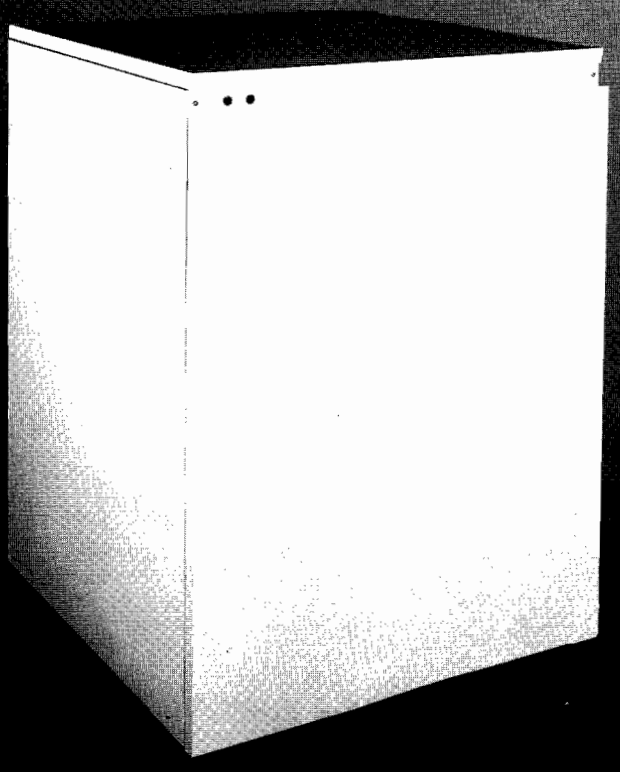
FIREBIRD

OLYMPIC *Combi*
OIL BOILER



INSTALLATION
COMMISSIONING
SERVICING &
USER INSTRUCTIONS

THIS MANUAL MUST REMAIN
WITH THE HOUSEHOLDER ON COMPLETION OF
INSTALLATION

NSAI
I.S. EN ISO 9002

OIL FIRING TECHNICAL ASSOCIATION FOR THE PETROLEUM INDUSTRY
OFTEC
OIL FIRING EQUIPMENT GROUP MEMBER

CONTENTS

FIREBIRD

FOREWORD

This instruction manual is produced for the reference and guidance of qualified installation engineers. EU legislation governs the manufacture, operation and efficiency of all domestic oil boilers. One effect of this will be that boilers and burners will require to be supplied as matched units tested and approved to OFTEC Standard OFS AI00.

FIREBIRD Boilers are full manufacturing members of OFTEC (Oil Firing Technical Association for the Petroleum Industry) and are participating in its Boiler testing and approvals programme to comply with OFS A100 and EC Efficiency Directive.

We earnestly recommend that boilers are installed, commissioned and serviced by fully qualified and experienced personnel. It should be noted that it is the responsibility of the installer to ensure that the boiler is properly commissioned. Failure to do so may invalidate the boiler guarantee and any extended warranty.

All appropriate OFTEC manuals and BS Standards should be studied and their requirements adhered to and used in conjunction with these instructions. This manual includes a list of some BS Standards and Building Regulations.

OFTEC is conducting training and registration of engineers and this is to be commended, as reading of this manual alone for installation and servicing procedures cannot replace the critical advantage provided by training and years of experience.

1 INTRODUCTION

The Firebird Combi 90 boiler is based on the Oylympic and Super Q 70/90 De Luxe Boilers. All boilers in the range are designed and manufactured to meet all the latest European standards and the thermal efficiency requirements of the Boiler (efficiency) Regulations 1993. Its total output is 90,000 Btu/Hr and can be fitted to a conventional flue or easily adapted to a room sealed unit by using a Firebird rear outlet matched balanced flue kit.

The control panel is concealed behind the front 'pull-off' door panel and by the simple removal of four screws, this assembly can be pulled forward for access to components.

Clean combustion with kitchen-quiet operation is assured by a highly efficient matching pressure jet burner which produces very low NO_x emissions. The Combi 90 is a dedicated sealed system boiler having a 10 litre expansion vessel, system filling kit and 3 bar safety valve all fitted within its cabinet.

A drain-off cock is fitted inside the boiler beside the burner and there are flow and return connections provided under top lid of the boiler for connection to the heating and hot water systems. As all servicing can be carried out from the front, the boiler many be fitted under a kitchen worktop. The burner is factory set for use with kerosene 28 second class C fuel.

ALL FIREBIRD OIL PRODUCTS HAVE A 2 YEAR COMPREHENSIVE WARRANTY WHICH EXTENDS TO 5 YEARS ON THE BOILER SHELL.

NOTE:

FUEL NOZZLES ARE NOT INCLUDED IN THE WARRANTY AGREEMENT.

FIREBIRD

1 HEALTH & SAFETY INFORMATION

Under the Consumer Protection Act 1987 and Section 6 of the Health and Safety Act 1974, we are required to provide information on substances hazardous to health.

INSULATION AND SEALS

Ceramic Fibre, Alumino - Silicone Fibre material are used for boards, ropes and gaskets. Known hazards are that people may suffer reddening and itching of the skin. Fibre entering the eye will cause foreign body irritation. It may also cause irritation to the respiratory tract.

Precautions should be taken by people with a history of skin complaints or who may be particularly susceptible to irritation. High dust levels are only likely to arise following harsh abrasion.

Generally, normal handling and use will not give discomfort. Follow good hygiene practices, wash hands before consuming food, drink or using the toilet.

First Aid - Medical attention should be sought following eye contact or prolonged reddening of the skin.

The small quantities of adhesives and sealants used in the product are cured. They present no known hazards when used in the manner for which they are intended.

1 FUEL SPILLAGE

1. Switch off all electrical and other ignition sources.

2. Remove all contaminated clothing to safeguard yourself against fire risk and skin damage. Wash affected skin throughly with soap and water and remove clothing to a safe well ventilated area and allow to air before cleaning.

3. Contain and smother the spill using sand or other suitable non-combustible material.

4. Do not allow fuel to escape into drains or water courses. If this happens, contact Fire Brigade and Local Water Authority.

5. Consult local Authority about disposal of contaminated soil.

1 SAFETY

Safe use of Kerosene and Gas Oil.

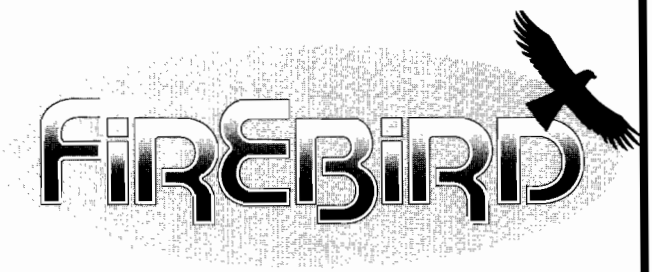
These fuels give off a flammable vapour when heated moderately. Vapour ignites easily, burns intensely and may cause explosion. The vapour can follow along at ground level for considerable distances from open containers and spillage's collecting as an explosive mixture in drains, cellars, etc.

Fuels remove natural oils and fats from the skin and this may cause irritation and cracking of skin. Barrier cream containing lanolin is highly recommended together with good personal hygiene.

Gas oil may also cause irreversible damage to your health on prolonged or repeated skin contact.

Always store fuels in a properly labelled and constructed tank. Always handle fuel in open air or well ventilated space away from sources of ignition and refrain from smoking.

Always drain fuel using a proper fuel retriever, funnel or mechanical siphon. Never apply heat to a fuel tank, container or pipework. Never siphon fuel through tube by mouth. If accidentally swallowed contact doctor immediately and do **NOT** induce vomiting. Avoid inhaling fuel vapour as this can cause light headedness and seriously impair your judgement.



1 FIRST AID

If fuel is accidentally swallowed:-

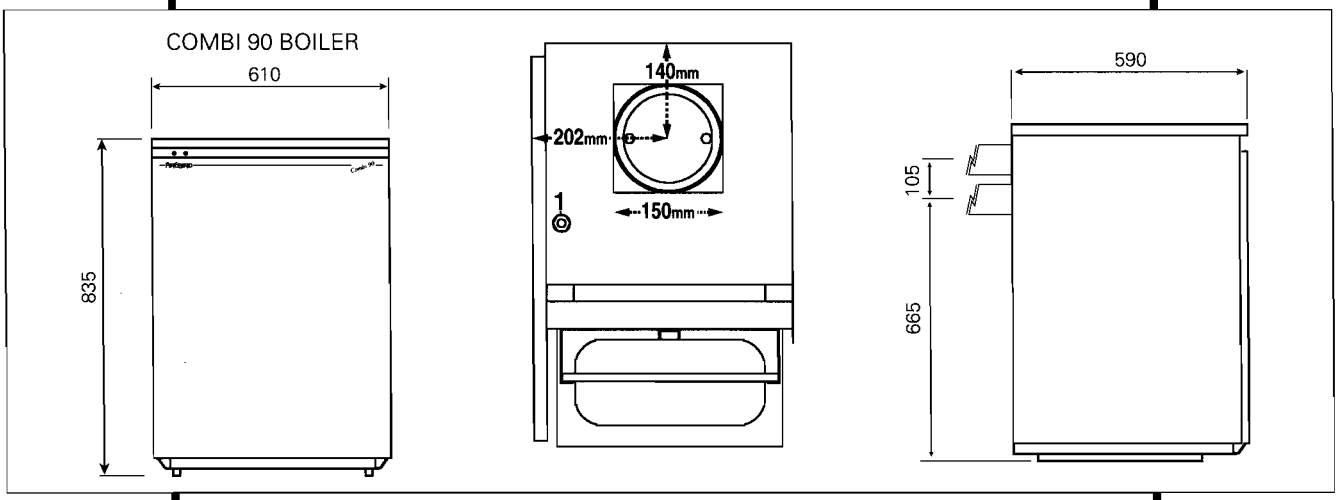
* Seek medical attention immediately. Do NOT induce vomiting.

If fuel is splashed into eyes:-

* Wash out with running water for at least ten minutes and seek medical attention.

2 TECHNICAL SPECIFICATION

2-A Dimensions



DIMENSIONS		
HEIGHT:	835mm	($32^{7}/_{8}$in)
DEPTH:	590mm	($23^{1}/_{4}$in)
WIDTH:	610mm	(24in)

2-B Technical Specifications and Recommendations

Heat Output	90,000 Btu/Hr
Electricity Supply	230 v - Boiler~50 Hz Fused at 5 amp
System Pipe Connections (on boiler)	
Heating Flow	22 mm
Heating Return	22 mm
Mains Cold Water Boiler connection	15 mm
Hot Water delivery	15 mm
Safety pressure Relief Valve Outlet	15 mm for connection via tundish to drain
All Copper Tube connections:	BS 2871 Copper Tube

Isolating ball valves are fitted to all boiler/system connecting pipework

Pressure Jet Oil Burner	Riello G5X or Ecoflam Flair or Bentone Sterling
Fuel	Kerosene Class C2
Burner Nozzle	
Type	Danfoss H Pattern
Size	0.85 US Gall/Hr
Angle	80^{o}
Oil Pump Pressure	8 Bar

NB: Replacement Nozzles should be of same specifications and settings as above

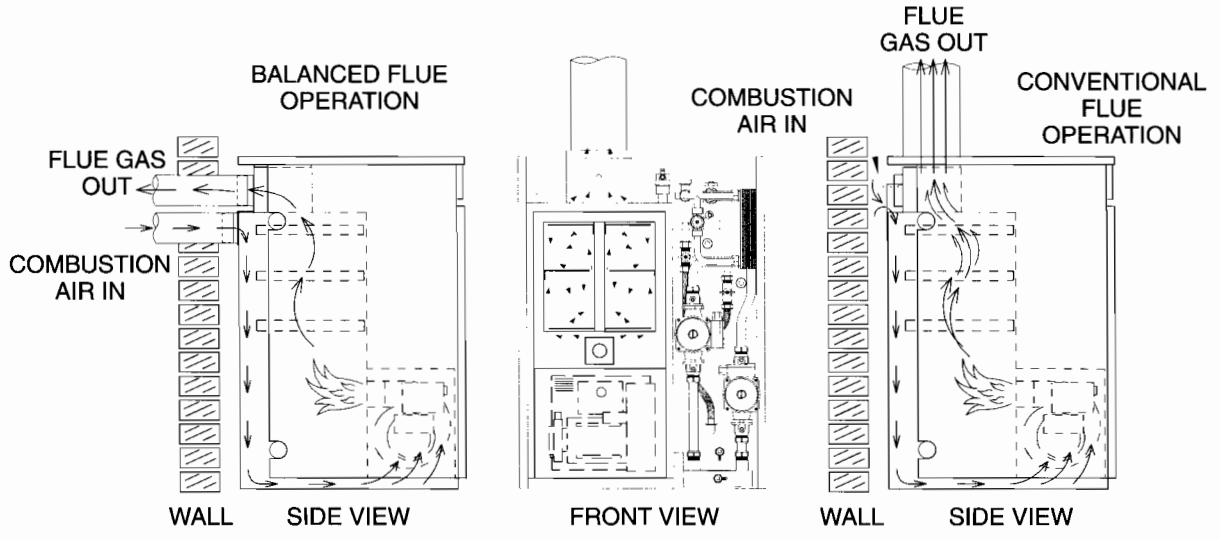
Danfoss OH Nozzles adjusted for same output as above may also be used

FIREBIRD

2 TECHNICAL SPECIFICATION

Domestic Hot Water Plate Heat Exchanger	Giannoni Albion, SWEP or Alfa Laval
Circulating Pumps	Grundfos UPS 25/60
Flue Pipe Connection	
Conventional Flue Socket	To take tail piece for 4" & 5" S/S Flue Pipe
Balanced Flue Assembly	3" Dia Spigot - for Flue and Air Pipe
Weight (Dry) - Incl. Pallet	200 Kg
Water Content - Total	70 Litres
- Primary Tank	45 Litres
Thermostats	
Boiler Central heating Control (Adjustable)	65° C - 85° C
Boiler Safety Limit	110° C
Tank (DHW)-Fixed	81° C
Tank Safety' Limit	110° C
EA-Fixed	87° C
Over-run-Fixed	93° C
Boiler integral Expansion Vessel nominal capacity	10 Litres pre-charged to 0.5 Bar
Heating System (Sealed)	Fit in accordance with BS 7074 Part I, BS 5449, OFTEC Standards, etc.
Max. Operating Pressure	2.5 Bar (Follow all BS & OFTEC Standards)
Max. System Pressure (Cold)	1.5 Bar
Min. System Pressure (Cold)	0.5 Bar + 0.3 Bar
Boiler Test Pressure	4.5 Bar
Safety Valve Operating Pressure	3 Bar
Heating System Pressure Gauge (mains supply excepted)	0 - 6 Bar Range
Flue Draught Reqd. (Conventional Flue)	Min: 0.040 In WG Max: 0.15 In WG
Flue Gas Temperature (approx) Nett	220°C
Water side resistance-10°C Diff	26.8 ins WG
-20°C Diff	8.6 ins WG
Mains Water Supply Pressure	Up to 10 Bar. (Fit pressure reducing valve as necessary)
Mains Water Supply	
Limescale excess - when over 150/200 ppm	Consult Water Authority Fit appropriate scale reducer Also refer to Page 33
Domestic Hot Water Guide Performance	150 Litres draw off at average temp 48°C. Variations in mains water temperature, delivery and pressure can affect this performance

2-C Boiler Operation

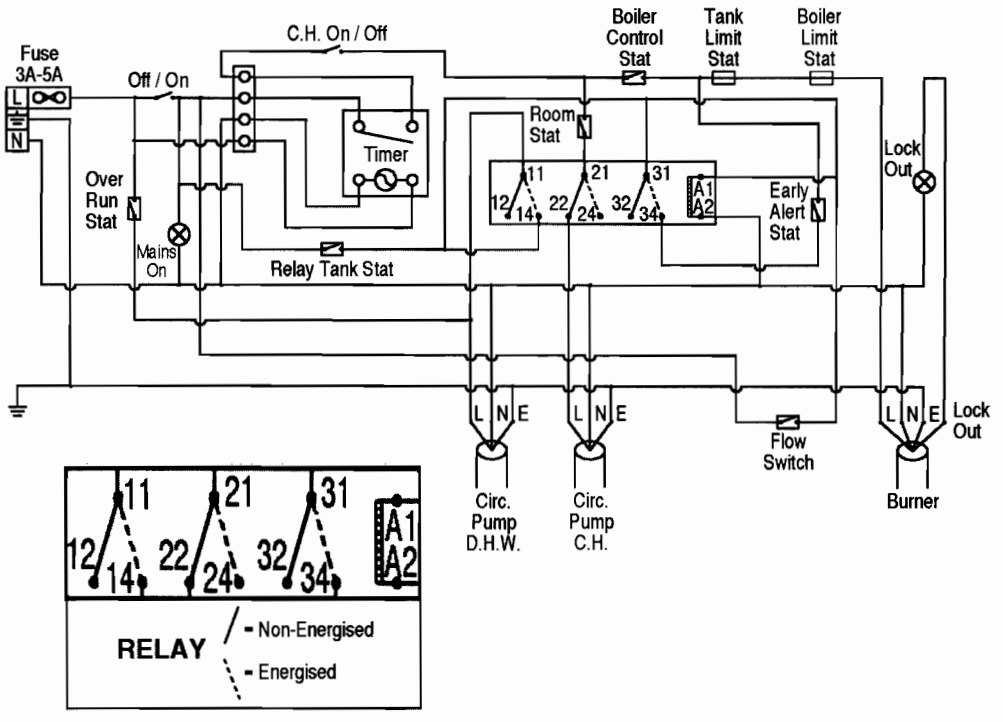


Oil Burner Performance Specification

Boiler Size	Output BTUs/hr Approx	Riello Burner Type Head	Danfoss Nozzle Size Angle	Pump Pressure	Air Shutter Position Approx	Litres Per Hour	Smoke NO	CO_2 % Approx	Flue Gas Temp°C Approx
90	90,000	G5X G3X	.85 80°	8 Bar	2.25	3.11	0-1	13.0	212°C

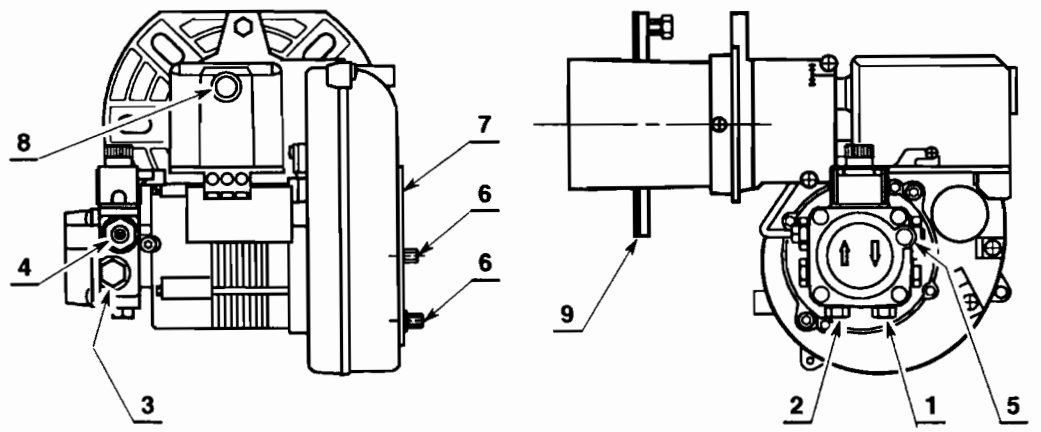
NB: Variations in nozzle throughput, Flue type, draught, oil viscosity etc may give results differing from above laboratory performance figures

