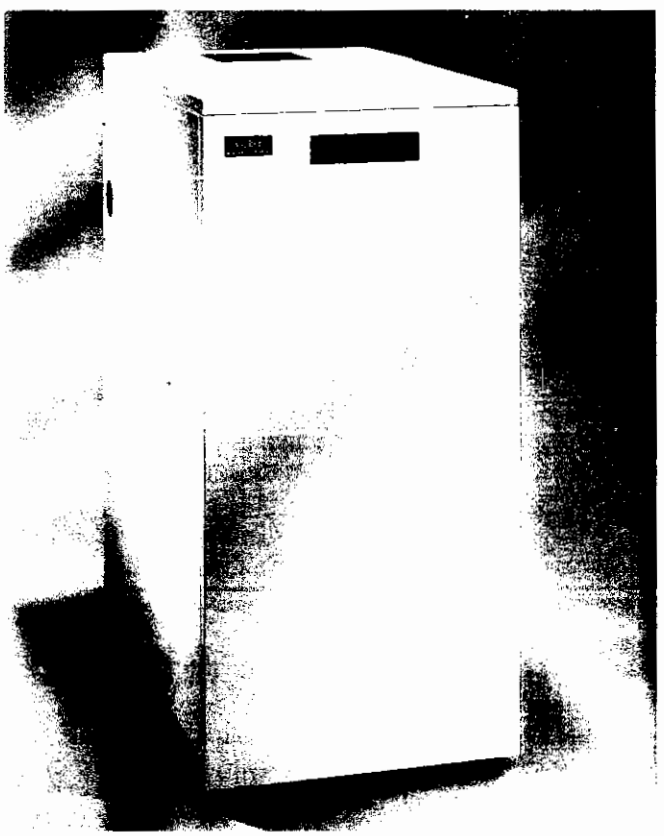
By Appointment to
H.M. Queen Elizabeth II
Boulter Boilers Limited
Boiler Manufacturers

Boulter
ECONOMY

Operating, Installation & Maintenance Manual
Oil Fired Boilers



Boulter

Document Ref. PL37000

Issue 3

Leave this Manual with the User

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.

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.

This appliance may contain some of the materials below.

INSULATION & SEALS

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

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

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

GLUES, SEALANTS & PAINT

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

KEROSENE 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 breathe 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

CONTENTS

1. INTRODUCTION

Boulter Economy Boilers are designed to operate with high efficiency and clean combustion on open vent gravity or fully pumped systems only – (for sealed systems a manual reset limit kit must be used, part no. EL37160C). They can be used in the following modes.

Low level rear outlet balanced flue or for connection to a conventional chimney.

Both models are supplied as standard to use kerosene 28 second class C2 fuel only for connection to a conventional chimney, they are suitable for new installations and for replacing existing boilers. The flue offtake is from the top of the boiler.

The balanced flue is supplied in a carton which includes ALL parts to convert balanced flue installation.

IMPORTANT SAFETY NOTES

Read these instructions before installing your boiler

The heating system must comply with the latest editions of British Standard 5410 and The Building Regulations, and Electrical Wiring Regulations BS 7671.

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

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

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

We recommend that you keep these instructions in a place near your appliance for easy reference.

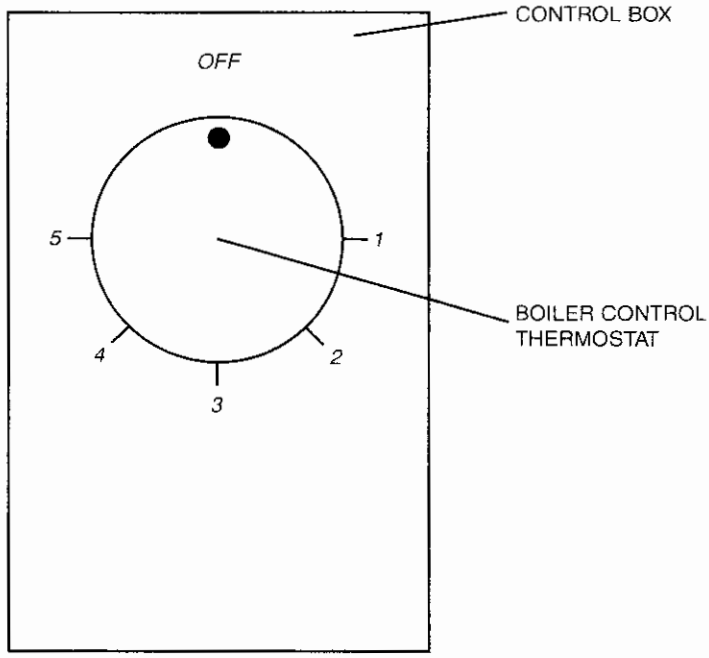
Air Supply to Boiler – Conventional Flue (only)

Where your Boiler is used on an open conventional flue system, a permanent air supply is required for combustion. Clearances provided at the top and rear of the appliance for air entry must be kept free of obstruction.

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

2. USERS INSTRUCTIONS

The Boiler Control Thermostat is located behind the Front Casing Panel Door



Boiler Control Thermostat

The Boiler Control Thermostat is the ON/OFF switch for the Boiler. To switch the Boiler off completely, turn the Thermostat to the 'OFF' position.

The Boiler Control Thermostat also controls the water temperature within the Boiler. The recommended Control Thermostat settings are as follows:-

WINTER HEATING & HOT WATER 4

SUMMER HOT WATER ONLY 2

The Boiler Control Thermostat automatically switches the Burner ON and OFF to maintain the selected temperature. The Burner is lit by an automatic ignition system and therefore there is no pilot flame.

The Boiler should not be operated below approximately 60ºC as this will cause corrosion which will reduce the life of the boiler (Control Thermostat setting No. 2).

Failure to Start

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

1. *Check that there is oil in the tank and that the supply valve is open.*
2. *Check any external controls are calling for heat via programmer/roomstat etc.*
3. *Check that the Boiler Control Thermostat is set high enough to be "ON" or calling for heat.*
4. *Check whether the red LOCKOUT button on the Burner Control box is glowing. This indicates that the Burner has attempted to start but has not fired successfully. Press the reset button on the Burner Control box, when released, the light will go out and the Burner will again attempt to start. If the burner does not run and again goes to lockout with red indicator glowing:-*

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

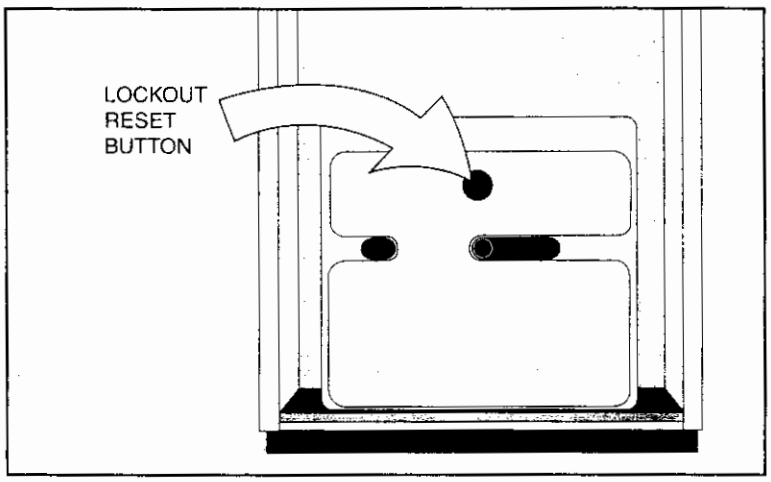


Diagram of Red Burner Box showing Lockout Reset Button position

SHUTTING OFF FOR THE SUMMER

If the Boiler is to be shut off for the summer it is advisable to have it thoroughly serviced when first shut down. Thorough cleaning will minimize corrosion during the idle period. Remember to ensure that the oil supply valve is open before switching on.

Frost Protection

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

If a frost thermostat is fitted, leave the Boiler with the Boiler Control Thermostat turned low but not off, and turn any time control switch to OFF.

Oil Delivery

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

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

Maintenance

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

The Boiler must be serviced at regular 12 month intervals by a qualified service engineer. Failure to have the Boiler serviced at the recommended intervals will invalidate the guarantee/warranty.

3. TECHNICAL DATA + INSTALLATION INSTRUCTIONS

Boiler Details

Max. Boiler working pressure 40 psi – 28 metres (92 ft) water head.

