



CONDENSING OIL APPLIANCES

FLOOR MOUNTED

• *STANDARD* • *SYSTEM* • *COMBI*



WRAS
APPROVED
PRODUCT

*Operating,
Installation, Commissioning
and Service Manual
To be retained by householder*

April 2008

	Page		Page
Section 1.			
Operating Instructions			
1.1	Introduction	3	
1.2	The Control Thermostat	4	
1.3	High Limit Thermostat	4	
1.4	Sealed Systems - applies to Combi & System appliances	4	
1.5	Water System - Combi & System appliances	4	
1.6	System Cleaning & Protection	5	
1.7	Filling the System	5	
1.8	Oil	6	
1.9	Fault Finding	6	
1.10	Servicing	6	
1.11	Guarantee	6	
1.12	How Grandee Condensing Combi Works	7	
1.13	Hot Water Temperature Control Thermostat (mixing valve)	7	
1.14	Hot Water Control Knob Combi appliances only	8	
1.15	Cold Water Supply	8	
1.16	Taps and Showers	8	
1.17	System Boilers	8	
1.18	Radiator Valves	8	
1.19	Thermostatic Radiator Valves	8	
1.20	Bypass or differential pressure valves	8	
1.21	Frost Protection	8	
Section 2.			
General Information			
2.1	Health and Safety	9	
2.2	Description of Products	9	
2.3	Design Rights and Patents	9	
2.4	Installing and Commissioning	9	
2.5	OFTEC	9	
2.6	Insulation & Sealing Compound	9	
2.7	Glues, Solvents, Paints	9	
2.8	Kerosene 28 Sec Fuel Oil	9	
Section 3.			
Technical Information			
3.1	Electrical Wiring Details	10	
3.2	Commissioning Data	10	
3.3	Fuel	10	
3.4	Dimensions	10	
3.5	Burners Specification Summary	11	
3.6	Baffle Configuration	11	
3.7	Commissioning Data	11	
3.8	Water - Technical Details	12	
3.9	Condensing Standard Floor Mounted	13	
3.10	Condensing Combi & System Floor Mounted	14	
3.11	Wiring Diagrams	15	
Section 4.			
Installation			
4.1	Regulations	18	
4.2	Health and Safety	18	
4.3	The Heating System	18	
4.4	Siting the Boiler	18	
4.5	Condensation Trap	18	
4.6	Clearance Requirements Around Boiler	18	
4.7	Combustion Air Supply (Conventional Flue Models)	18	
4.8	Ventilation	19	
4.9	Oil Supply - All appliances	19	
4.10	Ecoflam Oil Pump	20	
4.11	The Control Panel	21	
Section 5.			
Flue Systems			
5.1	Flue Systems	22	
5.2	Condensate Removal On Conventional Flue Appliance	22	
5.3	Balanced Flue	22	
5.4	Balanced Flue Terminals - Recommendations	22	
5.5	Flue Terminating Positions for Oil Fired Appliances	23	
Section 6.			
Fitting Instructions Condensing Standard and System Floor Standing			
6.1	Standard and System Floor Boilers - Balanced Flue	24	
Section 7.			
Commissioning, Service & Maintenance			
7.1	Commissioning Procedure	26	
7.2	Servicing & Maintenance	26	
7.3	Baffle Design & Positioning	26	
7.4	Fault Finding	26	
	Commissioning Document	28	

Section 1. Operating Instructions

1.1 Introduction

Your Grandee Condensing oil boiler is designed and manufactured to the highest engineering standards known to us and should give long and satisfactory service if installed, commissioned and serviced correctly.

All Grandee appliances are fully automatic and capable of producing heat for hydronic central heating systems, both sealed or open vented, and for domestic hot water.

Your heating engineer should be capable of calculating and fitting the necessary equipment for your central heating system and the incorporation within the system of your Grandee appliance.

In essence, your Grandee boiler will respond to its instructions, that is, it will switch on and off when the control devices, normally a programmer or time clock, direct it to. Grandee do not supply programmers or time clocks and your heating engineer will explain the operation of the type supplied to you.

As far as your Grandee boiler is concerned there is very little for you to concern yourself with but it will be helpful to understand the following:

Grandee Condensing Boilers - What are they?

Condensing boilers are very high efficiency appliances with combustion efficiencies around 95%. The extra efficiency compared with a 'standard' boiler is achieved by extracting virtually all useful heat from the combustion and flue products. So efficient, in fact, that the flue gases are cooled sufficiently to release their latent heat with the water vapour, which is produced in normal combustion, being cooled to the point of liquid condensate.

A Grandee condensing boiler would have a typical flue gas temperature of 55°C compared with about 120 - 180°C in a Grandee standard boiler and about 300°C in many typical oil boilers manufactured about 20 years ago.

How is this extra efficiency achieved?

In the boiler design, additional heat-exchanger capacity has to be created to squeeze out this additional heat. As heat is increasingly drawn from the flue gases the greater, in inverse proportion, must be the heat absorption characteristics to extract the available heat.

What happens to the condensate?

In a condensing appliance as efficient as Grandee, condensate is produced continuously whilst the boiler is in operation, and this condensate has to be run off into a drain or the normal waste system of a dwelling.

The Grandee condensing unit is remarkably free from narrow flue-ways and tubes. To gain access for inspection simply undo two wing nuts and detach the outer section of unit.

This minimises potential problems and maximises the reliability of the condensing unit.

What are the main reasons why I should install a Grandee Condensing Boiler?

1. Firstly, you will save money in running costs. Oil prices over a period of time are very competitive though volatile. Oil boilers are very efficient, considerably more so than gas boilers, but condensing boilers are at least 10% more efficient than most standard oil boilers.
2. In 2007 all new boilers have to comply with Part L of the Building Regulations which effectively means that only condensing boilers will be appropriate except in exceptional circumstances.
3. Government introduced home information packs, now mandatory council taxes and energy efficiency regulations are continuing their inexorable drive towards energy conservation and efficiency. Grandee condensing boilers may place you in an advantaged position in selling your home and, eventually council taxes.
4. Environmental groups argue that the burning of fossil fuels is damaging to the environment. Grandee condensing boilers make a significant contribution to lessen such emissions by reducing the amount of Carbon Dioxide (Co2) produced.

How efficient are Grandee condensing boilers and what is Sedbuk?

Sedbuk stands for "Seasonal Efficiency Of Domestic Boilers in the UK" and is an energy efficiency scheme devised by the government. The Sedbuk rating is calculated from laboratory tests combined with the type of fuel of an appliance, the climate, the hot water system, whether ignition is automatic or permanent and other such factors necessary to produce a meaningful indication of normal efficiency in typical usage.

Sedbuk Ratings

90% efficiency and above	=	Sedbuk A
86 - 90% efficiency	=	Sedbuk B
82 - 86% efficiency	=	Sedbuk C
78 - 82% efficiency	=	Sedbuk D
74 - 78% efficiency	=	Sedbuk E

Grandee appliances are Sedbuk rated 'A' - the highest grade - though combi units are grade B because an arbitrary 2.8% is deducted from all combi units. This methodology is being challenged as unfair and unrealistic by many manufacturers who actually believe, as we do, that combi condensing units are more efficient than separate hot water cylinder storage systems.

1.2 The Control Thermostat



This is the control knob which can regulate, within the band 50 - 80°C, the temperature of the boiler water, known as primary water, which is the water which runs through your radiators and heating system.

You are, therefore, able to adjust the temperature of the primary or boiler water. By rotating the control thermostat knob clockwise the temperature is increased and, conversely, when turned anticlockwise the temperature is decreased until, at its stop position, the boiler is switched off without interfering with external controls such as time clocks and programmers. As a general rule we would suggest an intermediate setting which is achieved by aligning the marker on the knob with the white line on the fascia panel.

