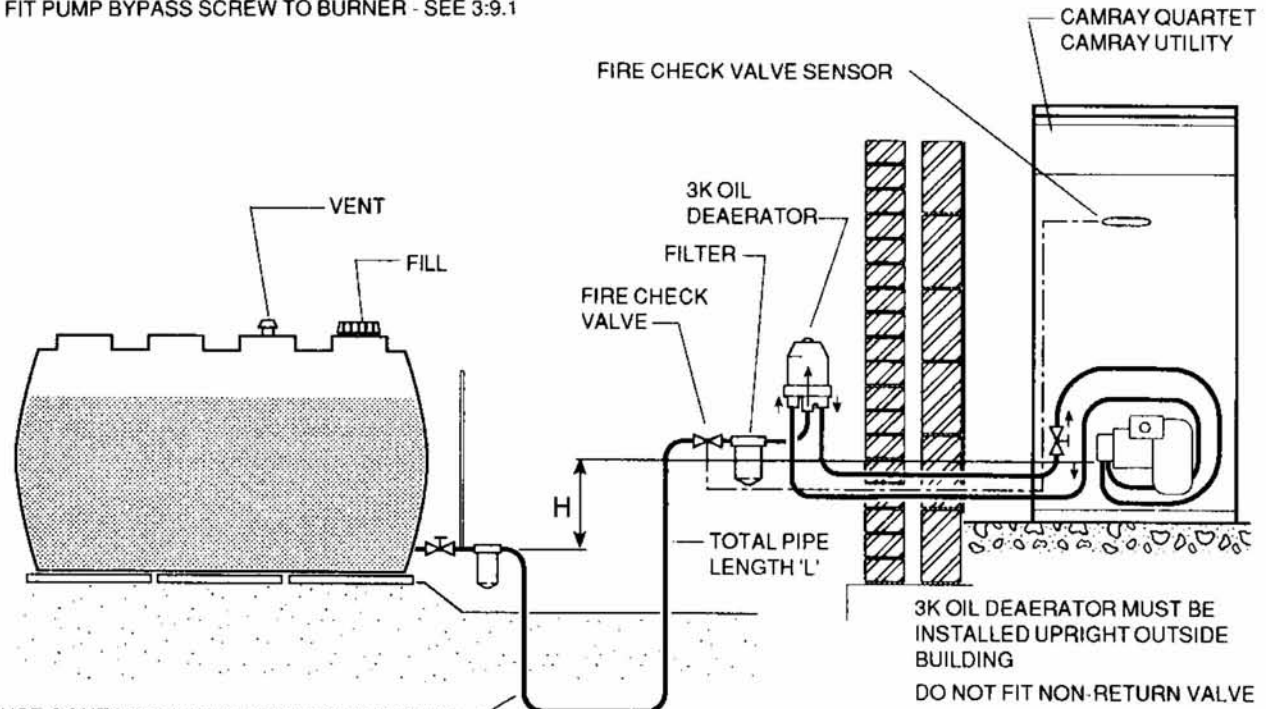


LH & RH FUEL ENTRY AVAILABLE (LH SHOWN)
SCHEMATIC DIAGRAM FIT BOTH HOSES AS SHOWN IN FIG. 3:8a

Fig. 3:8e Schematic Oil Pipe Connections

DEARATOR OIL SYSTEM - TANK OUTLET BELOW BURNER

FIT PUMP BYPASS SCREW TO BURNER - SEE 3:9.1



USE CONTINUOUS PIPE 10MM DIA MAXIMUM

The table right shows total Pipe Length 'L' metres.
 Note: RIELLO 40 Burner Types are listed assuming maximum Oil Rate.

Oil Rate Kg/h	Riello 40 Burner Type	Pipe Size mm O/D	Lift - H metres (3.5m Max)								
			0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	
A	2.5 to 6.3	G2Q	6	24	21	19	16	13	11	8	6
		G3Q	8	100	100	93	84	71	59	46	33
		G5Q	10	100	100	100	100	100	100	100	100
		G7Q	10	100	100	100	100	100	100	100	100

Fig. 3:8f Deaerator Oil System.

DEAERATOR OIL SYSTEM - OIL CONNECTIONS

Items 1-5 are supplied with the Boiler. See fig. 3:8c.

LH & RH FUEL ENTRY AVAILABLE (LH SHOWN)
 SCHEMATIC DIAGRAM FIT HOSE AS SHOWN
 IN FIG. 3:8a

ITEM	PART	QTY	CODE
6	3K Oil Loop	1	BS 03060
7	3/8" BSP x 10mm Coupling	1	FS 00157
8	Longlife Hose 900mm	1	BS 03103
9	1/4" x 10mm Coupling	3	FS 00151*

*SUPPLIED WITH BS 0305056C
 ITEMS 7, 8, & 9 ARE AVAILABLE AS A KIT NO. BS 03056C

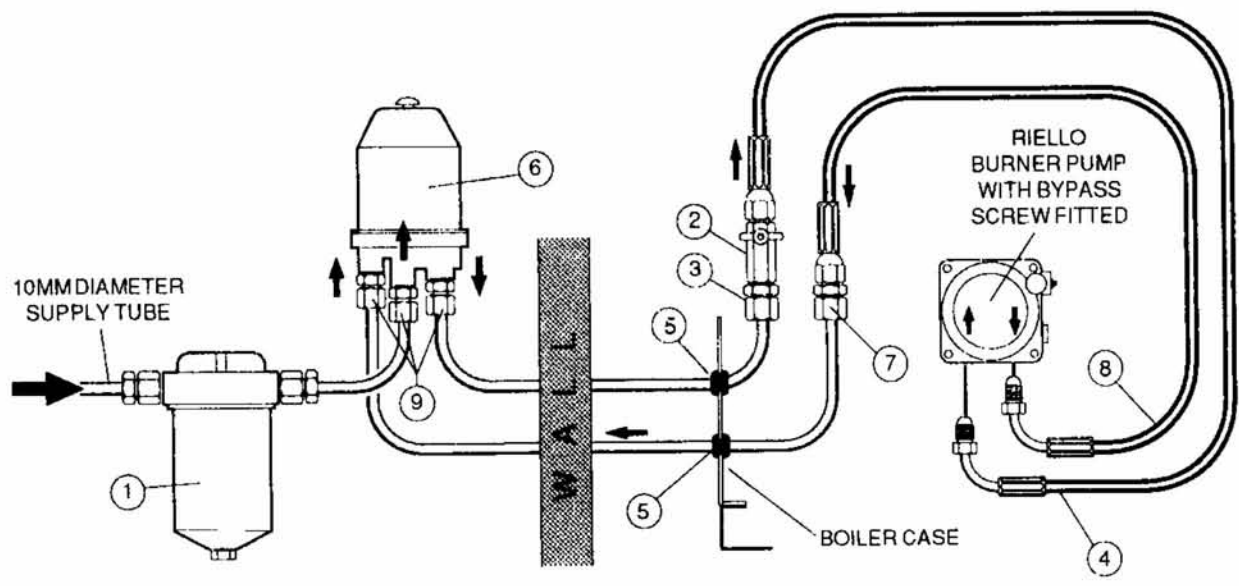


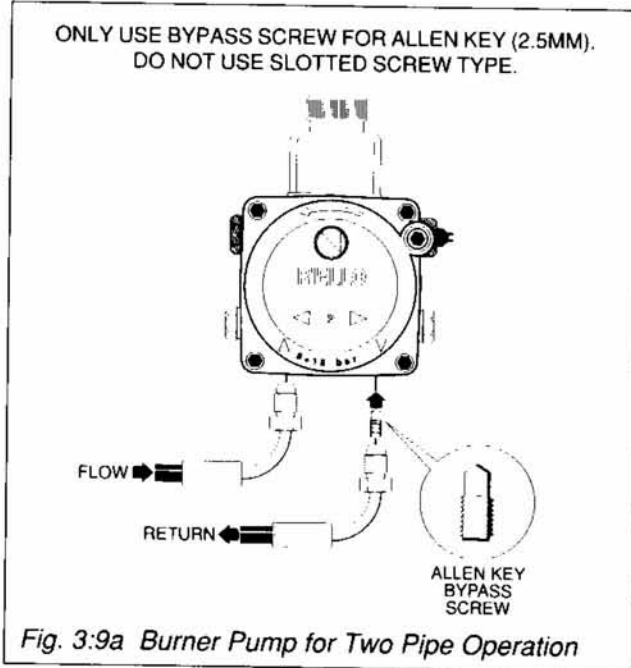
Fig. 3:8g Schematic Oil Pipe Connections

3:9 OIL BURNER

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

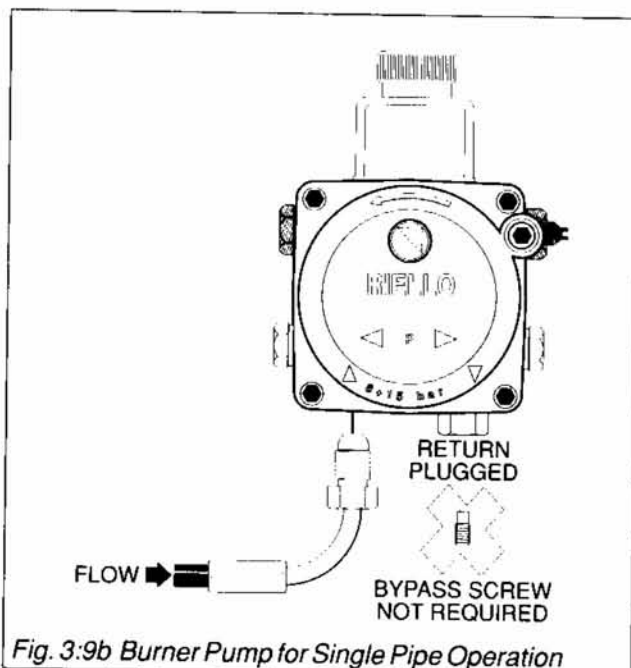
3:9.1 Burner Pump for Two Pipe System

For two pipe oil systems the Burner Oil Pump has to be fitted with the Bypass Screw supplied. Boilers are despatched with the Bypass Screw in a labelled envelope attached to the Burner. This socket screw is inserted into the return port as shown in Fig. 3:9a.



3:9.2 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. 3:9b.



3:10 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 separate Camray Quartet User Handbook.

3:10.1 Connecting Control Panel

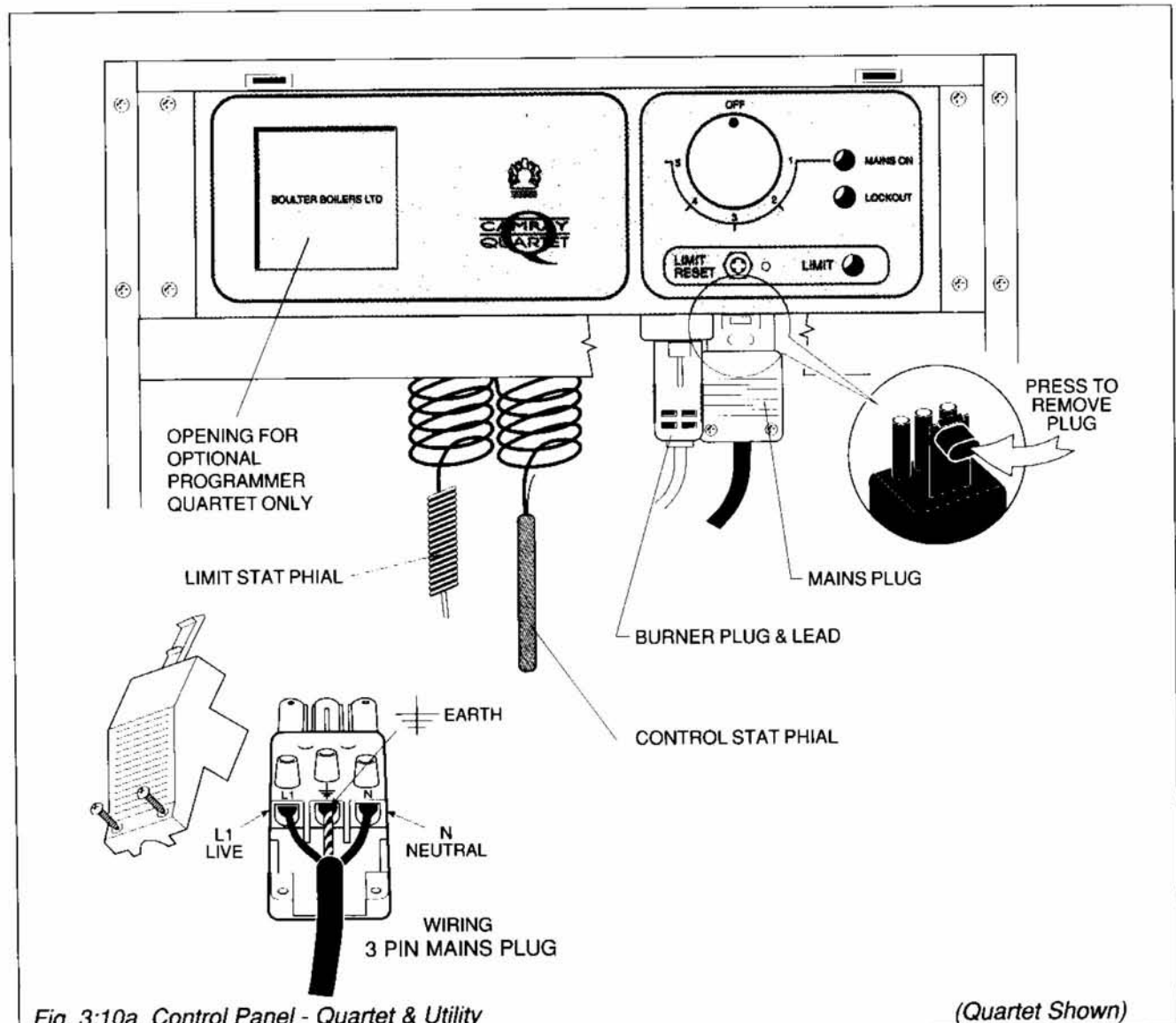
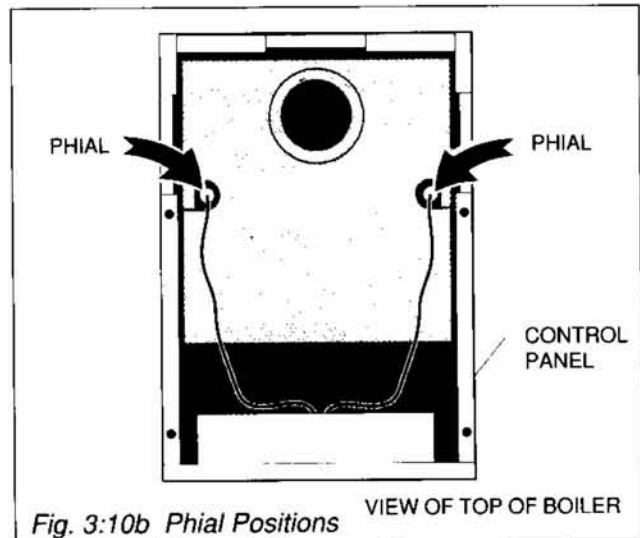
If a Boulter Programmer is to be fitted refer to section 3:11 of this manual for fitting instructions before connecting mains.

1. Connect the mains electrical supply to the 3 pin Mains Plug. See Fig. 3:10a.
2. Insert Mains Plug into the mating Mains Socket on the underside of the Control Panel.
3. Insert 4 pin Burner Plug on the end of the Burner Cable into its mating Socket on the underside of the Control Panel. See Fig. 3:10a.

NOTE: The 4 pin plug has an engagement peg. Depressing the peg with a small screwdriver allows the release of the plug from the socket.

3:10.2 Phial Positions

1. Insert the Boiler Control Stat 8mm Plain Phial into a pocket on the top of the Boiler Heat Exchanger as shown in Fig. 3:10b.
2. Insert the Limit Stat 8mm Coiled Phial into the second pocket on the top of the Boiler Heat Exchanger. See Fig. 3:10b.



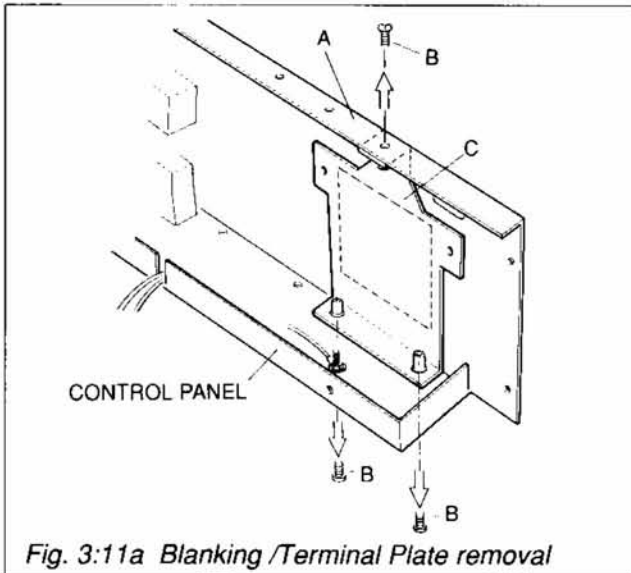
3:11 PROGRAMMER - QUARTET ONLY

The Programmer is available as an optional extra. The unit is supplied pre-wired to a 12 way terminal strip as detailed on wiring diagram - Section 3:12 and is available on code EL00034C.

WARNING
ISOLATE THE ELECTRICITY SUPPLY TO THE BOILER BEFORE PROCEEDING.

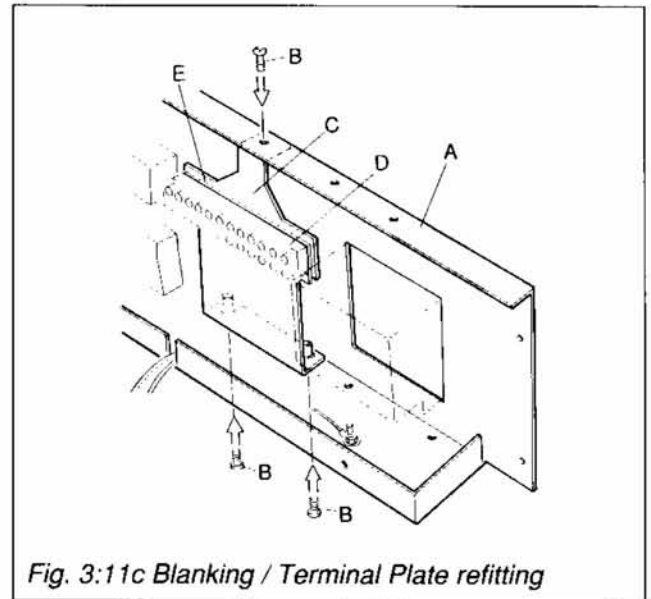
3:11.1 Fitting Programmer

1. Remove Boiler Control Panel (A).
2. Remove Control Panel Rear Cover.



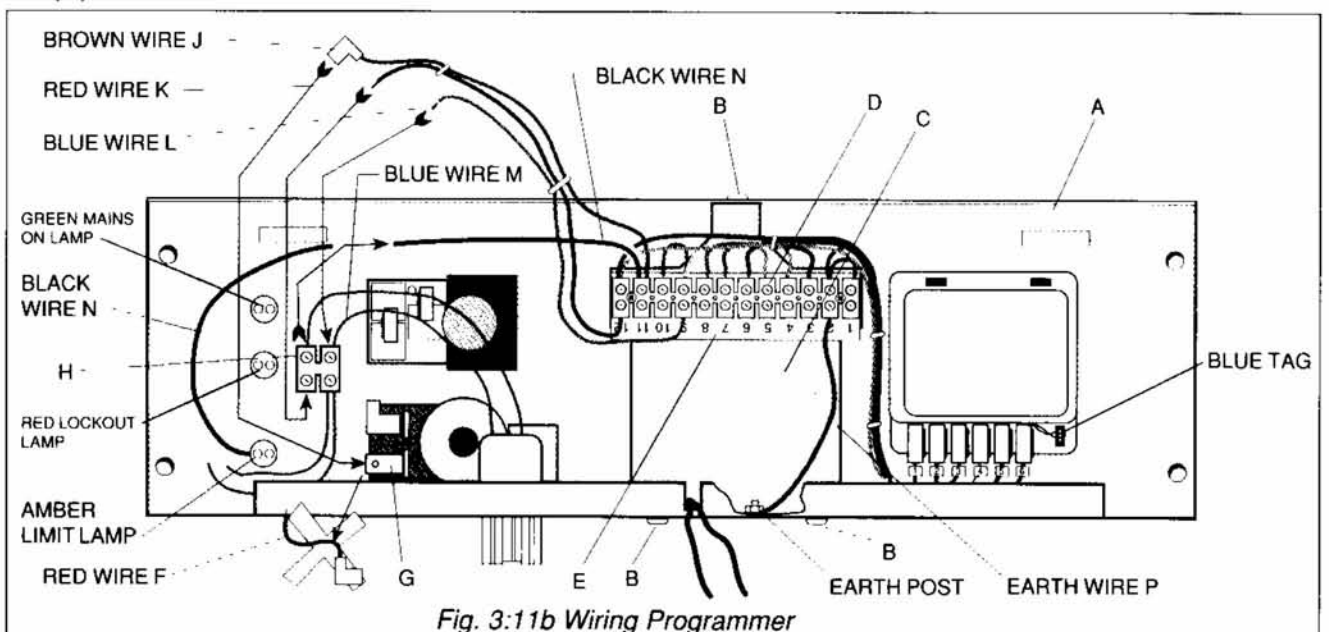
3. Remove 3 Screws (B) holding in the Blanking/Terminal Plate (C) and remove plate. See Fig. 3:11a.
4. Feed pre-wired Terminal Block (D) and wires through hole now exposed in the Control Panel and 'click' the Programmer in place with the display on the front of the Control Panel.
5. Bolt the Terminal Block (D) and Legend Panel (E) to the painted side of the Blanking/Terminal Plate (C).