2D Wiring Diagram Combi 90



2E & F

A



Riello Burner Specification

Thermal Power	19-35 - 1.6-3 kg/h
Fuel	Kerosene
Electrical Supply	Single phase 230-240V -10% -15% ~50Hz
Motor	Run current 0.85 A - 2850 rpm - 298 rad/s
Capacitor	4μF
Ignition Transformer	Secondary, 8 kV - 16 mA
Oil Pump	**Maximum pressure with kerosene- 10 bar (143 psi)**
Absorbed Electrical Power	0.15 kW

1. Return Oil Line Connection
2. Suction Oil Line Connection
3. Gauge Connection
4. Pump Pressure Regulator
5. Vacuum GaugeConnection
6. Screws Fixing Air-damper
7. Air Damper
8. Lock out Lamp and reset button
9. Flange with Insulating Gasket

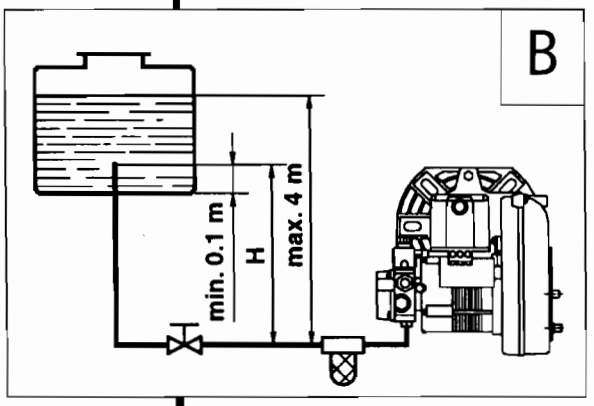
N.B. REFER TO SEPARATE BURNER MANUAL IF BURNER MAKE, TYPE OR SPEC. DIFFERS FROM ABOVE

2E & F

Burner Specification

N.B. Burner make, type and specifications may vary from details in this manual. Therefore **always follow instructions and details contained in separate burner instructions included with this manual**

B



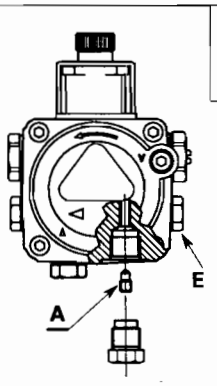
H (m)	L Meters	
	I.D. 8mm	I.D. 10mm
0.5	10	20
1	20	40
1.5	40	80
2	60	100

Oil Lines

Priming the pump

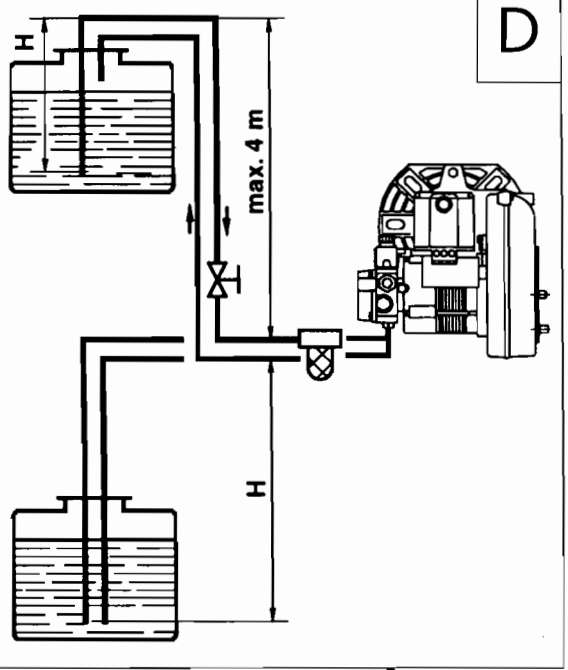
Loosen the pump plug 'E'(diamgram C) and wait until the fuel flows free of air. EG. no froth or air bubbles

C



H (m)	L Meters	
	I.D. 8mm	I.D. 10mm
0	35	100
0.5	30	100
1	25	100
1.5	20	90
2	15	70
3	8	30
3.5	6	20

D



WARNING

The burner is supplied for use with a one pipe system. For use on a two pipe system, it is necessary to fit the pump by-pass plug A supplied as a burner accessory. (See diamgram C).

Please also refer to separate burner instruction booklet as alternative oil pump may be fitted which requires removal of pump cover for by-pass plug fitting/removal.

The **pump suction** should not exceed a maximum of 0.4 bar (30 cm Hg). Beyond this limit gas is released from the oil.

Oil lines must be completely oil and air-tight. The return line should terminate within the oil tank at the same level as the suction line; in this case a non-return valve is not required. If the return line terminates above the fuel level, a non-return valve is necessary. This solution however is less safe than previous one, due to the possibility of valve leakage. (See diagram D)

H = Difference of level
L = Length of suction line
I.D. = Int. Dia of oil pipe lines

2 TECHNICAL SPECIFICATION

2 E & F Riello Burner Specification

PRIMING THE PUMP

Start the burner and wait for fuel arrival at priming plug. Should lock-out occur prior to arrival

of the fuel, wait at least 20 seconds before repeating priming.

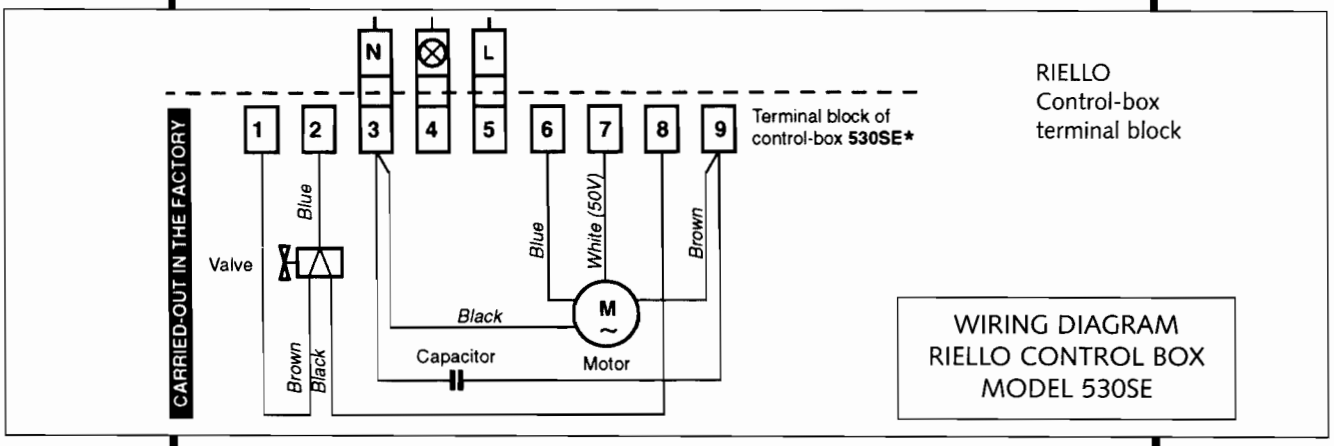
WARNING

1. Two pipe Systems

Before starting the burner make sure that the return pipe-line is not restricted; any obstruction would cause the pump seals to **rupture and leak**.

2. Single Pipe Systems

If replacing pump at any time please ensure that by -pass plug 'A' (see diagram 'C' page 6) is positively removed. Failure to do this may also result in pump leaking.



NOTES

Wires of 1mm² section.

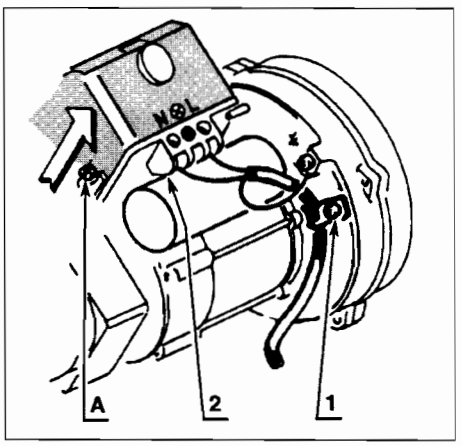
Do not interchange live with neutral.

To remove control-box from burner, loosen screw (A) (see diagram) and release in direction of arrow.

The photocell is fitted directly onto the control-box (underneath the ignition-transformer) on a plug-in support.

TESTING

Check the shut-down of the burner by switching the boiler off. If burner flame does not cut off instantly air still exists behind nozzle. Switch on again allowing burner to run for a few minutes. Bleed air from pump ('E' diagram C). Switch off again while checking flame cut-off. Repeat until flame cuts off instantaneously.



Run of the electrical cable

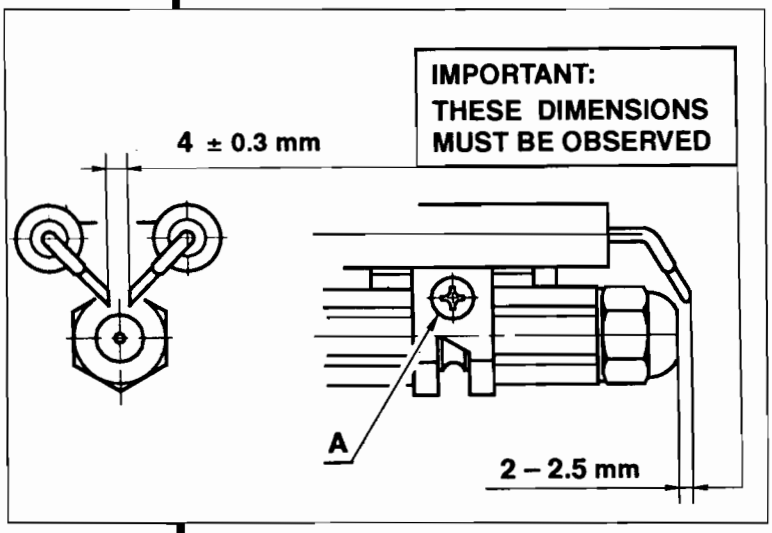
1) Cable-clamp

2) Terminal block

Positively ensure connection to earth terminal is carried out on **earth connection on fan housing** and **not between 'N'** & **'L'** on control box base.

FIREBIRD

2-E&F Riello Burner Specification



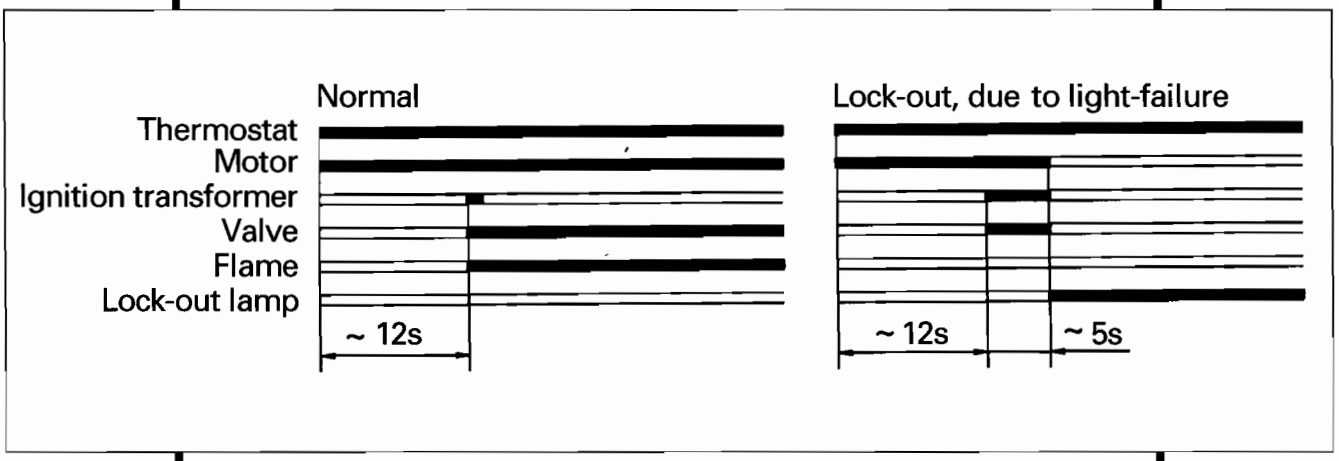
ELECTRODE SETTING

Riello G5X

Attention

Before fitting or removing the nozzle loosen screw (A) and move the electrodes forward.

RIELLO BURNER START-UP CYCLE

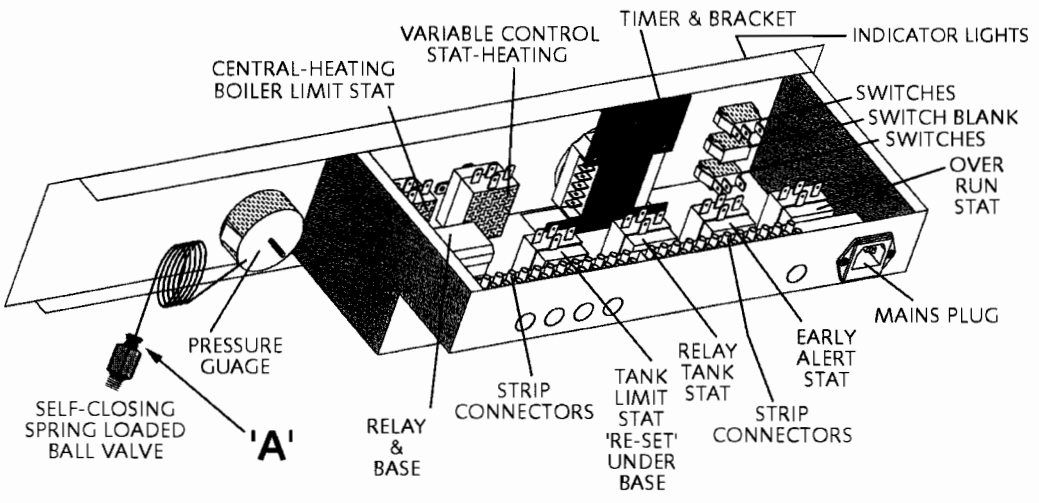


NOTE: Above information is provided relevant to Riello G 5X Burner. The Firebird Combi 90 has been tested and will operate equally efficiently using an Ecoflam or Sterling Burner which may also be fitted as original equipment.

Refer to separate burner instructions booklet packed with boiler. Separate Riello Burner instructions are also included when these burners are fitted. Always consult these as variations in specification can occur from time to time which may not be included in this manual. Information is more complete in appropriate burner manuals.

2-G Control Panel Layout

The control panel is concealed behind front door panel at the top front of the boiler, there are two operational indicator lights on the front of the boiler.
See diagram below



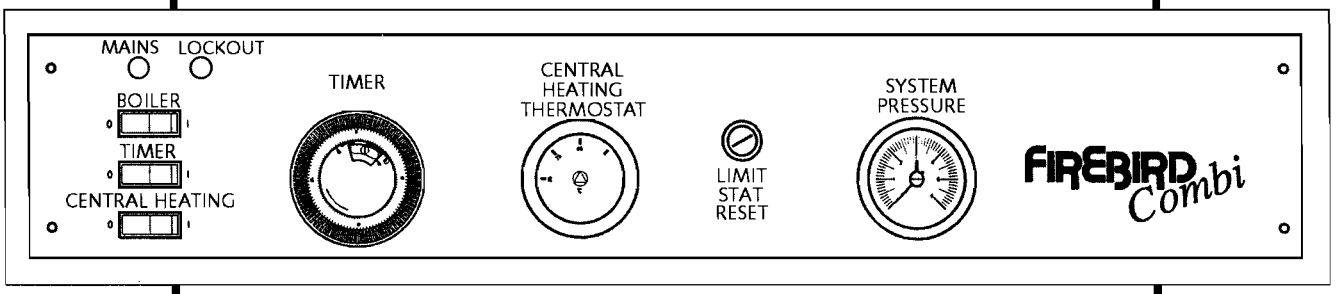
The control panel is designed for simplicity of use and is equipped with three rocker switches, adjustable thermostat knob, optional time control and limit thermostat reset button as shown above.

Control Panel

The control panel has a built in system pressure gauge which is connected to the boiler and heating system water at the safety valve.
For service convenience this connection is made via a self-closing spring loaded ball valve. Before removing control panel this connection should be undone at Point A indicated on diagram. A small amount of water may escape during this operation. The spring loaded ball valve illustrated above **must remain fitted to safety valve at all times**.
Remove each thermostat phial (probe) from respective pocket.
Mark and note carefully each phial and its correct pocket.

When replacing **make sure that each thermostat pocket receives correct phial**.

3



3 A Boiler Controls

Visible on the front boiler casing are indicator lights. (see diagram). These are:

1. Mains 'on'.

2. Control box lockout.

During normal operation only **'1'** Mains 'on' is lit.

The actual controls are concealed behind the panel. (see diagram above and page 10)

These are:

4. Mains (boiler) 'on' rocker switch.

5. Blank.

6. Central heating ON/OFF switch.

7. Boiler thermostat control.

8. Time control (optional).

9. Limit-stat reset button.

Limit-stat for D H W tank is situated at rear of control panel with its reset button underneath

3-B Operating Procedure

To start the boiler follow this sequence:

■ Turn on fuel supply.

■ Switch on power supply to boiler.

■ Activate the 'mains on' switch.

■ Set the boiler thermostat to the required temperature.

The boiler thermostat controls the boiler **when in central heating mode only**, thus maintaining the required boiler water temperature output for central heating.

Domestic hot water temperature is controlled by seperate non adjustable thermostat, plus thermostatic mixing valve. **Study very carefully section two of this manual.**

Safe operation is also maintained by the burner control system which provides the required ignition and shut off sequence.

If the optional timer control is fitted this will automatically switch the boiler off and on when **cental heating** is required.

Time switch does not control domestic hot water production.