Some householders hold the belief that by turning down the boiler temperature that they save fuel. Generally speaking, however, the boiler remains on longer as the heat transfer to the dwelling, through the radiators, is diminished and the boiler merely cycles longer. On the other hand if the temperature is set too low it is possible to create condensation within the boiler which could be deleterious. Therefore you are advised to leave the setting in an intermediate setting.

In the case of **combi appliances** the temperature of the primary water also influences the temperature and quantity of domestic hot water. The higher the temperature of the primary water, the greater the value of the built in heatstore or thermal value. Also the hotter the primary water, the better is the transfer of heat to the domestic water through the 'plate' heat exchanger. For optimum amount of hot water set the control thermostat to the highest figure.

Finally, the hotter the domestic hot water leaving the boiler, prior to the mixing valve, the greater the volume of domestic hot water reaching the tap. This is because, in these circumstances, more cold water is mixed with the hot water necessary to modulate the temperature of the water flowing through the tap or shower.

Summary:- Turn the control stat to maximum for hottest radiators and hotter/more domestic hot water. The cooler the primary water the cooler the radiators and cooler/less domestic hot water. Our recommendation is - set at maximum.

1.3 High Limit Thermostat

In the event that the operating thermostat should fail, a high limit thermostat is fitted as a safety precaution. This is designed to protect the boiler from overheating. Should the high limit thermostat be required to operate then the red light on the control panel will illuminate. To reset the high limit thermostat press the red button. It would be advisable to consult your service if this problem recurs.

Grandee Combi Appliances

Care should be taken to ensure that an adequate bypass is fitted to the heating circuit otherwise the hot water in the primary heat-exchanger can stratify and trigger the high-limit thermostat. This normally occurs when TRV's (thermostat radiator valves) are fitted which, when they all shut down, prevent proper circulation of the hot water in the primary heat-exchanger when no adequate bypass valve is fitted.

1.4 Sealed Systems - applies to Combi & System appliances

A minimum pressure is required for your Grandee Combi/System to operate properly which can be viewed on the pressure gauge located in the front panel of the appliance.

Recommended pressures are:-

1.25 bar cold

Up to 2.5 bar when hot.

The actual pressure will depend on the temperature and the amount of water in the heating system.

If the pressure drops below this minimum level the system should be re-pressurised.

If your system repeatedly loses pressure then there is probably a leak in the system which needs rectifying. Sometimes loss of pressure from a sealed system can be caused by poor quality and ineffective radiator valves.

1.5 Water System - Combi & System appliances

The heating system must comply with BS5499 and BS6798 Standards. Maximum domestic hot water temperature must not exceed 86°C. The mixing valve, however, ensures a maximum hot water temperature of 70°C and, therefore, the maximum temperature is substantially under the maximum permitted under BS Standards.

The system pressure, when on maximum temperature of 80°C (see section 1.2 The Control Thermostat) should not be more than about 2.5 bar. If the pressure is set near or on 3 bar then the pressure relief valve will activate indicating that the system is over-pressurised.

An expansion vessel of 10 litre capacity is also incorporated. If the

central heating system, excluding the boiler, exceeds 85 litres volume then a further expansion vessel will be necessary to cope with the additional volume/expansion.

Grandee Wall Combi and System boilers are factory fitted with a DRAIN-OFF COCK which is located beneath the heat-exchanger. Grandee Floor Combi and System boilers have the drain-off cock located bottom front right hand of the heat-exchanger.

1.6 System Cleaning & Protection

Central heating systems should be thoroughly cleaned and flushed out before installing a new boiler.

During final filling of the system, a chemical water treatment formulation should be added to the primary circuit to control corrosion and the formation of scale and sludge. Reasonable provision would be to follow the guidance on how to prepare and commission systems given in BS 7593.

Where the mains water hardness exceeds 100 parts per million, provisions **MUST** be made to treat the hot water circuit of combination boilers to reduce the rate of accumulation of lime scale.

Scale, normally calcium and/or magnesium carbonate, can block the plate heat-exchanger and both reduce hot water flow and impede the transfer of heat. Also, the mixing valve can be disabled, resulting in poor hot water performance.

Flow restrictions in poor hot water performance. Flow restriction can also be choked with limescale and other debris.

If your electric kettle accumulates scale you are likely to be in a hard water area.

Ask your installer to advise on the supply of an effective in-line descaler or water softener. Our experience is that only chemically treated de-scaler systems provide adequate protection.

1.7 Filling the System

Grandee Combi and System appliances are designed for sealed systems and must be installed by a competent, preferably OFTEC approved, engineer.

The system can be filled by:-

A make up by pre-pressurisation of the system using a temporary hose connection in conjunction with a stop valve and non-return, double-check valve.

DO NOT connect directly to the mains supply. Consult your Local Water Authority if in doubt.

Central Heating Expansion Vessel

This vessel is designed for a maximum system capacity of 130 litres (28.5 gallons).

The contents of the Grandee Combi and System Boilers must be deducted from the totals as follows.

Grandee Floor

Condensing Floor 15/23	less 60 litres	(13 gallons)
Condensing Floor 23/30	less 60 litres	(13 gallons)

If the volume of water in the central heating system exceeds 50 litres (11 gallons) then an auxiliary expansion vessel will be needed in compliance with BS4841. This should be fitted as near to the central heating return connection on the heat-exchanger and charged at an equal pressure to the factory filled expansion vessel. For further information consult BS7074 part 1. Where the central heating supply is fully heated and the pressure does not exceed 2.5 bar then the factory fitted expansion vessel is sufficient.)

Expansion Vessel Pressure

Grandee Combi and System appliances are designed for sealed central heating systems with contents up to 50 litres.

When filled **COLD** the recommended system pressure should be approximately **1.25 BAR** which equates to the maximum static head of the system. All plumbing fittings are designed to operate up to 3 bar which is the maximum pressure of the system. Any extra fittings supplied by the installer should, similarly, be capable of operating up to 3 bar pressure.

The system pressure can be checked by heating the central heating system to maximum temperature and checking the pressure on the pressure gauge provided. If the pressure is less than 2.25 bar then the system will be satisfactory. If the pressure exceeds 2.5 bar then a supplementary expansion vessel should be installed to cater for the additional expansion. This should be fitted as reasonably close as possible to the central heating return connection on the boiler ensuring compliance with BS4841 and BS7074 part 1.

Poor quality radiator valves are often responsible for loss or leakage from the central heating system and high quality valves which comply with BS2767 (10) 1972 are recommended. Grandee can supply suitable radiator valves if required.

Ensure that systems are properly flushed and that all debris, fluxes and foreign matter is cleared from the system. This is particularly important on old central heating systems where corrosion debris, scale and sludge has accumulated. Reduced circulation through restriction and blockages can cause premature corrosion of the heat exchanger as well as damaging components.

Grandee manufacture a top quality central heating protection and cleaning system.

Water Supply & Flow Rate - Grandee Combis only

Mains fed combi boilers share the available water with various devices such as taps, dishwashers and cisterns etc. The flow of water can be reduced if other such devices demand water simultaneously. This is quite normal and you are likely to experience this phenomenon as when several cold taps are turned on at the same time.

If the mains water pressure supply is low or long 15mm pipe runs are involved from mains to boiler then larger diameter pipework may have to be fitted.

In hard water areas, that is where the temporary hardness exceeds 100 p.p.m, scale can build up in the 'plate' heat exchanger, and may eventually block it completely. In these circumstances a suitable scale inhibitor **must** be fitted. Replacement of the plate heat-

exchanger is a simple matter, however. Consult your local water company to determine the hardness of water in your area.

1.8 Oil

Your Grandee oil appliance is designed to burn Kerosene 28° Class 2-BS2869.

Try to keep your oil storage tank replenished as sludge and debris could damage your burner. Also, if you run out of oil it can be expensive to call out an engineer to bleed air from the oil line and reset the burner.