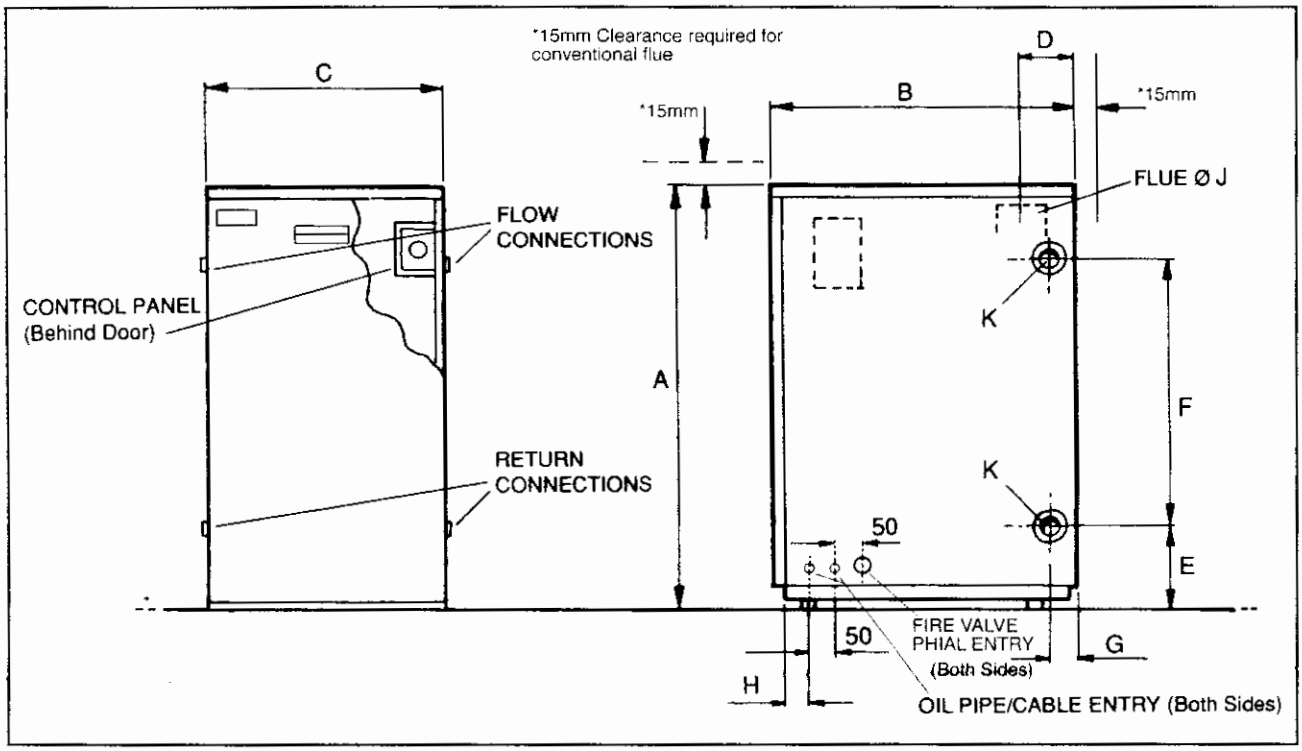
Minimum recommended return water temperature 60°C.

Minimum Conventional flue draught at boiler flue outlet 0.035"w.g. (8.75 N/m²).

Maximum Conventional flue draught at boiler flue outlet 0.15"w.g. (37.5 N/m²).

Water Resistance. 0.3m w.g. with 11°C temperature rise across the boiler.

DIMENSIONS



Model	Output		Hgt. A	Dep. B	Wid. C	Dim. D	Dim. E	Dim. F	Dim. G	Dim. H	Flue*	Flow & Return	Empty Weight	Water Content	
	kW	Btu/h x 1000	mm	mm	mm	mm	mm	mm	mm	mm	J Ø ins.	K Ø ins.	Kgs.	Litres	Imp. Gals.
50/70	15/20	50/70	860	600	405	106	120	535	45	45	4	1 BSP	102	17.9	3.9
70/90	20/26	70/90	860	600	470	106	120	535	45	45	4	1 BSP	120	20.1	4.4

INSTALLATION

Standards & Regulations

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

BS 5410 Oil Installation

Pt 1 under 44kW;

BS5449 Forced circulation hot water central heating systems for domestic premises.

BS4543 Pt. 1 & 3 Factory made insulated chimneys.

BS7671 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. Preferably by an OFTEC registered engineer.

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 from the boiler can be totally or substantially reduced whilst the boiler 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, with a reputable manufacturer's product.

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

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

Siting & Positioning

The noise level from Boulter Economy boilers is minimal, however consideration must be given to the following points.

1. Noise may be accentuated by the installation in small rooms or recesses with hard or hollow stud wall surfaces.

2. Some individuals may be particularly sensitive to even low noise levels and this should be taken into consideration.

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

Servicing Access and Clearances

Boulter Economy models require 450mm in front of and above the boiler for servicing access and therefore any kitchen work surface above the **boiler must** be removable. For conventional flue installations a minimum gap of 15mm should be left clear at the rear and top of the casing and **must not** be obstructed.

The Hearth

The Boiler requires a level hearth to stand on and if the floor is 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.

INSTALLATIONS WITH BALANCED FLUES

IT IS IMPORTANT THAT CARE IS EXERCISED IN CHOOSING A SUITABLE LOCATION.

It is a mandatory requirement that:–

(a) Low level balanced flues are not used for boilers operating with gas oil (Class D fuel).

(b) Positions should be avoided where combustion products could cause nuisance.

RECOMMENDED FLUE TERMINAL POSITION

Terminals should be positioned as to avoid products of combustion entering openings into buildings, neighbouring dwellings, adjoining properties, or other flues or vents.

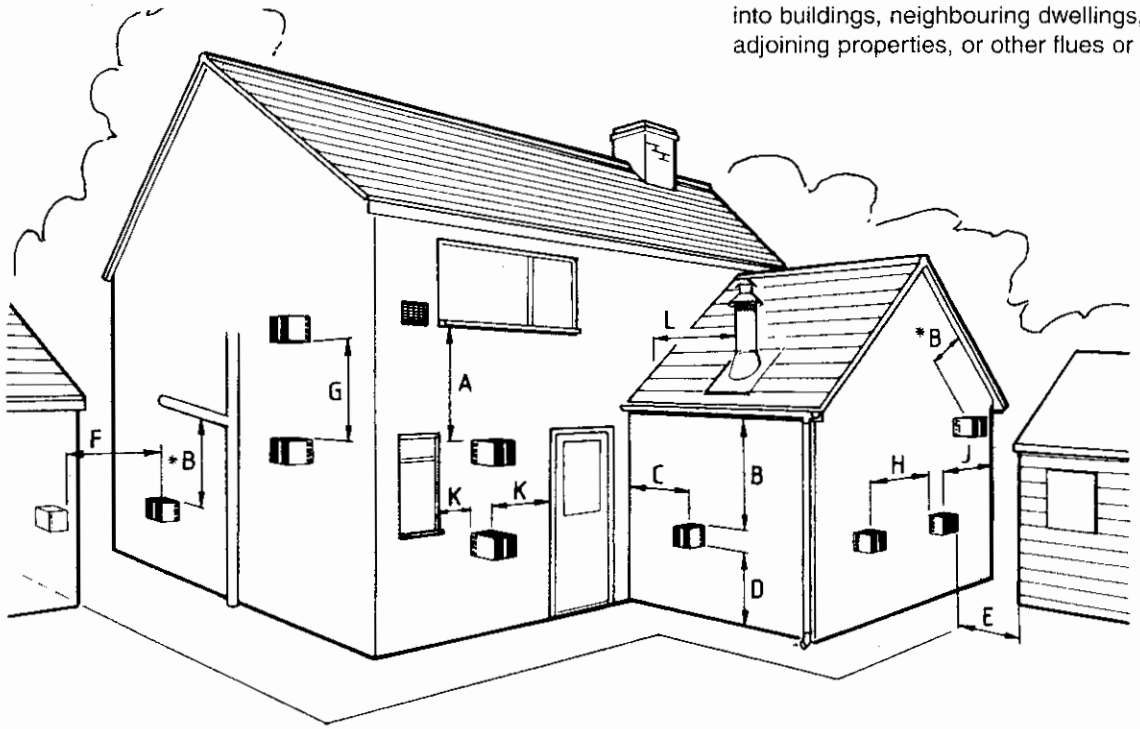


Table to above Flue Terminal positions allowed – MINIMUM dimensions.

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

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

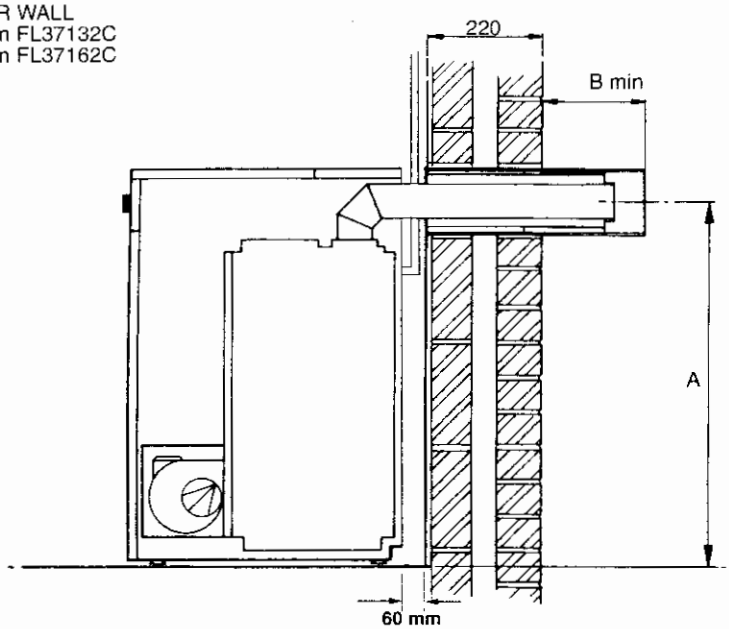
Positioning the flue terminal within a CAR PORT **is not recommended.**

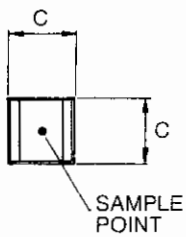
The flue terminal positions given are as recommended by Boulter Boilers. The final position of the flue should be checked with the local Building Inspectorate.