The boiler can be turned off by any of the following means:

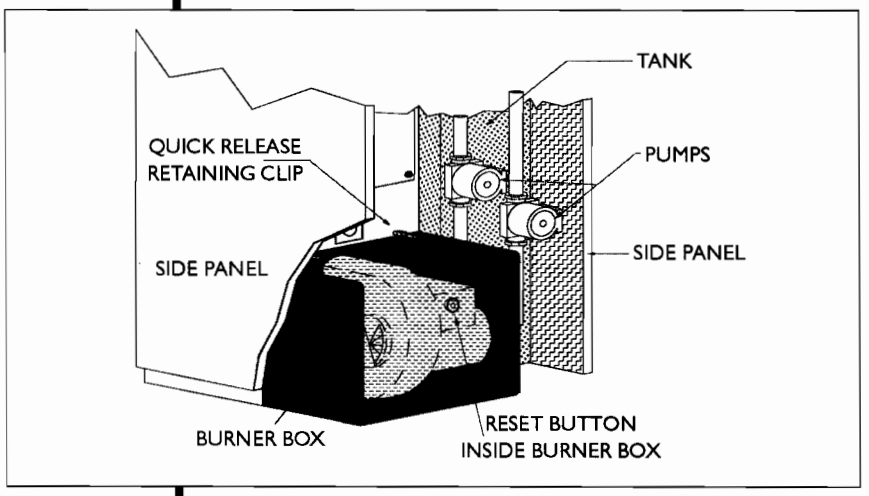
■ Turn the mains 'ON' switch to OFF.

■ Turn OFF the mains electrical supply to the boiler.

WHEN SERVICING ALWAYS SWITCH OFF THE MAINS SUPPLY TO THE BOILER

FIREBIRD

3 C Burner Lockout



To reset when Lock-out light shows: Remove burner cover by lifting spring clips and then pressing glowing reset button on burner control box.

The boiler is factory fitted with a burner control box lockout safety feature which operates automatically if a fault occurs in the burners operation. Should this occur, the **RED** light on the front of the boiler control panel - See diagram on previous page - will illuminate and its cause must be investigated. This could be caused by:

A. An interruption in the fuel supply. (Eg. empty oil supply tank)

B. An electrical supply fault.

C. A fault with the burner or its safety control system.

D. The failure of a component. (Eg. photo cell)

E. Worn or dirty oil nozzle.

Before attempting to restart the boiler the front panel and the burner-box cover should be removed and a visual check made for any obvious problems such as oil leaks, loose connections etc.

ENSURE OIL TANK CONTAINS CORRECT GRADE FUEL.

To restart the boiler:

1. Press reset button (see diagram above)

2. Ensure that the boiler thermostat, time switch (if fitted) and any external controls connected to the boiler are set to call for heat.

3. Check that the oil supply valves are open and that there is sufficient oil in the tank.

4. Check that the burner lockout light is unlit and with the 'MAINS ON' the boiler will be ready to commence its start sequence.

Servicing

The boiler requires servicing on an annual basis to ensure it maintains its efficiency, continues to perform reliably and as a regular check on its built-in safety features.

It is important that servicing should be conducted by a competent engineer, preferably one who is OFTEC trained and registered.

Please note: As a pre-heater kit is required to be fitted to the burner when using 35-second gas oil (only allowed on conventional flue applications) this means that annual servicing is usually sufficient - **although more regular servicing may be required depending on use.**

FIREBIRD

4 INSTALLATION

4 A Standards & Regulations

To ensure the highest standards of installation safety, it is important that the boiler be installed in compliance with the following regulations:

All current editions of the appropriate Building Regulations:-

Part G & J England & Wales
Part F, Section III Scotland
Part L Northern Ireland
Part J Republic of Ireland

BS 5410 Part 1 1997. Code of practice for Oil Firing Installations.

BS 799 Part 5 1987. Specification for Oil Storage Tanks.

BS 4876 1984. Performance requirements for oil burning appliances.

BS 5449 1990. Specification for Forced circulation hot water central heating systems for domestic premises.

BS 7074 Part 1 1989. Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems.

BS 5446 1990. Installation of hot water supplies for domestic purposes.

BS 7593 1992. Code of Practice for treatment of water in heating systems.

BS 715 1989. Metal flue pipes, fittings, terminals and accessories.

BS 1189 1989. Clay flue linings and flue terminals.

BS 4543 part 3 1990. Factory made insulated chimneys for oil fired appliances.

BS 6700. Design, installation, testing and maintenance of Services supplying water.

BS 7671.

Current IEE Regulations.

Local Water Undertaking Byelaws.
The Control of Pollution (Oil) Regulations.

In addition, **the work must comply with OFTEC Installation Requirements for oil fired boilers and oil storage tanks.**

The installer should also be aware of his/her responsibilities under The Health and Safety at Work Act. The interests of safety are best served if the boiler is installed and commissioned by a competent engineer, OFTEC trained and Registered or trained to other recognised standards.

It is the responsibility of installer and everyone concerned with any aspect of installation to ensure that all **applicable standards and regulations are fully adhered to**.

OFTEC also publish excellent guides including:-
- Safe Working Practices for Oil Firing Technicians'
- OFTEC Technical Book Three (Installation requirements for Oil Fired Boilers and Oil Storage Tanks)
- OFTEC Technical Book Four (Domestic Heating Systems)

and it is recommended that these should be adhered to.

Copies of British Standards may be purchased direct from:

BSI (Customer Services), 389 Chiswick High Rd.,
London W4 4AL
Tel.: 0181-9967002 Fax: 0181-9967001
International and EC Standards are also available from above

OFTEC Publications are available from:-

OFTEC, Century House,
100 High Street, Banstead,
Surrey.
SH7 2NN

FIREBIRD

4B

Positioning Boiler

Ensure that adequate clearance is available for making the water and flue connections.

As the boiler is serviced from the front, no headroom clearance is necessary but a clearance of 750mm must be available at the front of the boiler.

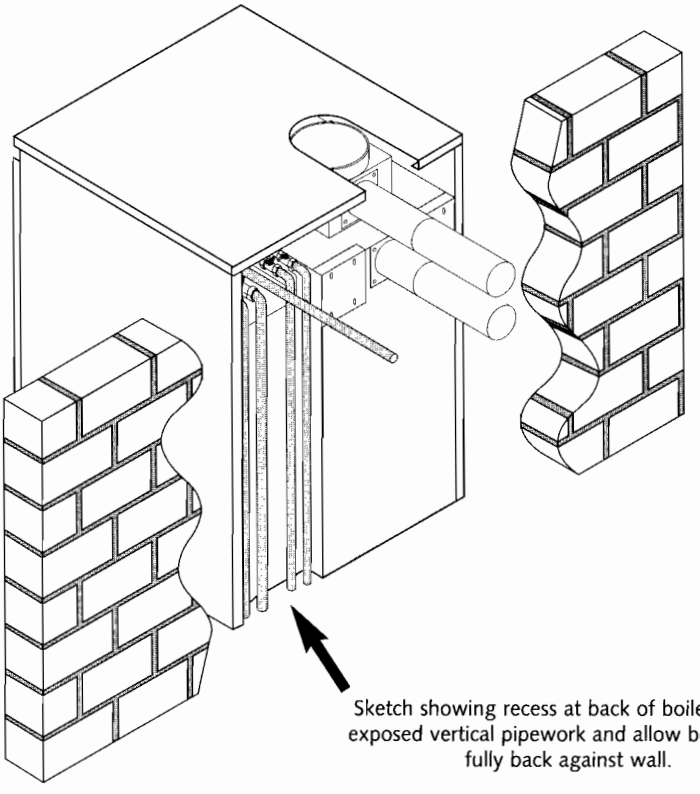
No special hearth is required as the boiler is fully insulated, but the floor must be level and capable of supporting the weight of the boiler and its water content.

Sound levels must also be a consideration. Whilst the Firebird Combi 90 is one of the quietest boilers on the market, some householders are particularly sensitive and the following points should be considered:

1. Tiled surfaces in a small room will amplify noise - particularly if the wall construction is hollow.

2. If a conventional flue passes through a bedroom it is capable of transmitting noise.

3. Low level balanced flue terminals can produce exhaust noise on the outside terminal and this should be considered when siting near adjacent property.



Sketch showing recess at back of boiler to take exposed vertical pipework and allow boiler to fit fully back against wall.

4-C Flue Systems

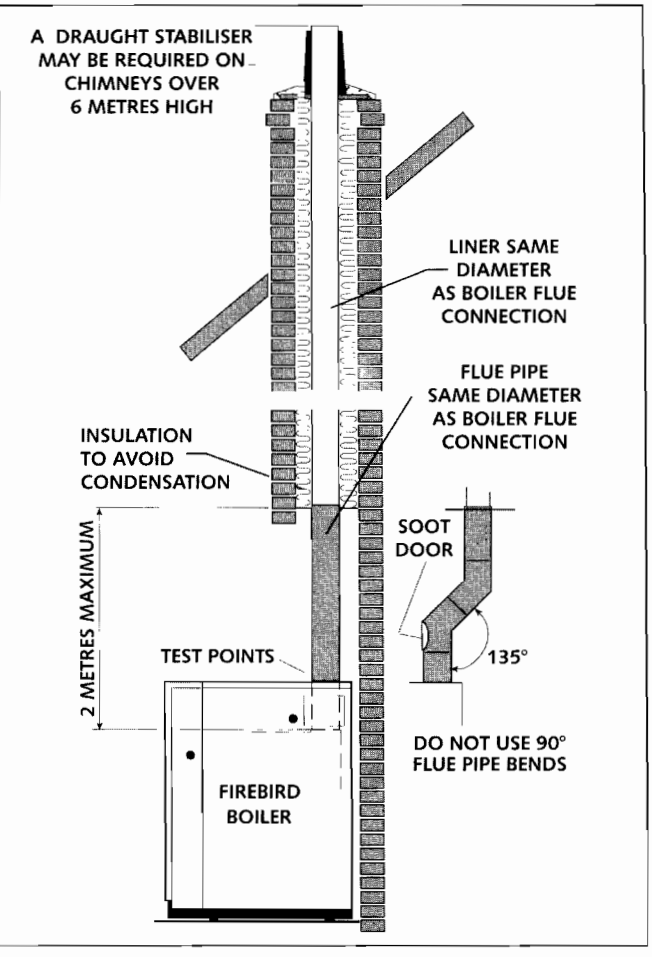
IMPORTANT

Because of the improved efficiencies of boilers under E.U. Efficiency requirements and OFS A100 Standard, it is necessary to pay extra special attention to flues and chimneys. The improved efficiency figures achieved by modern oil boilers are attained by using more of the heat (higher temperatures) heretofore allowed into flues and chimneys. This previously wasted heat helped to keep bad and poorly operating and often uninsulated flues and chimneys from condensing and causing problems. Please be fully aware of this when replacing an existing boiler. An old and poorly operating flue may need to be replaced to take full advantage of improved efficiencies and to avoid flue gases condensing and appearing as white water vapour at flue (chimney) outlet.

New flues and chimneys should be properly insulated and constructed to prevent condensation and draughting problems. Every individual concerned with any aspect of installation should be aware of the foregoing and should have full knowledge of and **work to European, National and Local Govt. Standards and Building and Installation Regulations**.
These manufactures instructions must not in any way be mis-interpreted as over-riding the above or any statutory regulations. It is absolutely essential that the boiler is properly installed so that NO FLUE GASES can enter the building at any time. Flue pipes should be safely sealed into the wall to prevent flue gases re-entering room or building. Refer also to page 21.

NOTE:
All brick chimney constructions must comply with current building regulations and BS 5410: Part 1. Insulated factory made chimneys should comply with BS 4543.

Conventional Brick Chimney With Liner



4-D Balanced Flue Siting

A. Below a gutter or sanitary pipework.

B. Horizontal from opening, airbrick, window etc.

C. Above ground or balcony level.

D. Below eaves or balcony

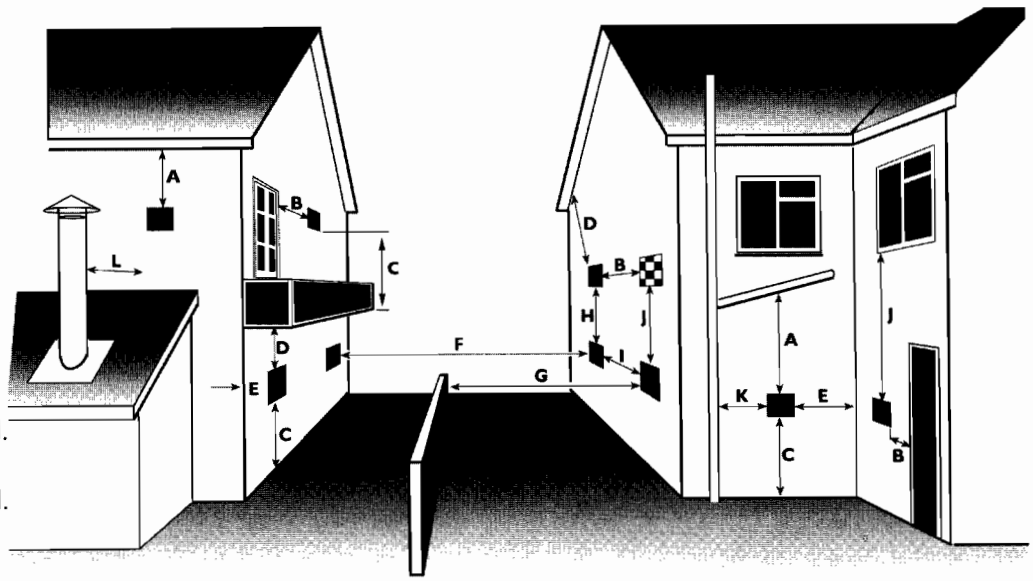
E. From an internal or external corner.

F. From a terminal facing the terminal.

G. From a surface facing the terminal.

H. Vertical from terminals on the same wall.

I. Horizontal from terminals on the same wall.



J. Below an opening, airbrick, window etc.

K. From vertical sanitary pipework.

L. Vertical flue from wall.

Information supplied by OFTEC
Book three Nov. 1997
See note at foot of page

Notes:

1. The terminal should be positioned to avoid combustion products entering the building or accumulating in stagnant pockets around buildings.
2. The terminal must be protected by a guard if it is less than 2 metres above ground level or in a position where any person has access to it (i.e. a balcony).
3. A heat protection shield should be fitted if the terminal is less than 850mm from a plastic or painted gutter or less than 450mm from painted eaves.

Building Regulations

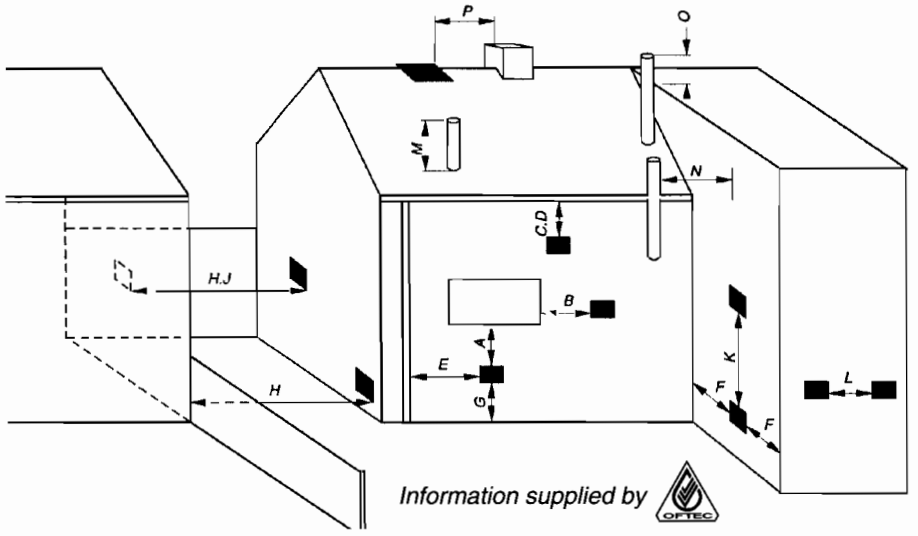
	A	B	C	D	E	F	G	H	I	J	K	L
England & Wales 1991	-	600	-	-	600	-	-	-	-	600	-	-
Scotland 1990 Balanced*	600	-	600	600	600	600	600	1500	600	600	600	-
Low level*	1000	-	600	1000	600	600	600	1500	600	600	1000	-
Northern Ireland 1994	-	600	-	-	600	-	-	-	-	600	-	-
Republic of Ireland 1997	-	600	-	-	600	-	-	-	-	600	-	-
Firebird recommends (Minimum)	**600**	**600**	**600**	**600**	**1000**	**1500**	**1500**	**1500**	**1000**	**600**	**600**	**1000**

*Where the terminal is within 1 metre of any plastic material, such material should be protected from the effects of combustion products of fuel. There are additional general requirements in most Regulations and Standards that the flue must be positioned so that it does not cause a nuisance and permits the dispersal of combustion products.

NOTE: The Buildings Regulations clearances shown above are **minimum** allowed. To take account of prevailing site conditions it is advisable wherever necessary to follow the manufacturers preferred recommendation. If in doubt contact manufacturer for advice.

Always check for any Building Regulations amendments which may have been issued after the publication of this manual

4D Clearances advised by the **British Standards** for Open, Low Level Discharges and Balanced Flues fitted to Oil Fired Boilers



Minimum distances to terminals in millimetres as measured from top of the chimney or the rim of a low level discharge opening

A	Directly below an opening, air brick, window etc	600
B	Horizontally to an opening, air brick, window etc	600
C	Below a gutter, eaves or balcony with protection	75
D	Below a gutter or a balcony without protection	600
E	From vertical sanitary pipework	300
F	From an internal or external corner	300
G	Above ground or balcony level	300
H	From a surface or boundary facing the terminal	600
J	From a terminal facing the terminal	1200
K	Vertically from a terminal on the same wall	1500
L	Horizontally from a terminal on the same wall	750
M	Above the highest point of an intersection with the roof	600
N	From a vertical structure on the side of the terminal	750
0	Above a vertical structure less than 750mm from the side of the terminal	600
P	From a ridge terminal to a vertical structure on the roof	1500

These notes form an integral part of the information shown above.

1. Terminals should be positioned so as to avoid products of combustion accumulating in stagnant pockets around the building or entering into buildings.
2. Appliances burning Class D oil have additional restrictions.
3 Vertical structure in N, 0 and P include tank or lift rooms, parapets, dormers etc.
4. Terminating positions A to L are only permitted for appliances that have been approved for low level flue discharge when tested to OFS A1OO or A1O1.
5. Terminating positions must be at least 1.8 metres distant from an oil storage tank unless a wall with at least 30 mins fire resistance and extending 300mm higher and wider than the tank is provided between the tank and the terminating position.
6. Where a flue is terminated less than 6OOmm away from a projection above it and the projection consists of plastic or has a combustible or painted surface, then a heat shield of at least 750mm wide should be fitted to protect these surfaces.
7. For terminals used with vapourising burners, a horizontal distance of at least 2300mm is required between the terminal and the roof line.
8. If the lowest part of the terminal is less than 2 metres above the ground, balcony, flat roof or other place to which any person has access, the terminal must be protected by a guard.