1.9 Fault Finding

Notes are provided in Section 7 of this manual but please take note of the following points.

- a). Check the electric supply and that no fuses are blown. If a fuse fails more than once this means that there is a problem and you should consult your service engineer or an electrician. Do not tamper with electric under any circumstances.
- b). Do not press the reset (lock out) button more than three times and ensure you delay at least three minutes before each attempt or you risk damaging the control box.
- c). Check that you have not run out of oil.
- d). Check that the orange light is illuminated to denote that there is a power supply to your appliance.

1.10 Servicing

You are advised to have your boiler regularly serviced by a qualified, preferably OFTEC trained, engineer. With kerosene burning appliances service at least once yearly.

You **MUST** have your boiler correctly installed and commissioned otherwise your manufacturers warranty will be rendered null and void.

Ensure that a copy of OFTEC form CD10 is left with you to prove that your appliance has been commissioned by an OFTEC engineer with a print out from the gas analyser.

Whereas we shall do our best to advise and assist you in remedying any problems which may arise, if you cannot produce commissioning data a charge will be made for the call out payable at the time of the visit. The manufacturer reserves the right not to inspect an appliance that has not been commissioned.

Before a call is made to site by the manufacturer payment or

a credit card transaction will be required. If the appliance has failed under warranty through faulty manufacture or components then a credit or cheque in repayment will be issued without delay. This procedure has been introduced because the manufacturer has made numerous site visits or abortive calls resulting from faulty installations or such as running out of oil, fire valves faulty etc, etc.

1.11 Guarantee

Subject to correct installation, commissioning and annual servicing, your Grandee boiler has a 12 month warranty. Nozzles and associated problems are excluded from the manufacturers warranty.

If you return the Guarantee Card within 14 days of installation, with full details of the appliance and commissioning data provided, then the warranty is extended for a full 12 months. That is, for a 2 year period from date of installation.

Important

Ask your service engineer to complete the enclosed installation and commissioning card. If it is not completed, it is likely that your appliance has not been commissioned and will not operate correctly. Furthermore, your guarantee will be **INVALID**.

Remember, post your Guarantee Card to us within 14 days of the date of installation to qualify for your extended warranty up to 2 years maximum.

Extended warranties can be purchased, subject to the above terms & conditions. See details enclosed.

5 Year Primary Heat-Exchanger Warranty

The primary heat-exchanger is guaranteed for 5 years against manufacturing defect subject to correct installation and servicing. This 5 year warranty is limited **STRICTLY** to parts only and does not include labour.

SUMMARY:

The manufacturer will pay for parts and labour if equipment fails through faulty manufacture of equipment during the warranty period.

The manufacturer will not pay for either installation or operating faults.

Householders may be asked to provide credit card or payment details prior to a manufacturers engineer visit in case the problem with the appliance originates in the system or incorrect installation or commissioning.

The manufacturer must be contacted to approve all warranty work.

Helpline

Telephone 0121 454 2244 for advice. We want to help you and your installer. A short telephone call can avoid problems.

Extra notes for Grandee 'Combi' appliances

1.12 How Grandee Condensing Combi Works

Grandee Condensing Combi incorporates a high-tech boiler, similar in principle to most oil-fired boilers, which comprises an ultra compact heat-exchanger and pressure jet burner. This boiler heats water, known as primary water, which circulates through radiators for central heating. In addition, for increased efficiency, it passes through our patented condensing unit.

The appliance also embodies a high efficiency plate heat-exchanger which transfers heat from the primary water to the domestic water directly from the mains, thus providing hot water at mains pressure. Within the appliance are components such as circulating pump, heating system expansion-vessel, water temperature control valve and such other controls which you would expect to find in a well designed, efficient modern heating system. Yet with Grandee Condensing Combi all this is extremely compact and beautifully, though simply, engineered. No need for copper cylinders, tanks of water in the loft, and long heat-wasteful pipe runs. Poor showers are a thing of the past.

Grandee Condensing Combi is the finest range of oil combination boilers available featuring several ingenious and patented innovations.

Combis and hot water - Better but different

Grandee Condensing Combi boilers produce hot water in a different manner from traditional systems with copper cylinders. An understanding of the principle will enable you to obtain optimum results for your appliance and realise your level of expectation.

So what is the main difference?

Grandee Condensing Combi heats cold water directly from the mains by transferring heat in the boiler (primary water) to the incoming cold mains (domestic) water by means of a highly efficient 'plate' heat-exchanger.

The advantages of the system are:

- Hot water is delivered at mains pressure (regardless of flow-rate) which means that vigorous pressure can be delivered for showers. Typical mains pressure can be 30 - 50 p.s.i. compared with say 5 - 10 p.s.i. from a storage tank in the roof (each 2.3 feet of 'head' produces merely 1 p.s.i.).
- The hot water is potable - that is, it is fresh from the mains like the cold supply and has not passed through storage tanks in the roof or a copper cylinder.
- It is more economical and more efficient to produce hot water by this means rather than the old copper cylinder method.
- Hot water can be produced indefinitely provided that the flow rate is equated to the boiler output.

With Grandee Condensing Combi a carefully calculated ther-

mal store of primary water is built into the appliance so as to supplement the burner output. This thermal store takes between 5 and 20 minutes to 'charge' dependent on the boiler output and its thermal value can vary according to its temperature. The hotter the thermal store, the larger the battery.

However, if the amount of water being drawn off should 'over-take' the boiler's ability to produce heat the temperature of the hot water will fall. A simple remedy is to turn the tap down (reduce the flow rate) in such a way as to restrict the flow. But then, unlike the copper cylinder method, the hot water will flow indefinitely.

In order to reduce the possibility of excessive water flow, each Grandee Combi incorporates a built in flow regulator, carefully sized according to the output of the appliance, in order to stabilise the delivery of hot water. This flow regulator also enhances the performance of its various control thermostats and mixing valves within the appliance which perform better when less subjected to extreme and sudden changes of volume and temperature.

1.13 Hot Water Temperature Control Thermostat (mixing valve)

This is the control knob which can regulate, within the band 50 - 75°C, the temperature of the boiler water, known as primary water, which is the water which runs through your radiators and heating system.

You are, therefore, able to adjust the temperature at which the primary water leaves the boiler. Some homeowners prefer very hot water whereas others, particularly where children, old or infirm are involved, prefer lower temperatures through their radiators. Turn anti-clockwise to reduce primary water temperature, clockwise to increase. The temperature of the primary hot water is not the final determinant of the domestic hot water temperature which can be adjusted by the hot water control knob. See Section 4.11.

Normally we would expect the knob to be set between graduations 3 and 4 which corresponds to approximately 50-55°C.

From a cold start Grandee Condensing Combi Compact takes up to 20 minutes to adequately heat its thermal store. The bigger the thermal output the faster the appliance is ready to provide hot water. In normal usage the appliance is seldom stone cold and, therefore, the appliance will normally produce hot water in 10 minutes or so. If your system incorporates a time clock or programmer it would be prudent to time your Grandee Combi to switch on approximately 20 minutes before you are likely to require domestic hot water to ensure that it is fully 'charged'.

Programmers enable you to time when your Grandee is switched on or off. They are normally supplied as **single** or **twin** channel versions. Both types can be used with Grandee boilers.

For Grandee Combi boilers, it may be preferable to fit a **twin channel** programmer because you would be able to control the timing of the on/off of the hot water and central heating separately.

Example: If you wanted to have hot water available from 6am until 10pm and central heating from 6am until 9am and then 4pm till 10pm then a **twin channel** programmer would be required.