A Terminal Guard should be fitted if persons could come into contact with the Terminal or if it could be subject to damage.

TYPE	LOW LEVEL HORIZONTAL REAR	MODELS	50/70 70/90 - 75mm

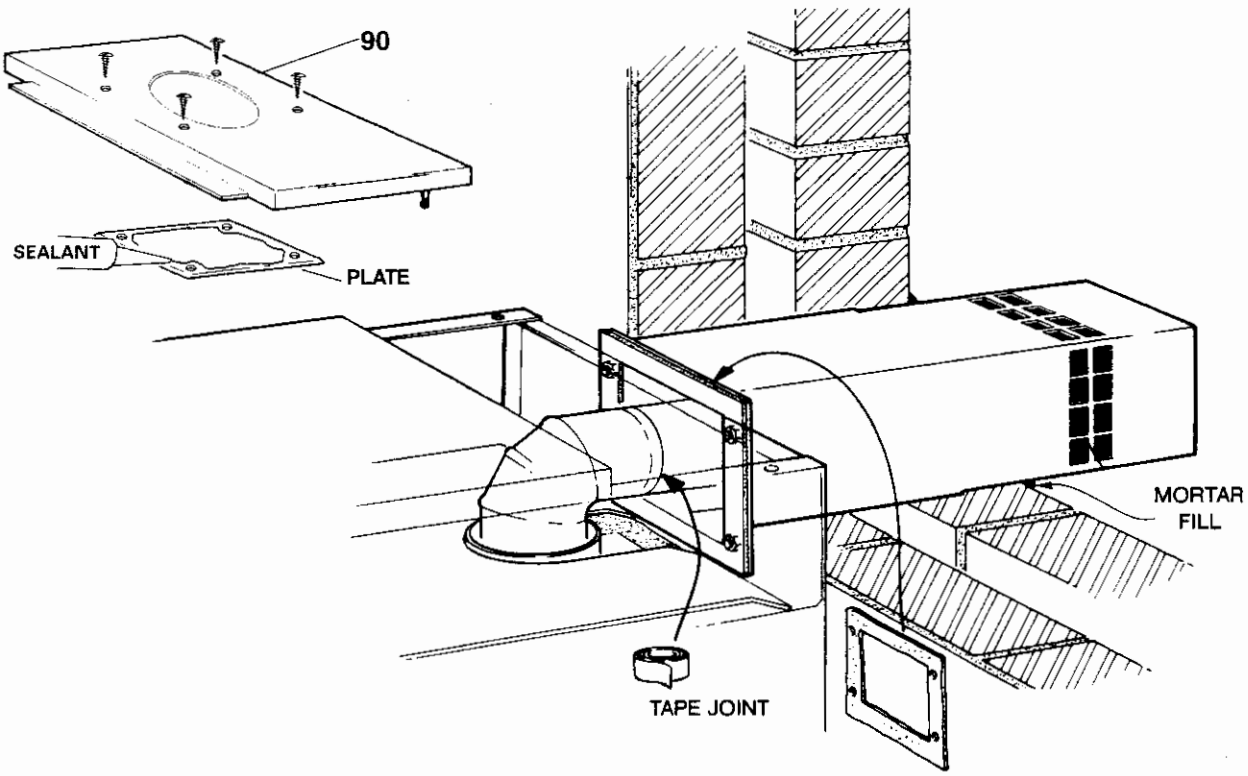
EXTENSION FOR WALL
Thickness 508mm FL37132C
Thickness 914mm FL37162C

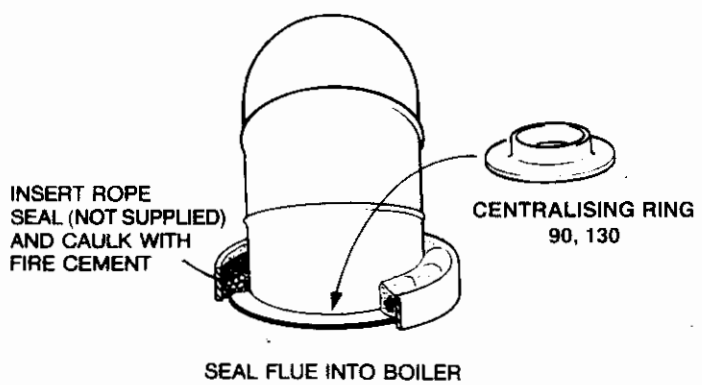




Dimensions in mm

MODEL	A	B	C
50/70 70/90	790	175	142





THE CHIMNEY – (FLUE Ø4")

Conventional Chimney Installation Only

IMPORTANT POINTS TO NOTE ARE:–

- The Boiler requires a minimum stable draught of 0.1 mbar (0.04w.g.)
- If the chimney exceeds 6m 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).
- 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 – 90º bends should be avoided – use 135º bends. Bends with soot doors should be used where necessary.

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.
- At least 15mm clearance is required at the top and back of the appliance.
- 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.

Opening Sizes

- The air opening required for combustion only is 550mm²/kW above 5kW.
- 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.
- When the boiler is situated in a confined space with Combustion or Ventilation air from outside – Allow 550mm²/kW at low level and in addition 550mm²/kW at high level;
- When Combustion and Ventilation air is taken from a heated adjoining space the allowance should be 1100mm²/kW at low level and in addition 1100mm²/kW at high level. Ensure that the heated adjoining space itself has an adequate supply of air.
- When the Boiler is installed in a basement or low level boiler house where air can enter only from high level, the incoming air supply for Combustion and Ventilation should be ducted to low level. A high level outlet should be provided for ventilation.

4. OIL SUPPLY

Oil Storage/Oil Tanks

When positioning the tank, allow access for fuel delivery lorries. In the interest of the most economical deliveries, the oil tank should be of 3,000 litres capacity.

Steel 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.

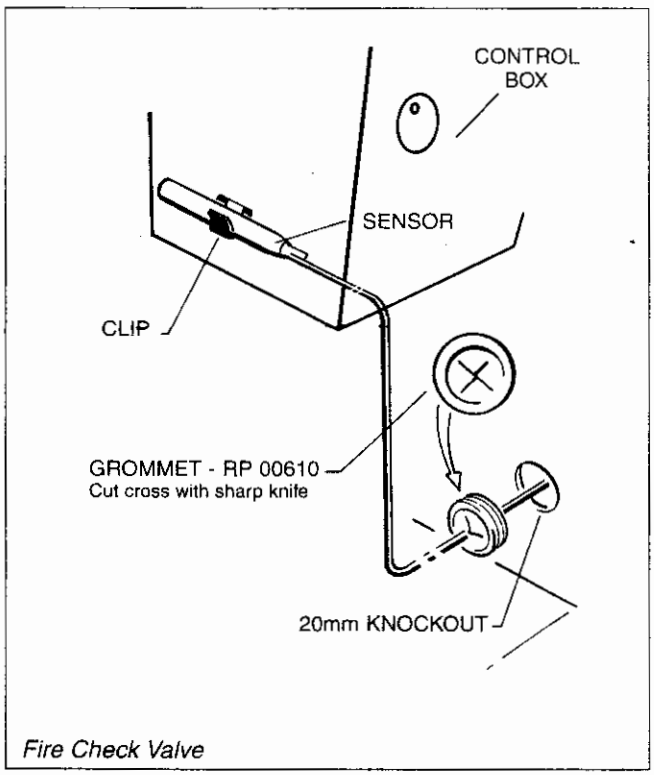
Plastic tanks are now available which are UV stabilised for protection against sunlight. These do not need to stand on piers, but should be supported across the entire base area, ideally on 50mm thick concrete slabs or a concrete base. As there is only one tapped outlet they are more suited to single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

Oil Supply to the Burner

The oil entry holes on the boiler casing are shown in the diagram. Flexible hoses 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.

It is essential for reliable operation and a condition of the guarantee that an OIL FILTER with a maximum mesh of 70 µm is fitted in the oil pipe from the tank to the burner, as close to the boiler as possible but NOT inside the boiler casing.