4-E Ventilation and Combustion Air

1. Conventional Flue Boilers

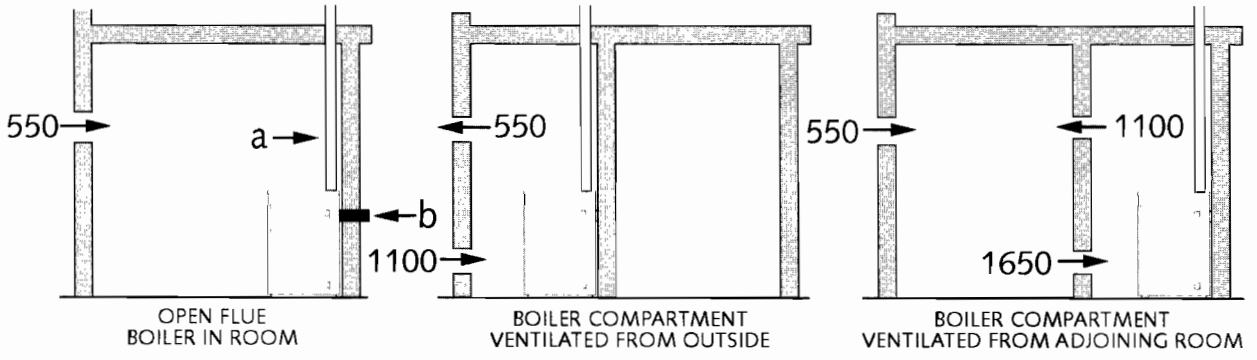
An adequate supply of **combustion and ventilation air** is essential for efficient and safe boiler operation and the openings for this should be positioned to cause least possible draught, **with no possibility of being accidentally blocked.**

Please note: The British Standard Code of Practice for Oil Firing BS5410: Part 1, requires a permanent air inlet opening of **550mm² per kW (above 5 kW)** of boiler rated output. (Note: 1kW = 3412 Btu/h).

Also, when the boiler is installed in a compartment or confined space, **ventilation** openings are required to ventilate and to avoid overheating in the boiler area.

Combustion & Ventilation air supply for conventional open flue boilers

The figures shown are free areas of grilles in mm² per kw of appliance rating (output).



Conventional open flue (a) or open flue low level discharge (b)

Information supplied by OFTEC

FULL TEXT of both BS 5410 Part 1: 1997 and appropriate Building Regulations for each country should be obtained and fully applied

N.B. Please Carefully Note:

A. For boiler installations in domestic garages in Scotland, Part F of Building Regulations permits **only** Room Sealed appliances to be used (Ref. OFTEC Bk. Three May 1999 page 1 (18).

B. Technical annex T1/127 to OFTEC Book Three, May 1999 page 2 (19) Para. 1, 2 states " In Scotland and the Republic of Ireland **only** Room Sealed Balanced Flue Appliances can be used in that location " (i.e. domestic garages).

Definitions

Combustion Air is air required directly by boiler oil burner for combustion process.

Ventilation Air is air required in room for ventilation, cooling, etc. and to promote a healthy living environment.

FIREBIRD

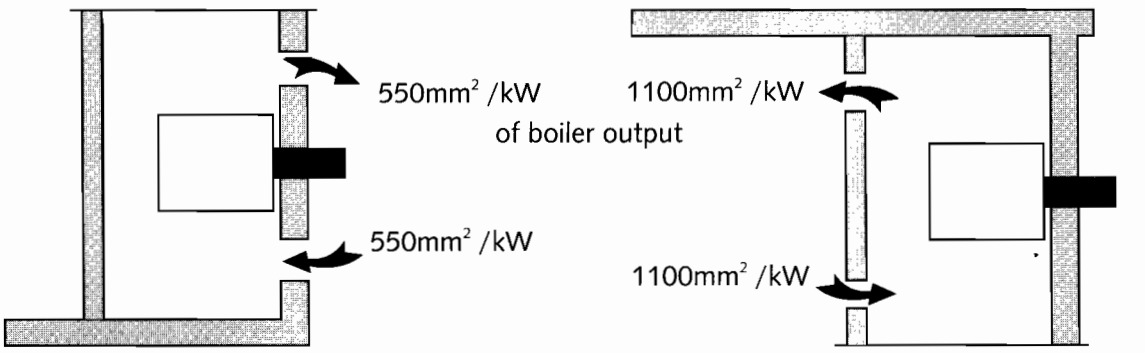
4 E

2. Balanced Flue Boilers

The Firebird Combi boiler may be set for Room-sealed balanced flue operation and then does **not** draw **combustion air** from inside the room. **It is drawn from outside direct to burner by airpipe supplied with boiler.** Flue gases are expelled in the same way. However, if the boiler is installed in a **compartment** or **small room**, some **ventilation air** is necessary to maintain acceptable temperature in boiler area

☛ Balanced flue boiler in room (eg. kitchen) does not require individual ventilation. ☚

Information supplied by OFTEC



4-F Domestic Heating & Hot Water Systems

HVCA Codes of Practice and BS 5449: Part 1 "Forced Circulation Hot Water Systems" should be adhered to when installing the boiler. Refer also to Regulations and Standards listed on page 13.

Electrical Supply

The boiler controls require 230V 1 phase 50Hz electric supply with a 5amp fuse.

THIS APPLIANCE MUST BE EARTHED.

A qualified electrician must carry out all electric wiring in accordance with current I.E.E Regulations and any local regulations which may apply.

The mains electrical supply must be taken from a double pole isolating switch with a 5amp fuse, positioned somewhere close to the boiler. Heat resisting cable must be used which can be routed into the boiler through the access provided on either side of the base.

Ancillary controls are provided for with terminal connections in the control panel.

FIREBIRD

5 OIL SUPPLY

The boiler burner is factory set to use 28-second kerosene. However, Gas oil 35-second can be used with a conventional flue installation **if** a PRE-HEATER is also fitted. Note: Gas Oil 35sec **may not** be used with a balanced flue installation.

If boiler location allows use of 35 sec.Gas Oil, pump pressure should be increased and air settings readjusted as necessary. **This adjustment should be carried out by qualified persons only.**

5-A Oil Storage Tank Siting

Consult OFTEC Manual

It is very unlikely that a fire should start from a domestic oil tank, however it does need to be protected from a fire which may originate in a building nearby. For this reason, the tank should be located at least 1.8 metres from any building and no closer than 760mm from any boundary. If it must be closer than 1.8 metres, the building wall should not have any openings other than ventilation openings. In addition, the wall should have a half hour resistance to an internal fire and extend 1.8 metres from any part of the tank.

A non-combustible radiation barrier is an alternative but this must meet the requirements of BS 5410 Part 1: 1994, "clause 28" Section 6.4.

Steel tanks must be mounted on brick or block piers with a waterproof membrane between the piers and tank.

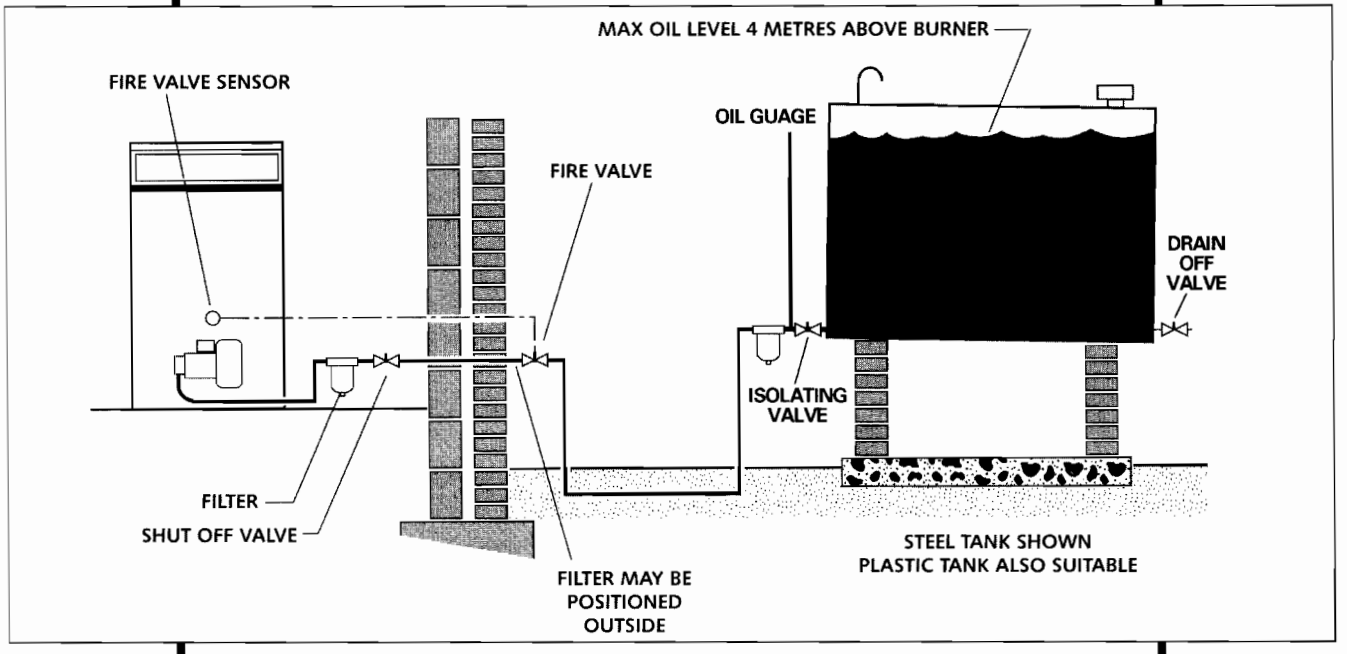
Polyethylene tanks do not need pier supports and may be mounted on any flat surface which can support the weight of the tank and its contents. They also do not corrode and never require painting.

5-B Flexible Oil Pipe(s)

A flexible burner oil hose is supplied with the boiler.
Please note: A filter must not be fitted inside the boiler and all joints in the oil line must be oil-tight. Soldered joints are not permissible. Before connecting to the boiler always flush the complete oil supply line and ensure that oil supply is completely clean and free of any dirt or foreign matter.

5-C Single Pipe System

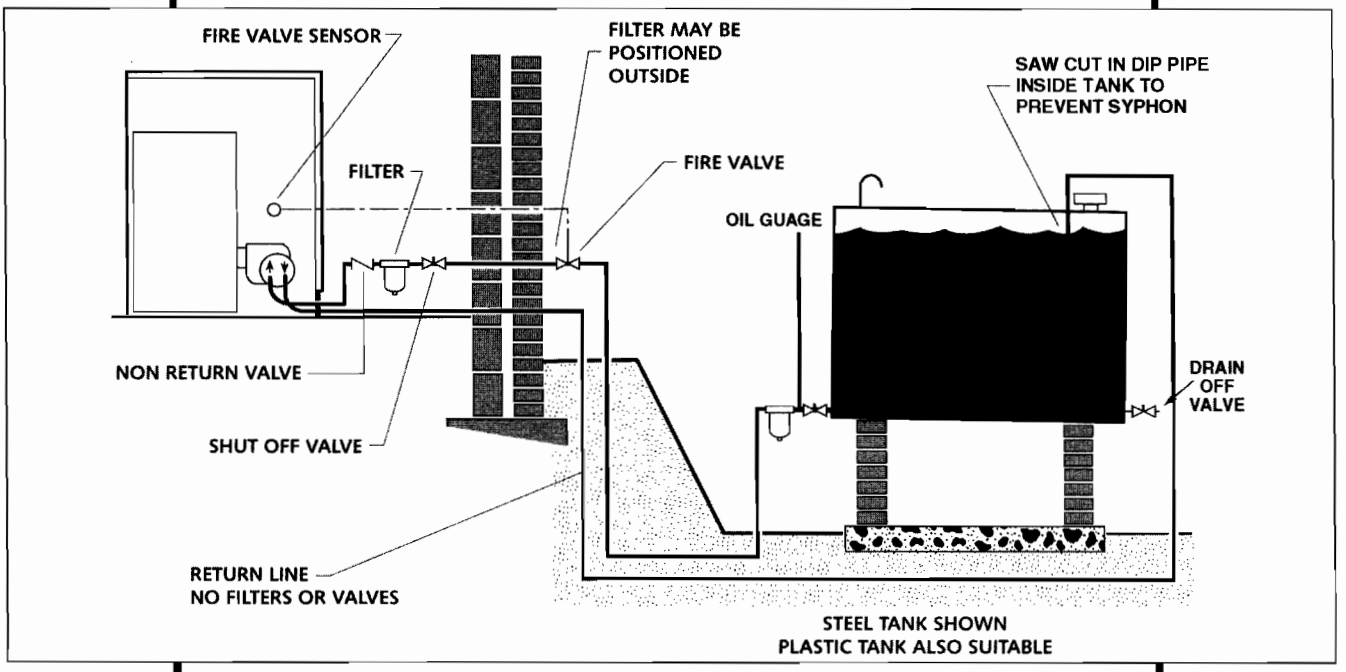
Where installations have the bottom of the tank above the oil burner, a single pipe system may be used.The oil burner should then be set for single pipe operation - **See also manufacturers oil burner manual**



5-D Two Pipe Systems

Where installations have the bottom of the tank below the oil burner pump a two pipe system is required. Ensure that valves and filters are not fitted in the return line as this must be unobstructed at all times.

The oil burner pump should be set for two pipe operation as detailed in accompanying oil burner manufacturers manual refer also to page six of this manual - section 2E+F



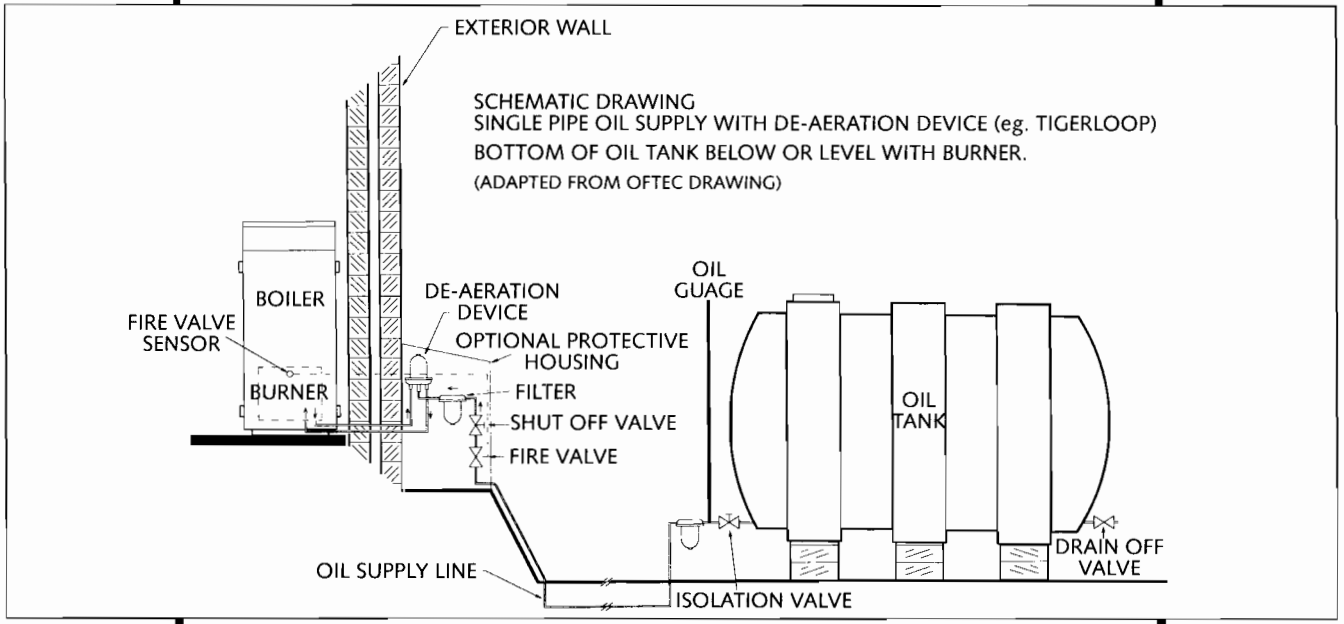
5-E Tigerloop Single Pipe Systems

IMPORTANT: The Tigerloop should not be fitted inside the dwelling - See drawing below and OFTEC manual book 3 page 2(10)

Where installations normally require a two pipe system but have long or impractical return line runs, a 'Tigerloop' De-aerator can be used which removes air from a single - pipe - lift oil feed. Higher lift heights can be achieved than are possible with conventional two pipe systems.

The oil burner pump should be set for two pipe operation.

Individual Tigerloop instructions must be implicitly followed.



6 FLUE SYSTEMS

6-A Important Notice

Because of the improved efficiencies of boilers under E.U. Efficiency requirements and OFT A100 Standard, it is necessary to pay extra special attention to flues and chimneys. The improved efficiency figures achieved by modern oil boilers are attained by using more of the heat (higher temperatures) heretofore allowed into flues and chimneys. This previously wasted heat helped to keep bad and poorly operating and often uninsulated flues and chimneys from condensing and causing problems. Please be fully aware of this when replacing an existing boiler. An old and poorly operating flue may need to be replaced to take full advantage of improved efficiencies and to avoid flue gases condensing and appearing as white water vapour (pluming) at flue (chimney) outlet.

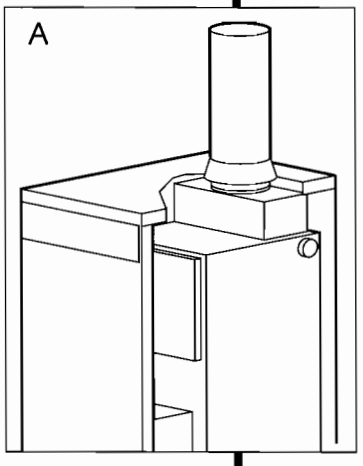
New flues and chimneys should be properly insulated and constructed to prevent condensation and draughting problems. Every individual concerned with any aspect of installation should be aware of the foregoing and should have full knowledge of and work to **European, National and Local Govt. Standards and Building and Installation Regulations**.
These manufactures instructions must not in any way be mis-interpreted as over-riding the above or any statutory regulations. It is absolutely essential that the boiler is properly installed so that NO FLUE GASES can enter the building at any time. Flue pipes should be safely sealed into the wall to prevent flue gases re-entering room or building. Refer also to page 15.

PREPARING BOILER FOR CONVENTIONAL CHIMNEY/FLUE OPERATION

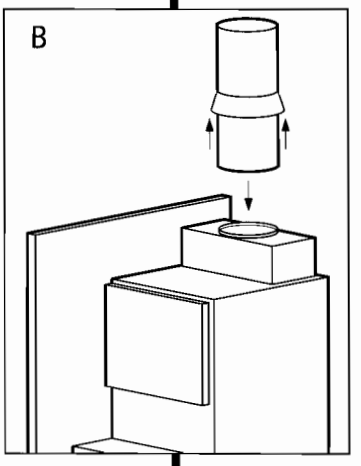
Before installing Combi boiler in the above mode please ensure:

A. That chimney flue is cleaned, draughting adequately, lined if necessary and not subject to downdraughts. **It is emphasised that boiler and flue should be connected properly in a manner which will not allow flue gases to enter room or building at any time from any part of the installation.**

B. That adequate unrestricted air for combustion and ventilation is provided to room in which boiler is situated - see diagram pg.17 & 18.