1.14 Hot Water Control Knob Combi appliances only

This knob adjusts, thermostatically, the temperature of the domestic hot water by rotating clockwise (cooler) or anti-clockwise (hotter). Its temperature range is approximately 30 to 70°C regardless of the temperature of the primary water (see The Control Thermostat, Section 1.13) this valve enables you to exercise control of the hot water temperature. The lower the temperature setting the greater is the volume of hot water delivered but this thermostatic control valve is useful where young children or infirm people are involved as excessively hot water can be avoided without reliance upon alternative control devices. The coolest water is available on setting 1 and the hottest on setting 5 (see Section 1.13). Normally your installer will adjust this to your preferred setting.

1.15 Cold Water Supply

Whenever possible use 22mm pipe from the cold water mains supply to the appliance and first hot water outlet to maximise the flow rates to the various draw off points. Constant volume flow regulating or balancing valves may be required to avoid water starvation to individual taps.

1.16 Taps and Showers

Ensure that all taps and shower heads are compatible for mains pressure operation. Single-lever taps are particularly suitable for Grandee Combi appliances. Shower heads must not be immersed in bath water and should be held a minimum distance of 25cm above the bath. Otherwise a double-check valve must be fitted to prevent anti-siphonage to the domestic water supply.

1.17 System Boilers

Grandee Condensing System boilers are a type of intermediary appliance between 'Combi' and 'Standard' models. A System boiler is sealed by means of an expansion vessel contained within the casing of the appliance and which enables expansion and contraction of the primary water in the heating cavity thereby eliminating the feed and expansion tank usually located in the loft of the dwelling.

Sealed systems should only require occasional replenishment once the system is filled and should reduce any potential for

internal corrosion of the heating system. System boilers also contain the circulating pump within the boiler casing as well as a pressure gauge and pressure release valve.

The expansion vessel should be inspected during the annual service of the appliance.

1.18 Radiator Valves

Leakage from a sealed system which requires constant replenishment, introduces fresh water and, thereby, corrosion into the heating system which is undesirable. Use suitable valves, connections and high quality radiator valves which comply with BS.2767:10 to avoid such loss of water.

1.19 Thermostatic Radiator Valves

Where a central heating system is equipped with thermostatic radiator valves, a suitable bypass or differential pressure valve **MUST** be fitted. It is not sufficient to leave a small radiator with open valves which risk being closed by the householder at certain times (i.e. summer months).

Failure to fit a suitable bypass can cause stratification of primary water in the heat exchanger and may trigger the high limit thermostat. Also, the circulating pump may be damaged or burned out if it is prevented from performing normally. Stratification of primary water can create vapour pressure, impede the circulating pumps' performance and cause cavitation.

1.20 Bypass or Differential Pressure Valves

Ensure that your heating system is fitted with a suitable bypass especially where thermostatic radiator valves are used or where zoning valves or other circuit controls are fitted within the system.

1.21 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 advise you on an appropriate course of action, either by installing a frost thermostat or the addition of system anti-freeze.

N.B.

All Grandee's External models come fitted with a frost thermostat as standard.

Section 2. General Information

2.1 Health and Safety

In designing and manufacturing central heating equipment, Grandee take every precaution to ensure that our products comply with the latest legislation and guidelines to safety. The finest quality and safest materials and components currently available are always used in the manufacturing processes. Our prime concern is, however, the health and safety of our customers and our trade customers. To this end under the Health and Safety at Work Act and the Consumer Protection Act we draw your attention to the following information. You or your heating/service engineer must assume responsibility and wear protective clothing or equipment appropriate to any materials or components which would be judged as hazardous to health and safety. The following information should be noted carefully (COSHH Regulations 1988).

2.2 Description of Products

Grandee Condensing appliances are compact floorstanding oil boilers which provide heat for domestic hot water and central heating.

They have been designed and manufactured to OFTEC OFS A100, European Directives BED 92/42 and EEC LVD EN 60335-1 and EMC 89/33C/EEC and WRAS.

Grandee Condensing appliances are only suitable for fully pumped, sealed systems to a maximum working pressure of 2.5 bar. All appropriate controls are included within the appliance including a pressure release valve.

Grandee Combi is designed to burn Kerosene 28 Class C fuel - BS2869.

2.3 Design Rights and Patents

Grandee products are protected by various design and patent rights. The Company has been successful in the past in securing legal costs and damages from infringers and will not hesitate to take the necessary action to protect its legitimate interests.

Patent and patent application numbers:

2022796GB, 2230335C, 97 02 69 67, 9724537.7, 9813053.7

2.4 Installing and Commissioning

We strongly recommend, in the interest of safety, efficiency and reliability, that your Grandee appliance is installed and commissioned by a qualified engineer, preferably OFTEC registered. Failure to do so will jeopardise the manufacturers warranty.

If in doubt please contact us for details of our approved engineers. Otherwise we suggest you contact OFTEC direct at :-

OFTEC

Oil Firing Technical Association
Foxwood House, Dobbs Lane, Kesgrave
Ipswich IP5 2QQ

Tel: 0845 65 85 080 Fax: 0845 65 85 181

E-mail: enquiries@oftec.org

Website: www.oftec.org

2.5 OFTEC

OFTEC is the Oil Firing Technical Association for the oil industry and is committed, along with member companies, to the improvement of appliances, safety, training and Codes of Practice associated with oil heating. Grandee are members of OFTEC and have served on a number of OFTEC committees. We vigorously support OFTEC in its continued quest for improvement in technical and safety standards.

2.6 Insulation & Sealing Compounds

The following may be injurious if inhaled and may cause irritation to eyes, nose, throat or skin. Use gloves, face masks and goggles when handling. Avoid inhalation and contact with skin and eyes.

Glass Fibre, ceraboard, glass rope, insulation blocks, acoustic foam mineral wool and fire cement.

Treatment

Wash hands thoroughly after use and dispose of dust and waste carefully and wrapped. If irritation occurs wash eyes or skin with copious amounts of clean water. If inhaled, seek fresh air and drink clear water to clear throat. Blow nose to clear foreign matter.

2.7 Glues, Solvents, Paints

Take care, use gloves and masks for protection in the handling of such materials and follow manufacturers instructions. Flush eyes, if necessary, with copious amounts of clean water and wash hands thoroughly.

2.8 Kerosene 28 Sec Fuel Oil

Take care in handling fuel oils which can cause skin irritation and which should **never** be taken internally. Avoid contact with skin or clothing.

Also avoid breathing kerosene vapours.

Lanolin creams are recommended for use where kerosene has come into contact with the skin. Wash thoroughly and apply lanolin based cream which helps to restore the dryness and skin cracking associated with skin contact with mineral oil such as kerosene.

ALWAYS SEEK MEDICAL ADVICE IF SYMPTOMS PERSIST OR IF IN DOUBT.

Section 3. Technical Information

3.1 Electrical Wiring Details

All electrical connections and wiring should be performed by a qualified electrician in accordance with the latest BS7671: 1992 regulations and the latest IEE Wiring Regulations.

Disconnect the main supply before attempting any electrical connections.

The electrical supply must be 220/240 volts A/C single phase 50 Hz protected by a 5 amp fuse.

Grandee Appliances Must Be Earthed

The appliance must be earthed and connected to the mains supply by a double pole isolating switch.

The appliance must be earthed with an earth cable longer than the mains current cables, that is the line and neutral supplies.

Extended cables must be fastened by strain relief bushes.

Voltage Fluctuations

In some areas, particularly remote urban areas, voltage fluctuations can occur. This can effect the spark generation or starting sequence of the appliance and can cause locking out.

3.2 Commissioning Data

Grandee oil boilers are designed to comply with OFTEC and European legislative requirements and must be installed and set up correctly to insure satisfactory performance and efficiency.

The table on page 11 indicates typical settings to be achieved when the appliance is commissioned. There could be slight variations from these figures to allow for manufacturing tolerances i.e. nozzle, oil pump, fan and site conditions.

Please contact the manufacturer for assistance if required. We shall do our utmost to give advice and help. No responsibility will be accepted for maladjustment or for problems caused by failure to comply with manufacturers instructions or advice. Neither will the manufacturer accept responsibility for faults in the design or installation of the central heating system.