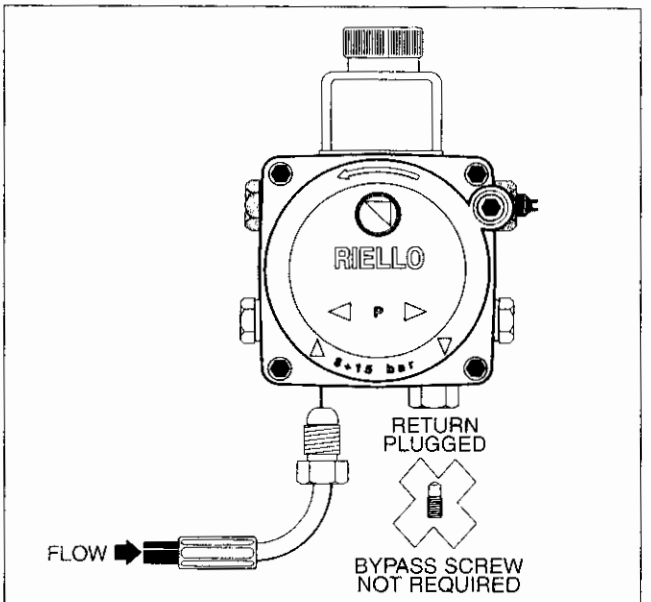
A FIRE VALVE must also be fitted in the oil supply line, external to the boiler and preferably at the point where it enters the building. The sensor should be located above the burner in the clip provided in the control box. The entry point for the sensor should be one of the two 20mm knockouts located at the bottom of each side casing. To ensure the casing seal is maintained on balanced flue models, always pass the sensor through a blind grommet – it will be necessary to cut across the diaphragm.



Fire Check Valve

Single Pipe System

If the bottom of the oil tank is above the burner, install a 10mm copper supply pipe to the burner, remembering to incorporate an oil filter, shut off valve and fire check valve. The burner pump is supplied set for single pipe operation with the return port plugged, and the bypass screw not fitted. Check that it is correctly set.



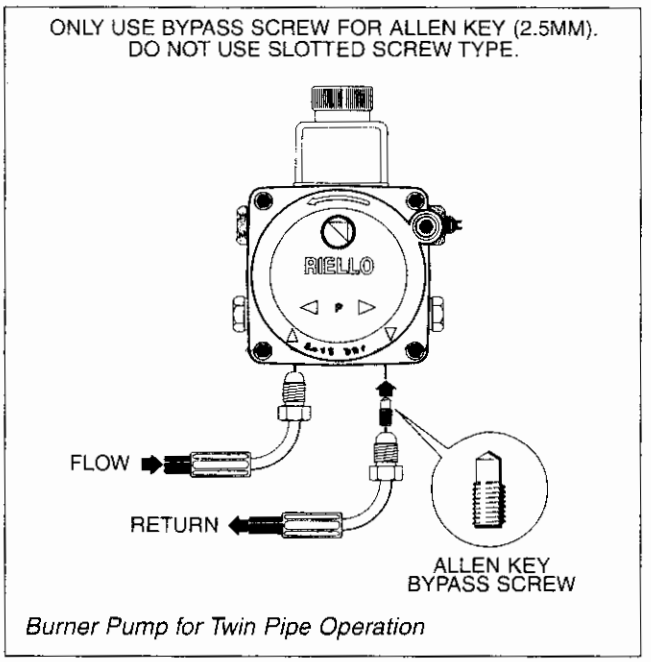
Burner Pump for Single Pipe Operation

Two Pipe System

When the bottom of the oil tank is below the burner, a 10mm return pipe is needed. The oil filter, shut off valve and fire check valve should always be in the line supplying oil from the tank to the burner.

A non-return valve should be fitted in the oil supply line from the tank to the burner so that the oil flows in the correct direction. Non return valves **must not** be fitted in the return line which must remain unobstructed at all times.

Ensure that the burner oil pump is set correctly for 'two pipe' operation, by ensuring that the pump is fitted with the bypass screw (supplied in a labelled envelope attached to the burner).



Burner Pump for Twin Pipe Operation

Deaerator Oil Pipe System

An alternative two pipe arrangement can be achieved using the 3K oil loop deaerator (Part No BS03060, available from Builders Merchants) 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 outside the building. A non-return valve **must not** be fitted in the return line.

The advantage of using the 3K oil loop is where a two pipe run from the oil tank is long or difficult to achieve.

Water Separator Oil Filter

For Boiler changeover applications, the use of a Water Separator Oil Filter, available from BOULTER BOILERS is recommended (BS 03052).