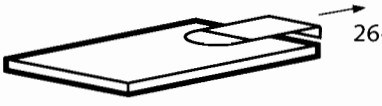


C. That there is no extractor fan capable of causing negative pressure in boiler room resulting in burner malfunction and flue gases being drawn back into boiler room.



Conventional Flue Installations-

1. Remove blanking plate from top panel by pulling backwards.



2. Fit trim sleeve to flue pipe (if supplied).

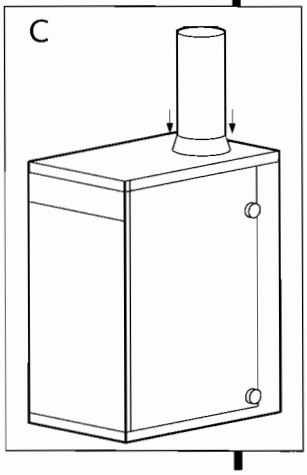
3. Slide upwards and 'park' it out of the way

4. Fit flue pipe into boiler socket and properly seal with high temperature silicone mastic or non-cracking fire cement.

5. Fit white enamel top panel

6. Fit cut-out cover plate behind flue pipe (shown in diagram)

7. Slide trim sleeve down against top panel (see diagram 'C')

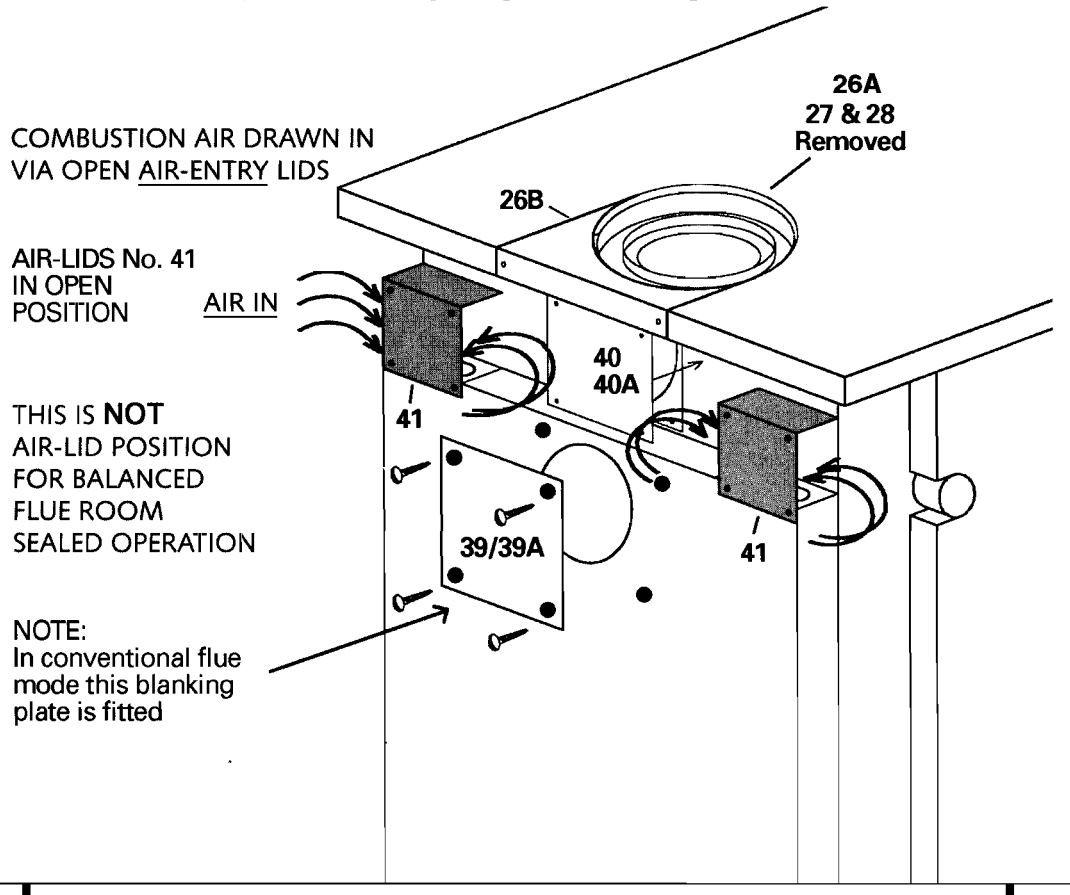


FIREBIRD

6-B Conventional Flue Systems

IMPORTANT: THE INSTALLER MUST EXAMINE THIS ILLUSTRATION CAREFULLY BEFORE PROCEEDING WITH INSTALLATION.

CONVENTIONAL FLUE OPERATION



Conventional Flue System

Check position of air entry lids (2 No.) item No.41 see diagram above. **MAKE CERTAIN** that both these lids are in the **OPEN** position to receive combustion air from boiler room. Use blanking plate No.39 and gasket No.39A to close off air pipe entry. Make sure that blanking plate No.40 and gasket No.40A is fitted in position shown. Remove blanking plate No.26A from top white panel, shown in diagram on pg.23, **remove flue-outlet steel cover No.27 and gasket No.28, shown in diagram on pg. 43,** fit and seal vertical flue pipe in place.
Vertical flue trim plate No.26B should be positioned before moving boiler into final position.

ENSURE UNRESTRICTED AIR-SUPPLY TO BOILER ROOM. No further adjustments are required for adequate combustion-air supply. Check burner operation when installation is completed, use burner **Combustion Analyser** to ensure correct performance.
Consult separate burner manual supplied with boiler.

FIREBIRD

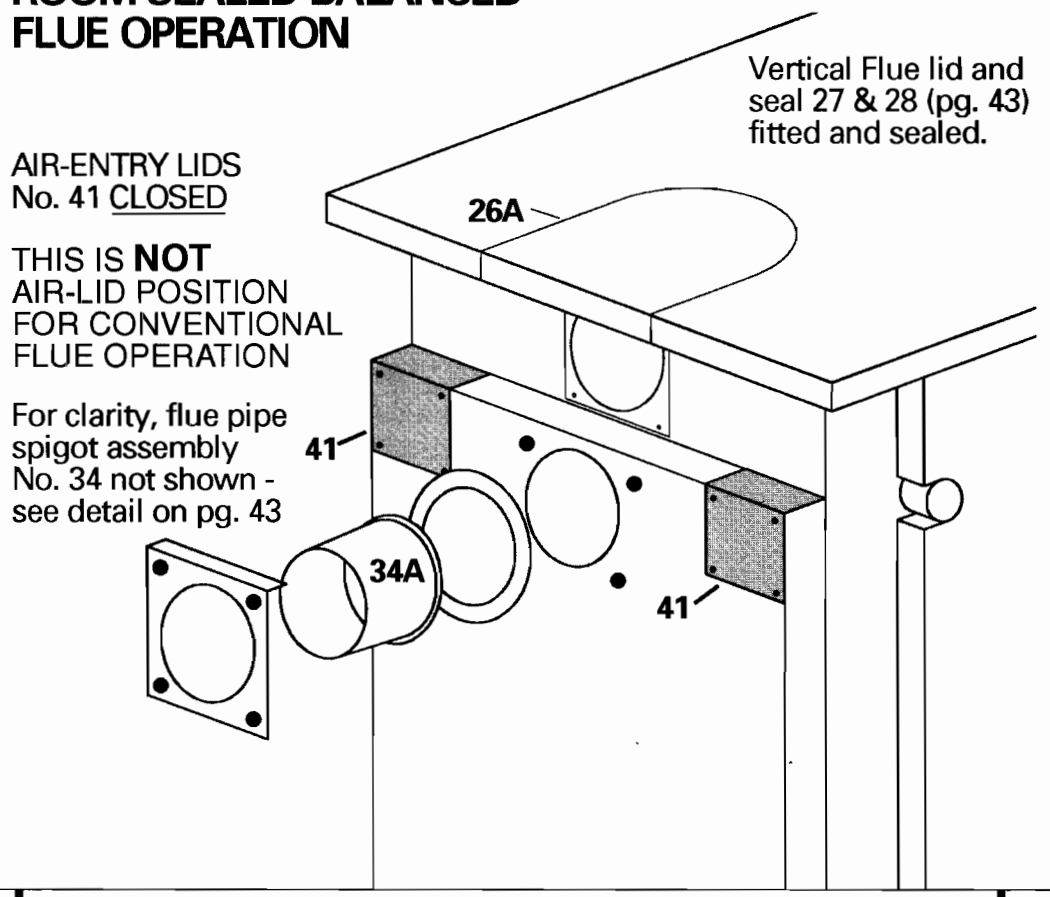
6-C Balanced Flue Systems

Preparing Combi Boiler for Room Sealed Operation

IMPORTANT: THE INSTALLER **MUST EXAMINE THIS ILLUSTRATION**

CAREFULLY BEFORE PROCEEDING WITH INSTALLATION

ROOM SEALED BALANCED FLUE OPERATION



Balanced Flue System

Before installing boiler in this mode please ensure that adequate

VENTILATION air is provided. COMBUSTION AIR is drawn into the boiler from outside via air pipe connected to air-spigot No.34A, remove blanking plate 39A as illustrated in diagram on pg. 22, and installation section 4E, pg. 17, VENTILATION AIR is required to dissipate any incidental heat from boiler unit.

Check position of two air entry lids (see diagram above). MAKE CERTAIN that both of these lids are in the CLOSED position. Use a little silicone mastic under lids to ensure air tight fit.

Ensure that vertical flue lid and seal No. 27 & 28, page 43 & 44, are fitted and sealed in position.

To fit stainless steel exhaust flue pipe remove blanking plate 40. (see diagram on pg.22) and connect stainless steel spigot No.34 with its gasket and retaining plate.

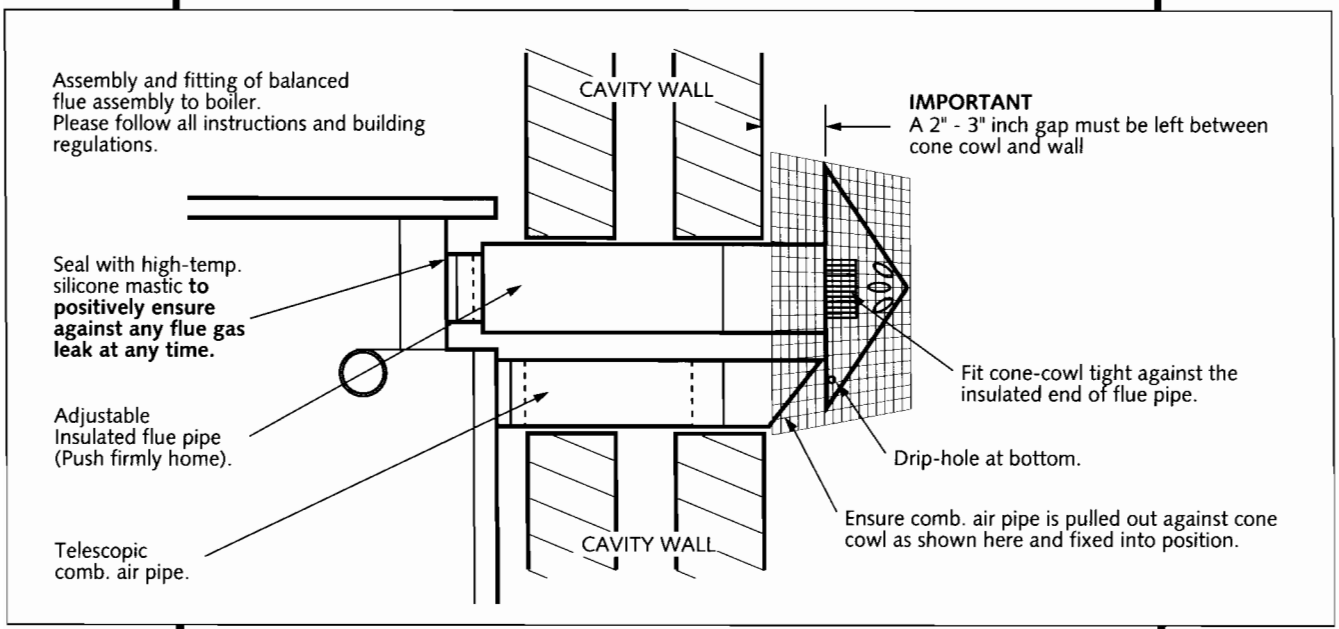
FIREBIRD

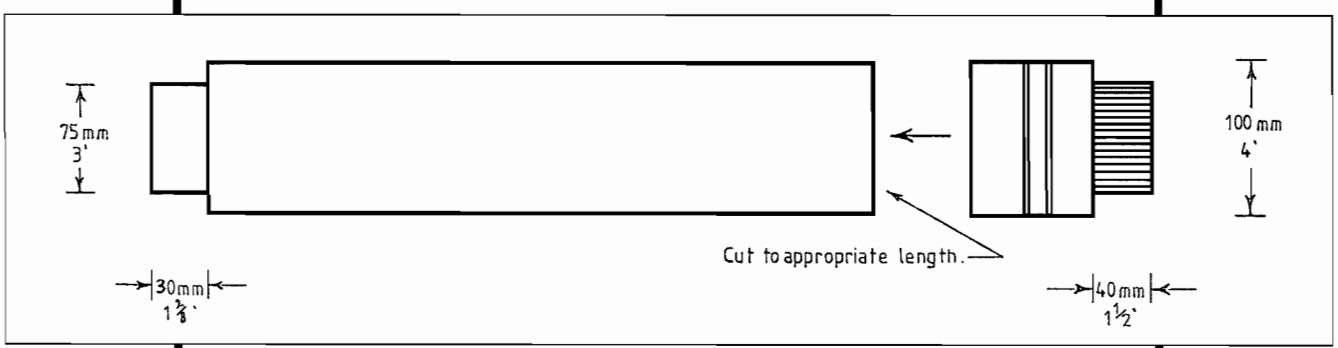
6 FLUE SYSTEMS

The balanced flue option provides much greater flexibility in siting the boiler than a conventional flue. All that is required is a suitable outside wall to fit the horizontal low level balanced flue. Refer to flue siting section 4D, page 16.

Having cut a hole large enough to accommodate the air inlet and flue outlet pipes - see diagram on page 3 for measurements - in the external wall - **it is good practice to assemble the flue to the boiler, with the boiler away from the wall**. Joints should be sealed by following the instructions illustrated below. The boiler with the flue and air pipe assembly can be carefully positioned and pushed through the wall.
When this is done, **seal around both the inner and outer wall skins with mortar or a mastic compound otherwise exited flue gases may re-enter building.**

Balanced Flue Assembly



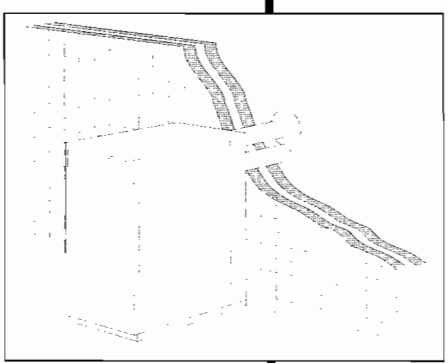


The standard rear outlet balanced flue kit is supplied with a 24" flue pipe which can be shortened to accommodate various wall thicknesses.

HANDY HINT

When cutting stainless steel flue and air pipes, use standard hacksaw with blade inserted in reverse.

This is a little slower but enables easier cutting and lengthens the blade life.



Balanced flue option siting

7 COMMISSIONING

It is recommended that commissioning is carried out by a competent and qualified service engineer.

It should be noted that it is the responsibility of the installer to ensure that the boiler is properly commissioned. Failure to do so may invalidate the boiler guarantee and any extended warranty.

7-A Procedures

1. Oil Tank

The installation of the oil tank and supply line should comply with the instructions shown earlier in this manual. Consult OFTEC Manual - Book No. 3, Section 2.

If a single supply line is used ensure that the bottom of the tank is above the burner. A two pipe system should be used where the level of the oil in the tank may fall below the level of the oil burner pump.

Check and ensure correct grade fuel oil has been supplied.

2. The Burner

A Tigerloop single pipe system may also be used in low-level tank installations. See page 20 Section 5. Please flush out oil pipe by drawing off some oil **before** connecting fuel pipe to burner - otherwise there is a danger of grit and dirt being forced into the burner pump, resulting in pump blockage, damage and 'lock-out'

3. The Boiler

A. Switch off the power supply, ensure that the boiler is full of water and that all valves are open.

B. Check that boiler baffles are correctly positioned.

C. Check the oil supply by disconnecting the oil supply hose at the burner and running off a quantity to ensure it is free from air. then bleed air from burner pump. Refer to section 2 Item-E, page 7, sketch C.

D. If fitted, check that the time switch is 'ON' and that both room and boiler thermostat are calling for heat.

E. Reconnect electrical supply and the boiler should start. If the burner lock-out activates, this suggests air in the pump. Wait a minute or so and try again. If lock-out occurs again, air must be bled from the pump pressure gauge connection point once more.

F. View the burner flame through the sight glass - it should be bright cream/yellow without any sign of smoke.

G. Run the boiler for about fifteen minutes then take a CO_2 reading and adjust as necessary.

7-B Handing Over

A thorough check of the system should be made, then the householder should receive a clear and concise demonstration of the boiler operation and any system controls.

This manual and burner manufacturers manual plus any other instructions should be handed over to the user, the guarantee card should be completed and posted, and the user advised about the importance of annual servicing.

FIREBIRD

8 SERVICING

Note: It is strongly recommended that servicing is carried out by a competently qualified engineer.

8-A Recommended Service Intervals

28 second oil	Once annually
35 second oil	Once annually (Must be fitted with a pre-heater kit)

Ensure that 35 secs fuel oil is only used where allowed by regulations, burner should then be re-set for this fuel. Before carrying out a service it is recommended that the following
is checked:

A). Smoke

B). CO_2

C). The flue gas temperature

D). Oil pressure

At the same time check for oil and combustion leaks. Advance to service **ONLY** after ensuring that both electric and oil supply to boiler is disconnected.

8-B The Oil Tank

Draw off any accumulated water and sludge from the tank by opening the drain cock. Turn off the oil supply and remove the filter bowl, then wash the element clean with kerosene.

8-C The Boiler

Remove combustion access door for access to baffles and to clean heat exchanger.

Check insulation sealing and its silver foil lining in combustion access door - replacing when necessary. When refitting this door be carful not to damage the foil and insulation by over tightening.

8-D The Burner

Check performance of oil-nozzle and replace as necessary.

Ensure correct specification replacement nozzle is used.

Check all oil filters and replace as necessary.

Remove burner and clean blast tube and ensure that airways are clear.

Ensure electrodes are clean, dry, not broken and are set as per burner specifications.

Clean fan and photocell.

Once again check flexible oil lines and connections for damage or leaks, replace as necessary.

Combustion Check

Carry out combustion analysis and ensure that boiler is performing to specification outlined in manual. Flue conditions may cause deviation from these figures.

Always keep careful record of flue gas analysis results including any verbal and written advice to customer (house holder). Always check carefully for restricted or blocked flue. If possible record CO levels and advise customer of need to keep boiler room well ventilated.