6. Re-using 3 Screws (B) refit Blanking/Terminal Plate (C) with Terminal Block (D) attached to its new position on the Control Panel as shown in Fig. 3:11c.



3:11.2 Wiring Programmer

1. Remove Red Wire (F) from Limit Thermostat terminal (G) and 2 way Terminal Block (H) and discard
2. Fit Brown Wire (J) spade end onto vacated Terminal (G)
3. Secure Red Wire (K) into the vacated hole in 2 way terminal Block (H).
4. Fit Blue Wire (L) in along side the existing Blue Wire (M) in 2 way terminal Block (H).
5. Remove Black Wire (N) from Terminal Block (H) and fit this into number 11 of Terminal Block (D).
6. Fit Green/Yellow Earth wire (P) securely to Earth Post.
7. Make all necessary connections to the 12 way Terminal Block (D) as wiring Diagram - Section 3:12.
8. Check connections and Refit Back Cover and Control Panel to Boiler.



3:12 PANEL WIRING DIAGRAM

IMPORTANT
ENSURE GOOD EARTH

QUARTET STANDARD CONTROL PANEL SCHEMATIC WIRING DIAGRAM

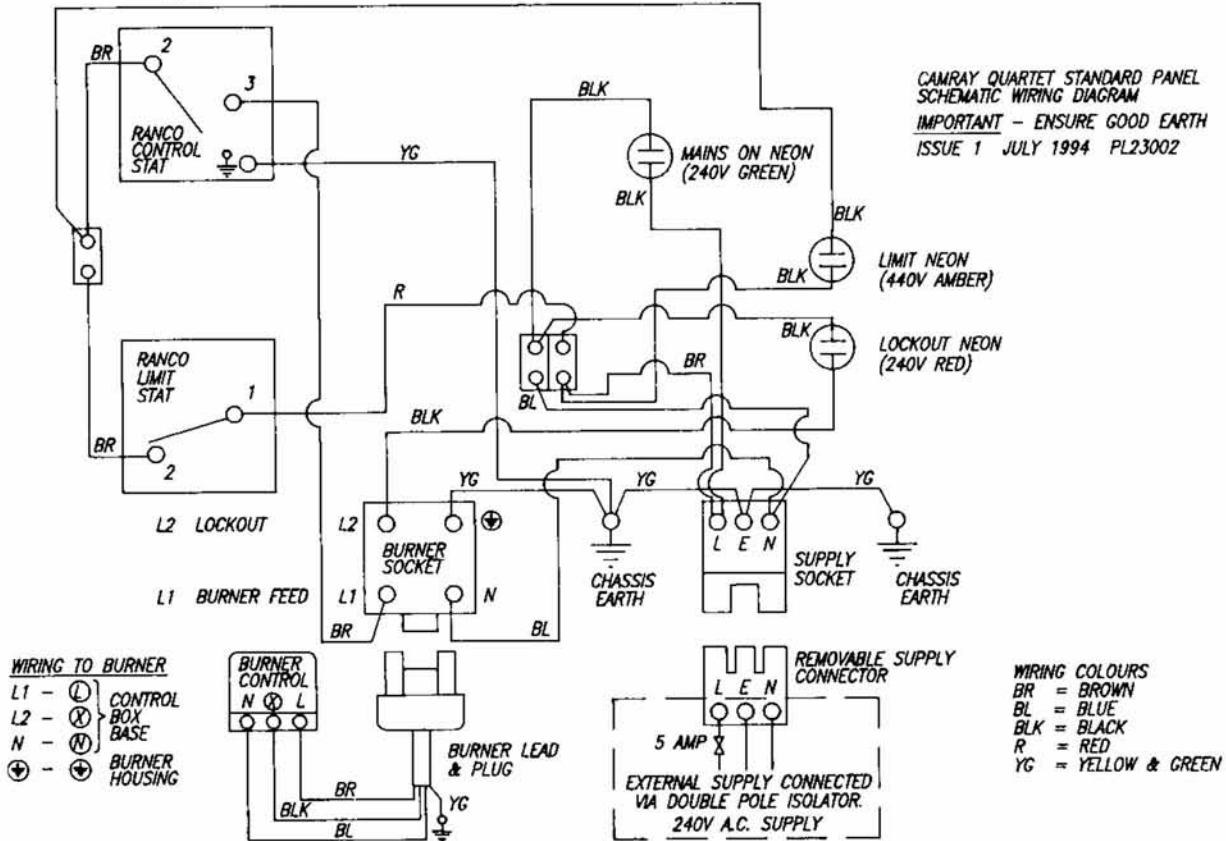


Fig. 3:12a Wiring Diagram - QUARTET

UTILITY CONTROL PANEL SCHEMATIC WIRING DIAGRAM

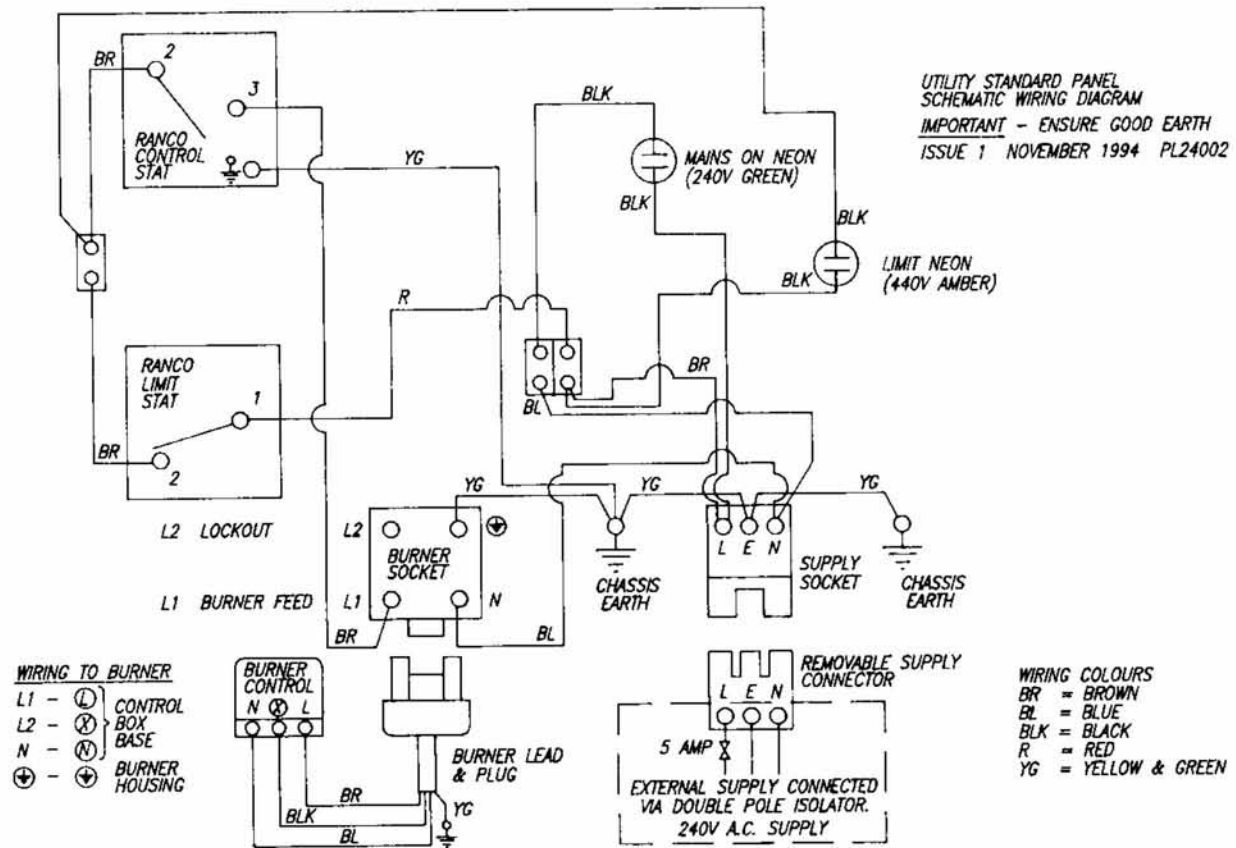


Fig. 3:12b Wiring Diagram - UTILITY

IMPORTANT
ENSURE GOOD EARTH

QUARTET CONTROL PANEL with PROGRAMMER SCHEMATIC WIRING DIAGRAM

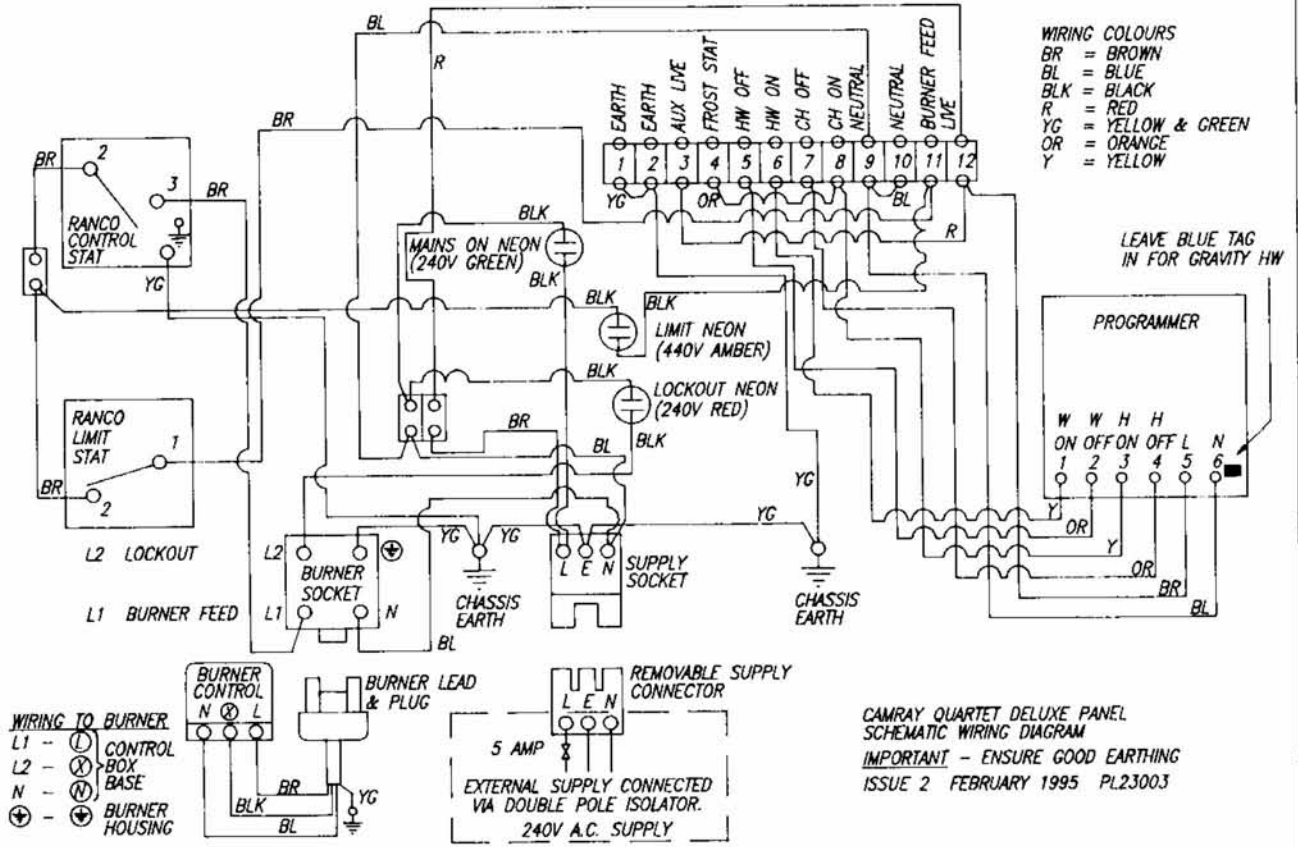


Fig. 3:12c Wiring Diagram - QUARTET plus PROGRAMMER

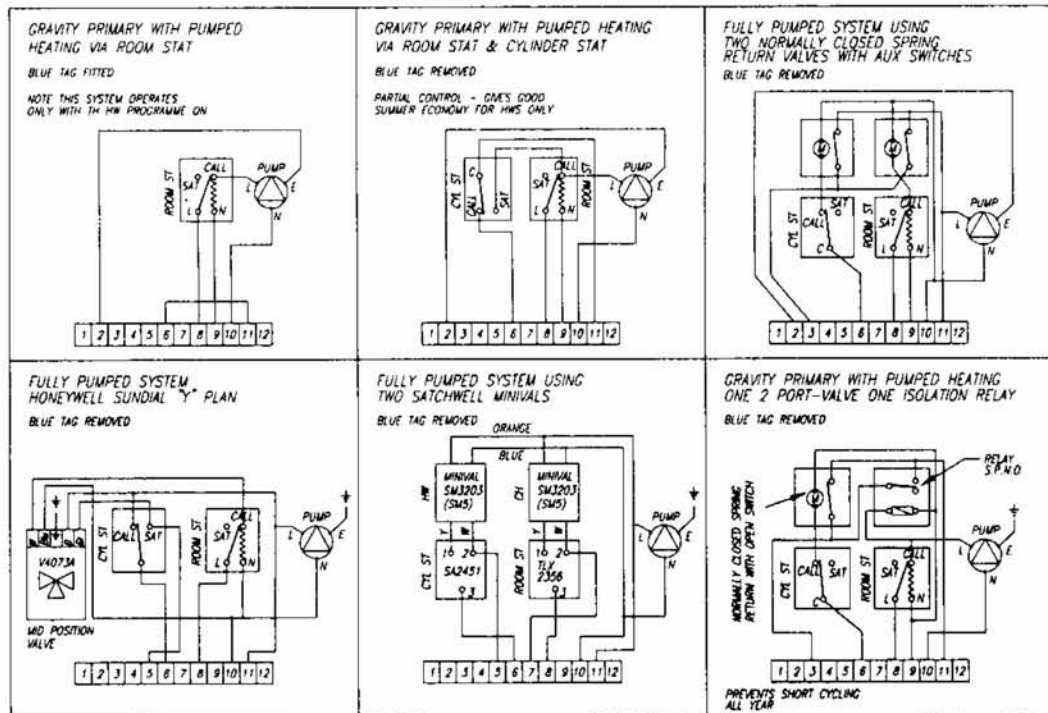
USE BOULTER BOILERS QUARTET PROGRAMMER KIT EL00034C

3:12.1 Typical External Wiring Options

IMPORTANT Blue tag must only be fitted to terminal 6 of time clock for gravity hot water only. It must be removed for fully pumped systems.

TYPICAL EXTERNAL WIRING OPTIONS

IMPORTANT NOTE: BLUE TAG MUST ONLY BE FITTED TO TERMINAL 6 OF TIME CLOCK FOR GRAVITY HOT WATER ONLY. IT MUST BE REMOVED FOR FULLY PUMPED SYSTEMS.



4:1 BALANCED FLUE BOILERS

A range of Balanced Flue Kits are available as optional extras for Camray Quartet & Utility.

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. Low level balanced flues are not used for boilers operating with gas oil (Class D fuel).
2. 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 BOILERS LTD. who will be pleased to consider and discuss it.

4:1.1 Balanced Flues Types

Three types are available.

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

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

IMPORTANT

It is not permissible to burn Gas Oil (Class D) fuel if LOW LEVEL HORIZONTAL balanced flue is to be used.

4:2 HORIZONTAL BALANCED FLUES

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 general restrictions as to the positioning of Horizontal Balanced Flue Terminals. Refer to Fig. 4:4a.

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. Close proximity to internal corners where products of combustion may not freely disperse and may enter the air intake to the boiler.

4. Positions such as narrow passageways, especially with a closed end, where easy dispersion could be adversely affected.

5. 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. Position 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.

4:3 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.

4:3.1 Positioning of Vertical Flues

Listed are general restrictions as to the positioning of Vertical Balanced Flues. Refer to Fig. 5:4b.

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 BS 5410:1).

3. Care should be taken to ensure that there is clearance between the outer surface of the flue and any combustible material.

4:4 POSITIONING THE BOILER

Read Sections 4:2 & 4:3

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. See Fig. 5:4b.

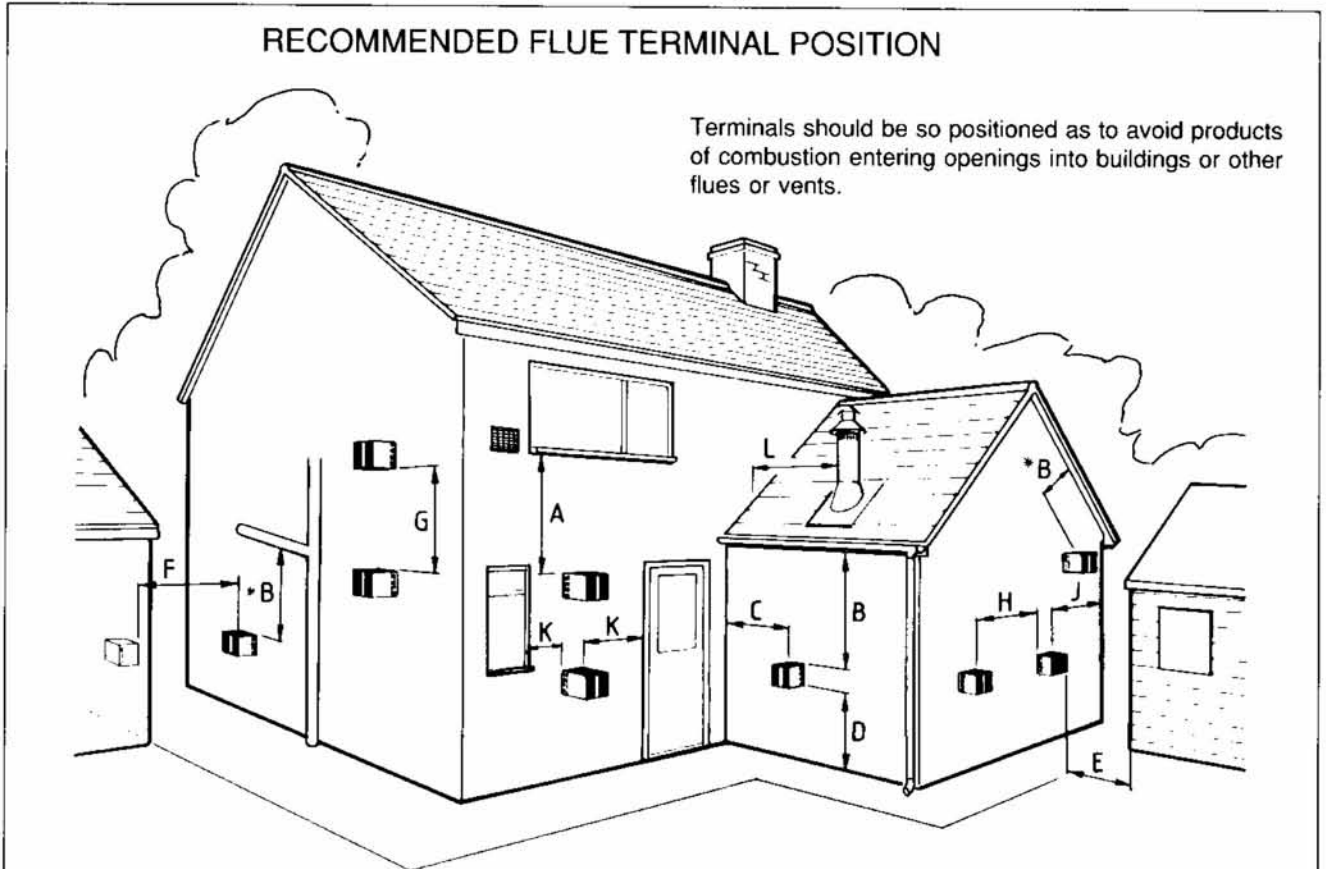


Table to above Flue Terminal Positions - MINIMUM dimensions.