SINGLE PIPE OIL SYSTEM - TANK OUTLET ABOVE BURNER

DO NOT FIT PUMP BYPASS SCREW TO BURNER

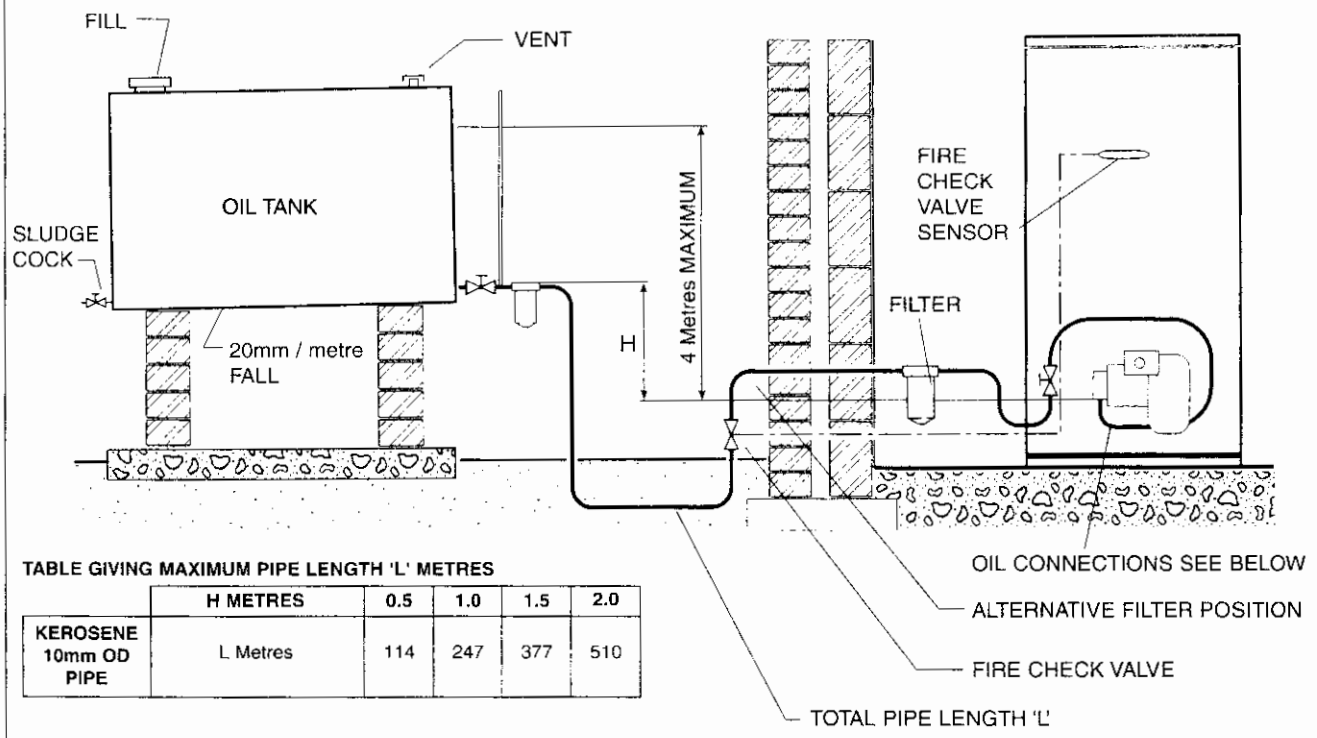


TABLE GIVING MAXIMUM PIPE LENGTH 'L' METRES

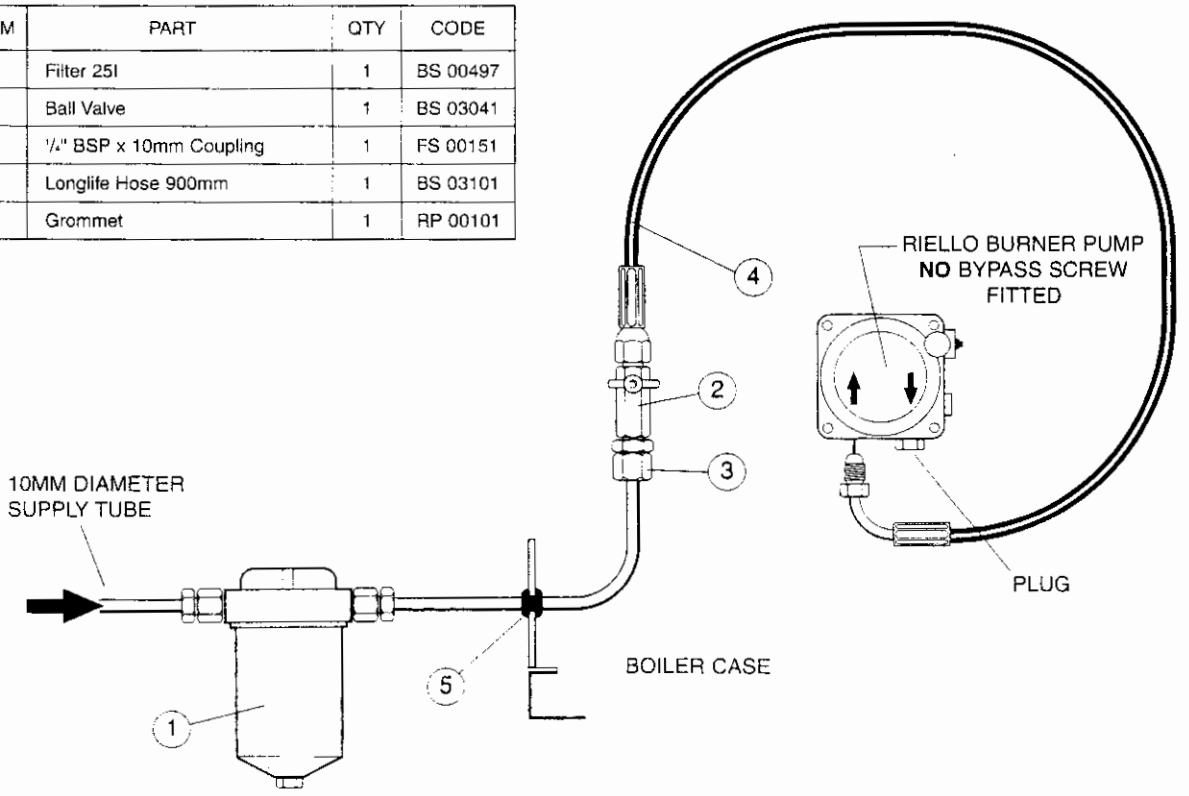
	H METRES	0.5	1.0	1.5	2.0
KEROSENE 10mm OD PIPE	L Metres	114	247	377	510

Single Pipe Oil System.

SINGLE PIPE OIL SYSTEM - OIL CONNECTIONS

Item 5 Supplied with Boiler

ITEM	PART	QTY	CODE
1	Filter 25l	1	BS 00497
2	Ball Valve	1	BS 03041
3	¼" BSP x 10mm Coupling	1	FS 00151
4	Longlife Hose 900mm	1	BS 03101
5	Grommet	1	RP 00101



LH & RH FUEL ENTRY AVAILABLE (LH SHOWN)
SCHEMATIC DIAGRAM FIT HOSE AS SHOWN

TWO PIPE OIL SYSTEM - TANK OUTLET BELOW BURNER

FIT PUMP BYPASS SCREW TO BURNER

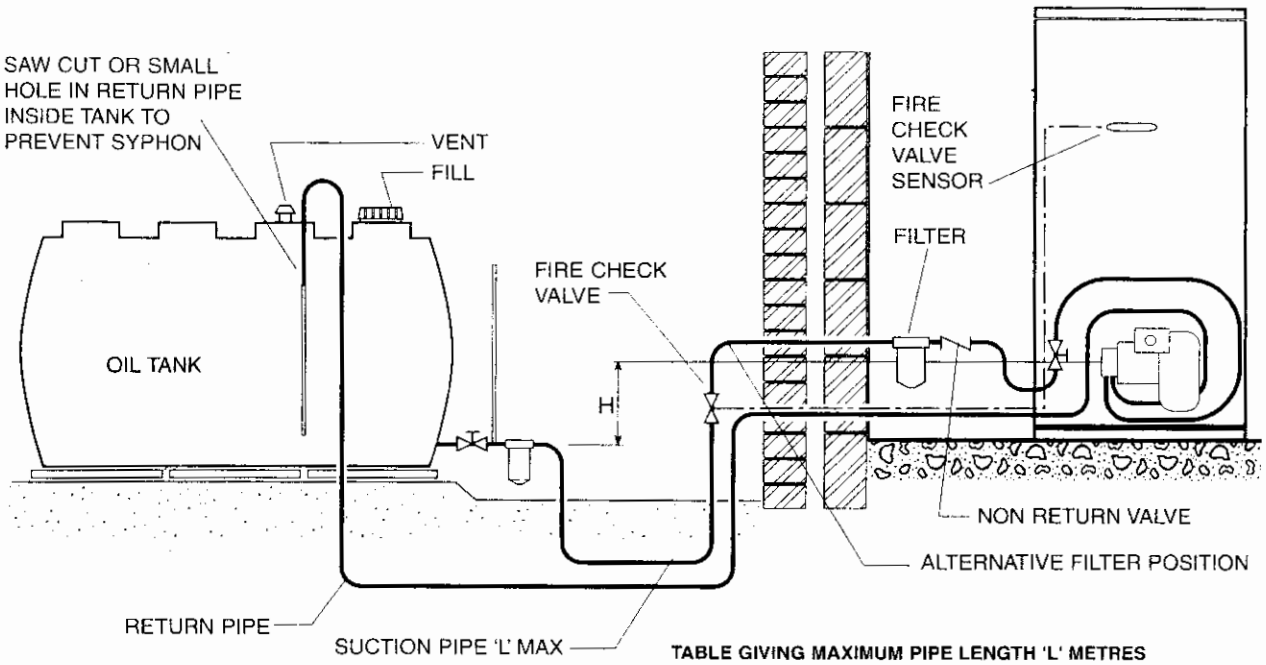


TABLE GIVING MAXIMUM PIPE LENGTH 'L' METRES

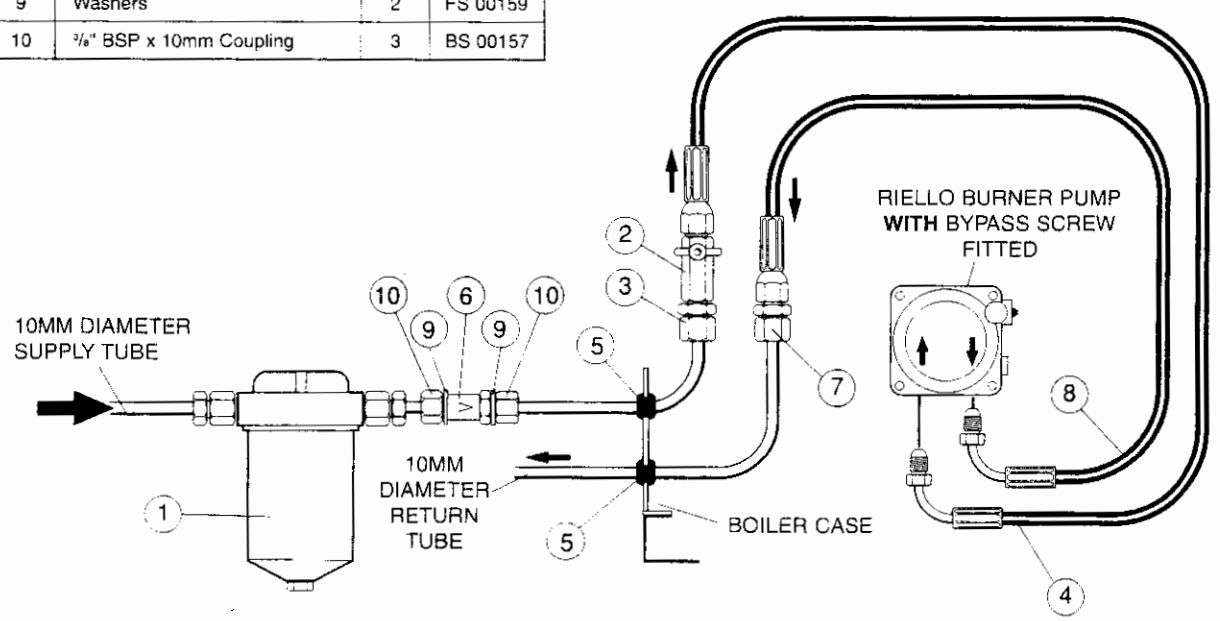
	H METRES	0.5	1.0	1.5	2.0
KEROSENE 10mm OD PIPE	L METRES	176	151	129	103

Two Pipe Oil System.