9 FAULT FINDING

IMPORTANT

Before making any electrical checks, turn OFF mains supply to boiler. Ensure all exposed electrical connections are covered before re-firing.

PROBLEM	POSSIBLE CAUSE	ACTION
BURNER WILL NOT START	Control box lock-out RED light ON.	Press reset button on front of burner N.B. TRY TWICE ONLY.
	Fuse blown.	Fit new 5amp fuse, if it blows again, check for short circuit in wiring.
	Motor or pump seized.	Check for rotation and replace as necessary.
		Check for live supply continuity up to burner.
		If live supply confirmed, change control box.
	Limit-stat tripped.	Press Limit Stat re-set button and check function of boiler Control thermostat.
	Boiler thermostat or other system controls satisfied.	Ensure all controls are calling for heat.
	Electrodes incorrectly set	Reset gap and position electrodes as shown in burner diagram.
	Nozzle blocked or faulty	Replace nozzle with **one of same specification**.
BURNER STARTS BUT FLAME IS INTERMITTENT	Air trapped in pump.	Bleed off air through pressure gauge tapping.
	No oil supply.	Check that flex oil line at burner is not kinked thereby restricting oil flow.
	Electrode insulator cracked.	Check and replace if insulator cracked or crazed.
	Solenoid valve faulty.	Check coil for continuity and replace if faulty.
	Photo-cell not seeing flame.	Clean photo-cell and make sure it is fully plugged in.
	Low oil pressure.	Check pump pressure and adjust to correct setting.
	Faulty Ignition transformer and H.T. contacts.	Check for spark and condition of H.T. contacts. Replace if necessary.

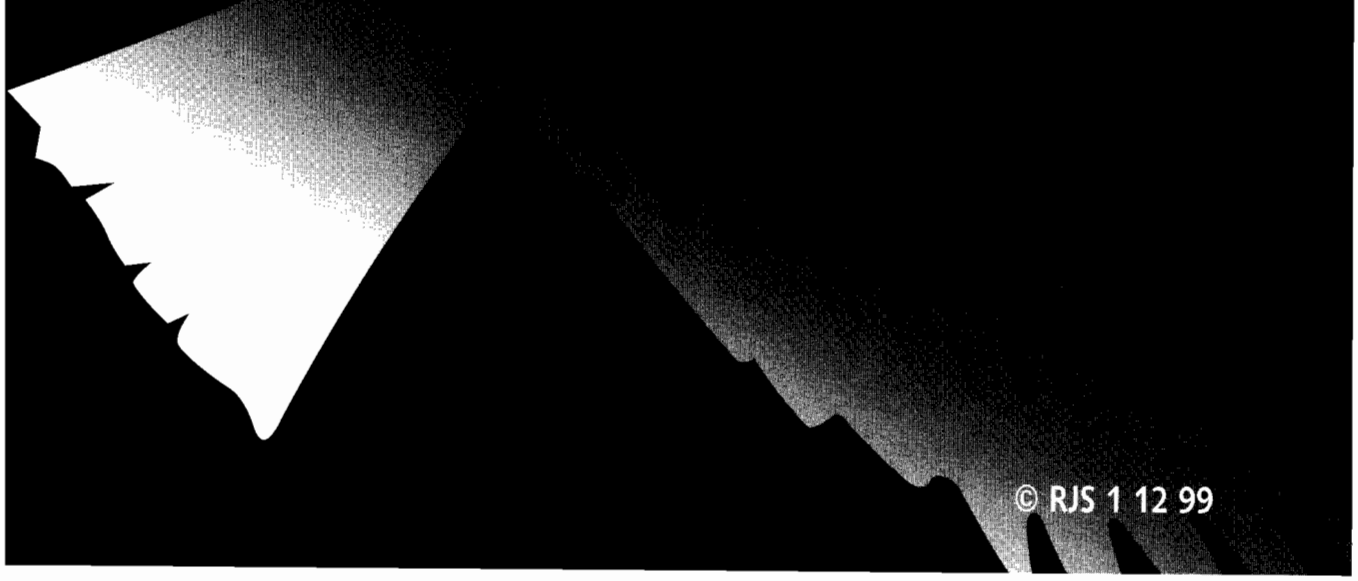
9 FAULT FINDING

PROBLEM	POSSIBLE CAUSE	ACTION
FLAME ESTABLISHED BUT BURNER LOCKS OUT AFTER A FEW SECONDS	Oil filter partially blocked.	Wash filter clean with kerosene.
	Oil contaminated with water.	Run off oil at burner until free of water and drain condensate from tank.
	Oil pressure low.	Check pump pressure and adjust to correct setting.
	Photo-cell fault.	Clean photo-cell and ensure it is fully plugged in. Replace if faulty.
POOR FLAME CUT-OFF	Dirt in solenoid valve.	Clean or replace valve.
	Oil contaminated with water.	Run off oil at burner until free of water and drain condensate from tank.
	Air in pump or at back of nozzle.	Bleed pump through pressure gauge port, also check for leaks in oil supply line if 2 pipe system.
	Pump shut-off piston sticking.	Replace pump.
MORNING START LOCK OUT	Low voltage.	Check with local electricity board.
	Combustion settings incorrect.	Check combustion under normal running conditions and compare readings with those given under 2C & 2E & F.
	Oil level in tank falling below burner.	Raise tank or fit a 2-pipe system.

Combi Oil Boiler

PART 2

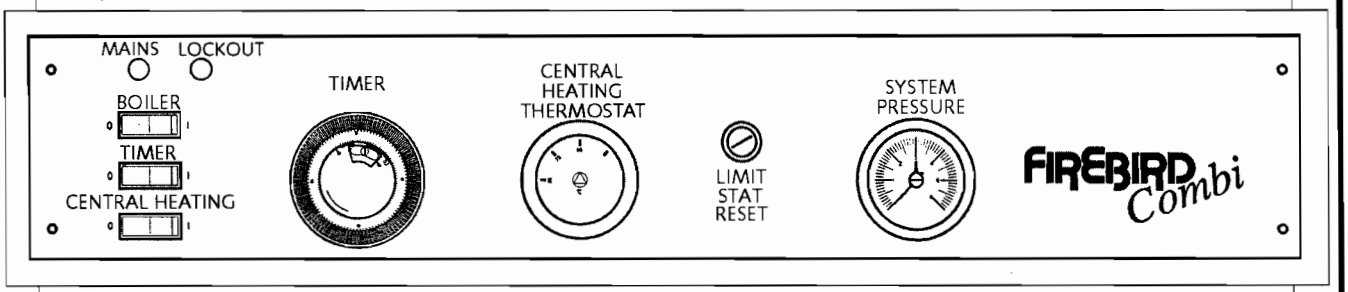
Sealed System and Domestic Hot Water



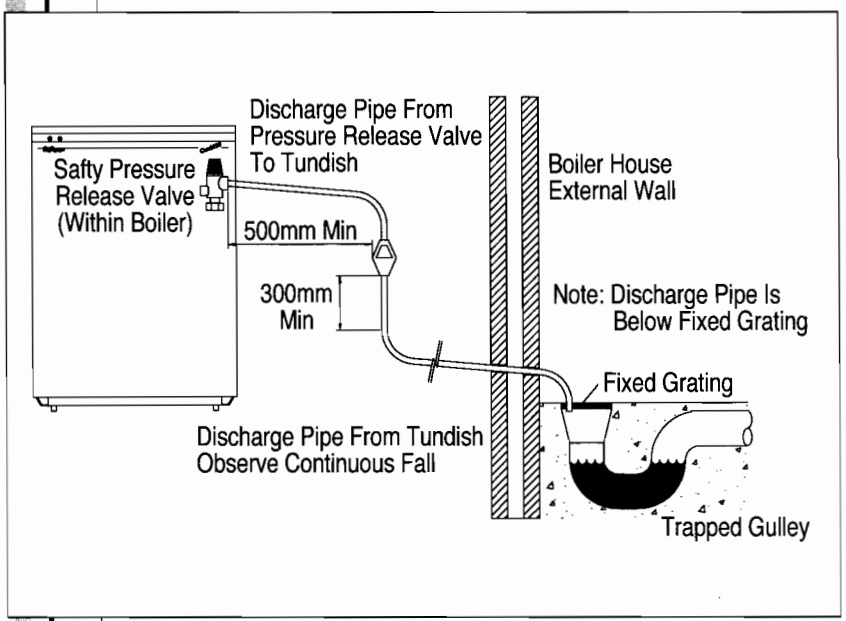
DOMESTIC HEATING AND HOT WATER

SEALED HEATING CIRCUIT

The system must comply with BS 7074 Part 1 and BS 5449 Part 1 with a maximum water temperature of 86°C.



* A manual reset overheat limit thermostat is located on the electrical control panel and is accessed by pulling forward and removing front door panel. If a boiler overheat condition arises the burner will stop and remain inoperative until this thermostat reset button is depressed. Limit-stat for D H W tank is situated at rear of control panel with its reset button underneath. See diagram above.
Panel switch marked 'TIMER' above is only used if alternative timer is fitted.



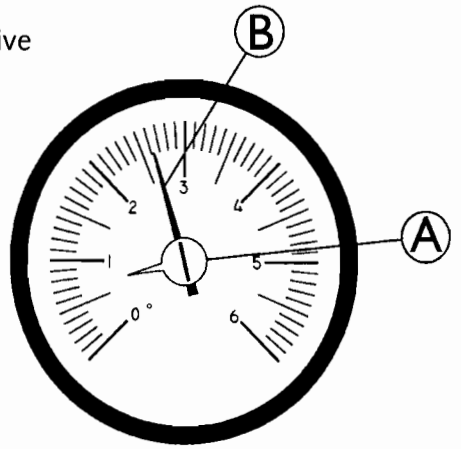
* A pressure relief valve to BS 6759 operating at 3 bar (45 lb/in^2) is fitted. A discharge pipe of 15 mm diameter is also fitted to the discharge connection on the pressure relief valve. During installation an extension pipe should be fitted to this, leading, to outside the building. The pipe should be as short as possible and should have a tundish fitted in a protected position within the building. Alternatively, if acceptable, it may discharge within building. In this case the discharge pipe **outlet end**, should terminate within 100 mm above inside floor level, and be in a visible and accessible position. No tundish is necessary in this position and householder should be advised that this discharge end should always remain open. In every case it should be directed downwards away from any electrical components or where it could cause a hazard to the user/occupier. See diagram above.

Note:- Water must not discharge above an entrance, window or where public have access. The installer must be aware that the discharge may be boiling water.

* A drain cock must be fitted at the lowest points in the system to enable draining as necessary. A drain cock is already fitted at the bottom of the boiler heat store to enable draining of boiler and tank unit only. All pipes connected to boiler should have shut off valves fitted to facilitate this.

* A Pressure gauge, having range 0 to 6 bar is fitted to boiler control panel. This indicates water pressure in boiler and system at time of reading. **Pressure when cold should** be 0.5 bar minimum to 1.5 bar maximum. This is known as Initial System Design Pressure (P_i).

A manually adjustable red pointer is also fitted on the protective glass of pressure gauge. This has a screwdriver slot. When system is cold and filled to Initial Fill Pressure P_i this pointer should be rotated to **read exactly as black pointer** on dial. This should not be subsequently altered. If system pressure, as indicated on black pointer on dial, falls **below** that indicated by red pointer when system and boiler are cold this means that Initial System Fill Pressure has dropped. Refill system until indicated pressure rises to the same as red pointer indicates - in this case 0.7 bar, as shown on accompanying pressure gauge sketch. Sketch also shows black pointer indicating maximum final system design pressure (P_f).



N.B. **Initial System Design Pressure (measured in bar) equals static head of system (measured in bar) plus 0.3.**

* A 10 litre expansion vessel is fitted to boiler, precharged with air or nitrogen to **0.5 bar** which allows a system static head of 5 metres. If the static head is greater than this then the air charge in the vessel must be increased to balance the higher static head. **The air charge should not exceed a pressure of 1.5 bar.**

The Firebird Combi 90 Boiler **with its built in Expansion Vessel** having an initial air charge pressure of 0.5 bar is capable of accommodating the expansion of a heating system with a **total** water content of about 125 litres. If total water content of system is greater than this or if air charge pressure has to be greater because of higher static head **then an additional vessel** will be required to be fitted to the **return** pipe as close as is practicable to the boiler. There should be no valves or restrictions between vessel and boiler.

If static head is altered then it is also necessary to alter air charge pressure to equal static head (+ 0.3 Bar). This is necessary in order to keep system water from entering expansion vessel until system is being heated and thus allow its maximum acceptance volume (V) to be used **only to accommodate the expansion of system water during boiler operation.**

Remember that air charge pressure **must** be **equal** in both vessels (attached to the same system). In the above example this is 0.5 bar. **Air charge pressure** is the air pressure in expansion vessel **before** system is filled. It is measured with a tyre gauge attached to Schrader valve on the vessel.

N.B. N.B. With heating system up to full working temperature, if the final system design pressure (P_f) reads more than 2.6 bar, as indicated on control panel pressure gauge, then it is likely that:

(a) **Total** system water content is greater than that calculated and if additional expansion vessel has been fitted it should be replaced with a larger unit
OR if integral boiler expansion vessel only is used then an additional expansion vessel is required.

(b) Static head may be higher than calculated. In this case it is necessary to re-measure static head and revise expansion vessel air charge pressure.

(C) Expansion vessel incorrect size or air charge pressure incorrect.

Refer to BS 7074 Part 1 and BS 5449 for further information.

DOMESTIC HEATING AND HOT WATER

EXPANSION VESSEL AND SYSTEM REQUIREMENTS

Safety Valve Setting		3 bar	
Initial System Pressure	0.5 bar	1.0 bar	1.5 bar
Total Water Content of System	TOTAL VESSEL VOLUME **		
Litres	Litres	Litres	Litres
25	2.1	2.7	3.9
50	4.2	5.4	7.8
75	6.3	8.2	11.7
100	8.3	10.9	15.6
125	10.4	13.6	19.5
150	12.5	**->[16.3]<-**	23.4
175	14.7	19.1	27.2
200	16.7	21.8	31.2
225	18.7	24.5	35.1
250	20.8	27.2	39.0

FOR FURTHER INFORMATION CONSULT APPROPRIATE TRAINING MANUALS AND BS 7074 PART 1, BS 5449, ETC

*** * When calculating size of any additional expansion vessel required, remember to deduct the boiler expansion vessel volume of 10 litres from the calculated total system vessel volume required, as given in above table.**

EXAMPLE: using above table

If .....Total water content of system - 150 litres
And .....Initial system pressure required is - 1.0 bar
Then .....Vessel volume required [from above table] - 16.3 litres
But .....Vessel supplied with boiler - 10.0 litres
Therefore ....Additional vessel required - 6.3 litres (minimum)
(For this system of 150 litres - total water volume)

..Nearest available stock size for additional vessel required, at 1 bar initial system pressure (taken from above table) is 8 Litres.

It is emphasised that the installer should be fully acquainted with sealed system installation and operation, calculation of total system water volume, determining of initial system pressure required and calculation of any additional expansion vessel volume required.

NB .. Ensue that all expansion vessels in the same system are set at EQUAL air charge pressures.

DOMESTIC HEATING AND HOT WATER

Domestic Hot Water Circuits

The final 600 mm mains water supply should be of copper tube to BS 2871 Part 1. Ensure that any capillary fittings used are of lead free solder variety. For user comfort the mains pressure at taps should be between I and 5 bar. If it exceeds this it is advisable to fit a pressure reducing valve adjusted to reduce pressure to an acceptable level within above range. To ensure user comfort and satisfaction it may be advisable to discuss foregoing with householder. Where long hot water supply-pipe runs are used these should be insulated to prevent rapid cooling of residual hot water after draw off is completed.

If the boiler is fitted in a hard water area check that hardness does not exceed 200 p.p.m. by testing with a standard test strip. Immerse test strip in flowing tap water for one second. Shake off excess water. Check strip after approximately fifteen seconds. If three or more zones have changed colour the water hardness is over 200 p.p.m. **(Read instructions on test strip package)**. Fitting of an in line scale inhibitor is then necessary.

Failure to check water hardness and fit appropriate water softening equipment will result in scale build up and consequent reduction in water heating performance. Check with local Water Authority if in doubt.

Hot and Cold taps, mixing valves and fittings must be suitable for operating at mains pressure up to 10 bar Bidets with the supply of hot and cold mains water are permitted if they are of the over-rim flushing type and have shrouded outlets which enable them to have temporary hand held spray attached. Showers of loose headed or flexible type must be fixed so that the head cannot fall closer than 25 mm above the top edge of the bath to prevent it immersing into the bath water. Alternatively the shower should have an anti-syphoning device incorporated at the point of the flexible connections.

Water Flow Regulation

The flow rate of water from individual taps may be affected by any of the following:-

1. Number of taps in use at one time
2. Cold mains pressure
3. Diameter and length of pipework in the domestic water circuits within the dwelling.
4. Excessive flow from 3/4" bath taps in a house system converted to mains water supply.

It is recommended:-

A. To ensure that the mains water connection to the appliance is the first connection from the mains on entering the dwelling.

B. Where flow starvation is encountered that flow restrictors or balancing valves are fitted at supply outlets. See leaflet included with this manual.

* The boiler has circulating pumps fitted therefore no other is normally required. They are factory set at maximum output. This setting should not be altered as production of domestic hot water may be adversely affected.

SYSTEM FILLING, TESTING AND MAKE-UP

Introduction

Mains cold water is supplied through the boiler pipework to two separate circuits operating at different pressures.

Circuit One

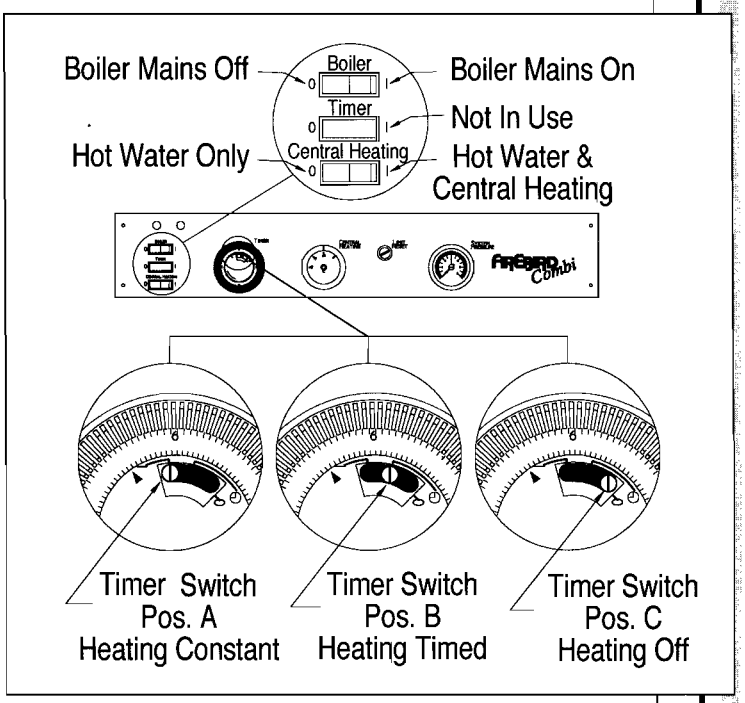
This is the Radiator Heating System including boiler and primary tank which is filled from mains supply via flex filling loop (Page 45) within boiler to a pressure determined from system static head, expansion vessel size and system water volume.This flexible filling loop should be disconnected when boiler and system are filled and checked, See diagrams Page 36.