REF	DESCRIPTION	DISTANCE IN MM
A	Directly below an Opening, Air Brick or Window	600
B	Below a Gutter, Sanitary Pipework or Eaves	600*
C	From any Internal Corner	900
D	Above Ground	700
E	From a surface facing the Terminal	2000
F	From a Terminal facing a Terminal	2000
G	Vertically between Two Terminals on the same wall	1500
H	Horizontally between Two Terminals on the same wall	1200
J	From any External Corner	600
K	Horizontally from any Opening, Air Brick, Window or Door	600
L	Vertical Flue from wall (Flat or Pitched Roof)	600

*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.

The flue terminal positions given are as recommended by BOULTER BOILERS. The final position of the flue should be checked with the local Building Inspectorate.

BOULTER BOILERS would be pleased to advise on any difficult positioning.

Fig. 4:4a Balanced Flue Terminal Positions

4:5 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 FL23150).

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

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

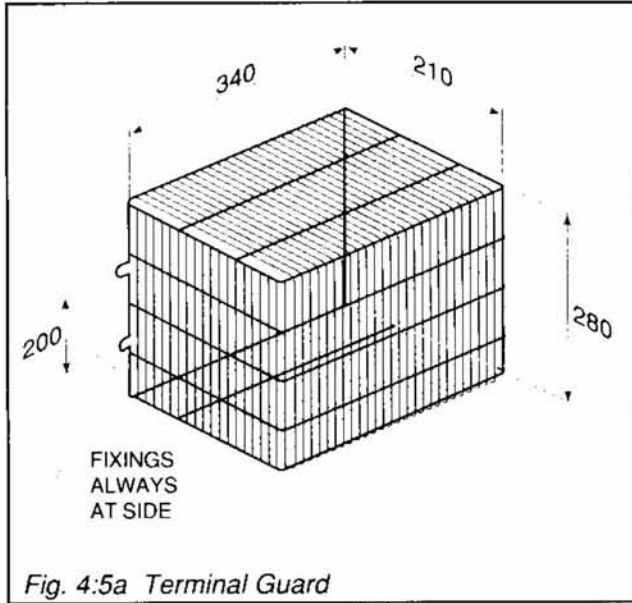


Fig. 4:5a Terminal Guard

4:6 HORIZONTAL FLUE TERMINAL

The Terminal for Horizontal Balanced Flues is fixed to the outside wall with a loose Flange that is secured with four screws.

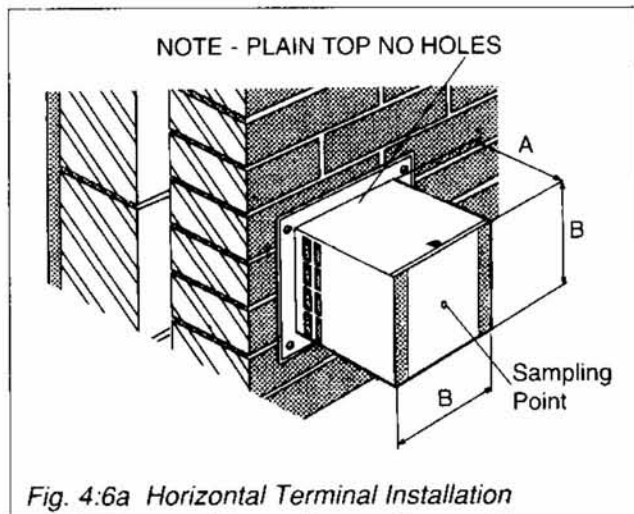
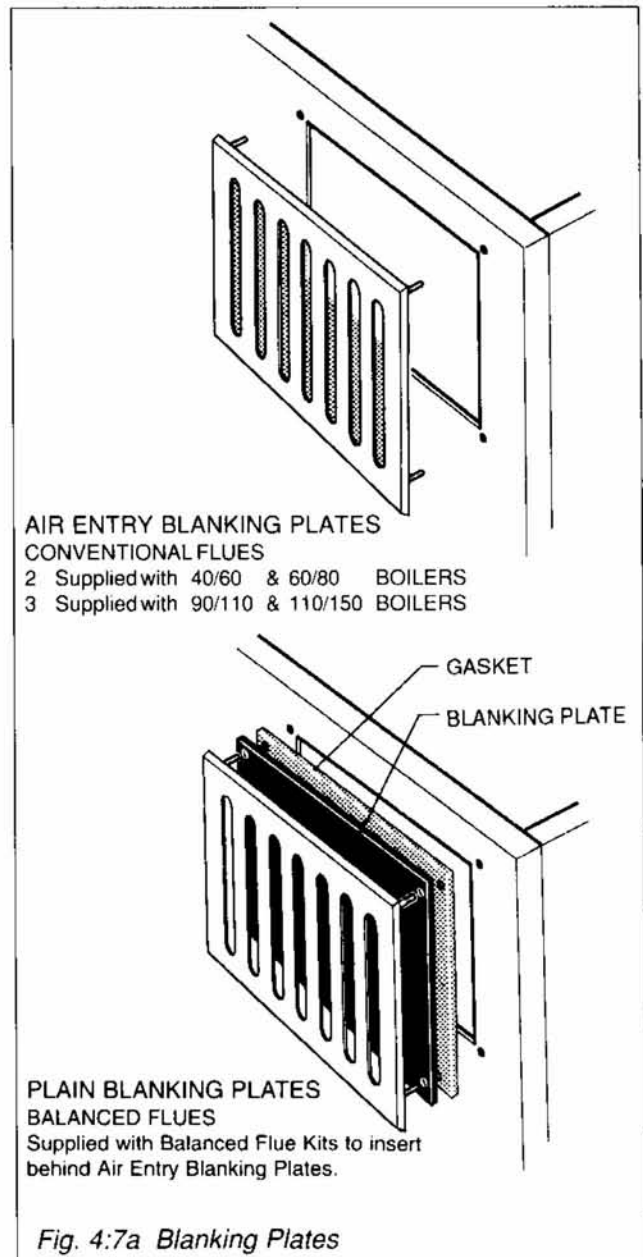


Fig. 4:6a Horizontal Terminal Installation

Dim. mm	A	B
40/60	150	130
60/80		
90/110	161	160
110/150		



AIR ENTRY BLANKING PLATES CONVENTIONAL FLUES

- 2 Supplied with 40/60 & 60/80 BOILERS
- 3 Supplied with 90/110 & 110/150 BOILERS

PLAIN BLANKING PLATES BALANCED FLUES

Supplied with Balanced Flue Kits to insert behind Air Entry Blanking Plates.

Fig. 4:7a Blanking Plates

4:7 BLANKING PLATES

In Conventional Flue form, the Boiler is provided with Air Entry Side Panel Plates, two on models 40/60 & 60/80 and three on 90/110 & 110/150.

When the Boiler is used with any Balanced Flue kit, fit Gaskets supplied between gridded Air Entry Plate and Boiler Casing, see diagram 4:7a. Important NO AIR ENTRY PLATES SHOULD BE LEFT OPEN.

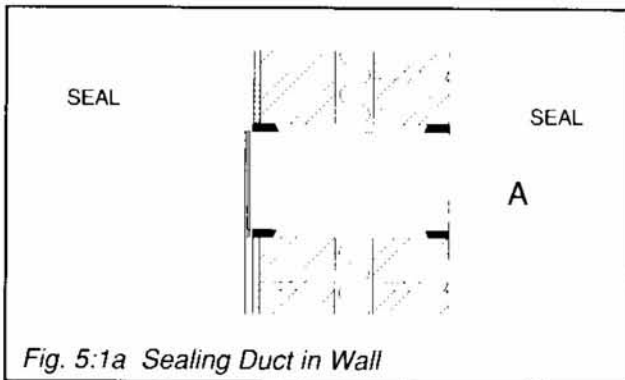
None of the possible Low Level Flue positions, must ever be left open but always blanked or fitted with a Terminal Air Duct.

The Top Panel Blanking Plate must always be fitted when Low Level Flue positions are used.

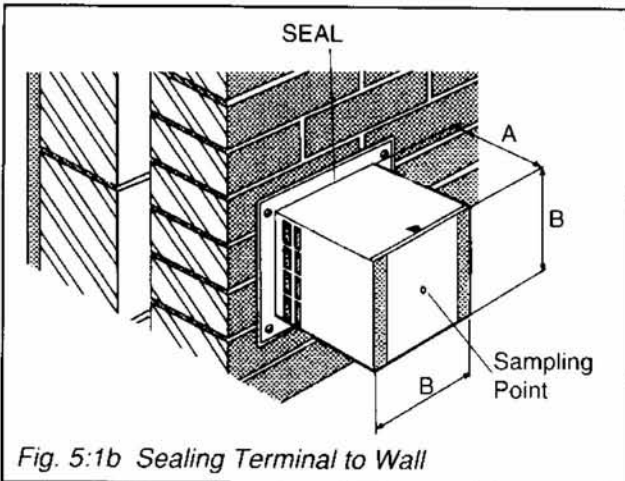
5:1 NOTES ON INSTALLATION

LOW LEVEL AND HIGH LEVEL BALANCED FLUES

1. Where possible the Terminal Air Duct (A) should be sealed in the wall both inside and out with mortar or mastic.



2. Sealant supplied should be applied around the Terminal Clamp Plate after fixing.



3. HIGH LEVEL FLUES - AIR DUCT LENGTH

The standard Horizontal Kit Air Duct must be modified for high level use so that the square Air Duct slides inside the Flue Duct Elbow.

To maintain maximum effective length cut off the Fixing Flange, preferably by cutting along the line of its flanges. This reduces the Air Duct by about 10mm.

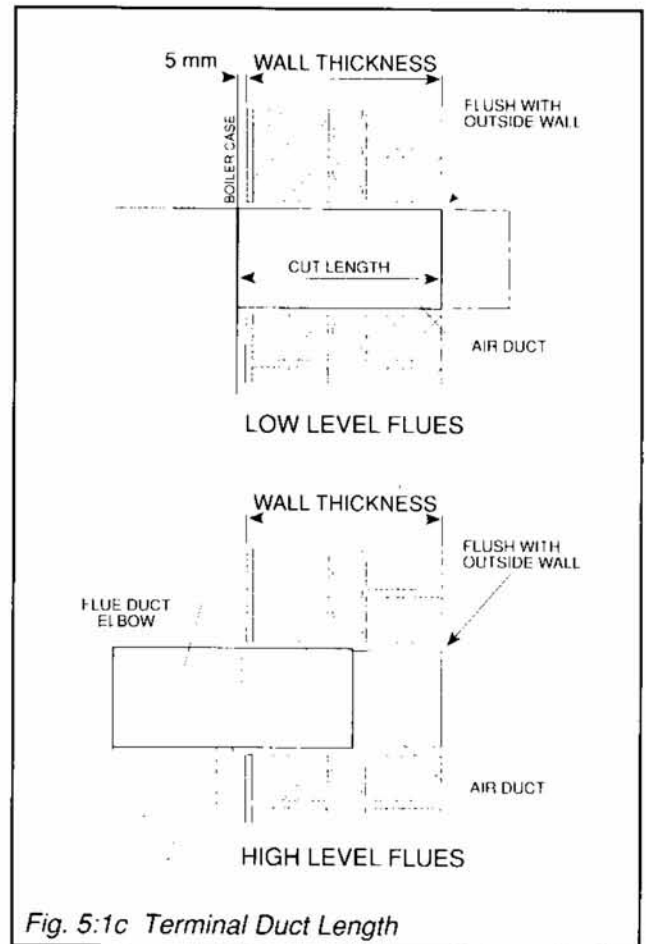
Otherwise, cut the flanged end off at the required length to suit the wall thickness (fig. 5:1c).

Because the union of ducts is effectively a telescopic joint, the basic components allow for walls thicker than 500mm (see page 34).

It may be necessary to also shorten the Flue Duct Elbow where walls are single skin.

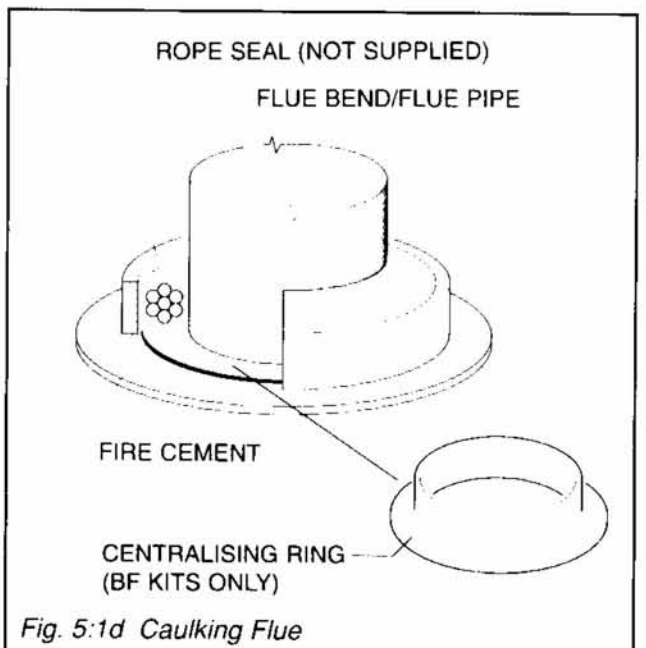
Once the required assembly length is achieved, always tape the joint between Duct and Elbow before final assembly.

4. The Terminal Air Duct may have to be cut to length to suit the wall thickness. See Fig 5:1c



5. A 500mm Flue Extension Kit is available for walls over 500mm thick. The Extension Air Duct and Flue are added to the standard lengths supplied.

6. Always tape Flue and Duct joints before final assembly. After assembling the Flue, caulk the Flue Bend / Flue Pipe into the Boiler with the centralising ring as shown in Fig 5:1d.