TWO PIPE OIL SYSTEM - OIL CONNECTIONS

1 off Item 5 Supplied with Boiler

ITEM	PART	QTY	CODE
6	Non Return Valve	1	BS 00538
8	Longlife Hose 900mm	1	BS 03103
9	Washers	2	FS 00159
10	⅜" BSP x 10mm Coupling	3	BS 00157

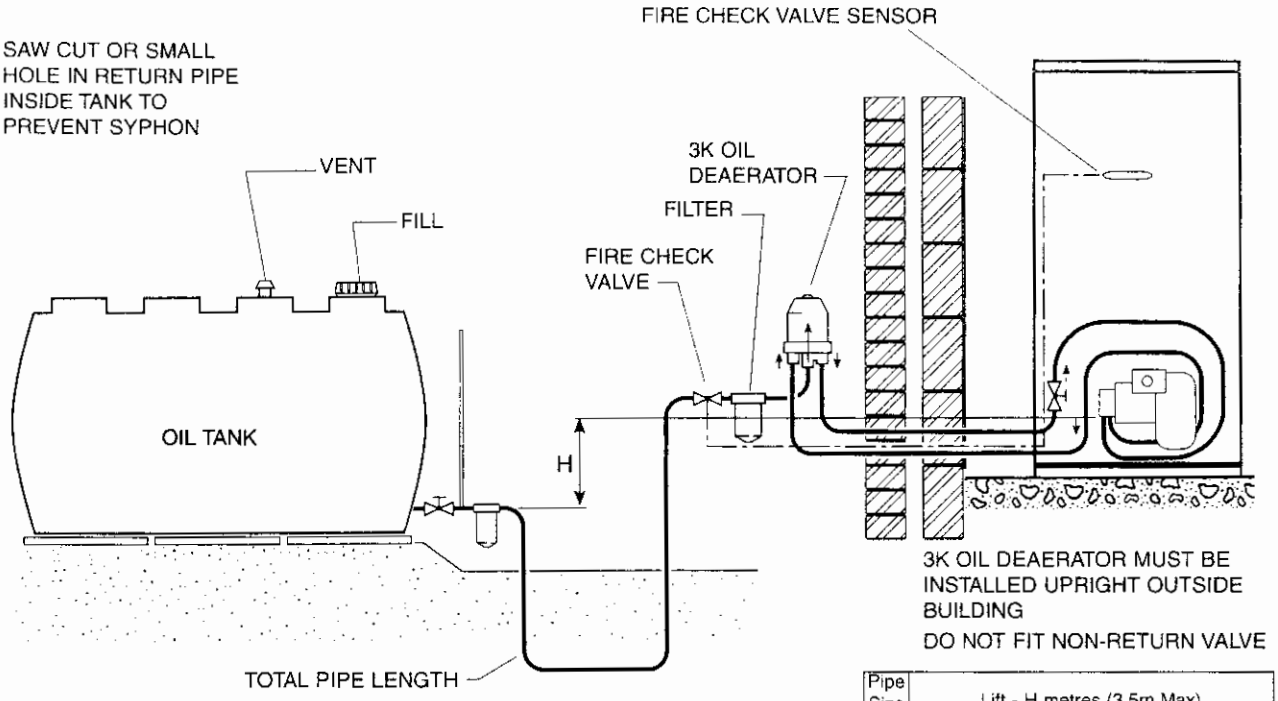


LH & RH FUEL ENTRY AVAILABLE (LH SHOWN)
SCHEMATIC DIAGRAM FIT BOTH HOSE AS SHOWN

Schematic Oil Pipe Connections

DEAERATOR OIL SYSTEM - TANK OUTLET BELOW BURNER

FIT PUMP BYPASS SCREW TO BURNER



3K OIL DEAERATOR MUST BE INSTALLED UPRIGHT OUTSIDE BUILDING

DO NOT FIT NON-RETURN VALVE

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
6	24	21	19	16	13	11	8	6
8	100	100	93	84	71	59	46	33
10	100	100	100	100	100	100	100	100

The table right shows total Pipe Length 'L' metres

Note: RIELLO 40 Burner Types are listed assuming maximum Oil Rate.

Deaerator Oil System.

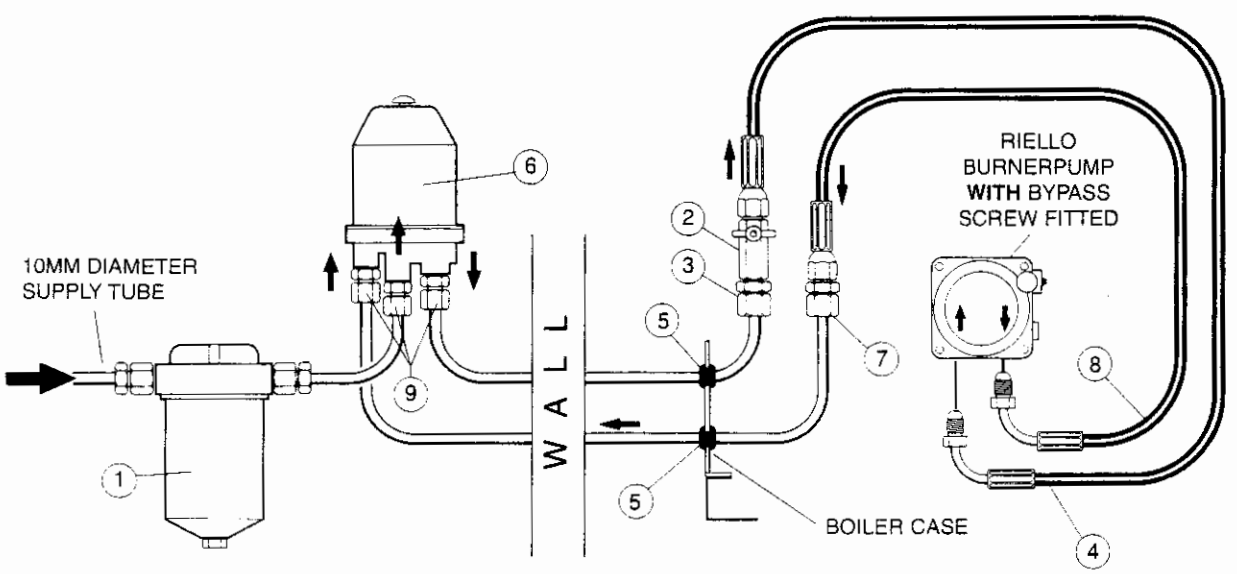
DEAERATOR PIPE OIL SYSTEM - OIL CONNECTIONS

1 off Item 5 Supplied with Boiler

ITEM	PART	QTY	CODE
6	3K Oil Loop	1	BS 03060
7	⅜" BSP x 10mm Coupling	1	FS 00157
8	Longlife Hose 900mm	1	BS 03103
9	¼" x 10mm Coupling	3	FS 00151

LH & RH FUEL ENTRY AVAILABLE (LH SHOWN)
SCHEMATIC DIAGRAM FIT BOTH HOSE AS SHOWN

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



Schematic Oil Pipe Connections

5. ELECTRICAL

Control Panel Installation

ELECTRICITY SUPPLY 230V. Single Phase 50Hz

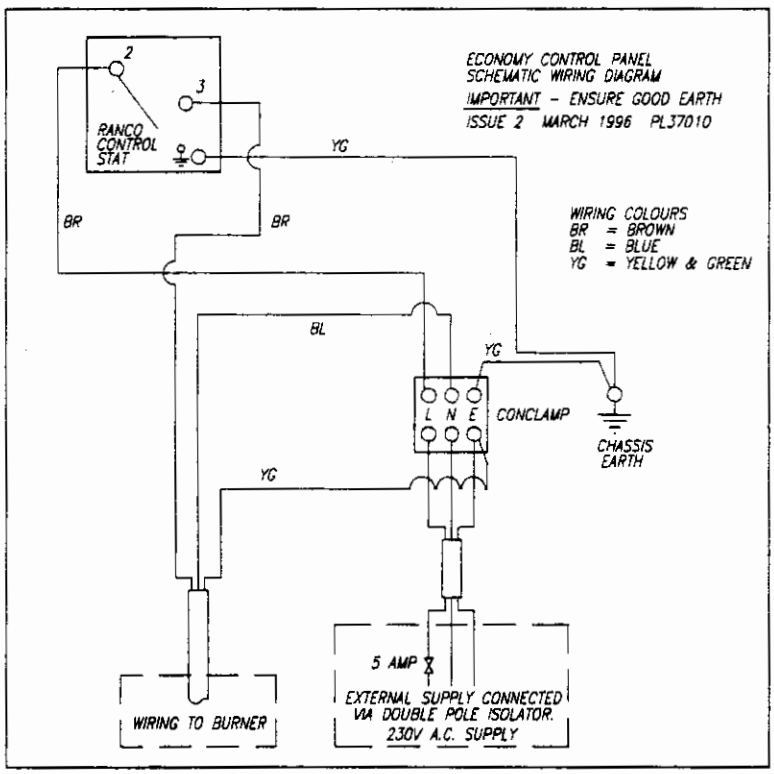
A mains terminal strip and clamp (conclamp) is provided in the control panel. The supply should be through a double pole isolating switch, fused 5 amp.

All wiring to supply and all system components external to the boiler must comply with the latest edition BS 7671 (IEE Wiring Regulations current).

Connect the mains supply to the terminal strip and clamp together with the prewired burner cable.

SCHEMATIC WIRING DIAGRAM

IMPORTANT – ENSURE GOOD EARTHING



For wiring for optional manual reset limit thermostat refer to fitting kit EL 37160C.