Ensure that a fully qualified or OFTEC registered engineer carries out the commissioning.

Grandee appliances, when set up correctly, should give efficiencies around or above 90%. (See detailed commissioning notes in Section 7).

3.3 Fuel

The recommended fuel for your Grandee boiler is Kerosene 28°(sec) viscosity (Redwood number 1) which complies with BS 2869 - 7 classes C2 and D. See Code of Practice for oil firing BS 5410 part 1. Grandee boilers are set up and tested at the factory with nozzles and adjustments suitable for Kerosene.

The manufacturer will accept no responsibility for appliances which have been adjusted to burn gas oil unless specifically arranged, supplied and factory designed.

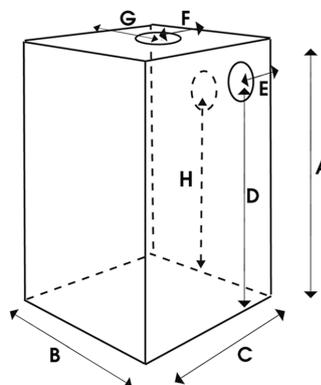
BIODEISEL

Your Grandee Condensing appliance can be connected to burn oil or deisel. Contact the manufacturer for full details.

As at February 2008 Grandee are testing various bio-diesel fuels on it's appliances.

The results will be published in due course but please contact us in the meantime for interim advice.

3.4 Dimensions



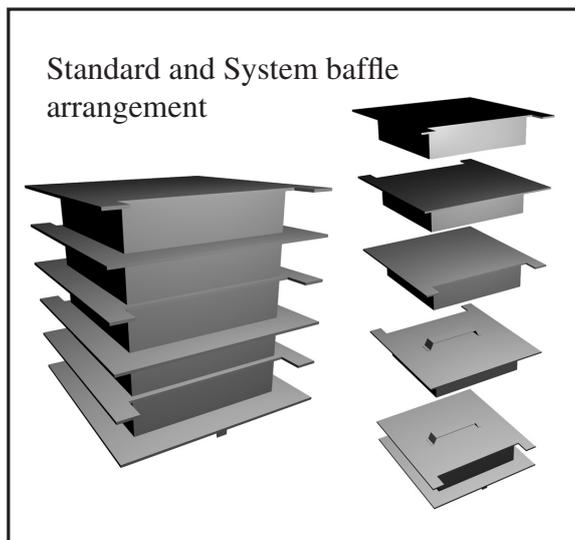
MODEL	A	B	C	D	E	F	G	H	FLOW/ RETURN	SEDBUK RATED
Standard PRODUCT CODE HCF 15/23	860mm	435mm	570mm	785mm	133mm	100mm	215mm	770mm	22mm	A
System PRODUCT CODE HSCF 15/23	860mm	435mm	570mm	785mm	133mm	100mm	215mm	770mm	22mm	A
Combi PRODUCT CODE HCCF 15/23	860mm	535mm	570mm	785mm	133mm	100mm	265mm	770mm	22mm	B
Standard PRODUCT CODE HCF 23/30	860mm	535mm	570mm	785mm	133mm	100mm	265mm	770mm	22mm	A
System PRODUCT CODE HSCF 23/30	860mm	535mm	570mm	785mm	133mm	100mm	265mm	770mm	22mm	A

3.5 Burners Specification Summary

ECOFLAM MAX 1 TC

Blast Tube	TC MAX 1 Tube 1 (15/22 15/23) Tube 2 (23/28 23/30)
Control Box	Satronic TF 832.3
Fuel Pump	Danfoss BFP11 R3
Motor Type	AEG 75 Watt
Thermostat	Sopac Jaegar TSLM 3214 High Limit Thermostat Grandee 331C4AUT Sopac Jaeger TUA 2C501 Frost Thermostat Where Applicable

3.6 Baffle configuration



3.7 Commissioning Data - All Models

MODEL	OUTPUT		NOZZLE			PUMP PRESSURE		Co2	SMOKE BACHARACH SCALE	FACTORY SET AS DELIVERED
	BTu x 1000	kw	SIZE	PATTERN	ANGLE	Psi	Bar	%		
FLOOR STANDARD/ SYSTEM/COMBI 15/23 BURNER ECOFLAM MAX 1	60	17.6	0.55 DAN	EH	80°	110	7.5	11.5 to 12	0	
	70	20.5	0.60 DAN	EH	80°	120	8.2	11.5 to 12	0	YES
	80	23	0.65 DAN	EH	80°	130	8.9	11.5 to 12	0	
FLOOR STANDARD/ SYSTEM BURNER ECOFLAM MAX 1	87	25	0.75 DAN	EH	80°	110	7.5	11.5 to 12	0	YES
	95	28	0.75 DAN	EH	80°	120	8.2	11.5 to 12	0	

This data is provided as a guide because tolerances of nozzles and oil pumps can vary significantly.

Note: Technical information for System Boilers will match combi appliances of similar output.

3.8 Water - Technical Details

Pressure Relief Valve	3 bar
Expansion Vessel	10 litres (pre-charged at 1.0 bar)
Maximum Operating Pressure	2.5 bar (Hot)
Minimum Domestic Hot-Water Flow-Rate	2.25 litre (0.5 gal)/min
Domestic Hot Water Temperature	Adjustable 30° - 70°C
Maximum Mains Water Pressure	3 bar
Minimum Mains Water Pressure	1.25 bar
Water Connections	
Central Heating Flow & Return	22mm Copper
Mains Inlet (Cold)	15mm Copper
Domestic Hot	15mm Copper
Pressure Relief Valve	15mm Copper



3.9 Technical Information - Condensing Standard Floor Mounted

Standard Floor		CF 15/23	CF 23/30
Nominal	kW	21.8	28.5
Heat Output	Btu/h	74,552	97,242
Nominal	Btu/h	78,476	102,360
Heat Input	kW	23	30
Burner		ECOFLAM MAX 1 HW	
Weight Empty	kg	95	113
	lbs	209	249
Weight Full	kg	108	139
	lbs	238	306
Water	Litres	23	27
Content	Gallons	5.1	5.9
Fuel		Kerosene Class C2	Kerosene Class C2
Flue Type		Balanced or Conventional	
Appliance Full Load			
Efficiency	%	90	91
Exit Flue Con.	mm	BF 3 x 1	127
Diameter	ins	CF 4"	CF 4"
Exit Flue Gas	°C	Approx 55°C+	Approx 55°C+
Temp at Rated Output		Ambient	Ambient
Exit Flue Gas	kg/		
Mass Flow	sec	.00128 kg/sec	.01455 kg/sec
Fuel Burning	kg/		
Rate	sec	0.56	0.723
Control Thermostat		Adjustable between 50°C - 80°C	
High Limit Thermostat		Factory set 100°C	
Waterside Resistance	m/bar	5.4 at 10°C Diff	
Flow & Return		Flow 22mm copper	Flow 22mm copper
Sockets	ins	Return 1 x $\frac{3}{4}$ BSP	Return 1 x $\frac{3}{4}$ " BSP
System Types		Sealed or Open Vented	
Indicator Lights		Mains-Amber High Limit Stat-Red	
Max Hearth Temp	°C	Below 85°C	
Max Side Panel Temp	°C	Below 35°C plus Ambient	
Max Temp adjusting			
Control and Safety			
devices	°C	40°C	40°C
Max Emission Limits			
or Class		Class 1	Class 1
Max Operating Pressure		45p.s.i. (3 Bar)	45p.s.i. (3 Bar)
Test Pressure		65p.s.i.(4.5 Bar)	65p.s.i.(4.5 Bar)
Electricity Supply		220/240V Phase 150Hz 5 amp fuse	
Accoustic Insulation		Specialised Foam material where applicable	