5:2 LOW LEVEL HORIZONTAL FLUE

5:2.1 Rear

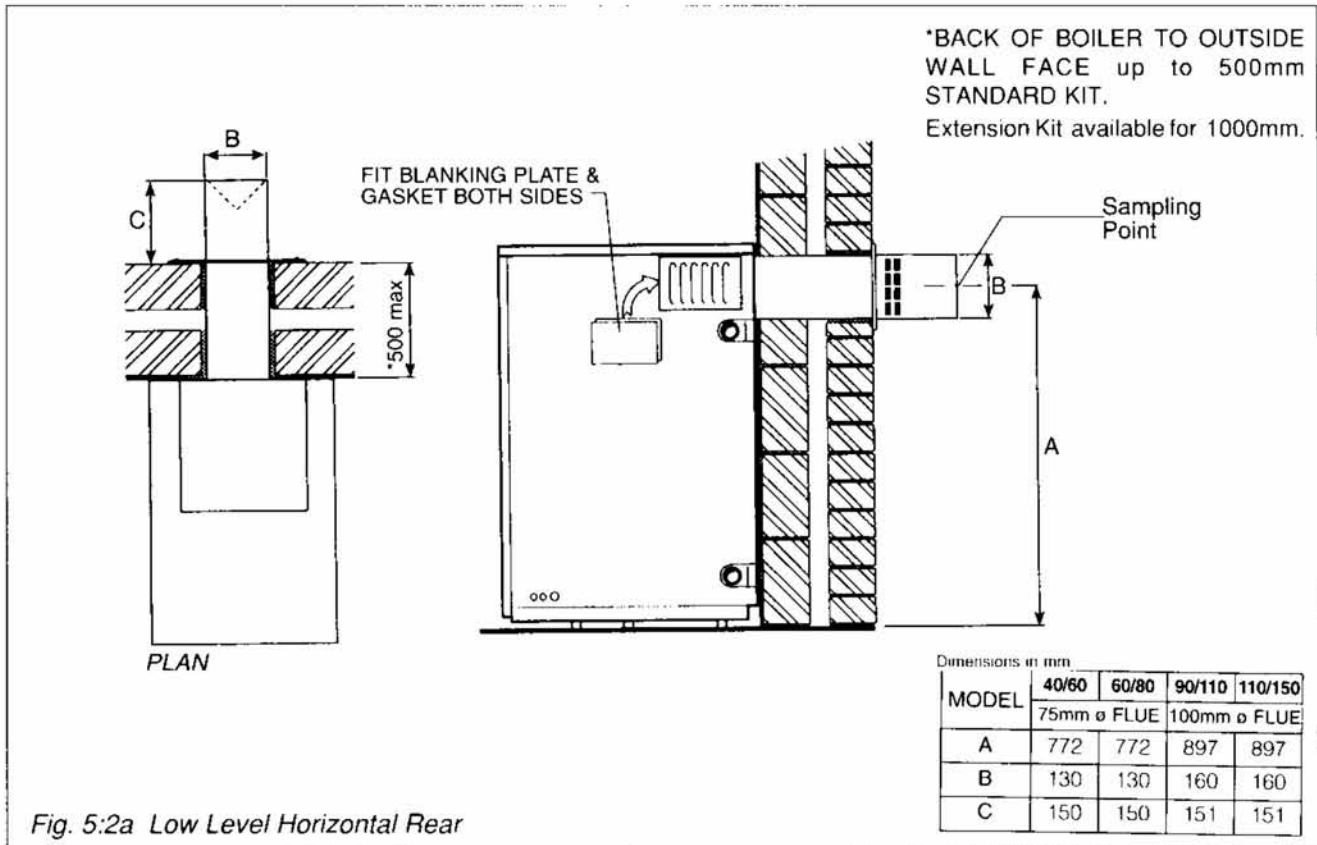


Fig. 5:2a Low Level Horizontal Rear

5:2.2 Side - Right or Left Hand

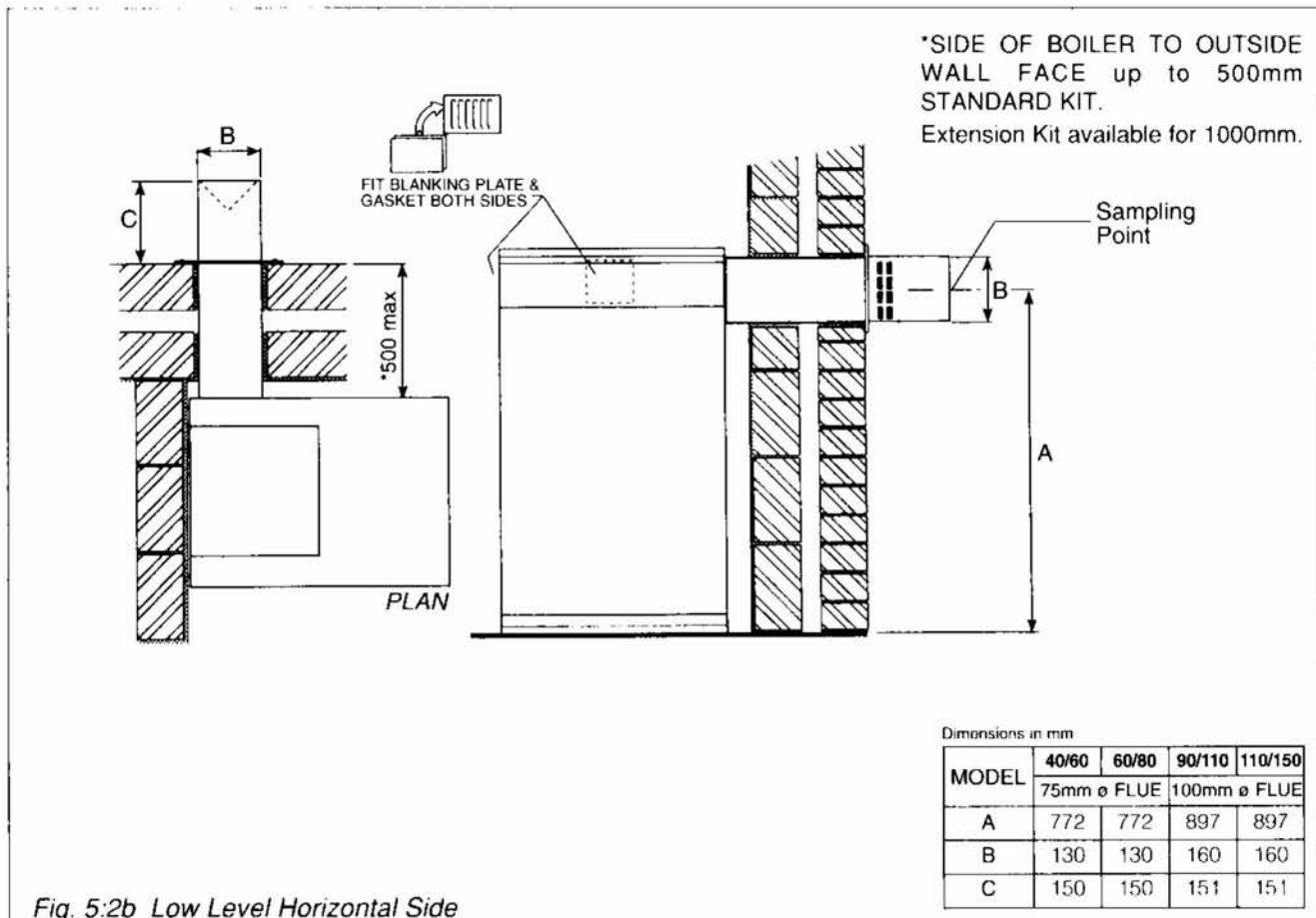
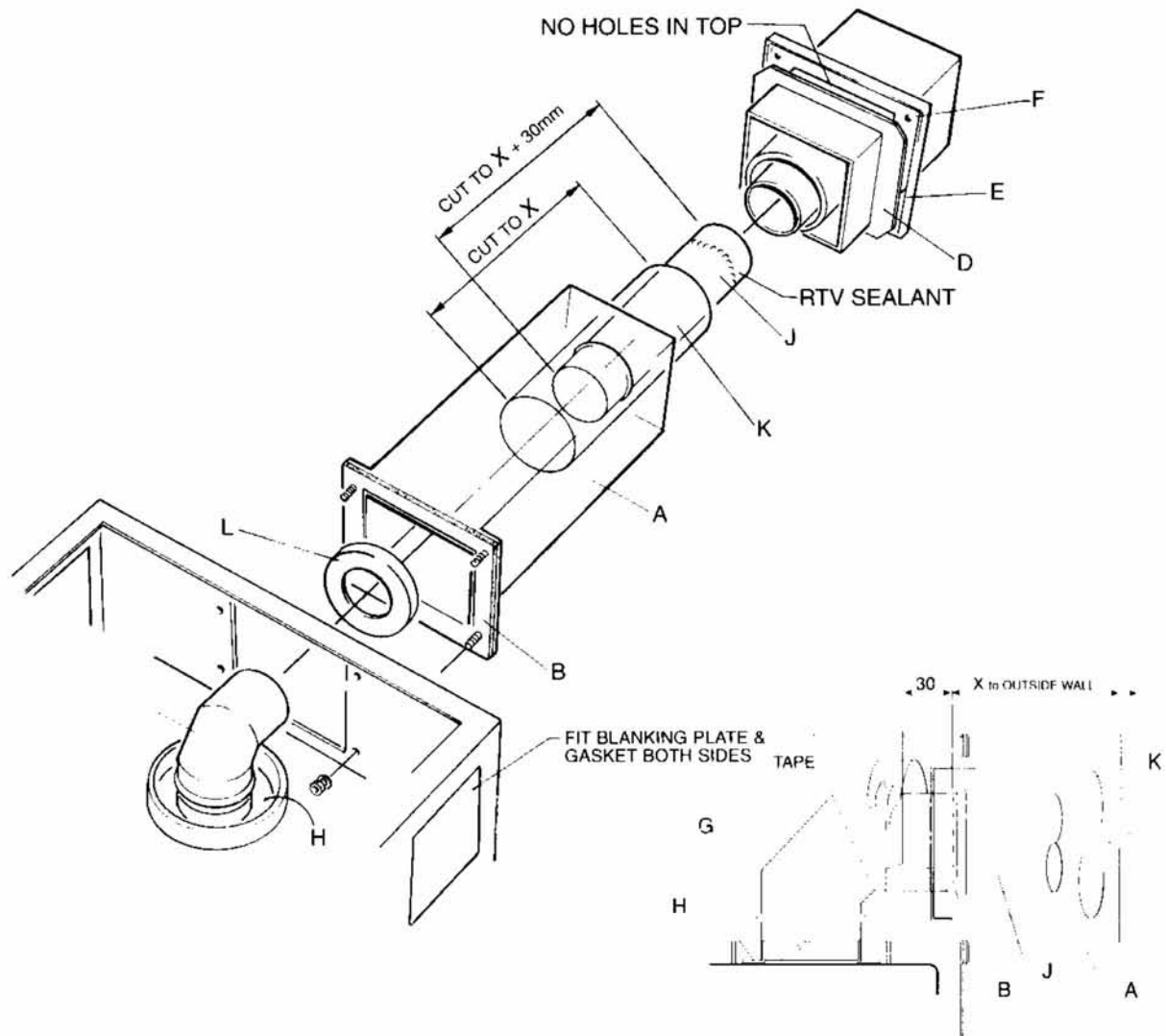


Fig. 5:2b Low Level Horizontal Side



LOW LEVEL FLUE INSTALLATION

Site conditions will dictate the best method of assembling low level Balanced Flues.

Illustration shows Flue Assembly in 'Rear' position. Flue can be assembled for left hand and right hand side.

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

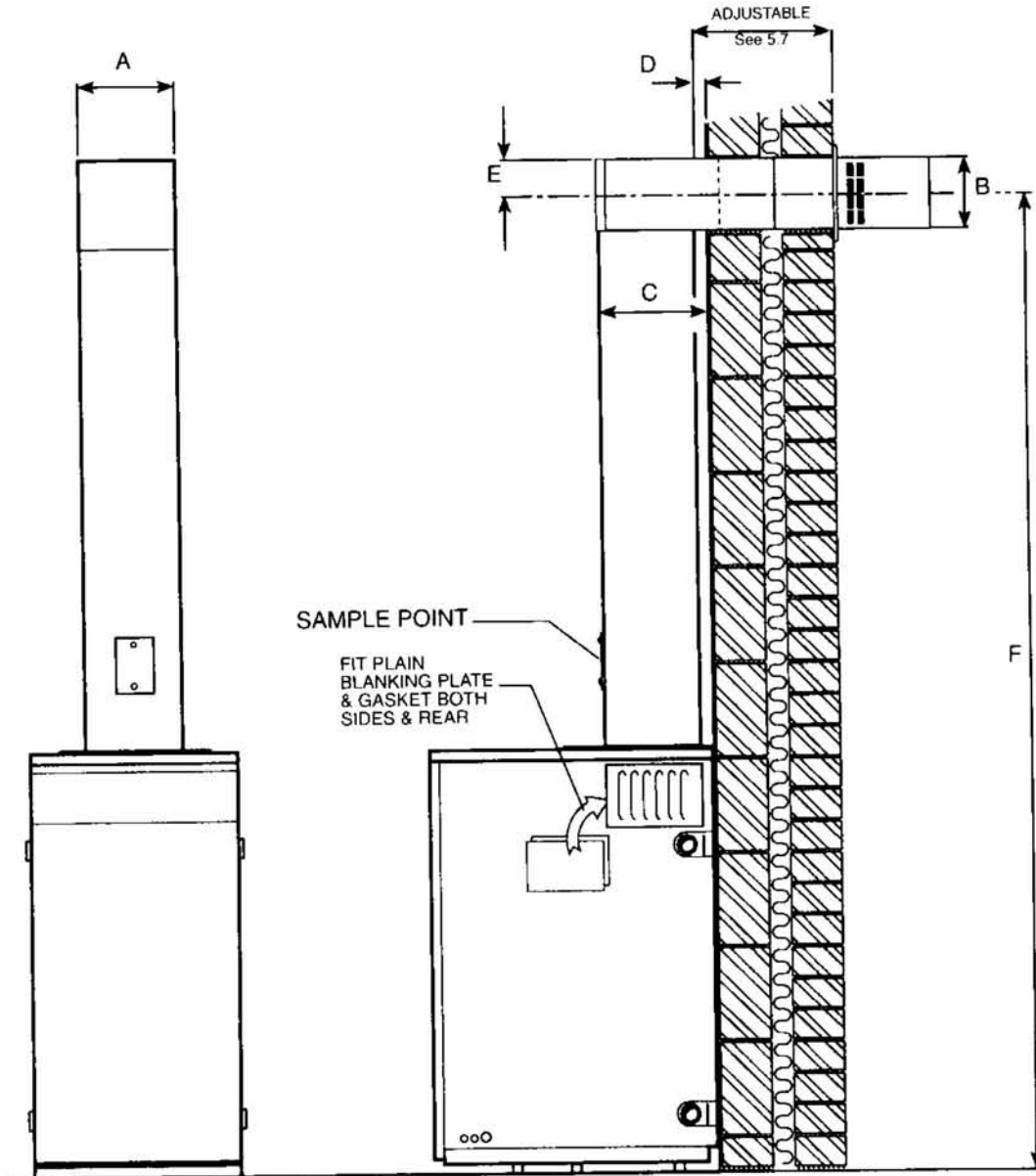
1. Position Boiler, check water connections are possible.
2. Mark Flue position.
3. Move Boiler away from wall and 'knockout' hole for Flue NEATLY!
4. Cut Terminal Air Duct (A) to length see fig. 5:1c.
5. Replace Air Entry Blanking Plates with Plain Blanking Plates.
6. Assemble Terminal Air Duct (A) with gasket (B) to Boiler either with the Air Duct (A) in the wall or:-
7. Push Boiler back in position passing the Terminal Air Duct (A) through the hole in wall.
8. Seal Terminal Air Duct (A) in wall, see fig. 5:1a.
9. Slide Terminal (D) into Terminal Air Duct (A) and push flat to wall,
10. Offer Trim Plate (E) onto Terminal (D), mark fixing hole positions (F). Remove Terminal, drill and fit wall plugs (supplied).
11. Fit Flue Elbow (G) with Centralising Ring (H) into Boiler outlet - do not tape or caulk yet.
12. Measure distance (X) from outside wall to the start of the Boiler bend, and add 30mm. Cut Flue tube (J) to this dimension opposite end to swage.
13. Using the same measured distance from (12). Cut Flue insulation tube (K) to this dimension.
14. Apply a generous bead of RTV sealant (supplied) around the outside of Flue tube (J) 50mm from end. Push this tube into the rear of terminal for about 100mm.
15. Push the Insulation Tube (K) onto its mating tube of Terminal (D).
16. Locate Spun Cup (L) onto Flue Tube (J) and over Insulation Tube (K).
17. Pass Terminal (D) with tubes (K) & (J) assembled through the hole in wall, KEEPING THE PLAIN FACE OF THE TERMINAL UPWARDS.
18. Locate Flue Tube (J) onto end of Elbow (G) (30mm joint) and tape joint as shown in 5:2c.
19. Pull Insulation Tube (K) and Spun Cup (L) forward to touch the taped joint. Tape or self tap insulation tube (K) to Spun Cup (L).
20. Secure outside Terminal Trim Plate (E) with 4 countersunk non rusting screws (supplied), see fig. 5:1b.
21. Caulk Flue Elbow (G), see fig. 5:1d.

ADVICE After cutting tubes or ducts, please dress cut ends to ensure mating parts slide together before final assembly.

Fig. 5:2c Low Level Horizontal Flue Assembly

5:3 HIGH LEVEL HORIZONTAL FLUE

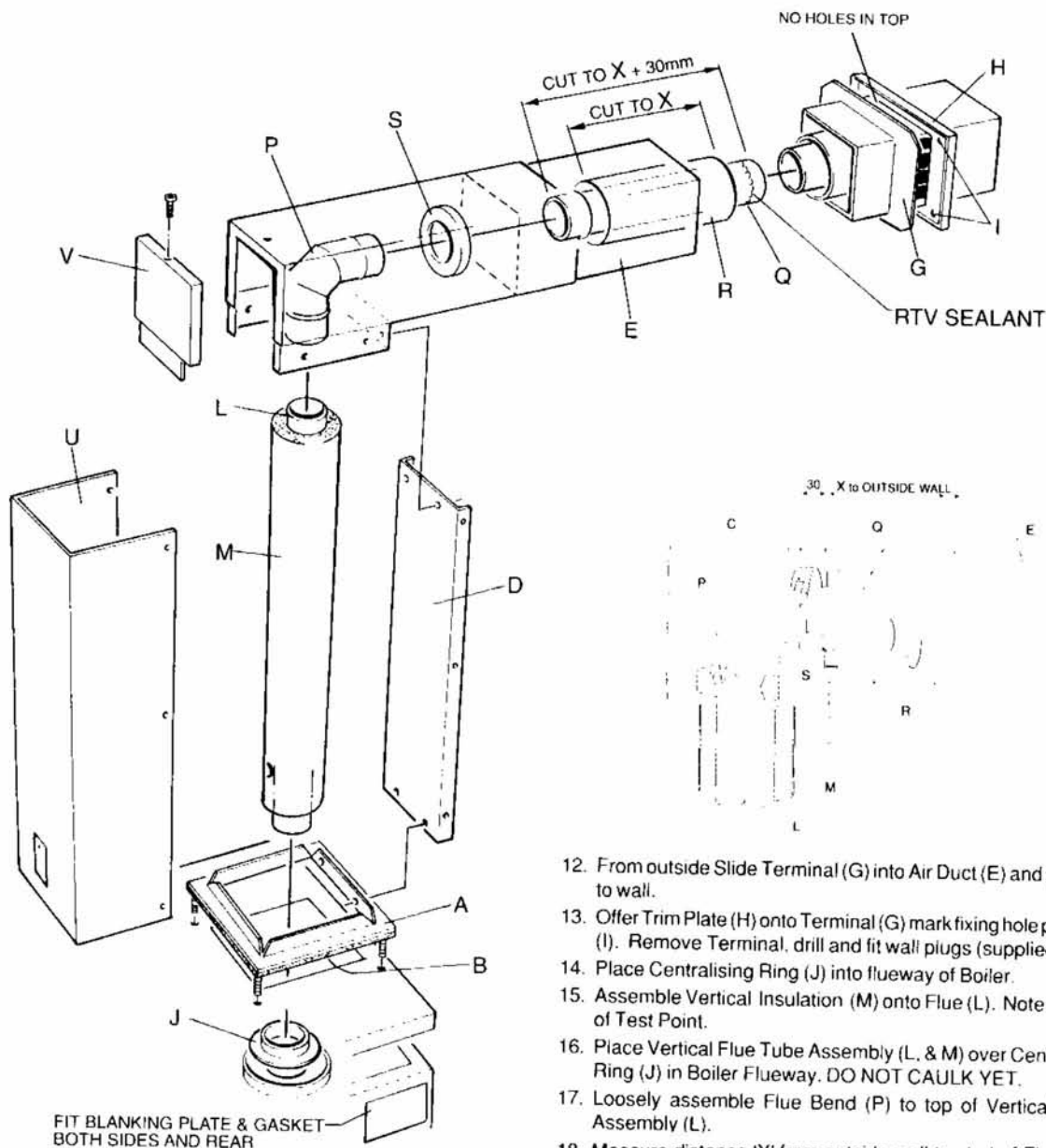
5:3.1 Rear



Dimensions in mm

MODEL	40/60	60/80	90/110	110/150
	75mm ø FLUE		100mm ø FLUE	
A	138		168	
B	130		162	
C	193		233	
D	24		26	
E	69		84	
F	1940		1991	

Fig. 5:3a High Level Horizontal Rear



HIGH LEVEL SIDE & REAR OUTLET - QUARTET AND UTILITY

1. Position Boiler, check water connections are possible.
2. Connect Flange(A) and Elbow Housing (C) with Duct Back Plate (D). Cut Flange off Air Duct (E) (see page 21).
3. Place this assembly (A,C & D) on top of Boiler, mark required hole position for flue Air Duct (E) on wall.
4. Remove assembly and move Boiler away from wall.
5. Knockout hole in wall for Air Duct (E) NEATLY.
6. Replace Air Entry Blanking Plates with Plain Blanking Plates.
7. Temporarily assemble Air Duct (E) to Elbow Housing (C).
8. Push Boiler back into final position and replace assembly (A,C & D and E) on top of Boiler passing Air Duct (E) through hole in Wall.
9. Mark length of Air Duct (E) flush with outside wall. Lift off assembly (A,C,D and E) from Boiler. Take Air Duct (E) off Elbow Housing (C) and cut Air Duct (E) to length, if necessary, see fig. 5:1c.
10. Slide Air Duct (E) into Elbow Housing (C) to the required position flush with outside wall dimension. Tape Joint.
11. Assemble Flange (A) with Gasket (B), Duct Back Plate (D), Elbow Housing (C) and Air Duct (E) to Boiler.

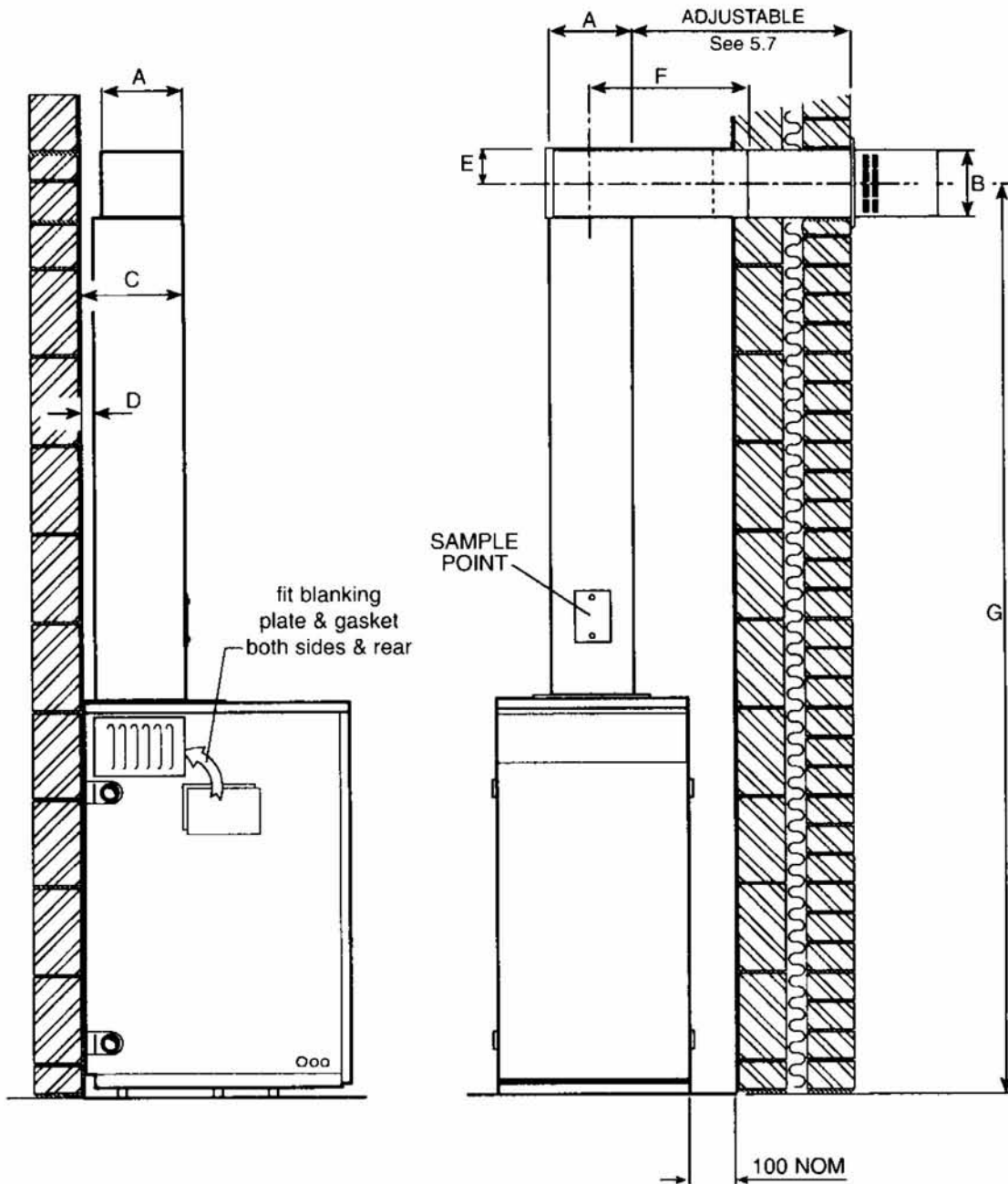
12. From outside Slide Terminal (G) into Air Duct (E) and push flat to wall.
13. Offer Trim Plate (H) onto Terminal (G) mark fixing hole positions (I). Remove Terminal, drill and fit wall plugs (supplied).
14. Place Centralising Ring (J) into flueway of Boiler.
15. Assemble Vertical Insulation (M) onto Flue (L). Note position of Test Point.
16. Place Vertical Flue Tube Assembly (L, & M) over Centralising Ring (J) in Boiler Flueway. DO NOT CAULK YET.
17. Loosely assemble Flue Bend (P) to top of Vertical Tube Assembly (L).
18. Measure distance 'X' from outside wall to start of Flue Bend (P) and add 30mm. Cut Flue Tube (Q) to this dimension.

19. Using the same measured distance as above (do not add the 40mm) cut Flue Insulation Tube (R) to length.
20. Push Insulation Tube (R) onto its mating tube of Terminal (G).
21. Pass Terminal (G) with Insulation Tube (R) through hole in wall, KEEPING THE PLAIN FACE UPWARDS.
22. Secure Terminal (G) in position with Trim Plate (H), using 4 countersunk non rusting screws (supplied), see fig. 5:1b.
23. Fit Cup (S) over swaged end of Flue Tube (Q) and fit (Q) to Bend (P) and tape joint.
24. Apply a generous bead of RTV sealant (supplied) around the outside of Flue Tube (Q), 50mm from end. Push Flue Tube (Q) with Bend (P) assembled into the rear of Terminal (G) and connect the open end of Bend (P) into vertical Flue tube (L), keeping the test point in (K) towards the front. -Tape joint.
25. Pull Insulation Tube (R) and Cup (S) forward (close to taped joint) - Screw or tape joint.
26. Caulk Flue Spigot joint in top of Boiler.
27. Fit Duct Cover (U) and Cover (V).