6. COMMISSIONING

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 below:

OIL TANK	Yes	No
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?	❑	❑
Does the tank slope at least 20mm per metre of length downwards towards the sludge cock?	❑	❑
Is the tank painted or suitably protected externally (metal tanks only)?	❑	❑
Is it 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 the oil supply adequately filtered?	❑	❑
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 approx. 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 SYSTEMS

Is a spring-loaded non-return oil valve fitted in the suction line (or a 3K oil loop)?	❑	❑
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	Yes	No
Is the boiler standing on a level incombustible hearth?	❑	❑
Is the thermostat phial inserted in its pocket?	❑	❑
Are the baffles and heat exchanger bottom insulation correctly located?	❑	❑
Is the boiler set for the fuel being supplied (Kerosene Class C 28 Sec)?	❑	❑
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 (Particularly relevant to Balanced Flue Boilers)

Do all casing panels seal with mating panels?	❑	❑
Have all holes been bunged and have grommets been fitted?	❑	❑
Has the air entry point used in conventional flue applications been sealed with the plate provided? This plate is supplied with the balanced flue kit. (Silicone sealant is provided to seal)	❑	❑

BURNER

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

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?	❑	❑

VENTILATION (Conventional Flued Boilers)

Is the ventilation opening from the outside of the boiler room adequate?	❑	❑
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?	❑	❑

GENERAL

Has the boiler been installed in accordance with manufacturer's instructions?	❑	❑
Have the manufacturer's 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 between 3 and 4 (not less than 2).

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.

AIR SHUTTER ADJUSTMENT

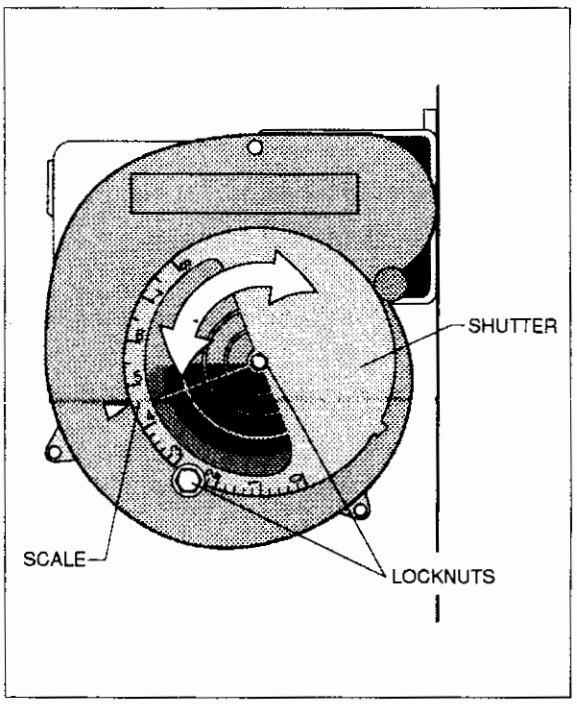
The Burner has a fixed Air Shutter with manual adjustment.

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

The Commissioning Data - 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.



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

Low level balanced flue, rear – hole provided in outlet end of terminal.

or

Conventional flue – above the boiler outlet. If necessary drill a small hole in the flue pipe just large enough to take the sampling probe, but after measurement, plug the hole.

Check the Smoke No., if clean wait 10 minutes and measure CO_2.

Adjust the air shutter if necessary, open to reduce CO2, close to increase CO2. (replace the burner cover after adjustments).

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

Check the flue gas temperature.

The figures should agree with data in boiler literature.

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

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.

COMMISSIONING DATA

Class C2, Kerosene Oil

Model Boulter Economy	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					
	15	50			.4 x 80°ES	8	115	1.6	1.61	10.5	0 - 1	190
50/70	17.5	60	443T57	Fixed	.5 x 80°ES	7.6	110	1.9	1.94	12	0 - 1	205
	20.5	70			.65 x 80°ES	7.6	110	2.6	2.26	12	0 - 1	210
	20.5	70			.65 x 80°ES	7.6	110	1.8	2.26	12	0 - 1	224
70/90	23.4	80	443T58	Fixed	.75 x 80°ES	7.6	110	2.2	2.58	12	0 - 1	228
	26.3	90			.75 x 80°ES	9.5	138	3.4	2.9	12	0 - 1	238

NOTES

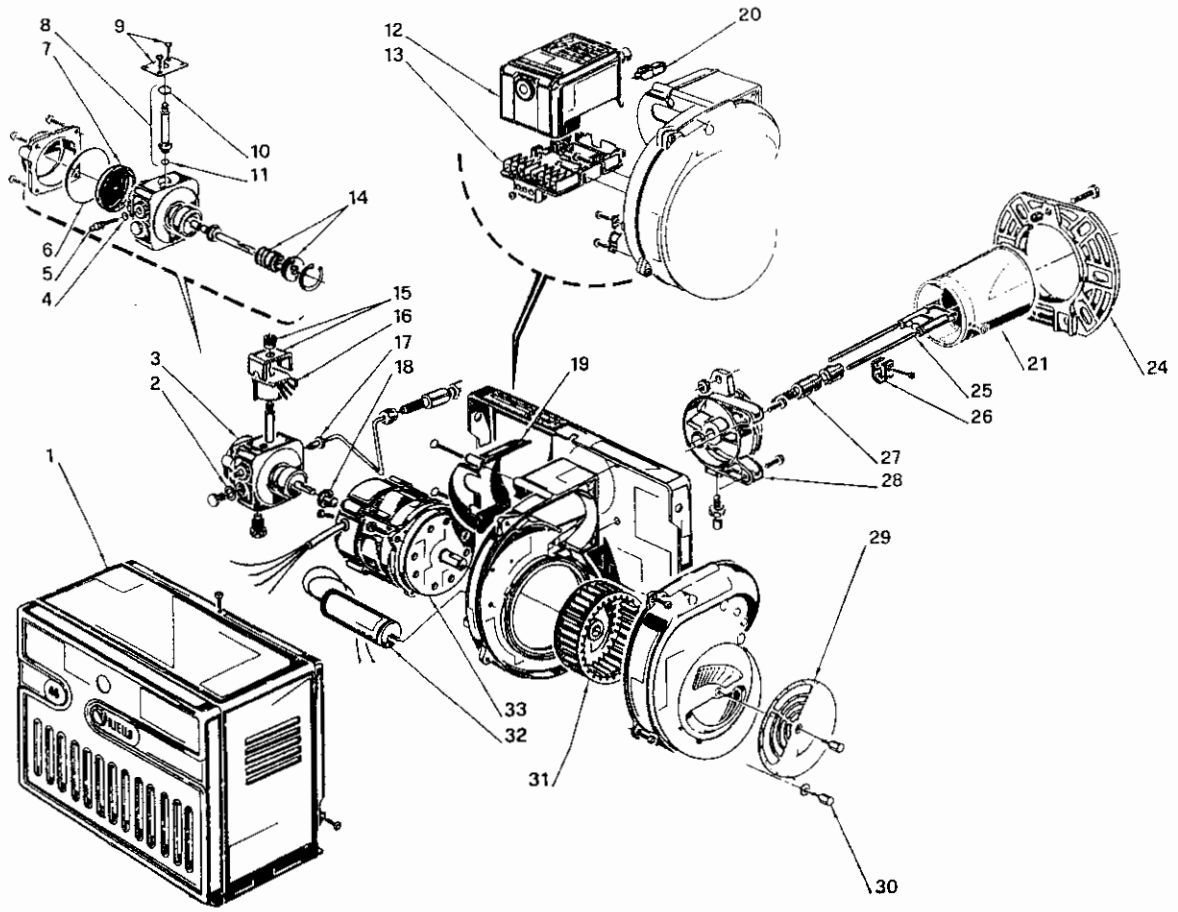
Air Settings

Air shutter settings shown in the table are only approximate. Final adjustment to obtain the correct CO2 and Smoke Number will be required during commissioning.

7. SPARE PARTS

ITEM	DESCRIPTION		50/70	70/90
1	Heat Exchanger (Short Boiler)		SBECO 50/70	SBECO 70/90
2	1st Baffle (top)		HE37021C	HE37031C
3	2nd Baffle		HE37021C	HE37031C
4	3rd Baffle (bottom)		HE37023C	HE37033C
5	Combustion Chamber base insulation		IN14203	IN14303
6	Inspection cover complete		HE37218C	HE37318C
7	Inspection cover insulation		IN14202	IN14302
8	Base Tray		PN37201C	PN37301C
9	Heat Exchanger Insulation set		IN37200C	IN37300C
10	Door panel		PN37205C	PN37305C
11	Rear casing panel		PN37202	PN37302
12	Left Side casing panel		PN37203C	PN37203C
13	Right Side casing panel		PN37204C	PN37204C
14	Top casing panel Front		PN37206C	PN37306C
15	Top casing panel Rear		PN37207C	PN37307C
16	Control Panel complete		PN37150C	PN37150C
17	Control thermostat		EL00230	EL0230
18	Limit stat (optional)		EL00215	EL00215
19	Knob		EL00209	EL00209
20	Burner complete (less nozzle)	Type	443T57	443T58
		Part No.	3744357	3744358
21	Sealed system manual reset limit kit		EL37160C	EL37160C

Type 443 T 57 and 443 T 58



CODE		DESCRIPTION	CODE		DESCRIPTION
1	**3008473**	Burner Cover	18	**3000443**	Joint
2	**3007077**	Seal	19	**3006556**	Cover
3	**3007811**	Pump	20	**3002280**	Photoresistance
4	**3007028**	O Ring	21	**3005775**	Blast tube assembly
5	**3007202**	Regulator	21A	**3006001**	Blast tube assembly (443T58)
6	**3007162**	O Ring	22		
7	**3005719**	Filter	23		
8	**3006925**	Needle Valve	24	**3007798**	Flange
9	**3007203**	Plate	25	**3007708**	Electrode assembly
10	**3007029**	O Ring	26	**3006552**	Electrode bracket
11	**3007156**	O Ring	27	**3005724**	Nozzle holder
12	**3001156**	Control Box 530SE	28	**3007796**	Collar
13	**3002278**	Control Box base	29	**3007204**	Air damper
14	**3000439**	Pump seal	30	**3008448**	Screw
15	**3006553**	Shell	31	**3005708**	Fan
16	**3002279**	Coil	32	**3005798**	Capacitor 4µF
17	**3008472**	Tube	33	**3007355**	Motor

The following items are supplied but not shown

RP03001	Flange Gasket
3005720	Economy Hose
3003602	Hose adaptor 3/8 - 1/4"

8. SERVICING

OIL TANK

- De-sludge oil tank, 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 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 the burner, inspect and clean if necessary.
- Inspect photocell, if badly discoloured, change it.
- Inspect the flexible oil hose for leaks or discolouration. Use only replacement flexible oil hoses that are detailed in the spare parts section of this manual or Boulter approved long life hoses.