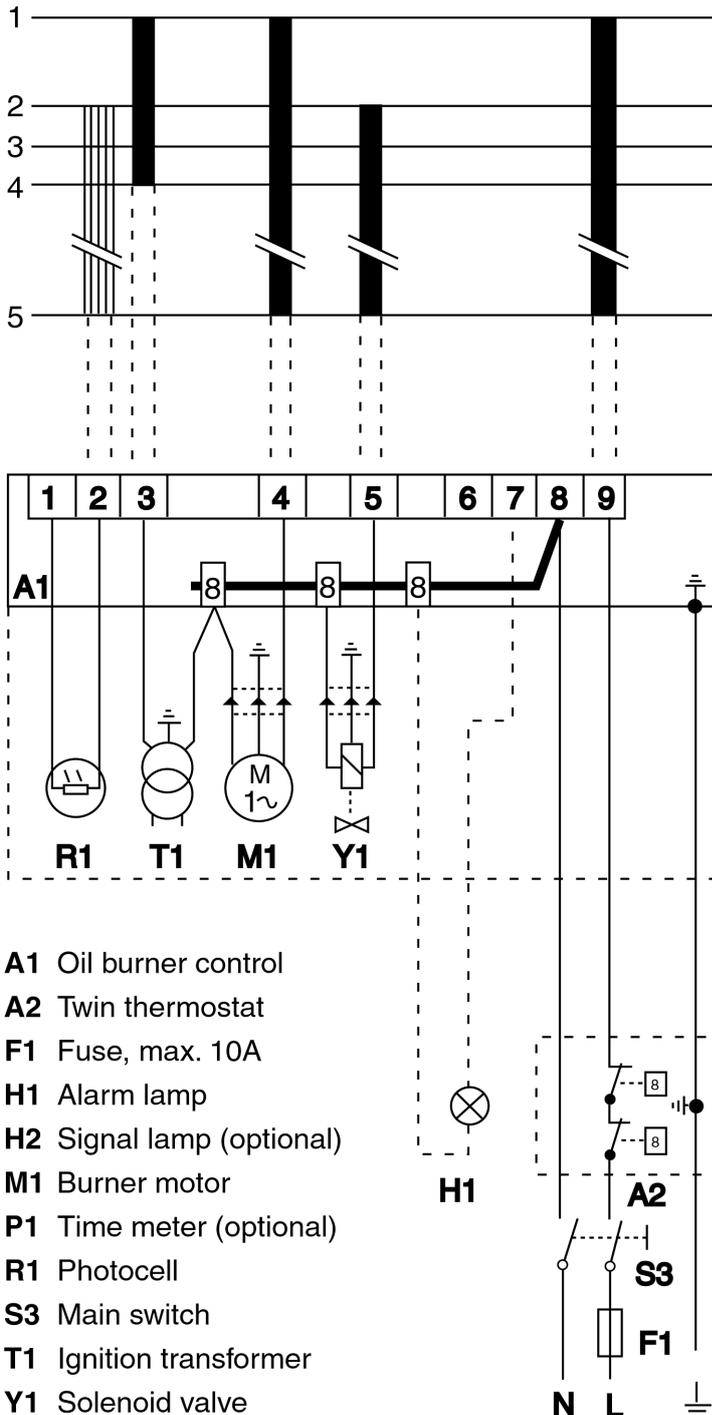
3.10 Technical Information - Condensing Combi & System Floor Mounted

Combi & System Floor		COMBI CCF 15/23 SYSTEM SCF 15/23	SYSTEM SCF 23/30
Nominal	kW	21.7	26.4
Heat Output	Btu/h	73,880	90,000
Nominal	Btu/h	77,770	99,990
Heat Input	kW	22.8	29.3
Burner		ECOFLAM MAX 1 HW	
Weight Empty	kg	128	131
	lbs	281	289
Weight Full	kg	187	175
	lbs	411	385
Water	Litres	60	45
Content	Gallons	13	10
Fuel		Kerosene Class C2	
Flue Type		Balanced or Conventional	
Flue Size	C.F.	4"	4"
Appliance Full Load			
Efficiency	%	93	93
Exit Flue Con.	mm		127
Diameter	ins	CF 5"	5"
Exit Flue Gas	°C	Approx 55°C+	Approx 55°C+
Temp at Rated Output		Ambient	Ambient
Exit Flue Gas	kg/		
Mass Flow	sec	.0011kg/sec	.0131kg/sec
Fuel Burning	kg/		
Rate	sec	0.537	0.655
Control Thermostat		Adjustable between 50°C to 80°C	
High Limit Thermostat		Factory set 95°C	
Waterside Resistance	m/bar	5.8 at 20°C Diff 23 at 10°C Diff	
Flow & Return		1 x 3/4" BSP	1 x 3/4" BSP
Sockets	ins	1 x 22mm	1 x 22mm
System Types		Sealed	
Indicator Lights		Mains-Amber High Limit Stat-Red	
Max Hearth Temp	°C	Below 85°C	Below 85°C
Max Side Panel Temp	°C	Below 35°C plus Ambient	
Max Temp adjusting			
Control and Safety			
devices	°C	30°C	30°C
Max Emission Limits			
or Class		Class 1	Class 1
Max Operating Pressure		45p.s.i. (3 Bar)	45p.s.i. (3 Bar)
Test Pressure		65p.s.i. (4.5 Bar)	65p.s.i. (4.5 Bar)
Electricity Supply		220/240V	50Hz 5 amp fuse
Acoustic Insulation		Specialised Foam Material	

3.11 Wiring Diagrams - Control Box Satronic TF 830B/TF 830B.2B

Fig: 1

ELECTRICAL WIRING control box SATRONIC TF 830B/TF 830B.2B



FUNCTION

- 1. Switch on operating switch and twin thermostat**
The burner motor starts, an ignition spark is formed, the pre-purge goes on till the pre-purge period expires and the solenoid valve opens (2).
- 2. Solenoid valve opens**
Oil mist is formed and ignited. The photocell indicates a flame.
- 3. The safety time expires**
 - a. If no flame is established before this time limit the control cuts out.
 - b. If for some reasons the flame disappears after this time limit, the burner will make an attempt to re-start.
- 4. Ignition spark goes out**
The ignition spark goes out 20 seconds after flame indication and the burner is in operating position.
- 4-5. Operating Position**
If the burner operation is interrupted by means of the main switch or the thermostat, a new start takes place when the conditions in accordance with point 1 are fulfilled.

The oil burner control cuts out
A red lamp in the control is lit. Press the reset button and the burner re-starts.

TECHNICAL DATA

Pre-ignition time	12s
Pre-purge time	12s
Safety lock-out time	10s
Post-ignition time	20s
Reset time after lock-out	min. 60s
Reaction time on flame failure	max 1s
Ambient temperature	from -0 to +60°C