ADVICE After cutting tubes or ducts, please dress cut ends to ensure mating parts slide together before final assembly.

Fig. 5:3b High Level Horizontal Flue Assembly

5:3.2 Side - Right or Left Hand



FOR ASSEMBLY REFER TO REAR OUTLET HIGH LEVEL

Dimensions in mm

MODEL	40/60	60/80	90/110	110/150
	75mm ø FLUE		100mm ø FLUE	
A	138		168	
B	130		162	
C	193		233	
D	24		26	
E	69		84	
F	357		392	
G	1940		1991	

Fig. 5:3d High Level Horizontal Flue Side

5:4 VERTICAL FLUE FLAT ROOF INSTALLATION

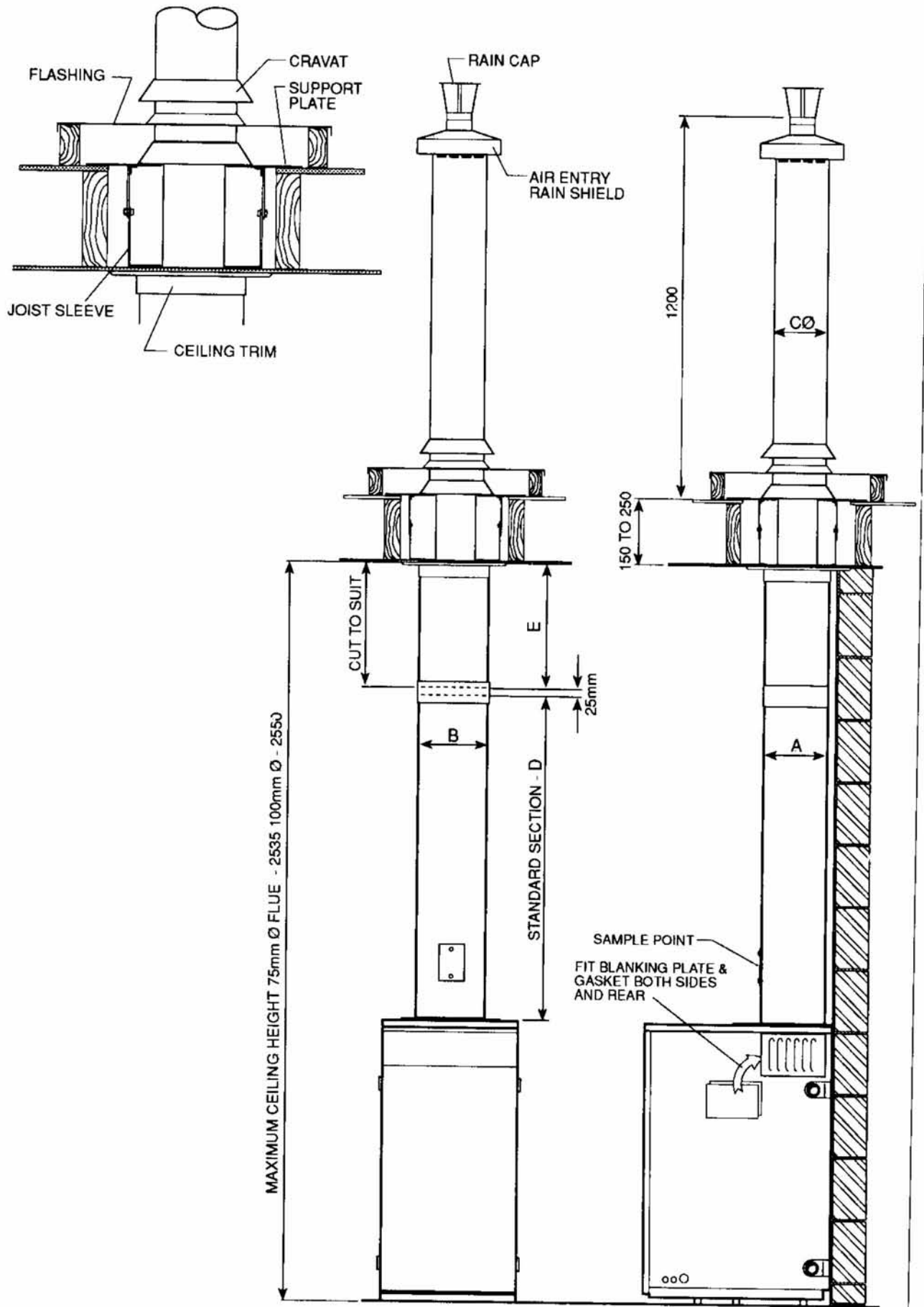


Fig. 5:4a Vertical Flue - Flat Roof

5:4 VERTICAL FLUE FLAT ROOF INSTALLATION - CONTINUED

5:4.1 Notes on Installation

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

By way of illustration, the assemblies are shown against a rear wall. This is not essential for satisfactory operation of the Boiler as the weight of the fixed size Flue Terminal is taken by item (S); Support Plate.

The maximum ceiling height attainable with a standard kit is as follows:-

40/60 & 60/80 2535mm (8'4").

90/110 & 110/150 2550mm (8'4½").

The Vertical Flue Kit has been designed to allow for various ceiling heights, by providing as standard a Joint Band Kit, items E & F.

To reduce the assembly height, the cut edges of the outer painted panels are to be contained within the joint band.

To increase the assembly height, an optional extension Duct/Flue Kit is available which is added to existing panels and provides an additional 600mm below ceiling height.

WARNING:- Where a Flue system passes through a joist frame, it is essential that the integrity of the ceiling's fire barrier is retained. This can be achieved by always using the Support Plate and fire stop ceiling trim. We would also recommend the use of the adjustable Joist Sleeve (optional) to complement the fire stop. This can however be achieved alternatively by following the requirements of Section J of the 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.

5:4.2 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 square Duct 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 Cover Plate from top Casing Panel of Boiler and fit Flue Adaptor Plate (A) with Gasket (B), also replace Air Entry Blanking Plates with Plain Blanking Plates from the Flue Kit together with their Gaskets. Re-position Boiler.
10. Assemble Flue Back Plate (D) with Joint Band Back (E).
11. Measure distance to ceiling from the bottom edge of the Ceiling Trim (C) to the support edge of the Joint Band Back (E). Cut the bottom edge of Duct piece (H) and top edge of back (G) to this dimension.
12. Place Centralising Ring (J) into flueway of Boiler.
13. Assemble Duct Back (G) to Joint Band Back (E).
14. Measure distance from Boiler Flue Outlet to Flange/Spigot connection point on Flue Terminal.
15. Assemble Flue Pipes (L&Y) and cut the Flue Pipe assembly (Y pipe end) to that dimension less 100mm (overlapping joint). Adjust length of Foiled Insulation (Z) by the same amount.
16. Assemble Flue Pipes & tape joint. Assemble Insulation (M&Z) onto Flue Pipes (L&Y) covering taped joint.
17. Apply a bead of RTV sealant (supplied) around the outside of the Flue stub projecting from the bottom of the Terminal, and also around the outside of the top end of the Flue Tube (L&Y), 50mm from end.
18. Slide flanged Flue piece (W), onto top of Flue Pipe assembly.
19. Place Flue Pipe assembly into Boiler with bottom end over Spigot of Centralising Ring (J).
20. Pull flanged Flue piece (W) up to Terminal end and bolt in position.
21. Align test point to front and caulk Flue Pipe to Boiler.
22. Fit Duct Cover (P) complete with Joint Band Front (F) and upper Duct Cover Front (H).
23. Fit Flashing Plate (U) and Cravat. Seal joint between Cravat and Flue with RTV sealant (supplied). Keep Cravat as low as possible onto Flashing Plate, to prevent entry of animals, birds or insects.

Components for
Vertical Flat Roof Installation:-

1. Standard Vertical Kit.
2. Joist Box Kit (R) (optional).
3. Flat Roof Flashing (U).
4. Vertical Casing Extension Kit at 600mm (when required).

Flat Roof Flashing (U) and Joist Box (R) are not included in Standard Vertical Kit and must be ordered separately.

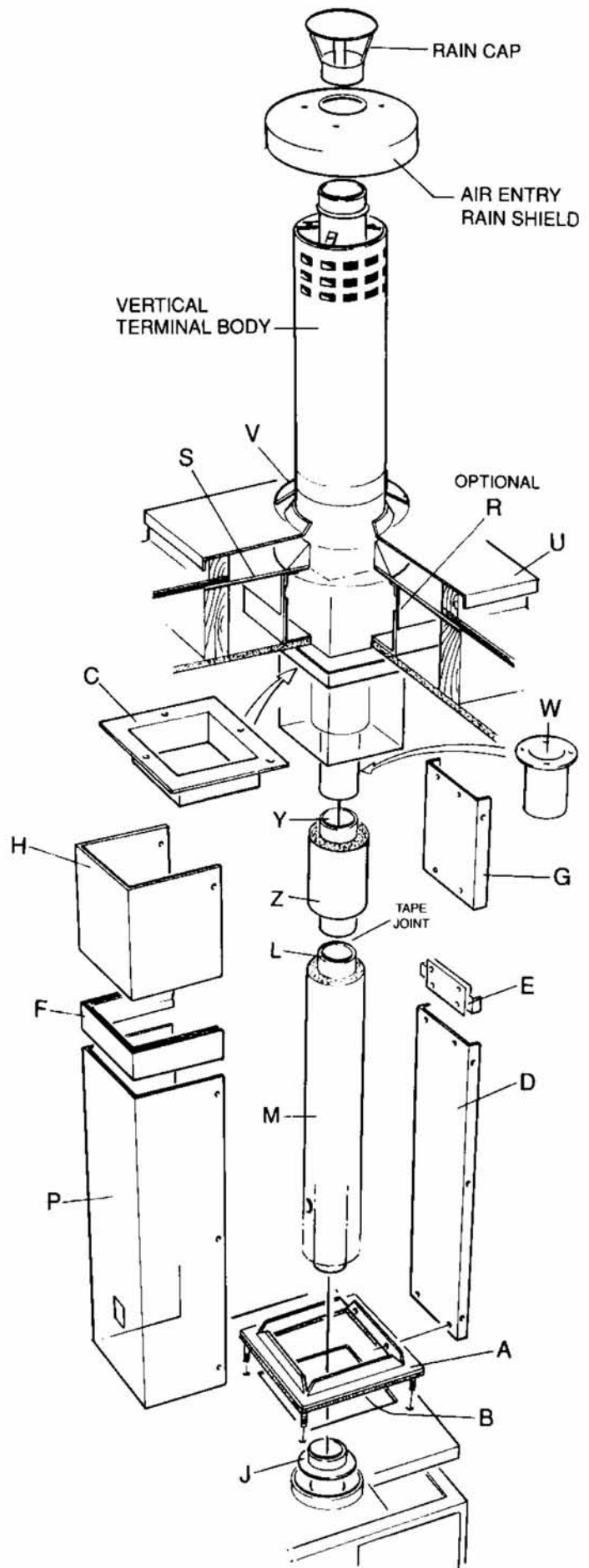
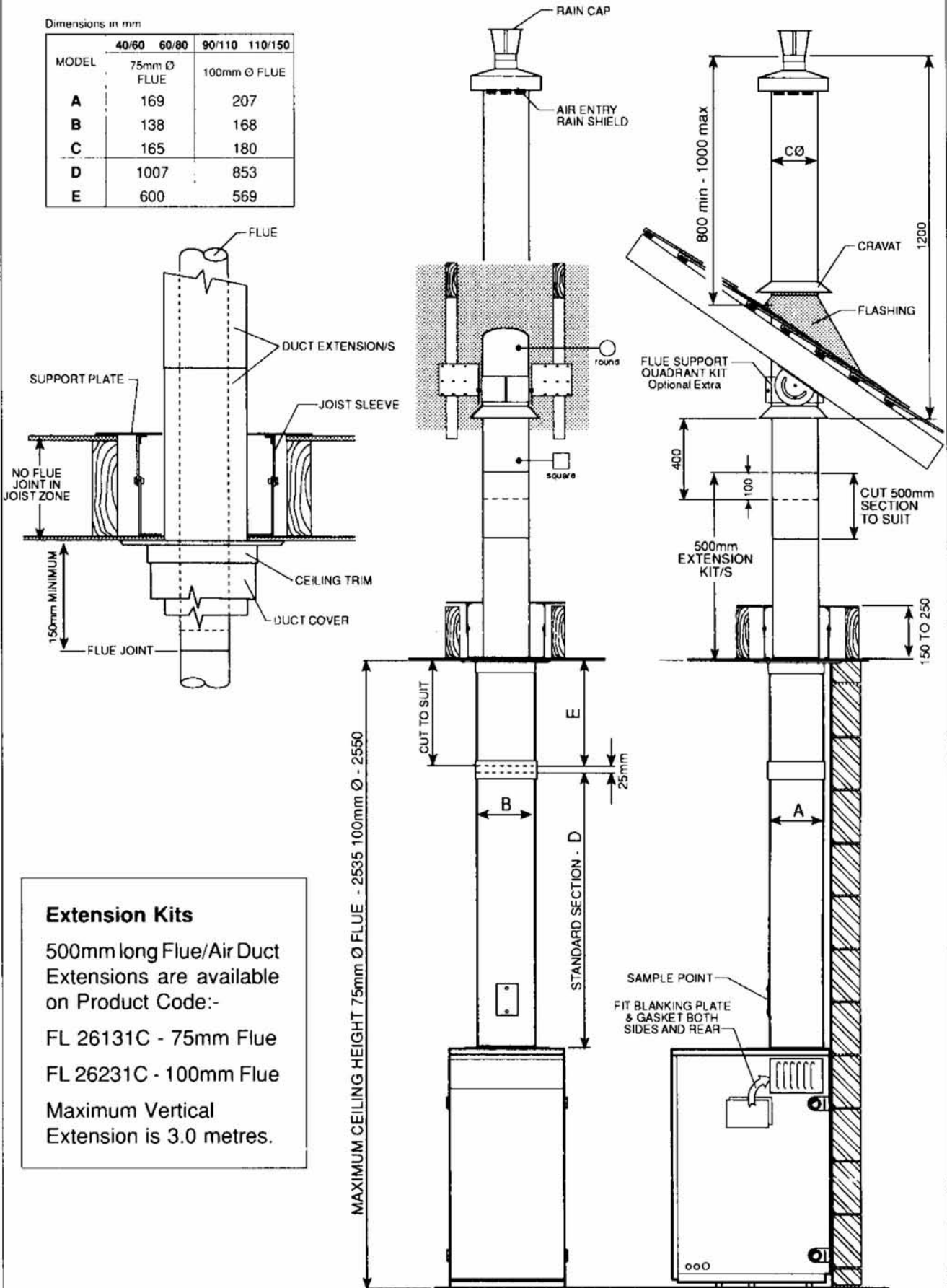


Fig. 5:4b Vertical Flue - Flat Roof Assembly

5:5 VERTICAL FLUE PITCHED ROOF INSTALLATION

Dimensions in mm

MODEL	40/60 75mm Ø FLUE	60/80 100mm Ø FLUE
A	169	207
B	138	168
C	165	180
D	1007	853
E	600	569



Extension Kits

500mm long Flue/Air Duct Extensions are available on Product Code:-

FL 26131C - 75mm Flue

FL 26231C - 100mm Flue

Maximum Vertical Extension is 3.0 metres.

Fig. 5:5a Vertical Flue - Pitched Roof

5:5 VERTICAL FLUE PITCHED ROOF INSTALLATION - CONTINUED

5:5.1 Notes on Installation

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

By way of illustration, the assemblies are shown against a rear wall. This is not essential for satisfactory operation of the Boiler as the weight of the fixed size Flue Terminal is taken by item (S); Support Plate.

The maximum ceiling height attainable with a standard kit is as follows:-

40/60 & 60/80 2535mm (8'4").

90/110 & 110/150 2550mm (8'4½").

The Vertical Flue Kit has been designed to allow for various ceiling heights, by providing as standard a Joint Band Kit, items E & F.

To reduce the assembly height, the cut edges of the outer painted panels are to be contained within the joint band.

To increase the assembly height, an optional extension Duct/Flue Kit is available which is added to existing panels and provides an additional 600mm below ceiling height.

WARNING:- Where a Flue system passes through a joist frame, it is essential that the integrity of the ceiling's fire barrier is retained. This can be achieved by always using the Support Plate and fire stop ceiling trim. We would also recommend the use of the adjustable Joist Sleeve (optional) to complement the fire stop. This can however be achieved alternatively by following the requirements of Section J of the 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.

5:5.2 Pitched Roof Assembly Procedure

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

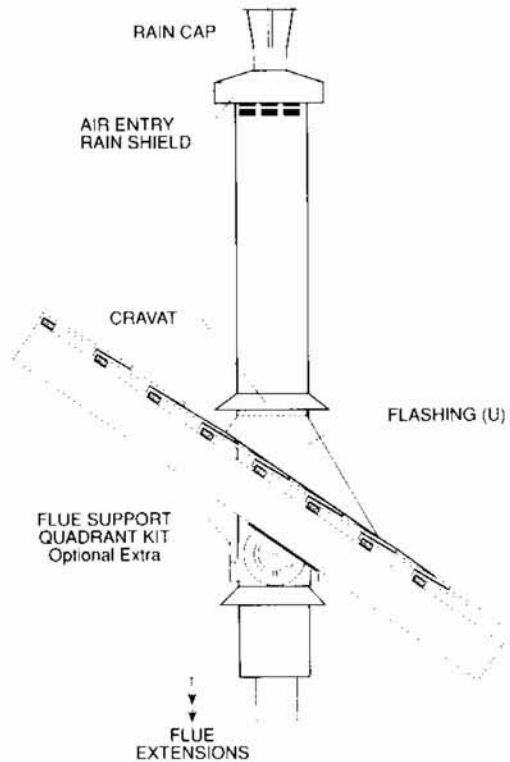
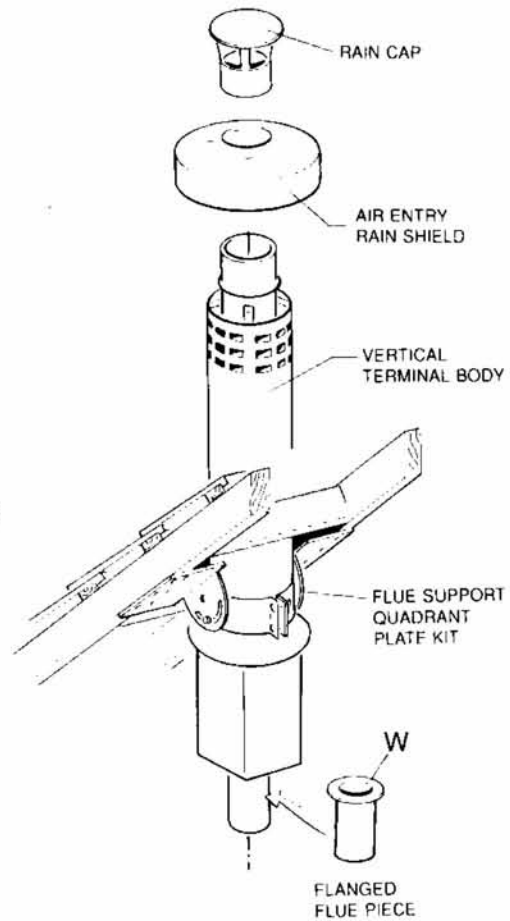
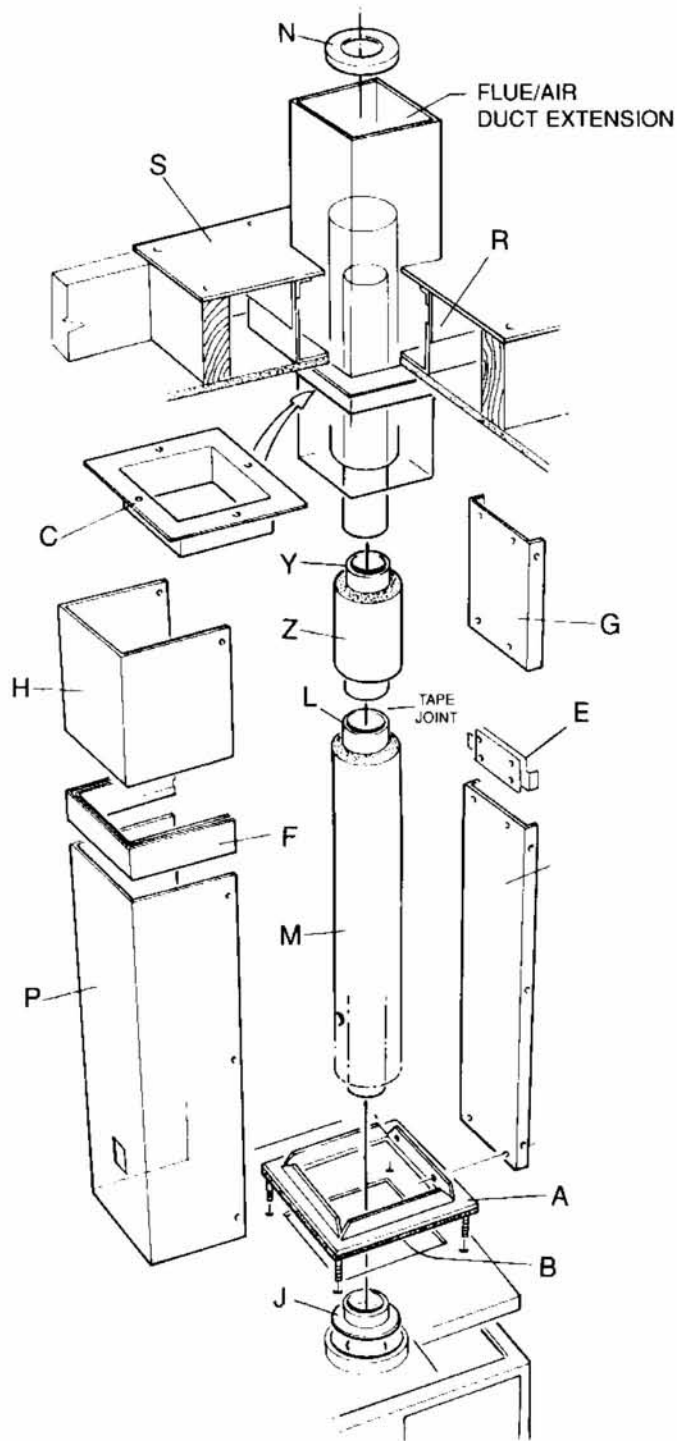
1. Position Boiler, check water connections are possible.
2. Mark Flue position on ceiling.
3. Move Boiler away from position and cut the ceiling neatly, keeping the opening size in the plaster board as close to the square Duct of the Flue Terminal as