Circuit Two

This is the domestic **cold** water supply through the boiler plate heat exchanger via domestic hot water pipework direct to hot taps. This works at full mains pressure or if this is excessive at a reduced pressure controlled by a mains pressure reducing valve to a pressure acceptable to householder and satisfactory for the correct operation of Combi Boiler System.This mains pressure reducing valve is **not supplied with boiler**, but will be available from a local supply merchant.

Boiler Operation and Control

The boiler control panel with all necessary switches and thermostats is fitted behind front door panel and may be accessed by removing this panel. Domestic hot water production cycle commences once boiler is switched on. If boiler and system are cold allow 20 - 30 minutes for domestic hot water heat store to reach working temperature. Central heating is controlled by positioning the appropriate switch to 'CH' and setting the time switch - also located on this panel. The boiler control system always gives priority to domestic hot water production by automatically overriding the central heating mode as necessary. The interruption to central heating lasts only as long as the demand for hot water continues. This has no significant effect on the heating circuit. Once hot water demand has ceased the boiler will automatically return to central heating mode if there is a demand. When hot water only is required turn central heating switch to 'off'.



If alternative time switch is used then refer to separate time switch instructions

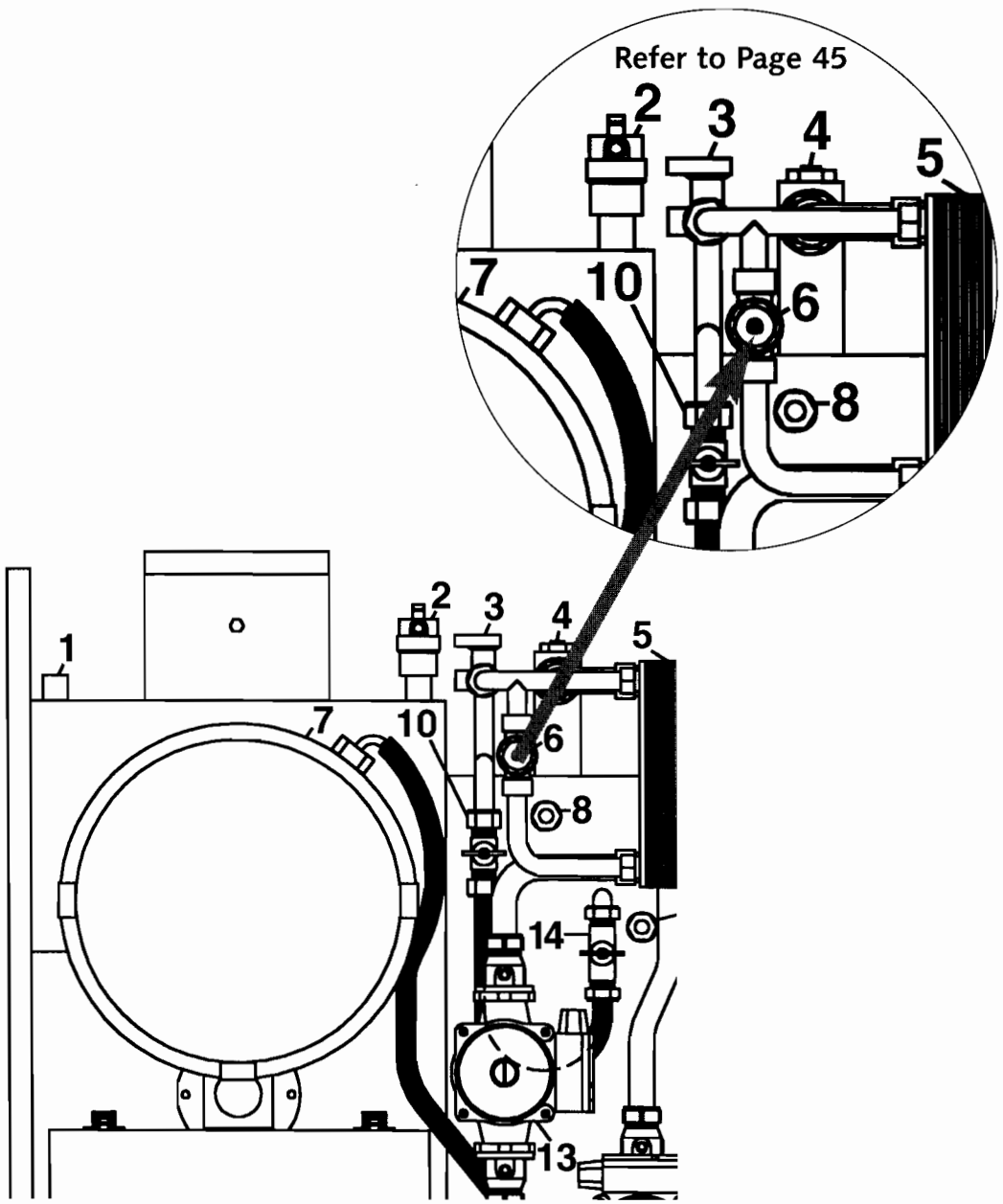
By request combi boilers are available with built-in timers.

Domestic Hot Water Operation

Hot water is available on demand by turning on a hot tap. This activates the flow switch which powers the domestic hot water pump ensuring that all boiler hot water is diverted to the domestic heat exchanger which heats the incoming mains water to give instant mains pressure hot water.

Hot water is then mixed with mains cold water by a thermostatic mixing valve set to ensure that it does not exceed 65°C. This is shown in accompanying diagrams - Item No. 6.

The burner may continue to run after hot water draw off has ceased - to ensure the pre-set temperature is restored in the heat store. This may also occur at any time if the control system senses that there is a need to replenish the heat store, i.e. if there has been natural temperature drop in heat store during long periods of low demand for domestic hot water.

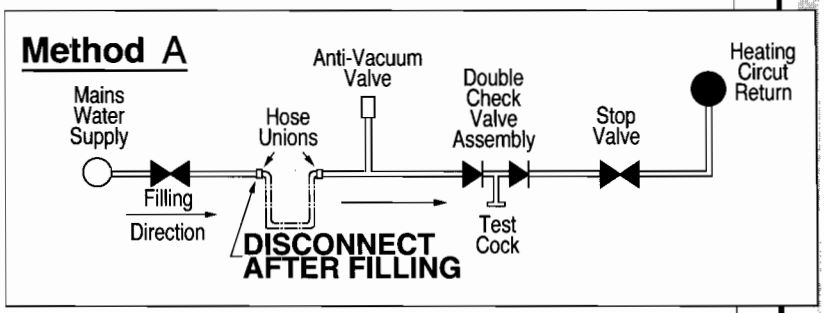


SYSTEM FILLING, TESTING AND MAKE-UP

System filling should take place **slowly** and can be done by either of the following methods:-

Manual Filling

The Firebird Combi 90 comes with this system built into the appliance. It consists of a flexible hose connection with a butterfly shut off valve at each end and a double check valve assembly at boiler end. To conform to requirements of BS 7074 Part I and local water Authority Bye Laws, the flexible hose should be disconnected at one end when filling has been completed and checked. Two end caps are supplied and should be fitted to disconnected ends as a safety precaution against inadvertent opening of ball valves.

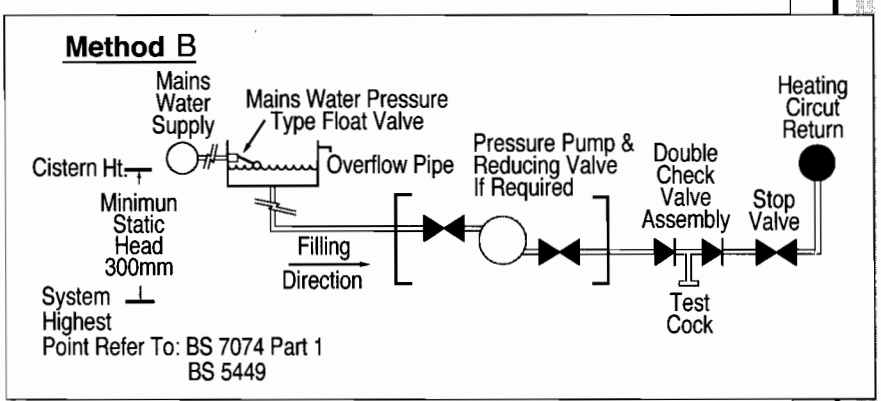


Pressure gauge on Control Panel should be checked occasionally when system is cold.
Refill to initial fill pressure if necessary. Should this be a frequent occurrence, complete system should be checked for leaks.

Automatic Filling

Automatic System filling may be made with a feed and make-up cistern connected through a double check valve and stop valve assembly to the return side of the heating system as close to the boiler as is practicable. This cistern **should be located above** the heating systems highest point to give a **minimum** static head of 300 mm between it (highest point) and cistern. The manual filling system fitted to boiler should then be disconnected and connection points blanked off.

This system has the advantage of automatic water make-up in the event of system pressure loss due to air elimination and minor leaks. In any case control panel pressure gauge should be occasionally checked. Remember also to check air fill pressure of Expansion Vessel when system is cold using standard tyre gauge connected to Schrader air valve on vessel.



NOTE: **There shall be no direct connection to the mains, even with the use of a non-return valve without the permission of Local Water Authority.**

* It is recommended that an inhibitor be added at the time of final fill to protect the System from corrosion. Ensure that this is carried out in accordance with inhibitor manufacturers instructions. Installer should ensure that inhibitor used is suitable and that it will have no adverse effect on Expansion Vessels diaphragms or any other part or component of the system.

SYSTEM FILLING, TESTING AND COMMISSIONING

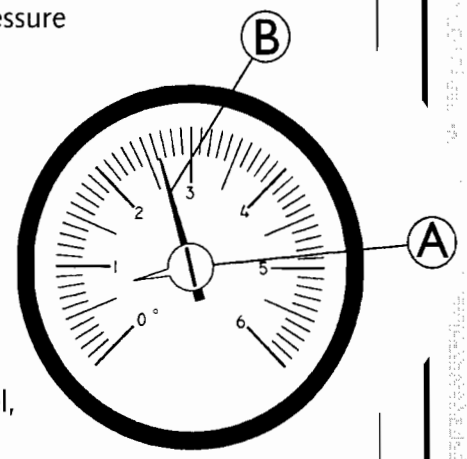
*** Before proceeding to filling, ensure that electricity supply is switched off at mains to avoid any possibility of time switch operating and passing power to appliance prior to filling.**

Filling and Testing

Check that **all** connections, especially compression joints, are fully tightened. Re-check and ensure that pressure vessel air charge is correct, then fill system with water via filling system used. **Turn off water supply before system pressure reaches safety valve operation point of 3 bar**. (Say 2 to 2.5 bar). Vent system via all manual air vents **including circulating pumps**, boiler, radiators, system high points. etc. Check that dust caps are loosened on auto air vents, keep constant check on system pressure gauge (fitted to control panel). If pressure has dropped readmit water to above pressure. Ensure **all** appropriate boiler and system valves **are open**.

With water supply turned off, **thoroughly** flush out boiler and system to remove **all** foreign matter before allowing boiler and pumps to operate. If in doubt drain system and repeat above procedure. At this stage flushing-out water should be clean and clear of all foreign matter.

Refill the system and again vent at all points as described above. Examine the complete system for water leaks having pressurised it to 1.5 - 2.5 bar. Correct any leaks, then check operation of safety valve by admitting further water until this valve operates. This should occur when system pressure rises to between 2.7 and 3.3 bar. When satisfied with valve operation, and with mains water still turned off, draw off sufficient water until initial system design fill pressure (P_i). (cold fill) is established (0.5 - 1.5 bar - as calculated for system). The red pointer B on pressure gauge should then be set at this initial system design pressure (P_i), i.e. system static head +0.3



Remember that initial cold fill pressure can only be checked when system water has properly cooled down. Check that **final operating pressure** (P_f) is under 2.5 bar with **all** radiators turned on and up to highest working temperature. Should system operating pressure exceed this, check:

1. That initial cold fill pressure is correct and , if additional expansion vessel is fitted, that pressure is equal in each vessel,
2. That expansion vessels are sized correctly.

Special attention should be given to existing heating systems where Firebird Combi boiler has replaced an existing unit. Extra effort should be made to ensure that all original pipe work and radiators are repeatedly flushed. If possible use a proprietary cleansing agent suitable for system as loosened scale and foreign matter can seriously reduce domestic hot water performance and pump efficiency.

Use corrosion inhibitor of suitable type.

Commissioning Record

Date: _____

Commissioning Engineer:-

Name: _____ Tel. No: _____

Address: _____

_____

Boiler:-

Type _____ Output: _____

Fuel Used: Kerosene (28 sec or Gas oil (35 sec)

Burner:-

Nozzle size: _____ Nozzle Type: _____

Pump Pressure: _____ Air Setting: _____

Flue Gas % CO_2: _____ Net Flue gas temp: _____

Smoke No: _____

Sealed system design pressure (cold): _____

Sealed system final operating pressure (P_f) : _____

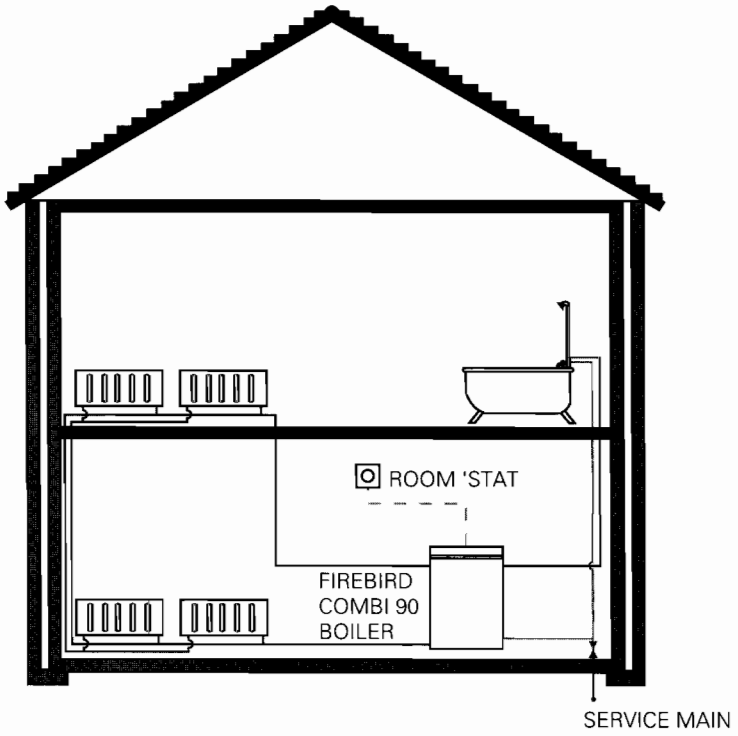
Commissioning Engineer Signature: _____

Notes & Comments

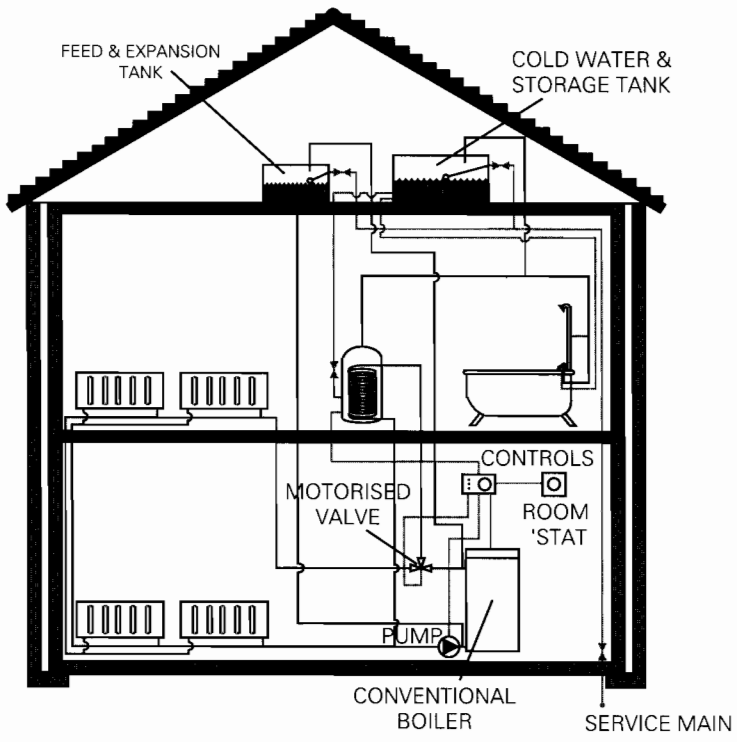
Service Report

NB All Information recorded hereunder should also be included in Engineers own filed service reports. It is recommended that the boiler be serviced, ***at least once a year***, and the details recorded below. Combi Boilers may need more frequent service. Engineer should advise householder.

Date	% CO_2	Net Flue gas temp	Smoke No.	Nozzle	Service Engineer/Tel. No. Signature & Comments
				Type ..... Size ..... Angle ..... Pressure	Signature:.....
				Type ..... Size ..... Angle ..... Pressure	Signature:.....
				Type ..... Size ..... Angle ..... Pressure	Signature:.....
				Type ..... Size ..... Angle ..... Pressure	Signature:.....
				Type ..... Size ..... Angle ..... Pressure	Signature:.....
				Type ..... Size ..... Angle ..... Pressure	Signature:.....
				Type ..... Size ..... Angle ..... Pressure	Signature:.....
				Type ..... Size ..... Angle ..... Pressure	Signature:.....