3.11 Wiring Diagrams - Combination Boiler Control Circuits

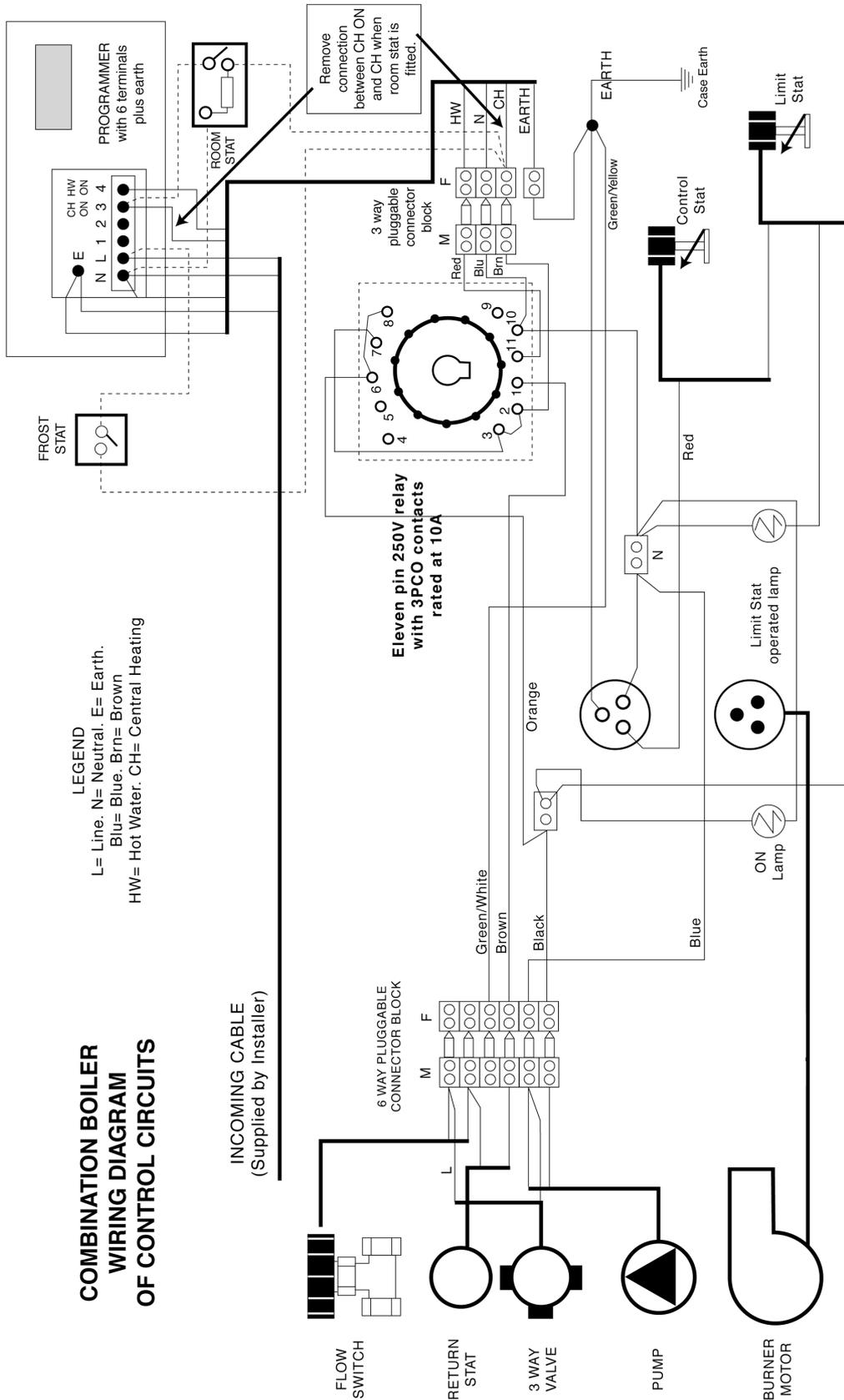
NOTE: Flue Diverter is connected to terminals 3 and 8 on the Burner Control Box.

Fig.2
Combi
electric
system

**COMBINATION BOILER
WIRING DIAGRAM
OF CONTROL CIRCUITS**

LEGEND

L= Line. N= Neutral. E= Earth.
Blu= Blue. Brn= Brown
HW= Hot Water. CH= Central Heating



3.11 Wiring Diagrams - Standard Models

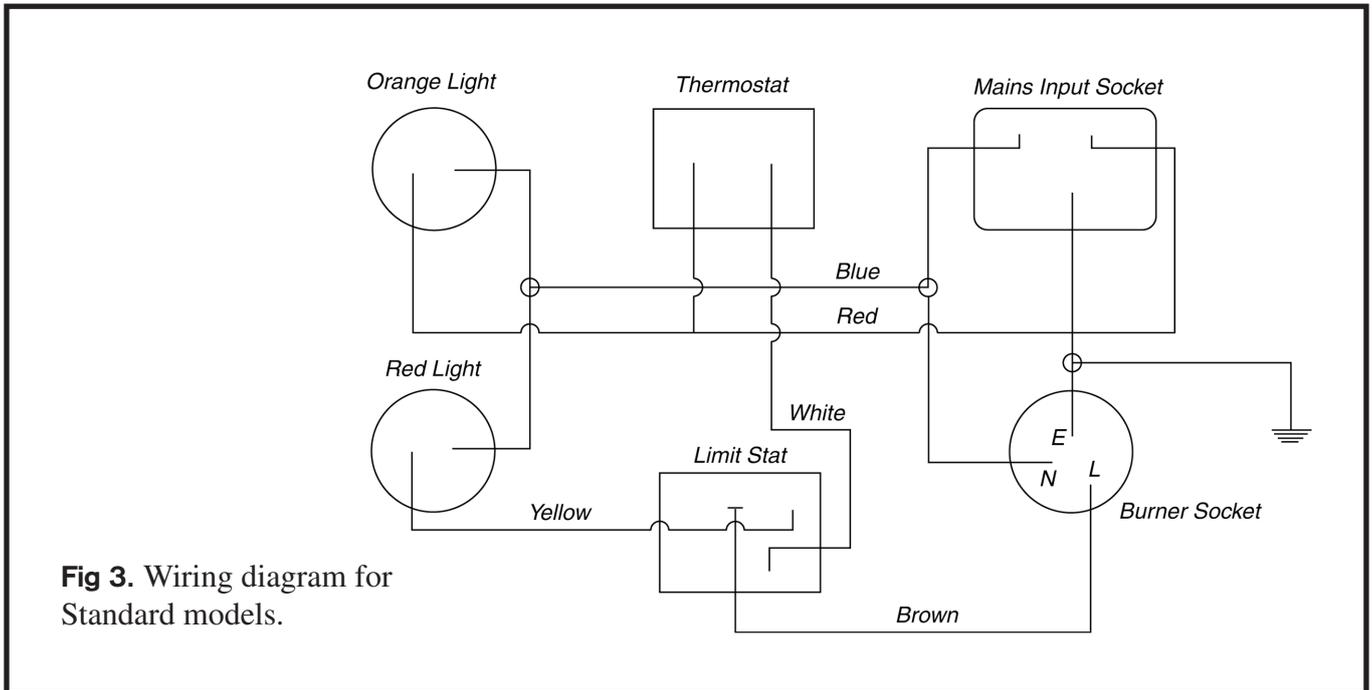


Fig 3. Wiring diagram for Standard models.