- practicable (say 10mm clearance all round).
4. Cut the ceiling timbers allowing more than 50mm clearance on all sides from timber joists. Create 3-4 sided timber framed box for the Support Plate.
5. Bolt Joist Sleeve (R) (optional) to Support Plate (S) and screw onto timber frame.
6. Cut opening in the pitched roof allowing more than 50mm clearance on all sides from timber.
7. Lower Flue Terminal into roof opening having previously removed the Rain Cap, Air Entry Rain Shield and Cravat and secure to the roof timbers with the optional Flue Support Quadrant Plate assembly, adjusting the angle to suit the pitch of the roof.
8. Apply a bead of RTV sealant (supplied) around the outside of the Flue stub projecting from bottom of terminal, and slide the flanged Flue piece (W) to Terminal end. Bolt in position.
9. Measure distance from underside of ceiling to the start of the square Duct of the Terminal and add 100mm.
10. Make up an assembly of Duct Extension pieces to this size.
11. Screw the ceiling trim (C) to the joist Sleeve (R).
12. Remove Cover Plate from top Casing Panel of Boiler and fit Flue Adaptor Plate (A) with Gasket (B). Also replace Air Entry Panel Plates with blank Plates from the Flue Kit together with their Gaskets. Reposition Boiler.
13. Assemble Flue Back Plate (D) with Joint Band Back (E).
14. Measure distance to ceiling from bottom edge of the Ceiling Trim (C), to the support edge of the Joint Band Back (E). Cut the bottom edge of the Duct piece (H) and top edge of Back (G) to this dimension.
15. Place Centralizing Ring (J) into flueway of Boiler.
16. Assemble Duct Back (G) to Joint Band Back (E).
17. Assemble Flue Pipes (L&Y) and tape joint, note position of Test Point and assemble Foiled Insulation (M&Z) onto Flue Pipe Assembly (L&Y).
18. Place sleeved Flue Pipe Assembly into Boiler with bottom end over Spigot of Centralizing Ring (J).
19. Measure distance from top of Pipe Assembly to the bottom edge of Flanged Flue piece (W) and add 130mm (30mm Flue joint and 100mm sliding joint).
20. Make up a Flue Pipe length, together with Foiled Insulation with extension Tubes to this size, tape joints. Keeping the top insulation 150mm short of Flue end.
21. Assemble Duct Extension pieces (from 10) and position in roof space, resting on Ceiling Trim (C), and overlapping Terminal end by 100mm. Screw and tape all joints.
22. Apply a generous bead of RTV sealant (supplied) around outside of top end of Flue Extension 50mm from end (from 20).
23. Insert assembly into Ceiling Trim (C) and up into tail end of Terminal Flue Pipe. Drop down assembly onto open end of Flue (Y). Tape joint.
24. Align test point to front and caulk Flue Pipe to Boiler.
25. Fit Duct Cover (P) complete with Joint Band Front (F) and upper Duct Cover Front (H) (from 14).
26. Fit Flashing Plate (U) and Cravat. Seal joint between Cravat and Flue with RTV sealant (supplied). Keep Cravat as low as possible onto Flashing Plate to prevent entry of animals, birds or insects.
27. Replace Rain Cap, and Air Entry Rain Shield.

Components Required for Vertical Flue Pitched Roof Installation:-

1. Standard Vertical Kit.
2. Joist Box Kit (R) (essential).
3. Flue Support Quadrant Plate Kit.
4. Flue/Air Duct Extension Kit/s at 500mm long, quantity to suit.
5. Pitched Roof Flashing.

Pitched Roof Flashing, Joist Box (R), Flue Support Quadrant Plate Kit and Extension Kits are not included in Standard Vertical Kit and must be ordered separately.



NOTE: The Vertical Terminal is a fixed length. All Flue extensions are made below the Terminal.

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

5:6 HIGH LEVEL FLUE LENGTH ALTERATION

5:6.1 To Shorten Flue

Fig. 5:6a.

The Flue can be shortened considerably providing the Sample Point is retained.

Cut out the required amount (A) plus 25mm, to allow for the Joint Band (C) (fig 5:6c), from the Back Plate (B) and Cover (D). Consideration should be given to the hole centres.

Cut Flue Pipe (E) and Foiled Insulation (F) down from the top by the amount of shortening required (A).

Assemble Flue with Joint Band C (fig 5:6c) - optional extra.

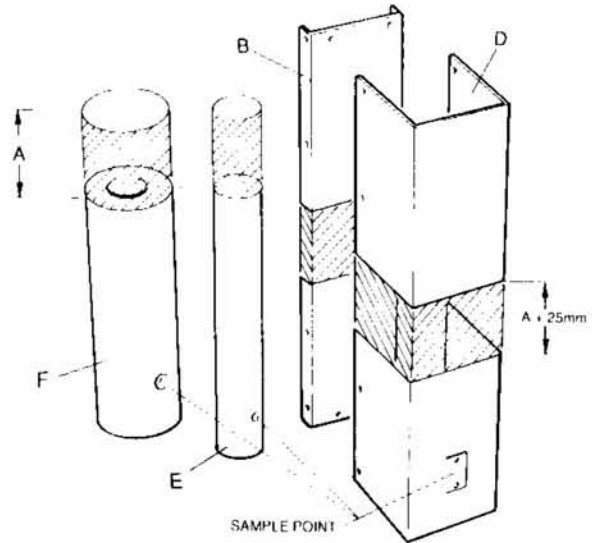


Fig. 5:6a High Level Horizontal Flue - Shorten

5:6.2 To Extend Flue

Fig. 5:6b.

The Flue can be extended using the Extension Kit list (see below). To achieve the correct height the extension parts may require shortening.

MAXIMUM EXTENSION - 600mm.

If shortening of the extension length is required, cut the Extension Back (F), Cover (G) to the required length less 25mm. Cut the Extension Flue Pipe (H) and the Foiled Insulation (J) the required length.

Assemble Flue and Extension with Joint Band C (fig. 5:6c).

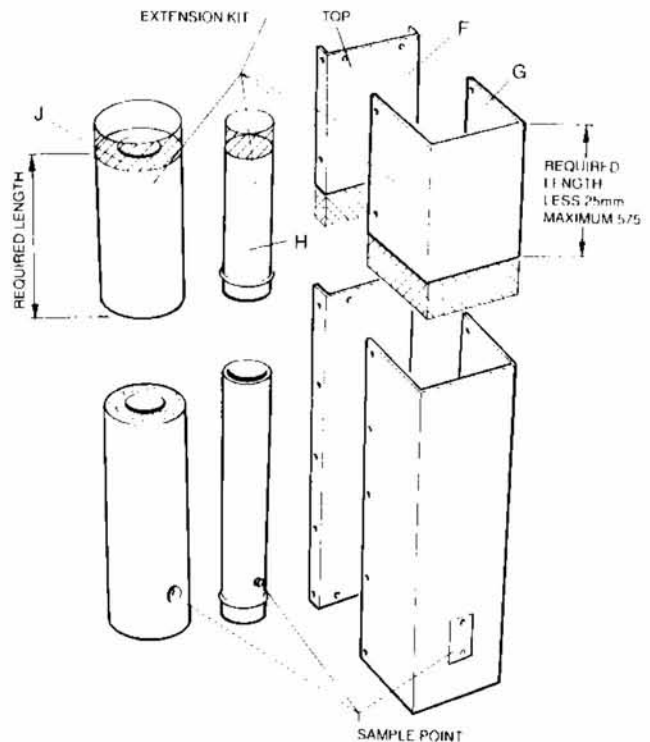
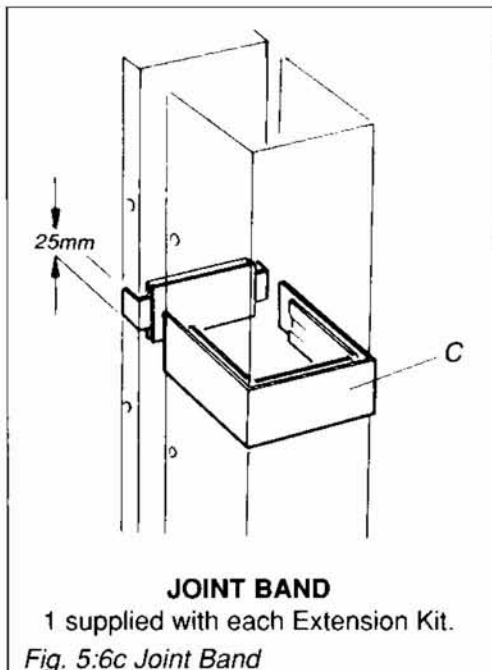


Fig. 5:6b High Level Horizontal Flue - Extension

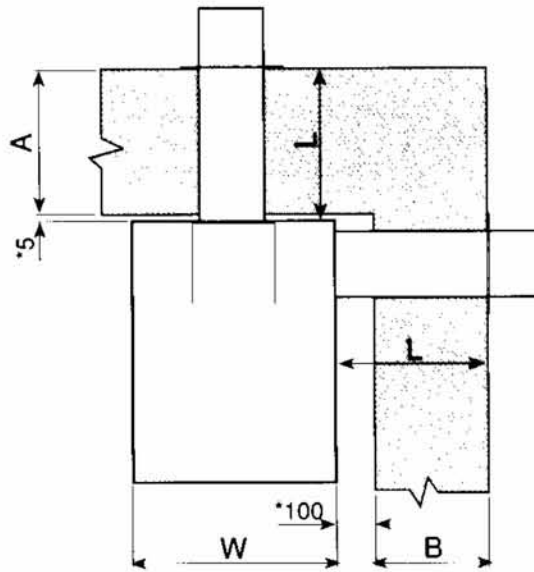


Part Numbers

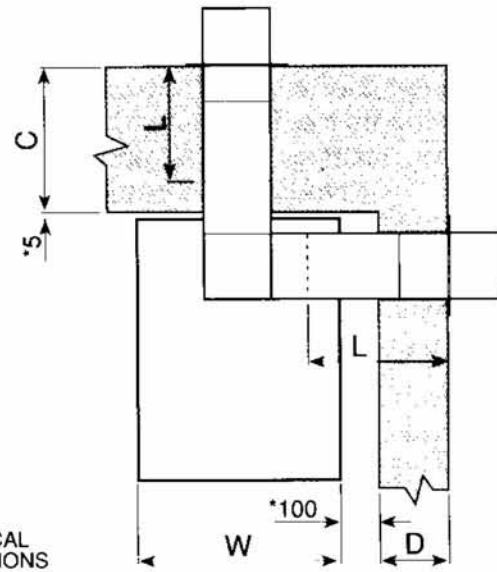
*Extension Kit includes:-
Back Cover,
Flue Pipe,
Insulation
Joint Band.

Model	Flue	Extension Kit* 600mm	Joint Band
40/60 60/80	75mm	Quartet FL26130C Utility FL27130C	FL26123C FL27123C
90/110 110/150	100mm	Quartet FL26230C Utility FL27230C	FL26223C FL27223C

5:7 MAXIMUM WALL THICKNESS FOR HORIZONTAL BALANCED FLUES



LOW LEVEL BALANCED FLUE



HIGH LEVEL BALANCED FLUE

*TYPICAL DIMENSIONS

500mm Flue Length

Table shows Maximum wall thickness for High Level and Low Level Balanced Flues with Standard 500mm Flue Kit.

Model	40/60	60/80	90/110 110/150
Case Width W	408	445	508
Flue Duct Length L	500mm Standard		
A	495	495	495
B	400	400	400
C	678.5	678.5	687.5
D	503.5	485	488.5

500mm Standard Duct and 500mm Flue Extension Kit

Table shows Maximum wall thickness for High Level and Low Level Balanced Flues with 500mm Optional Flue Extension Kit.

Model	40/60	60/80	90/110 110/150
Case Width W	408	445	508
Flue Duct Length L	500mm Standard + 500mm Extension Kit		
A	995	995	995
B	900	900	900
C	1178.5	1178.5	1187.5
D	1003.5	985	988.5

6:1 COMMISSIONING

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 OFTEC engineer.

If an engineer is not known Boulter Boilers will be pleased to provide details of an approved commissioning and servicing engineer from their list of OFTEC approved engineers.

6:2 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 by a qualified engineer using recognised test equipment.

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

6:3 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.

IMPORTANT

It is the responsibility of the installer to ensure that the Boiler is commissioned by an OFTEC Registered Commissioning Engineer.

6:4 BOULTER BOILERS RECOMMENDED COMMISSIONING CHECK LIST - 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 gauge
- Suitable hinged combined fill and vent cover, or capped fill and vent pipes
- Outlet 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 pipe adequate for the boiler rating?
- Are all joints leak proof?
- Is a fire valve fitted?
- Is a filter fitted? (correct way round)
- 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 oil supply as close to the burner as possible and drain approximately a gallon of oil into a very clean 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.

- Clean oil filters and de-sludge oil tank if necessary.

TWO PIPE OIL SYSTEMS

- Is a spring-loaded non-return oil valve fitted in the suction line? (or a 3K Oil 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 their pockets?
- Are the baffles and bottom insulation (where applicable) 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?

CASING PANELS

- Have grommets been fitted to relevant oil supply entry points (knockouts)?
- Have air tight cable entry connections been used?

BURNER

- Is the oil pump by-pass screw fitted, if applicable?
- Remove the burner. Is the correct nozzle fitted?
- If the burner has an adjustable head, do the settings agree with those given in the boiler instructions?
- Is the Air Shutter adjustment correct?

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 tube caulked into the boiler flue socket?
- Have all Air Entry Plates been replaced with Blanking Plates where necessary?
- Can leakage from flue tubes or air ducts occur?
- Is the sampling test point (on high level or vertical kits) resealed?

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 Air Entry Plates on side or rear of appliance?
- Will any ventilation fans prevent adequate supply of combustion air?

ELECTRICAL POWER SUPPLY

- Is the electrical supply to the appliance appropriate?
- Are the electrical input connections to the control panel correct?
- Are the electrical connections from the boiler control panel to the burner correct?
- Is the supply fuse correct?
- Does the wiring comply with the latest IEE Regulations?
- Does the power supply cable enter the casing through an air tight cable grip?

GENERAL

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

6:5 BOULTER BOILERS RECOMMENDED COMMISSIONING TESTS

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

COMMISSIONING TESTS

- 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 0-300 psi (0-20 bar) pressure gauge to the appropriate oil pump connection, and replace burner.
- Set the boiler thermostat to between positions 3 and 4.
- Switch on the electrical supply to the boiler, checking that programmers are switched to the 'ON' position, and that 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 - hole provided in outlet end of terminal.

High level balanced flue, rear or side or vertical - hole provided via screw in vertical flue duct section above Boiler.

or

Conventional flue - drill a small hole in the flue pipe, between the flue spigot and casing top panel (large enough to accept the sampling probe).

- 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. Reinstate 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 the operating instructions with the customer.

7:1 MAINTENANCE

A Boiler fired with Class C Oil should only require attention once each year, whereas with Class D Oil, attention twice each year may be required.

7:1.1 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 first 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.

7:1.2 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.

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 discoloration. Use only replacement flexible oil hoses that are detailed in the spare parts section of this manual.

BOILER

The 40/80 Boilers are serviced from the front. The larger 90/150 Boilers are serviced from the front and top.

Remove flueway 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.

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

COMBUSTION TESTS

Fit combined air bleed manifold and 0-300 psi (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. See illustrations of balanced flue kits. On CF boilers drill a small hole in the flue pipe, but after measurement, plug the hole.

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 data in Boiler Commissioning Data, Section 2.

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.

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.

7:2 AIR SHUTTER ADJUSTMENT

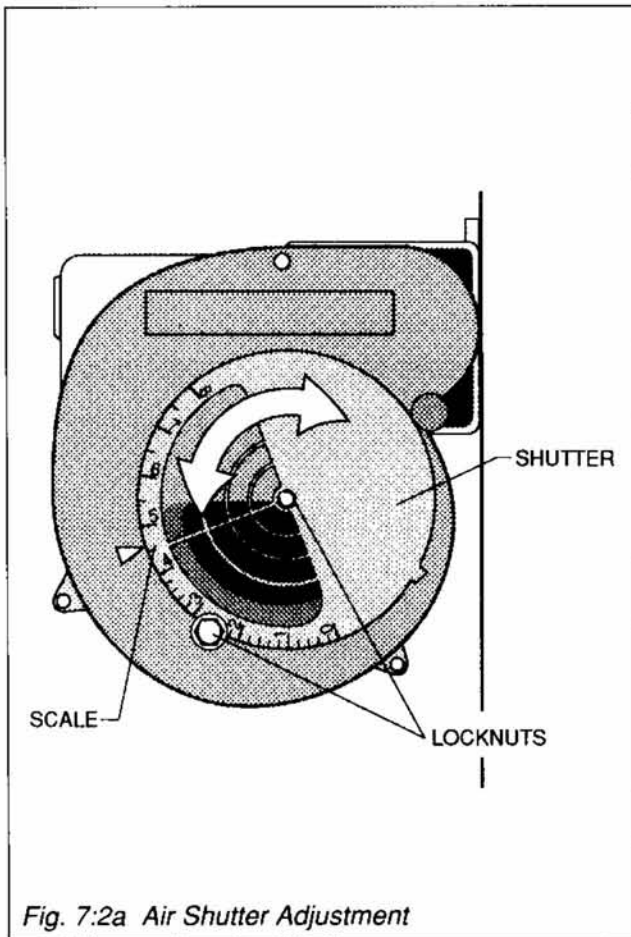
The Burner has a fixed Air Shutter with manual adjustment.

The Air Setting is set by BOULTER BOILERS before dispatch but may require fine adjustment on site.

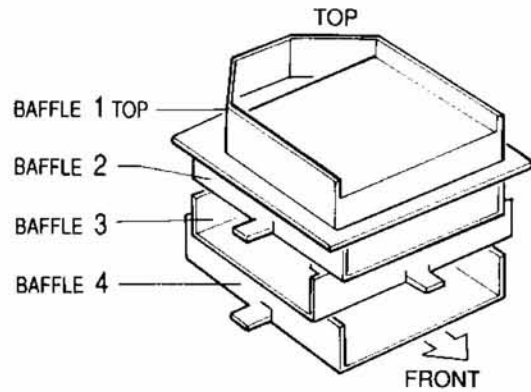
The Commissioning Data - Section 2:6, gives recommended Air Shutter adjustment for given output.

To adjust the Air Shutter use a spanner as shown. To increase the setting turn the airshutter anticlockwise and to decrease turn clockwise.

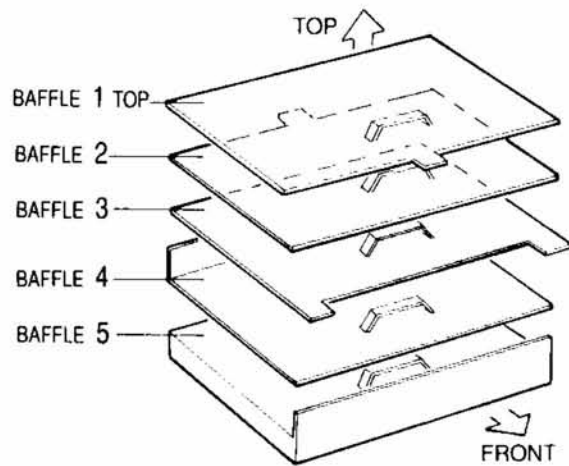
NOTE: For accurate reading of the setting it is necessary to remove the Burner to see the Scale.