BOILER

- 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 casing seals particularly on balanced flue appliances.

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 electricity 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 kit. If necessary 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 CO_2.
- Adjust the air shutter if necessary, open to reduce CO_2, close to increase CO_2.
- If the air shutter is adjusted, re-check the Smoke No.
- Check the flue gas temperature.
- The figures should agree with data in boiler literature.

FINAL CHECKS

- Check lockout function, either remove photocell and cover it, or remove solenoid coil, to simulate flame failure. Reinstate components and press lockout reset button.
- Check that the control thermostat is operating when the set temperature is reached.
- By temporarily removing the control thermostat phial, check the operation of the limit thermostat (if fitted).
- Complete a maintenance report and give the customer a copy, retaining a copy for your records.

9 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 counter clockwise)?
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 setting?
6. Is the lock-out reset button on the burner control box 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 service engineer.

IMPORTANT – Electrical Safety

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

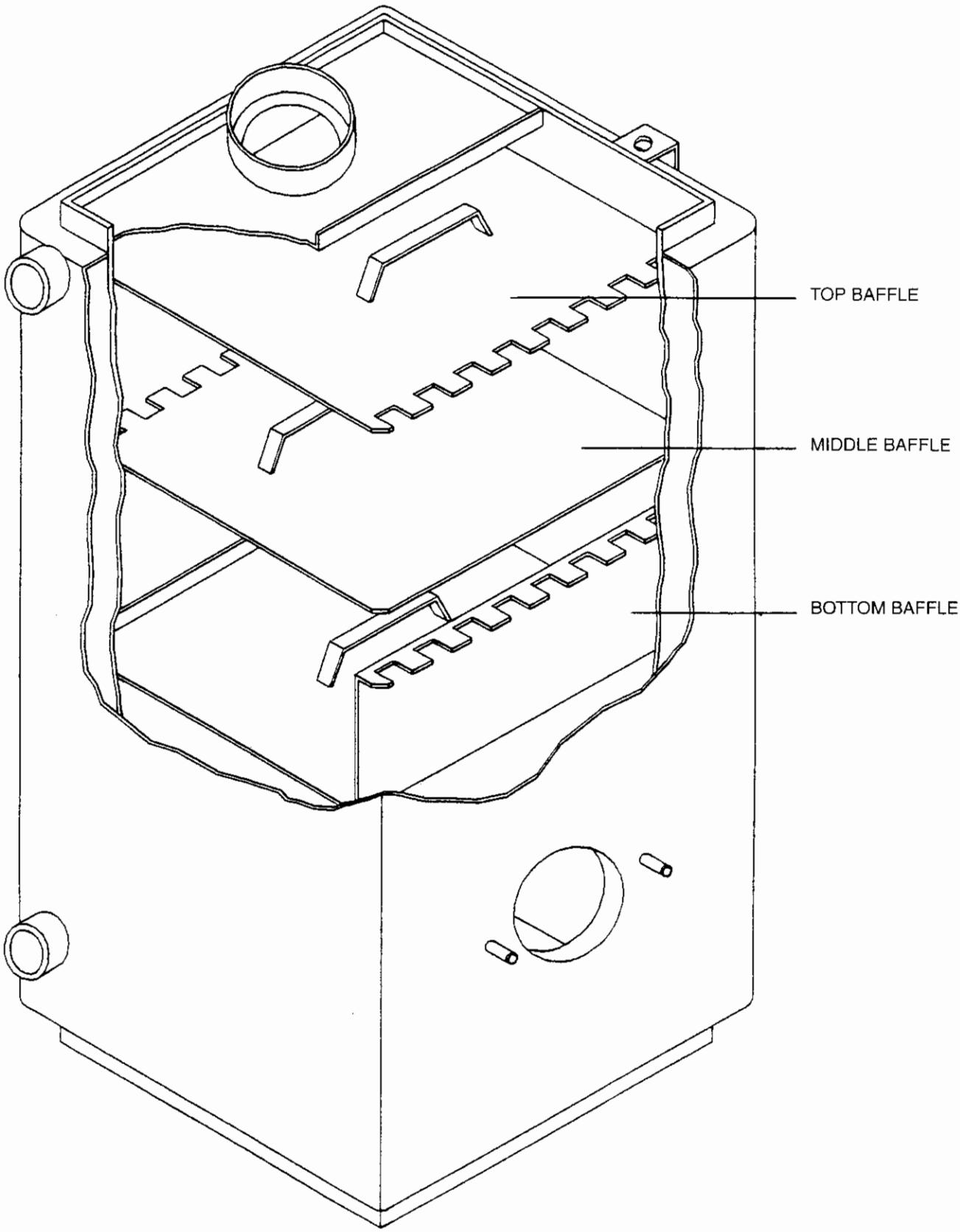
FAULT FINDING CHART

	Trouble or Complaint	*Possible Cause*	*Action*
1.	Suspect oil supply	No oil in tank	Check and arrange for tank to be filled if necessary.
		Supply valves closed	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.
		Air lock in pump	Bleed pump, check flexible oil line.
2.	Burner will not start	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 boiler stat, cylinder stat, room stat are calling for heat.
		Control box is locked out, refer to symptom 4	Press reset button on the control box.
		Photo-resistor receiving false light	Check that the photo-resistor is fully home in its housing. Burner will not start with illuminated cell.
		Faulty control box	Replace.
3.	Burner lights up but locks out after 15 seconds	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.
		Control box photo-electric cell circuit faulty	Replace control box.
		Flame instability	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)	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.
		Motor not driving pump shaft	Check that flexible drive is functioning correctly and not slipping.
		Blocked atomizer nozzle	Remove and replace nozzle.
		Oil pressure abnormally low	Check oil pressure on gauge and set to the correct pressure (see technical data).
		Solenoid valve faulty	Break union at outlet to check presence of oil. Check that seat is clear. Check coil for continuity. Inspect coil feed wiring to control box.
		Pump rotation incorrect	Check.
		Ignition failure: Electrodes dirty	Inspect and clean if necessary.
		Electrodes mis-set	Inspect and reset gap 3 to 4mm between tips, 2mm in front of nozzle face.
		Cracked electrode insulator	Check and replace if cracked or crazed.
5.	Burner lights up, runs continuously and emits visible smoke or shows excess smoke on combustion check	Air shutter closed	Reset to correct position.
		Wrong nozzle	Check make, type and spray angle.
		Worn atomizer nozzle	Replace if necessary.
		Oversize nozzle fitted in error	Check size and replace with correct size if necessary.
		Nozzle incorrectly stamped	Replace with correct nozzle.
		Burner air supply inadequate	Inspect air intake and fan for fouling of impeller with dirt.
		Burner oil pressure excessive	Check pressure and reset to correct pressure (see Technical Data)
6.	Burner lights up, runs normally but flame cuts off slowly on shut down (possibly with smoke or pulsation)	Air in nozzle	Should self-correct; if air repeatedly present; check for leaks on oil line and flexible.
		Magnetic valve not operating correctly	Inspect and replace if necessary.
		Shut off piston in pump sticking	Replace pump.
7.	Burner pulsates a) continuously	Air shutter setting incorrect or fan inlet blocked	Inspect and reset or remove blockage.
		Grossly oversized 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).
		Air in supply line	Purge at pump to remove.
	b) at initial firing	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 7b 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.
		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 venting over	Replace control stat.
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.

10. BAFFLE ARRANGEMENT



Appliance details to be completed by the installer.

About the Boiler

Boiler Model	
Serial Number	
Burner Type	
Fuel Type	
System Set Pressure	
Oil Tank Capacity	
Oil Supplier 1 ☎	
Oil Supplier 2 ☎	

About the Installation

Installer	
Installation Date	
Service Engineer	

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

Indicates changes from previous issue

OFTEC

Boulter

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