FIREBIRD COMBI 90 SYSTEM
SHOWING SIMPLIFIED HOUSEHOLD PIPING

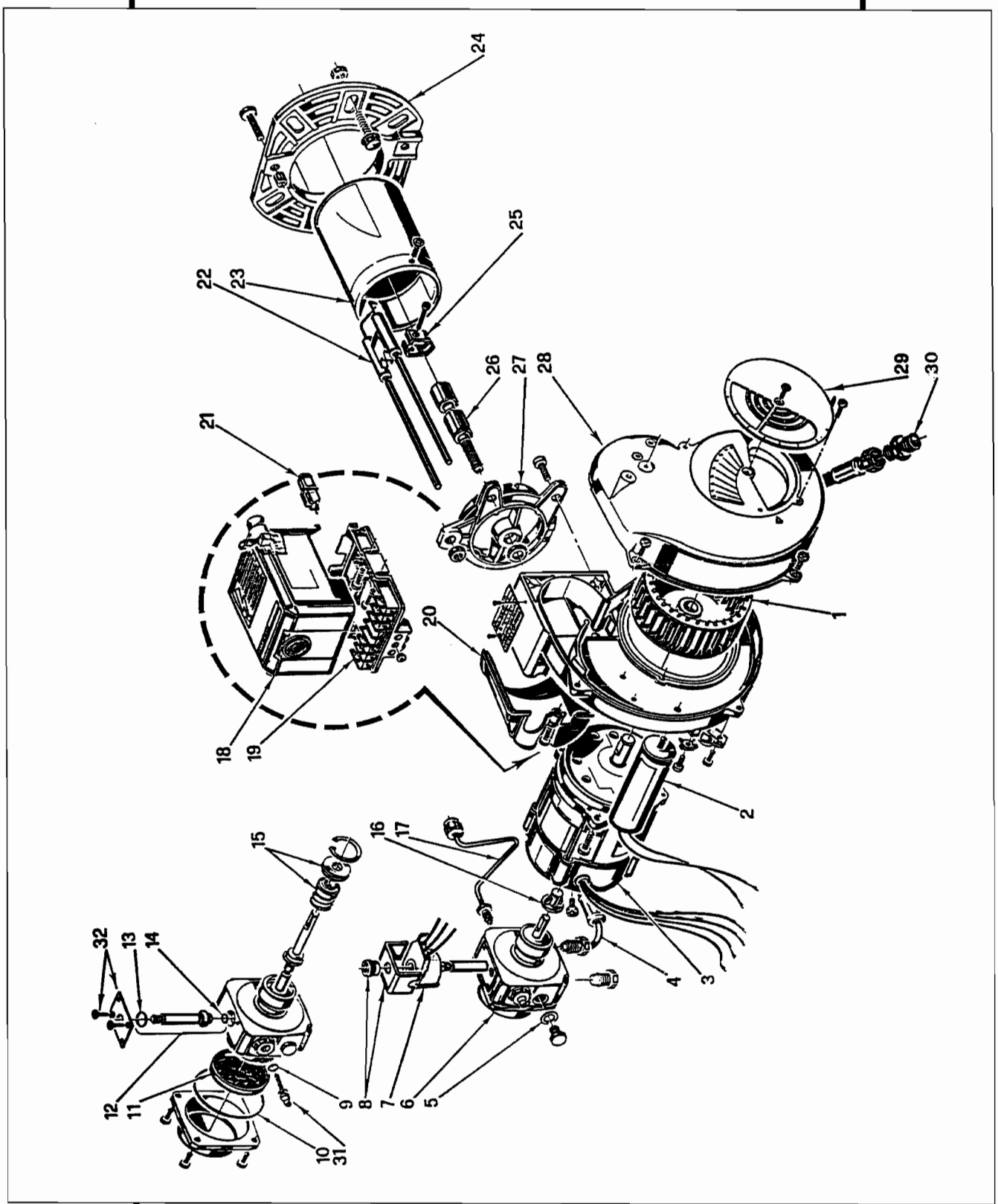


TYPICAL CONVENTIONAL BOILER SYSTEM

10 SPARE PARTS-BURNER

10-A Burner Parts Illustration

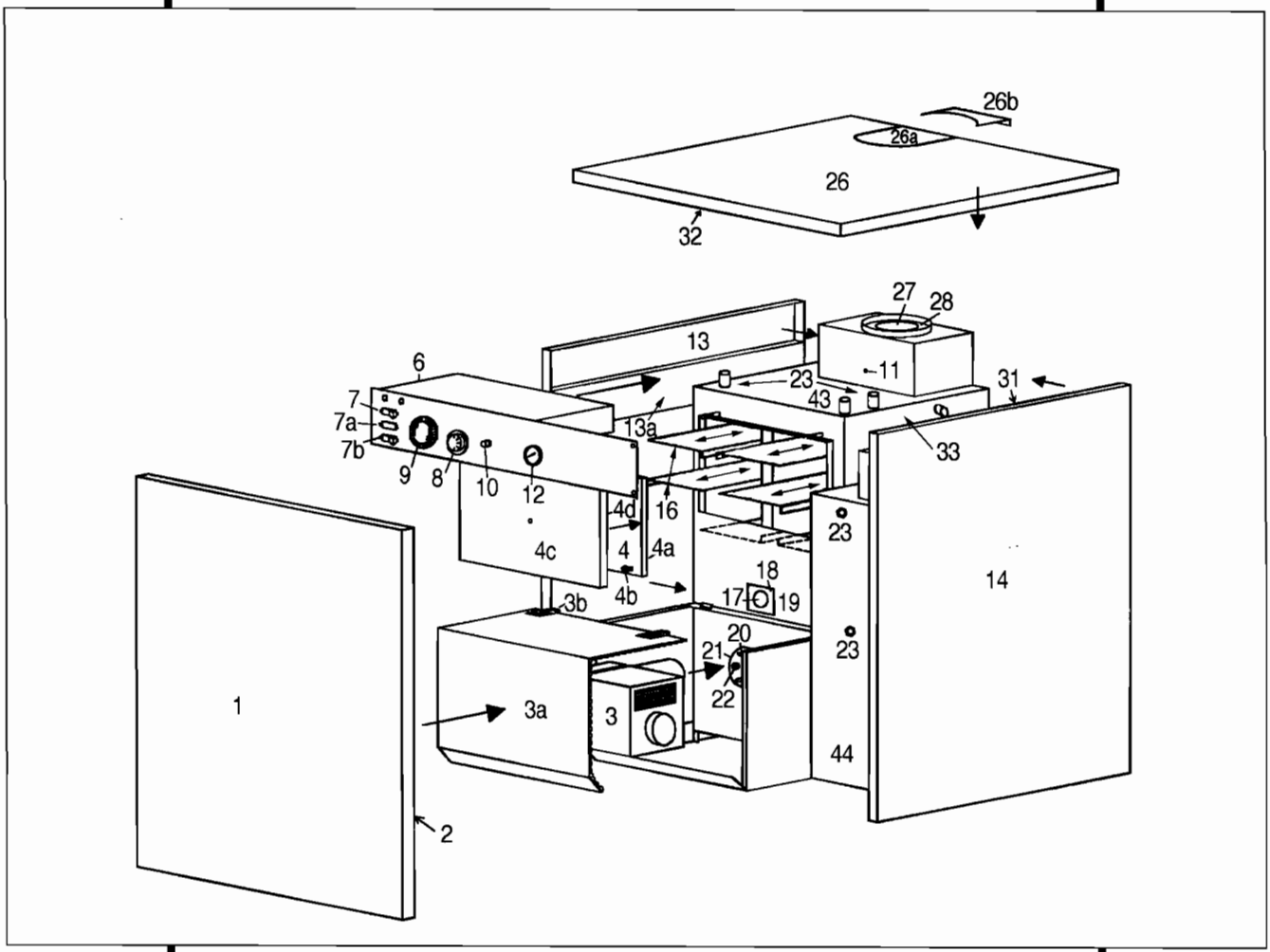
Riello 40 GXB Burner

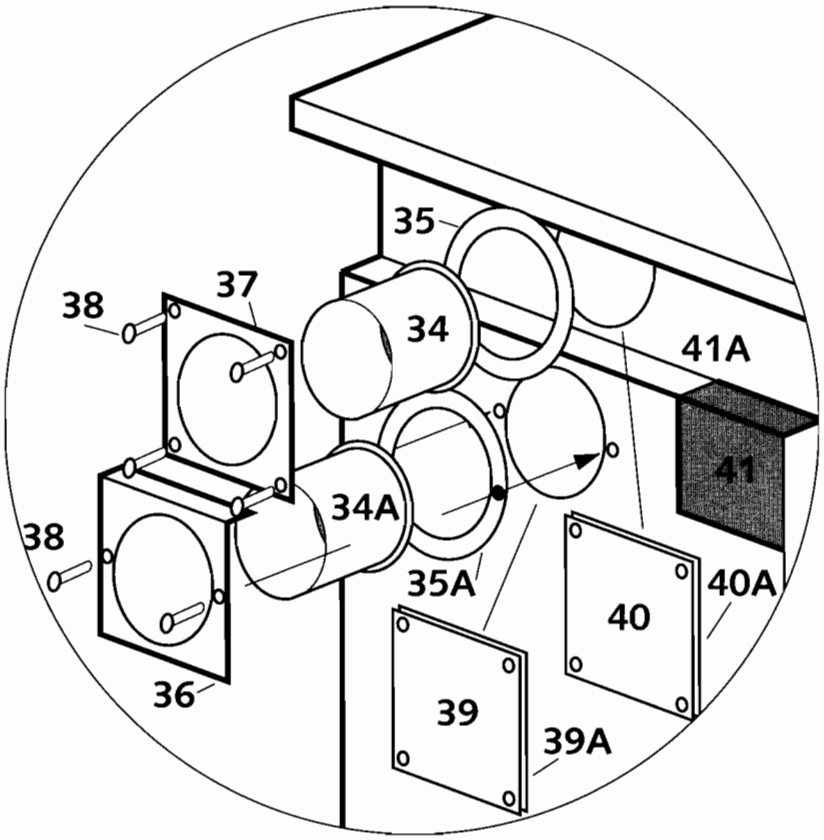


10-B Riello Burner Parts

No.	Code Spare Parts	Description
1	3005708	Fan
2	3005798	Capacitor 4μF
3	3007355	Motor 240V - 50Hz
4	3006934	Flexible oil line
5	3007077	Seal
6	3007450	Pump
7	3002279	Coil
8	3006553	Shell
9	3007028	O-Ring
10	3007162	O-Ring
11	3005719	Filter
12	3006925	Valve
13	3007028	O-Ring
14	3007156	O-Ring
15	3000439	Pump seal
16	3000443	Joint
17	3005723	Tube
18	3001156	Control box 530SE*
19	3002278	Control box base
20	3006554	Cover
21	3002280	Photoresistance
22	3005721	Electrode assembly
23	3006001	Cup-shaped head
24	3005786	Flange
25	3006552	Electrode bracket
26	3005724	Nozzle holder
27	3005760	Collar
28	3007207	Air intake
29	3007204	Air damper
30	3009046	Connector
31	3007202	Regulator
32	3007203	Plate

10-C Parts Illustration



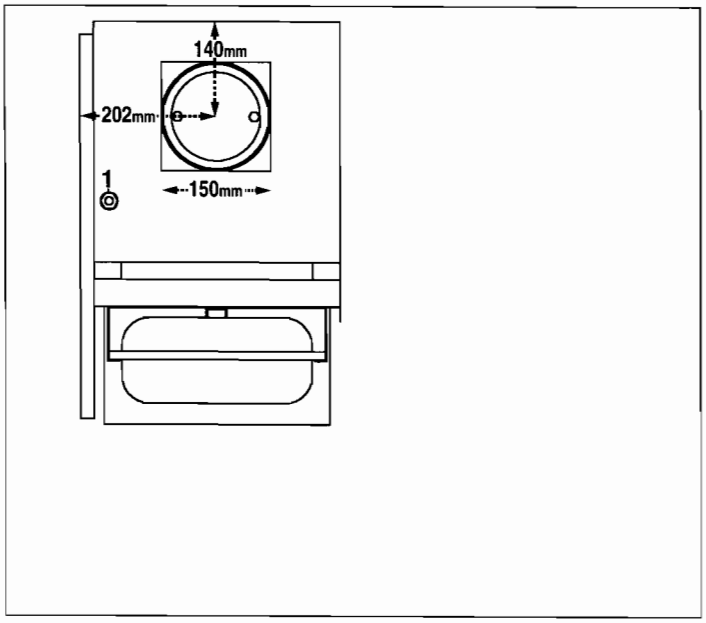


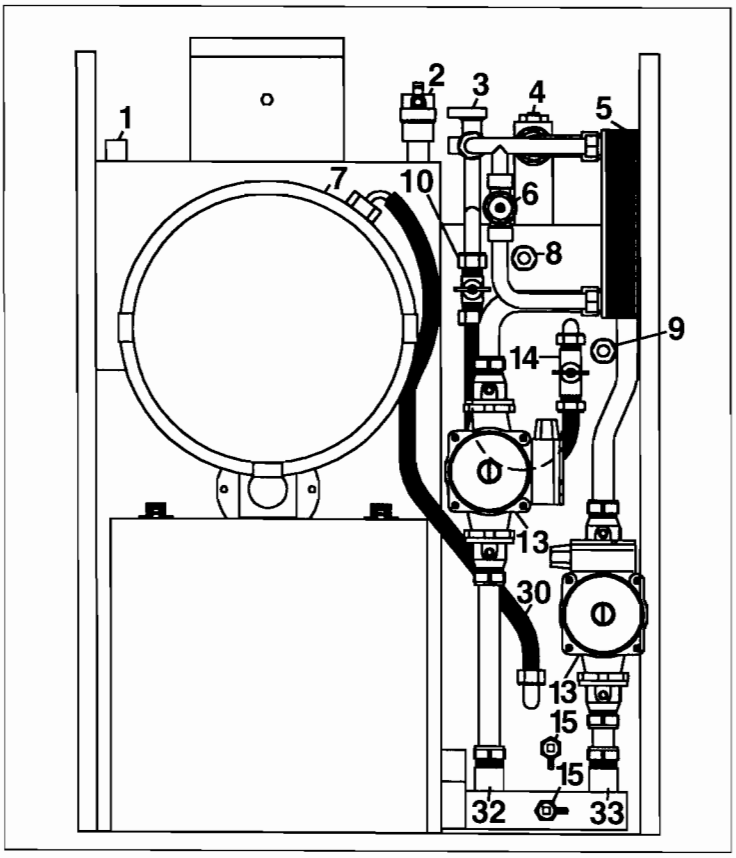
Firebird Oylympic Combi

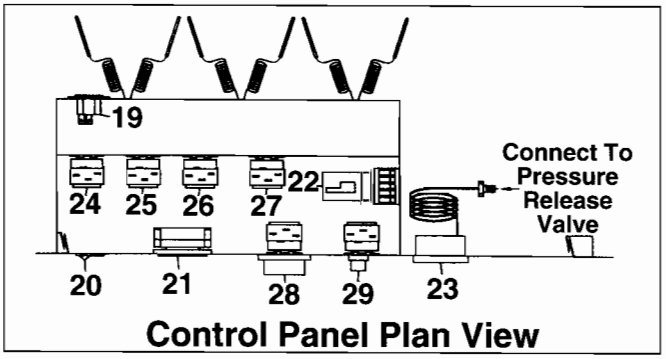
10-D Parts Description

Item	Part Description	Part Number
1	Combi front door panel	C9901
2	Insulation for front door panel	C9902
3	Burner	OY 5813 D
3a	Burner box cover	OY 5814 D
3b	Toggle clips	OY 5815 X
4	Combustion chamber steel door	OY 5818 D
4a	Combustion chamber door Insulation	OY 5819 D
4b	Retaining nuts for combustion chamber door	OY 5820 D
4c	Insulated steel cover	OY 5821 D
4d	Insulation for 4c	OY 5822 D
6	Combi control panel	C 9999
7	Mains switch	OY 5826 D
7a	Timer switch - If fitted	C 9903
7b	Central heating switch	C 9904
8	Control thermostat with knob + bezel	C 9905
9	Time switch (Timer with internal switch)	C 9906
10	High limit thermostat	OY 5831 D
11	Plug for analyser probe access	OY 5832 D
12	Pressure gauge	C 9907
13	White panel L.H. side	C 9908
13a	Galvanised retaining channel for 13	C 9909
14	White panel R.H. side	C 9910
16	Baffles	OY 5838 (9)
17	Sight glass for flame inspection	OY 5839 D
18	Bright steel holder for sight glass	OY 5840 D
19	Soft gasket for 17 + 18	OY 5841 D
20	Burner mounting flange	OY 5842 D
21	Flange gasket	OY 5843 D
22	Flange retaining nuts	OY 5844 D
23	Thermostat phial pockets	OY 5845 D
26	White top panel	C 9911
26a	Blanking plate for 26	C 9912
26b	Vertical flue trim plate for 26	C 9913
27	Steel lid for flue box	OY 5852 D
28	Insulated seal for 27	OY 5853 D
30	Side panel insulation L.H.	C 9914
31	Side panel insulation R.H.	C 9915
32	Insulation for 26	C 9916
33	Boiler shell	OY 5858 D
34	Horizontal flue spigot (Balanced flue)	OY 5859
34A	Horizontal combustion air spigot	OY 5860
35	Gasket	OY 5861
35A	Gasket	OY 5861
36	Combustion air spigot holder	OY 5862
37	Flue spigot holder	OY 5863
38	Screws - (Air and gas spigots)	OY 5864
39	Blanking plate for combustion air entry	OY 5865
39A	Blanking plate gasket	OY 5866
40	Blanking plate horizontal flue	OY 5867
40A	Blanking plate gasket	OY 5868
41	Air-back lids	OY 5869
41A	Air-back lids gaskets	OY 5870
43	Automatic air vent pocket	C 9917
44	Heat Store	C 9918

10E







Control Panel Plan View

D. H. W. Section

Item	Part Description	Part Number
1	Stat A+B pocket	OY 5845 D
2	Automatic air vent	C 9930
3	Flow switch	C 9931
4	Tank air vent	C 9932
5	Heat Exchanger	C 9933
6	Thermostatic blending valve	C 9934
7	Expansion vessel	C 9935
8	Stat C pocket	OY 5845 D
9	Stat D pocket	OY 5845 D
10	Isolator valve	C 9936
13	Pump	C 9937
14	Double check isolator valve	C 9938
15	Drain off cock	C 9939
16	Stat E+F pocket	OY 5845 D
17	Isolator valves	C 9940
18	Pressure release valve	C 9941
19	Mains plug	C 9942
20	Switches	OY 5826 D
		C 9903
		C 9904
21	Timer clock	C 9906
22	Relay & base	C 9943
23	Pressure Gauge	C 9907
24	Stat A	C 9990
25	Stat B	C 9991
26	Stat C	C 9992
27	Stat D	C 9993
28	Stat E	C 9994
29	Stat F	C 9995
30	Expansion vessel connecting hose	C 9944
31	Non-return valve 1	C 9945
32	Non-return valve 2	C 9946
33	Non-return valve 3	C 9947

Stat A	Over-run
Stat B	Early Alert
Stat C	Relay Tank
Stat D	Tank Limit
Stat E	Boiler Control
Stat F	Boiler Limit

NOTES

For further information on Firebird Products
please contact

FIREBIRD UK
Unit 6, Westover Industrial Estate, Ivybridge, Devon PL 21 9 ES.
Tel: [+44] 01 752 691177 Fax: [+44] 01 752 691131

FIREBIRD BOILERS
Ballymakeera, Co. Cork.
Tel: [+353] 026 45253 Fax: [+353] 026 45309

FIREBIRD PRODUCTS
Shean, Forkhill, Newry. BT35 9SY.
Tel: [+44] 028 30888330 Fax: [+44] 028 30889096

Int. Access Codes: Eg. N.I. +44 28 30888330