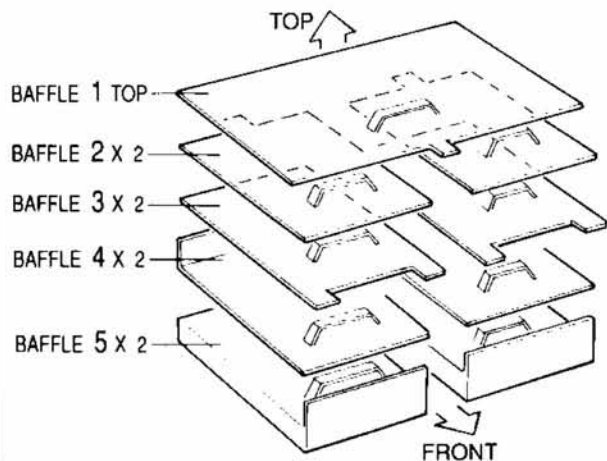
7:3 BAFFLE ARRANGEMENT



40/60 & 60/80



90/110



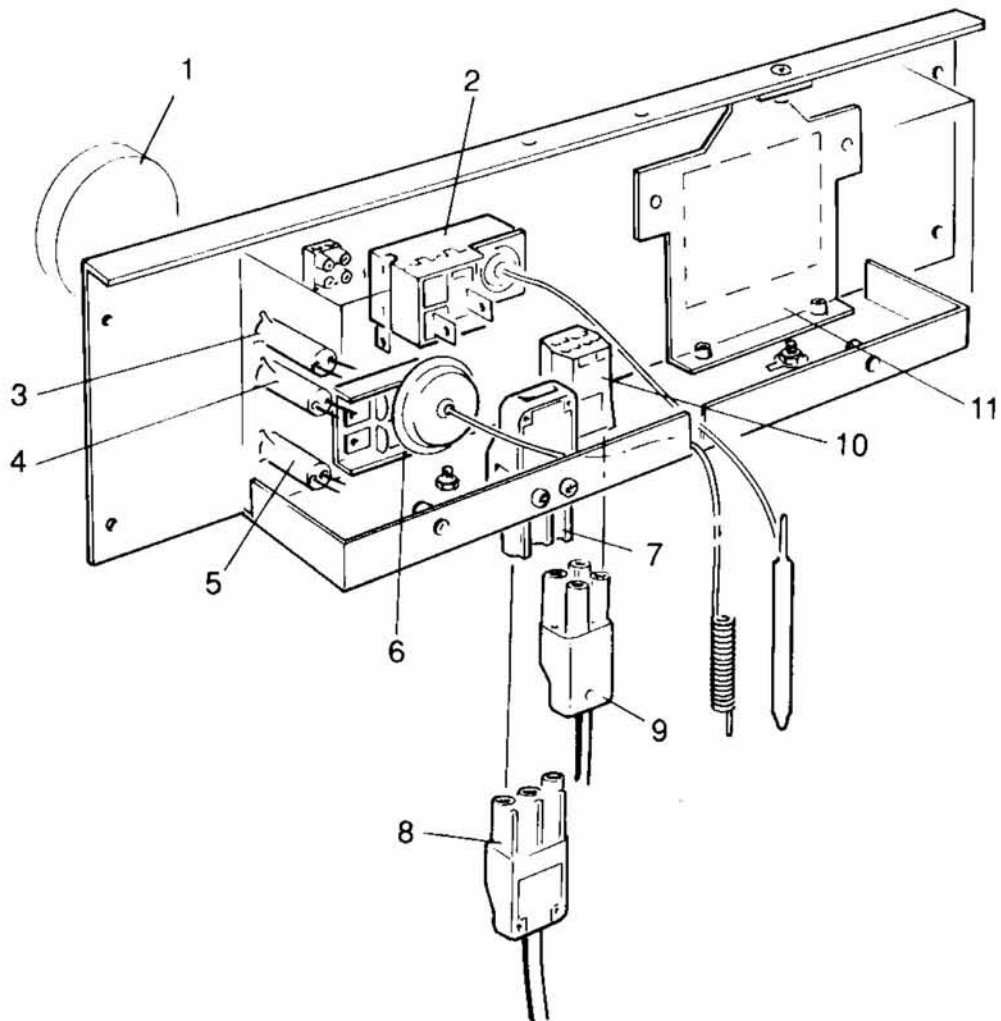
110/150

TO ENSURE CORRECT PLACEMENT OF BAFFLES
ENSURE THAT :-

- 1- ALL BAFFLES ARE HORIZONTAL
- 2- ALL BAFFLE HANDLES ARE IN THE FORWARD POSITION

Fig. 7:3a Baffle Arrangement

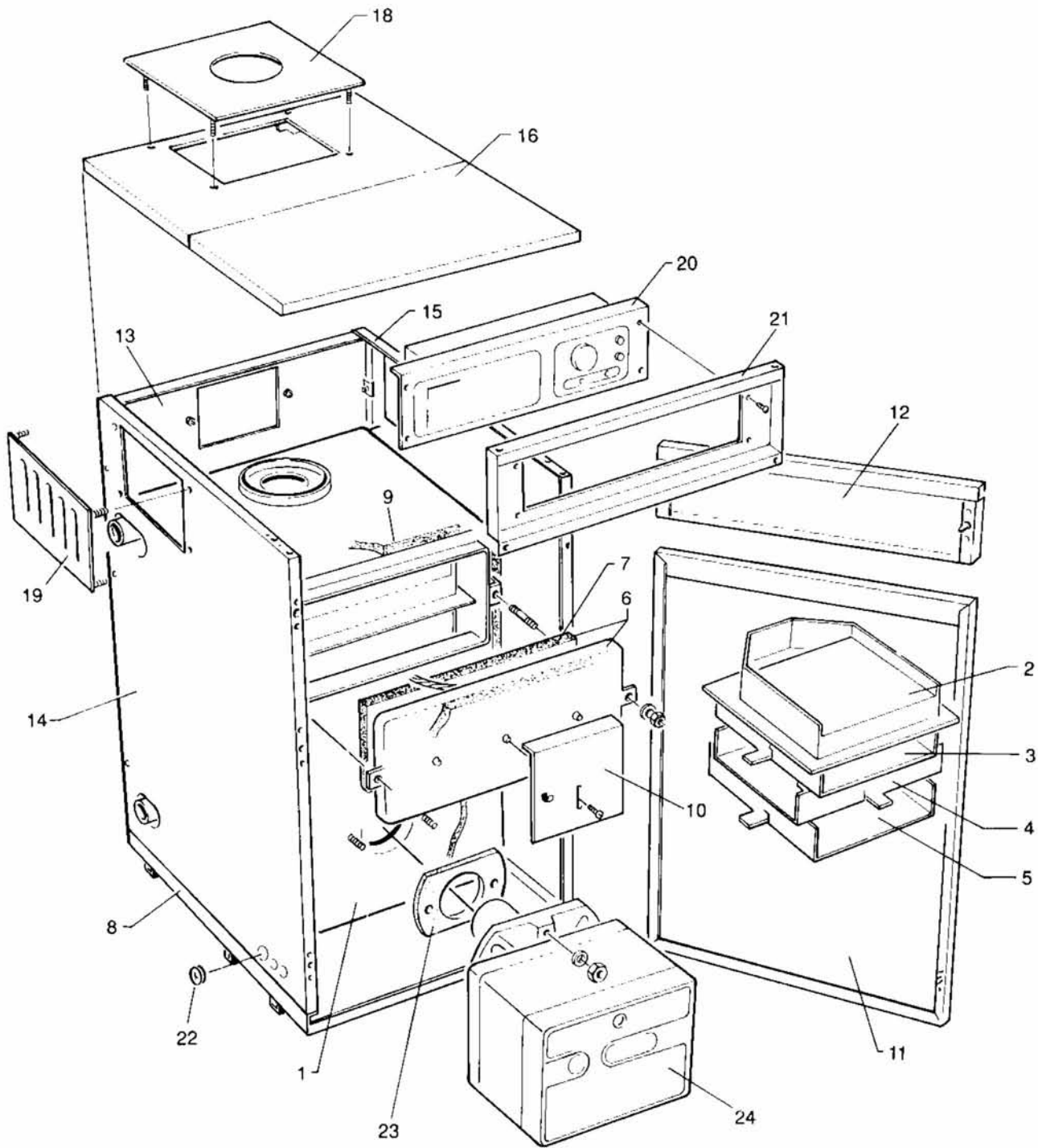
8:1 CONTROL PANEL PARTS



Item	Description	QUARTET	UTILITY
		All Models	All Models
1	Control Knob/Bezel	EL 00202	EL 00202
2	Control Thermostat (RANCO)	EL 00230	EL 00230
3	Mains Neon (Green) 240V	EL 23005C	EL 23005C
4	Lock-out Neon (Red) 240V	EL 23004C	N/A
5	Limit Neon (Amber) 440V	EL 23006C	EL 23006C
6	Manual Reset Limit Thermostat (RANCO)	EL 00215	EL 00215
7	3 Way Socket	EL 00036	EL 00036
8	3 Way Plug	EL 00037	EL 00037
9	4 Way Plug & Lead	EL 00013	EL 00013
10	4 Way Socket	EL 00012	EL 00012
11	Terminal Strip Support/Blanking Panel	PN 23153	N/A
Not shown	Boulter Programmer MP522/06	EL 00034	N/A

FOR OIL SYSTEM PARTS SEE SECTION
3:8, PAGES 10, 11 & 12.

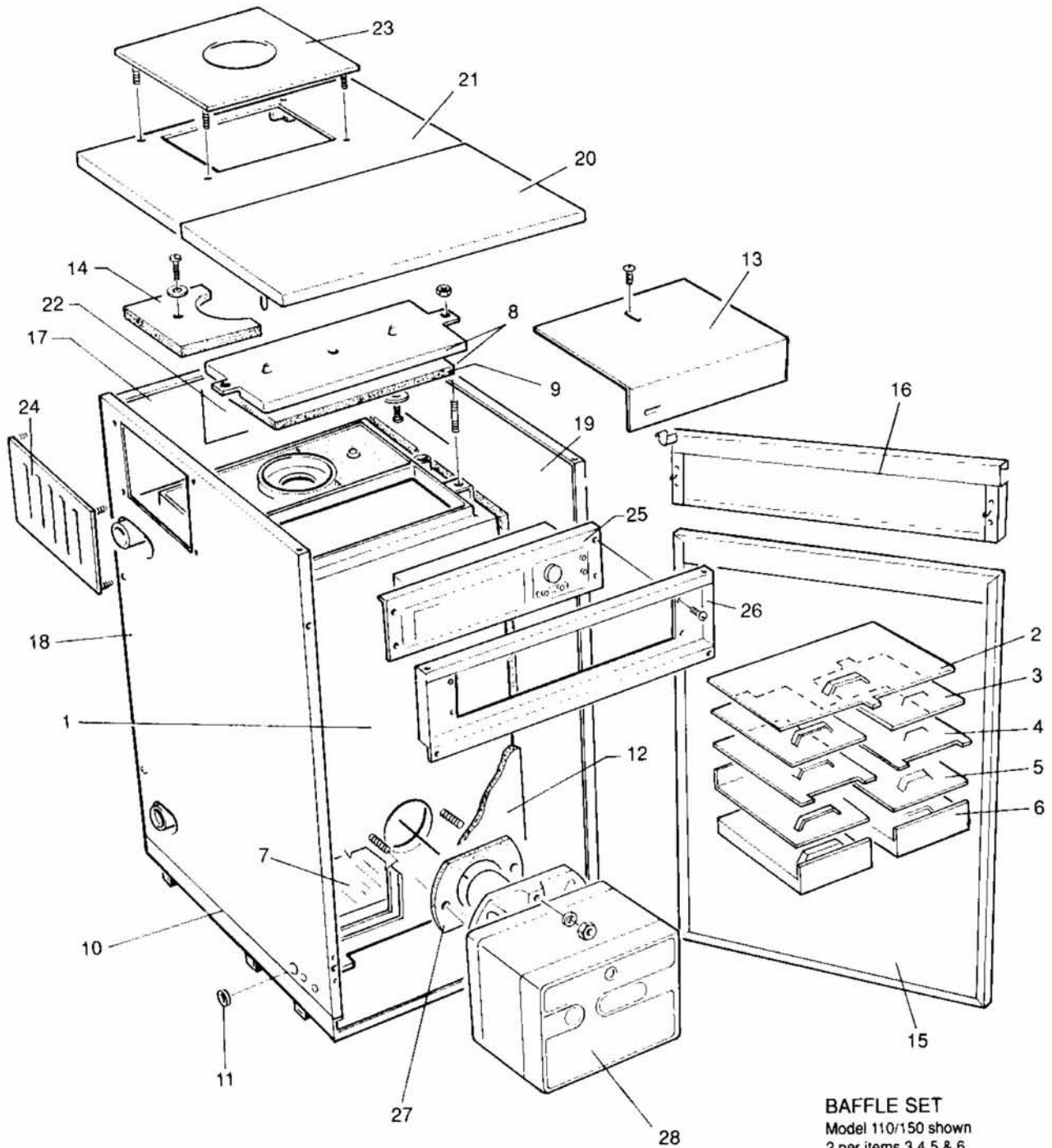
8:2 BOILER SPARE PARTS 40/60 & 60/80 BOILERS



8:2 BOILER SPARE PARTS 40/60 & 60/80 BOILERS

Item	Description	QUARTET		UTILITY		
		40/60	60/80	40/60	60/80	
1	Heat Exchanger (Short Boiler only)	SBQF 40/60	SBQF 60/80	SBQF 40/60	SBQF 60/80	
2	1st Baffle Top	HE 23014C	HE 23024C	HE 23014C	HE 23024C	
3	2nd Baffle	HE 23013C	HE 23023C	HE 23013C	HE 23023C	
4	3rd Baffle	HE 31012	HE 31022	HE 31012	HE 31022	
5	4th Baffle	HE 23013C	HE 23023C	HE 23013C	HE 23023C	
6	Inspection Cover complete	HE 23118C	HE 23218C	HE 23118C	HE 23218C	
7	Inspection Cover Insulation (Ceraboard)	IN 23101	IN 23201	IN 23101	IN 23201	
8	Base Tray	PN 31101C	PN 31201C	PN 31101C	PN 31201C	
9	Heat Exchanger Insulation Set	IN 31100C	IN 31200C	IN 31100C	IN 31200C	
10	Heat Shield	PN 23116	PN 23116	PN 23116	PN 23116	
11	Door Panel	PN 31105C	PN 31205C	PN 32105C	PN 32205C	
12	Front Access Door	PN 31109C	PN 31209C	N/A	N/A	
13	Rear Casing Panel	PN 31102C	PN 31202C	PN 32102C	PN32202C	
14	Left Side Casing Panel	PN 31103C	PN 31203C	PN 32103C	PN 32203C	
15	Right Side Casing Panel	PN 31104C	PN 31204C	PN 32104C	PN 32204C	
16	Top Front Panel	PN 31106C	PN 31206C	PN 32106C	PN 32206C	
	Top Rear Panel	PN 31107C	PN 31207C	PN 32107C	PN 32207C	
18	Conventional Flue Plate	PN 26111C	PN 26111C	PN 27111C	PN 27111C	
19	Air Entry Plate	PN 26117	PN 26117	PN 27117	PN 27117	
22	Control Panel Bracket	PL 31118C	PN 31218C	PN 32118C	PN 32218C	
23	Control Panel complete	PN 26150C	PN 26150C	PN 27150C	PN 27150C	
24	Kerosene Burner complete (less nozzle)	Type	422T56	436T56	422T56	436T56
		Part No.	3742256	3743656	3742256	3743656
25	Programmer Kit (Not Shown)	EL 00034C		N/A		

8:3 BOILER SPARE PARTS 90/110 & 110/150 BOILERS

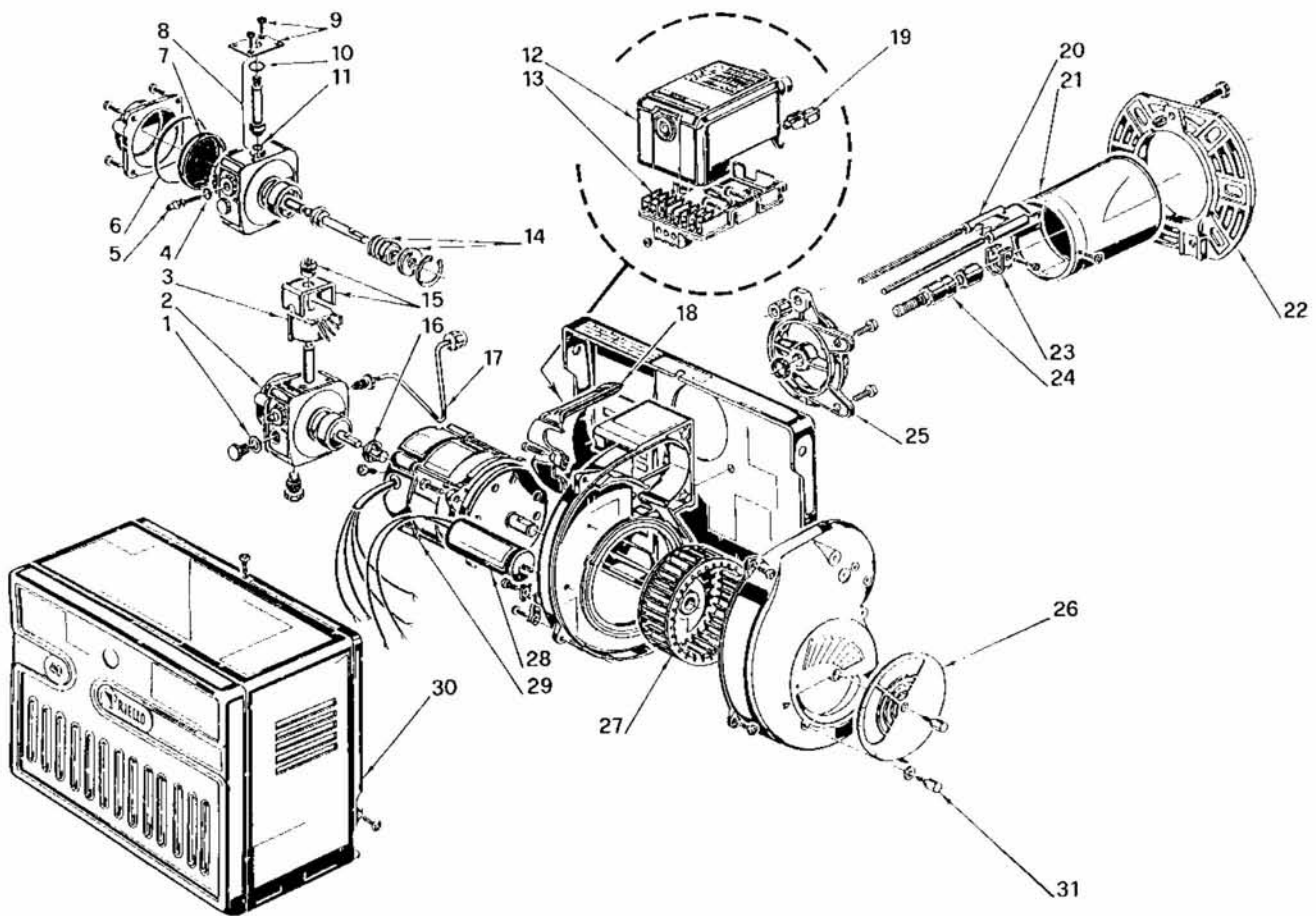


BAFFLE SET
Model 110/150 shown
2 per items 3,4,5 & 6
Model 90/110
1 per items 3,4,5 & 6

8:3 BOILER SPARE PARTS 90/110 & 110/150 BOILERS

Item	Description	QUARTET		UTILITY		
		90/110	110/150	90/110	110/150	
1	Heat Exchanger (Short Boiler only)	SBQF 90/110	SBQF 110/150	SBQF 90/110	SBQF 110/150	
2	1st Baffle Top	HE 23031C	HE 23031C	HE 23031C	HE 23031C	
3	2nd Baffle	HE 23032C	HE 23042C	HE 23032C	HE 23042C	
4	3rd Baffle	HE 23033C	HE 23043C	HE 23033C	HE 23043C	
5	4th Baffle	HE 23034C	HE 23044C	HE 23034C	HE 23044C	
6	5th Baffle	HE 23036C	HE 23046C	HE 23036C	HE 23046C	
7	Combustion Chamber Base Insulation	IN 14403	IN 14403	IN 14403	IN 14403	
8	Inspection Cover complete	HE 23318C	HE 23318C	HE 23318C	HE 23318C	
9	Inspection Cover Insulation	IN 23301	IN 23301	IN 23301	IN 23301	
10	Base Tray	PN 31301C	PN 31301C	PN 31301C	PN 31301C	
11	Grommet	RP 00610	RP 00610	RP 00610	RP 00610	
12	Heat Exchanger Insulation Set	IN 26300C	IN 26300C	IN 26300C	IN 26300C	
13	Heat Shield	PN 23316	PN 23316	PN 23316	PN 23316	
14	Flueway Insulation Ceraboard (pair)	IN 14401	IN 14401	IN 14401	IN 14401	
15	Door Panel	PN 31305C	PN 31305C	PN 32305C	PN 32305C	
16	Front Access Door	PN 31309C	PN 31309C	N/A	N/A	
17	Rear Casing Panel	PN 31302C	PN 31302C	PN 32302C	PN 32302C	
18	Left Side Casing Panel	PN 31303C	PN 31303C	PN 32303C	PN 32303C	
19	Right Side Casing Panel	PN 31304C	PN 31304C	PN 32304C	PN 32304C	
20	Top Casing Panel Front	PN 26306C	PN 26306C	PN 27306C	PN 27306C	
21	Top Casing Panel Rear	PN 26307C	PN 26307C	PN 27307C	PN 27307C	
22	Casing Blanking Plate	PN 26324C	PN 26324C	PN 26324C	PN 26324C	
23	Conventional Flue Plate	PN 26311C	PN 26311C	PN 27311C	PN 27311C	
24	Air Entry plate	PN 26317C	PN 26317C	PN 26317C	PN 26317C	
25	Control Panel complete	PN 26150C	PN 26150C	PN 27150C	PN 27150C	
26	Control Panel Bracket	PN 31318C	PN 31318C	PN 32318C	PN 32318C	
27	Gasket	RP 03001	RP 03002	RP 03001	RP 03002	
28	Burner complete (less nozzle)	Type	443T556	459T558	443T556	459T55
		Part No.	3744355 3744356	3745958 3745956	3744355 3744356	3745958 3745956
Programmer Kit (Not Shown)		EL 00034C		N/A		

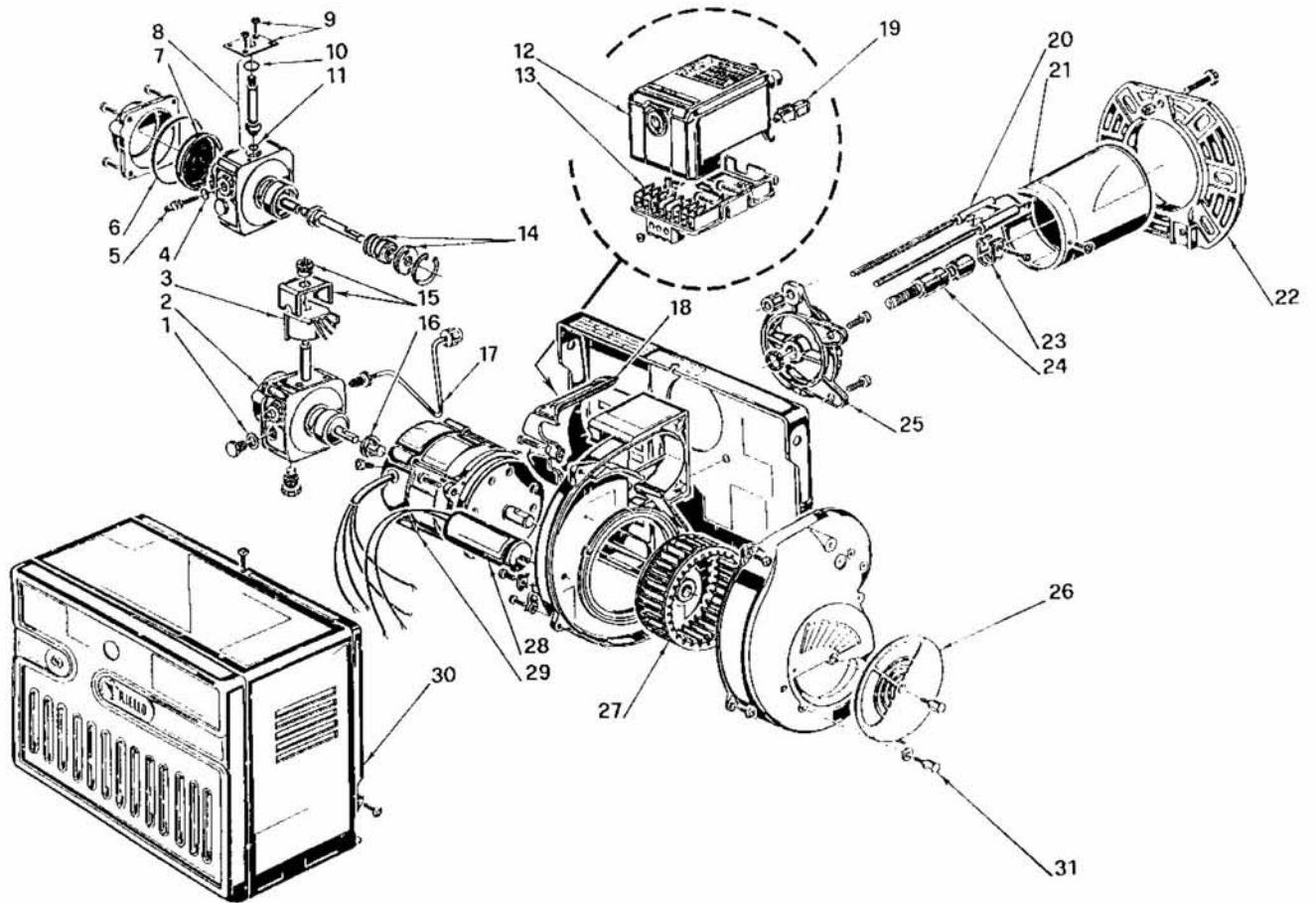
8:4 BURNER PARTS - TYPE 422T55 (KEROSENE ONLY)



Item	Part No.	Description
1	3007077	Seal
2	3007811	Pump
3	3002279	Coil
4	3007028	O-Ring
5	3007202	Regulator
6	3007162	O-Ring
7	3005719	Filter
8	3006925	Valve Assembly
9	3007203	Plate
10	3007029	O-Ring
11	3007156	O-Ring
12	3001156	Control Box 530SE*
13	3002278	Control Box Base
14	3000439	Pump Seal
15	3006553	Shell and Knob
16	3000443	Coupling

Item	Part No.	Description
17	3005723	Tube
18	3006554	Cover
19	3002280	Photoresistance
20	3005721	Electrode Assembly
21	3005775	Blast Tube
22	3005786	Flange
23	3006552	Electrode Bracket
24	3005724	Nozzle Holder
25	3005760	Collar
26	3007204	Air Damper
27	3005708	Fan
28	3005798	Capacitor 4 μ F
29	3007355	Motor
30	3008447	Body
31	3008448	Screw

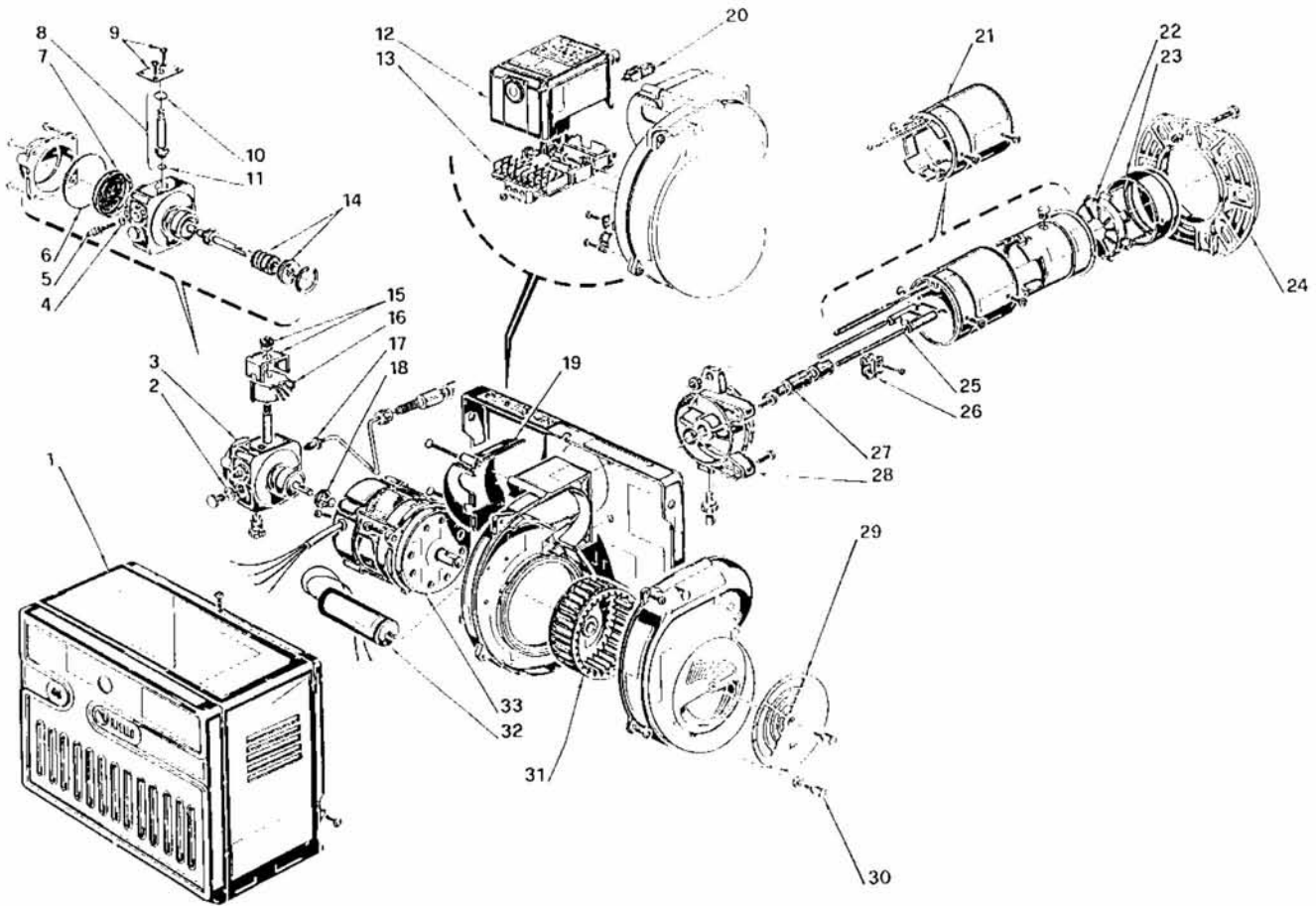
8:4 BURNER PARTS - TYPE 436T55 (KEROSENE ONLY)



Item	Part No.	Description
1	3007077	Seal
2	3007811	Pump
3	3002279	Coil
4	3007028	O-Ring
5	3007202	Regulator
6	3007162	O-Ring
7	3005719	Filter
8	3006925	Valve Assembly
9	3007203	Plate
10	3007029	O-Ring
11	3007156	O-Ring
12	3001156	Control Box 530SE*
13	3002278	Control Box Base
14	3000439	Pump Seal
15	3006553	Shell and Knob
16	3000443	Coupling

Item	Part No.	Description
17	3005723	Tube
18	3006554	Cover
19	3002280	Photoresistance
20	3005721	Electrode Assembly
21	3006001	Blast Tube
22	3005786	Flange
23	3006552	Electrode Bracket
24	3005724	Nozzle Holder
25	3005760	Collar
26	3007204	Air Damper
27	3005708	Fan
28	3005798	Capacitor 4 μ F
29	3007355	Motor
30	3008447	Body
31	3008448	Screw

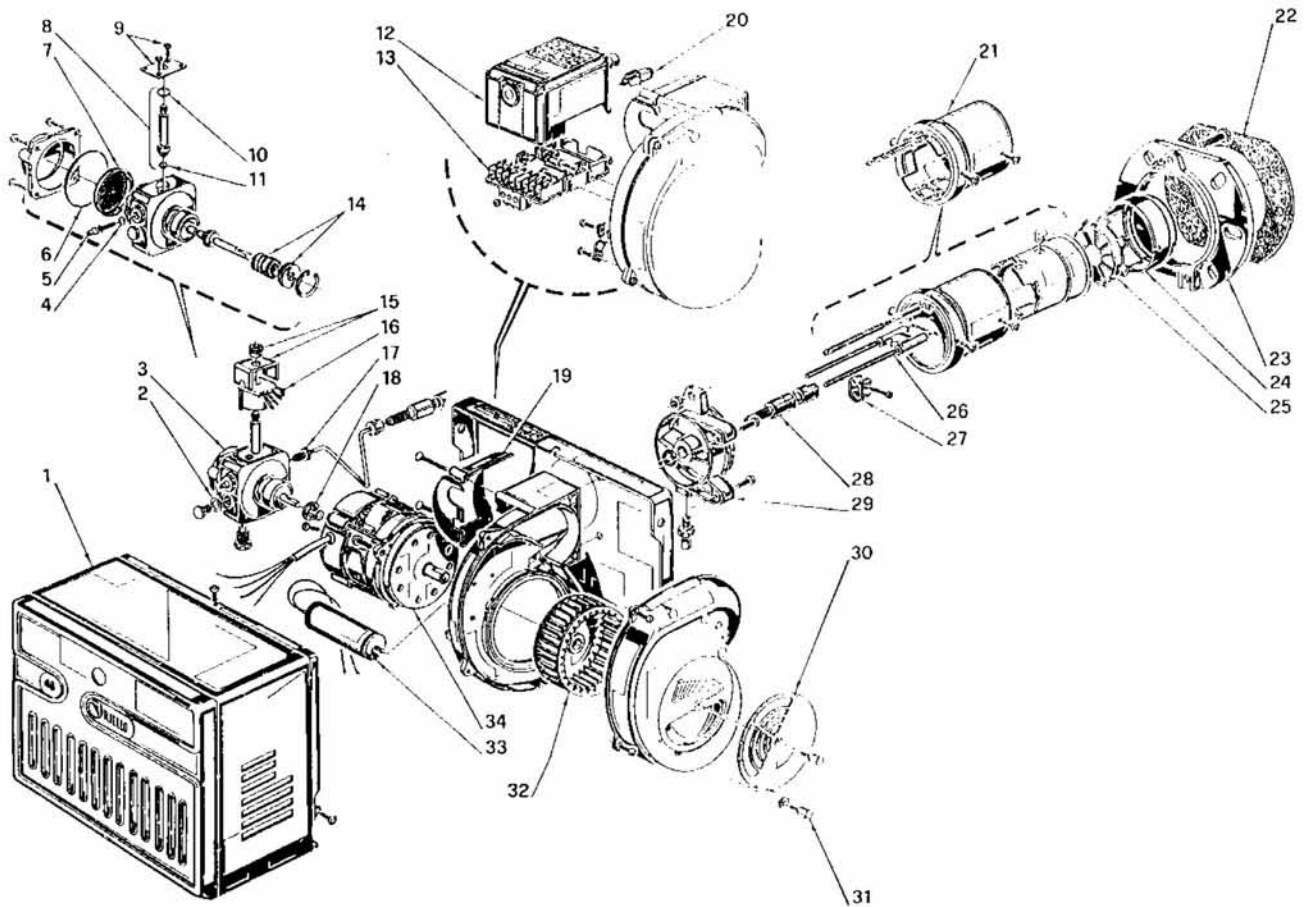
8:4 BURNER PARTS - TYPE 443T55 (KEROSENE ONLY)



Item	Part No.	Description
1	3008449	Body
2	3007077	Seal
3	3007811	Pump
4	3007028	O-Ring
5	3007202	Regulator
6	3007162	O-Ring
7	3005719	Filter
8	3006925	Valve Assembly
9	3007203	Plate
10	3007029	O-Ring
11	3007156	O-Ring
12	3001156	Control Box 530SE*
13	3002278	Control Box Base
14	3000439	Pump Seal
15	3006553	Shell and Knob
16	3002279	Coil
17	3005710	Tube

Item	Part No.	Description
18	3000443	Coupling
19	3006556	Cover
20	3002280	Photoresistance
21	3005706	Blast Tube Assembly
22	3005713	Diffuser Disc
23	3005714	End Ring
24	3005786	Flange
25	3005711	Electrode Assembly
26	3006552	Electrode Bracket
27	3005709	Nozzle Holder
28	3005761	Collar
29	3007204	Air Damper
30	3008448	Screw
31	3005708	Fan
32	3005798	Capacitor 4 μ F
33	3007355	Motor

8:4 BURNER PARTS - TYPE 459T55 (KEROSENE ONLY)



Item	Part No.	Description
1	3008450	Body
2	3007077	Seal
3	3007811	Pump
4	3007028	O-Ring
5	3007202	Regulator
6	3007162	O-Ring
7	3005719	Filter
8	3006925	Valve Assembly
9	3007203	Plate
10	3007029	O-Ring
11	3007156	O-Ring
12	3001156	Control Box 530SE*
13	3002278	Control Box Base
14	3000439	Pump Seal
15	3006553	Shell and Knob
16	3002279	Coil
17	3005789	Tube

Item	Part No.	Description
18	3000443	Coupling
19	3006557	Cover
20	3002280	Photoresistance
21	3007714	Blast Tube Assembly
22	3005795	Gasket
23	3005796	Flange
24	3005714	End Ring
25	3005713	Diffuser Disc
26	3007713	Electrode Assembly
27	3006552	Electrode Bracket
28	3005709	Nozzle Holder
29	3005791	Collar
30	3007907	Air Damper
31	3008448	Screw
32	3005788	Fan
33	3005798	Capacitor 4 μ F
34	3007355	Motor

9:1 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. Is the Boiler Thermostat set to the desired temperature?
6. Is the Lock-out Reset Button on the Control Box and Control Panel Neon 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.

Fault Finding Chart

<i>Trouble or Complaint</i>	<i>Possible Cause</i>	<i>Action</i>
1. Suspect oil supply	No oil in tank	Check and arrange for tank to be filled if necessary.
	Supply valves closes	Open all supply valves.
	Blockage in oil supply (Gravity head feed)	Shut off the burner isolating valve. Disconnect the oil supply at the pump entry. Place receptacle under the pipe. Slowly open the valve, note if the flow is unrestricted, restricted or blocked.
	Wrong grade of oil	Check for correct grade of fuel (see technical data).
	Water contamination	Open tank, drain valve and check.
	Tank vent blocked	Check.
	Filter blocked	Check for water or blockage.
	Air locks in supply pipe	Check for high points in main oil supply.
2. Burner will not start	Air lock in pump	Bleed pump, check flexible oil line.
	Interruption or absence of electrical supply at burner. (Check this at control box mains terminal with test lamp).	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.
	Control box is locked out, refer to symptom 4	Press reset button on the burner box.
	Photo-resistor receiving false light	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	Replace.
	No oil supply	Check oil in tank.
	Photo-electric cell not receiving light from flame	Check that photo-electric cell is clean and fully home in housing.
	Photo-electric cell connections loose	Check and tighten if necessary.

3.	Control box photo-electric cell circuit faulty Flame instability	Replace control box. Check combustion setting out and reset if necessary.
4. Burner starts but will not light up	This can be due either to absence of oil or 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 rotation incorrect <i>Ignition failure:-</i> Electrodes dirty Electrodes mis-set Cracked electrode insulator	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. Check. Inspect and clean if necessary. Inspect and reset gap 3 to 4mm between tips, 2mm in front of nozzle face. Check and replace if cracked or crazed.
5. Burner lights up, runs continuously and emits visible smoke or shows excess smoke on combustion check	Air shutter closed Wrong nozzle Worn atomiser nozzle Oversize nozzle fitted in error Nozzle incorrectly stamped Burner air supply inadequate Burner oil pressure excessive	Reset to correct position. Check make, type and spray angle. Replace if necessary. Check size and replace with correct size if necessary. Replace with correct nozzle. Inspect air intake and fan for fouling of impeller with dirt. 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 Magnetic valve not operating correctly Shut off piston in pump sticking	Should self-correct; if air repeatedly present; check for leaks on oil line and flexible. Inspect and replace if necessary. Replace pump.

7.	Burner pulsates (a) continuously	Air shutter setting incorrect or fan inlet blocked	Inspect and reset or remove blockage.
		Grossly oversized nozzle	Check and replace with correct size and type (see Technical Data).
		Air supply inadequate	Check fan operation and cleanliness.
		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 supply	Restart burner several times - press lockout reset 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 extension	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 boilerstat. Partially blocked filter	Replace, check and clean.
11.	Poor combustion readings	Low CO ₂	Check: air shutter, oil pressure, nozzle size (see Technical Data).
		High CO ₂	Check: air shutter, oil pressure, nozzle size, fan impeller blades, for cleanliness.
		High Smoke	Check: air shutter, oil pressure, nozzle size (see Technical Data) and burner head geometry. 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 odours	Leaking joints	Break all leaking joints and re-make.
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.

Vertical lines on either side of text indicate amendments to previous issue

CAMRAY
QUARTET

BOULTER BOILERS