3.11 Wiring Diagrams - System Models

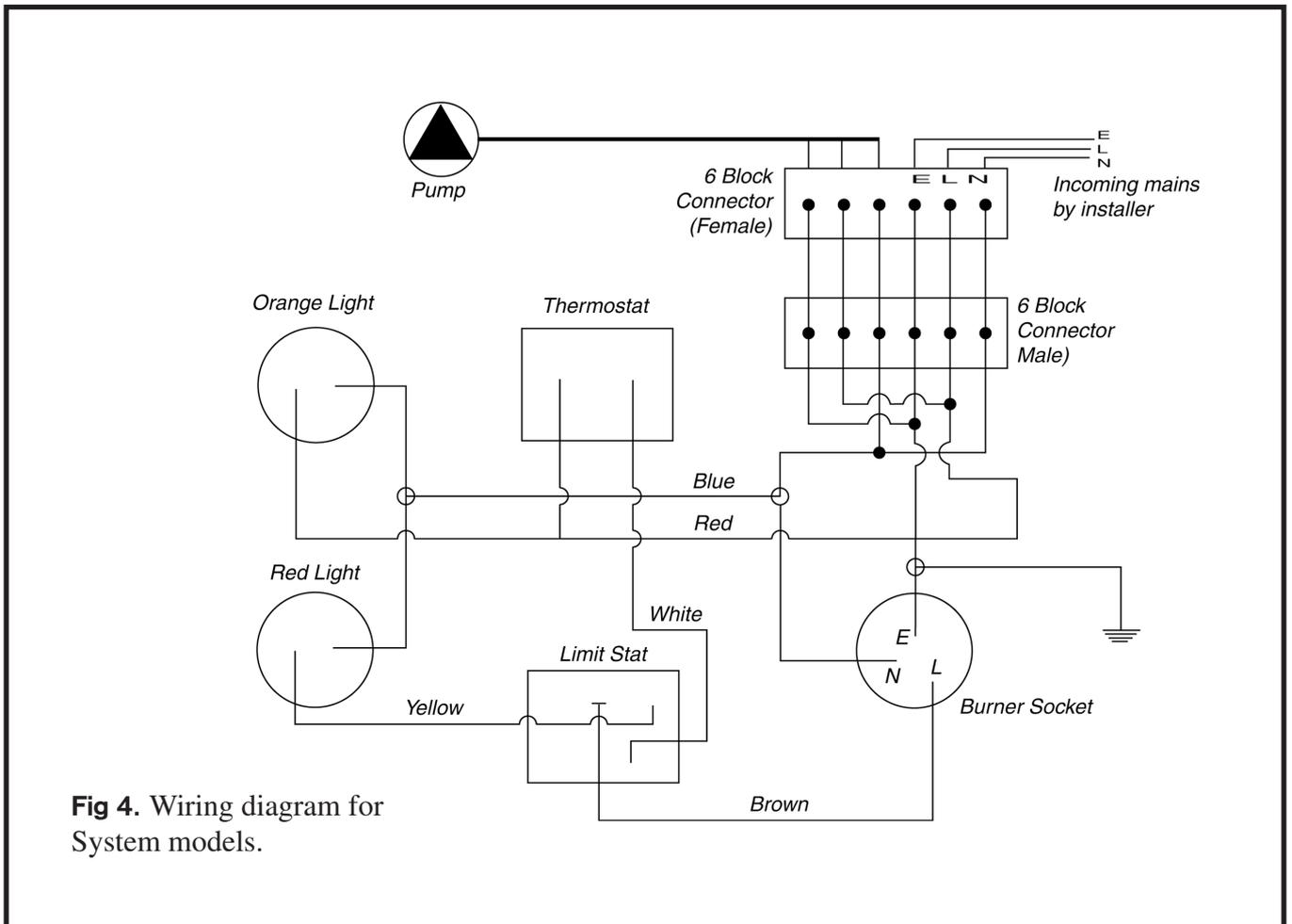


Fig 4. Wiring diagram for System models.

Section 4. Installation, Health and Safety

4.1 Regulations

Ensure that the following Standard and Codes of Practice are complied with when installing Grandee appliances.

Codes of Practice recommended by **OFTEC**

BS5410 parts 1 and 2 - Oil installations upto 45kW

BS4543 parts 1 and 3 - Factory made insulated chimneys.

BS5449 - Forced circulation hot water central heating systems for domestic installations.

Current Building Regulations +

Part J England and Wales

Part F Scotland

Part L North Ireland

BS7671 (1992) Electrical Wiring Regulations.

OFTEC Installation Requirements for Oil Fired Boilers and Oil Storage Tanks.

IEE Wiring Regulations 16th Edition.

4.2 Health and Safety

The installer must comply with the Health and Safety at Work Act and take note of his responsibilities for his own protection and that of persons carrying out the installation.

We strongly recommend **OFTEC** trained and registered heating engineers who should secure from **OFTEC** their guide to 'Safe Working Practices for Oil Firing Technicians'.

4.3 The Heating System

Grandee provide information related to the appliances of its design and manufacture and comply with and exceed all current technical and safety standards. It is not our role or responsibility to become involved in central heating systems or design though any assistance or advice we are able to offer will be provided upon request.

Installation must comply with BS 6798 and BS 5499.

Consult HVCA current Codes of Practice.

If the design of the system is capable of restricting adequate water flow through the boiler, if motorised valves or circulating pumps are able to prevent adequate water through the boiler, then it is possible for the water within the boiler to reach excessive temperature before the boiler thermostat reacts sufficiently to switch off the burner. In these circumstances the installer must arrange for the electrical supply to the boiler to be interrupted simultaneously with the closing of motorised valves or cessation of circulating pumps.

Where boilers are being replaced ensure that the system is thoroughly cleansed using a suitable flushing agent and that scale, if present, is chemically cleared so as to ensure full efficiency of the new system.

Localised boiling (kettling) and knocking noises in the system are invariably attributable to partially blocked systems, presence of air or other system malfunctioning.

4.4 Siting the Boiler

Choose a site where sufficient clearance allows connections to flow and return water pipes, oil supply and flue arrangements. See section 4.6.

All Grandee boilers have a hearth temperature below 85C and for floor mounted boilers the hearth should be level and comply with Building Regulations.

If the boiler should be standing on or fixed to combustible material then a non combustible insulated slab should be provided between the two.

Take note of total weight, when filled, of the boiler and provide that the floor loading is suitable. Your local Building Control Office is usually very helpful in providing advice relating to the floor loading of your boiler.

Grandee boilers are exceptionally quiet compared with most brands. All modern oil boilers make a noise, however, and it would be imprudent to expect a boiler to be completely silent. The type of construction of the dwelling, the size of the room, the quality of the flue can all influence the ultimate noise level of the appliance. Also the actual proper setting up and commissioning of the boiler itself can profoundly influence the operating noise level.

Contact us for advice if necessary. We can provide helpful suggestions and even perhaps arrange visits to other installations. Hollow construction, hard or tiled surfaces and conventional flue pipes can all transmit noise to varying degree. Discuss noise level in detail with heating engineer if you are particularly sensitive to noise.

Flues which pass through chimneys can sometimes transmit noise. Balanced-flue terminals also discharge exhaust noises.

4.5 Condensation Trap

Each Grandee condensing appliance is supplied with a condensation trap. This condensation trap **MUST** be connected to a suitable drain by the installer.

4.6 Clearance Requirements Around Boiler

Floor Boiler.....2" Top (detachable on Combi) and 2" on each side.

4.7 Combustion Air Supply (Conventional Flue Models)

Provision must be made for sufficient and continuous supply of air for combustion.

The air aperture should be located where it cannot be inadvertently blocked. It would be prudent to attempt to position it in such a way as to reduce draught if possible.

If the boiler is fitted in a confined space or cupboard, air for ventilation is needed to prevent possible excessive heating.

With Grandee Floorstanding boilers combustion air enters through the right hand side of the boiler casing. The insulation material on the inside has to be cut clear of this aperture for conventional flue models. The flue blanking plate forming part of the top panel of the casings must be removed.

(When ordered as Combi this will have already been done).

British Standard Code of Practice for Oil Firing BS5410 Part 1 has determined the requirement for a permanent air ingress aperture which should be 550mm² per kW of boiler output. Thus equates to approximately 1sq inch per 4000 Btu/h.

The table below indicates minimum-air requirements for Grandee boilers.

Grandee Model	Minimum Free Air	Aperture
15/23	145 sq cm	30 sq in
23/30	185 sq cm	30 sq in
Combi SFS 15/23	125 sq cm	20 sq in

When draught stabilisers are fitted allow twice the amount of fresh air intake and when a boiler is sited in a cellar or a low confined area then duct the air to low level and provide an additional high level outlet to allow for ventilation.

Take extra care if an extractor fan is present in the same room as the boiler to ensure that sufficient combustion and ventilation air is available for the boiler. Your commissioning engineer may need to carry out a simple CO₂% and smoke test to ensure that sufficient air is present.

4.8 Ventilation

Whether conventional or balanced flue mode Grandee oil boilers require ventilation to prevent overheating of the boiler or its controls. See ventilation guide issued by OFTEC.

4.9 Oil Supply - All appliances

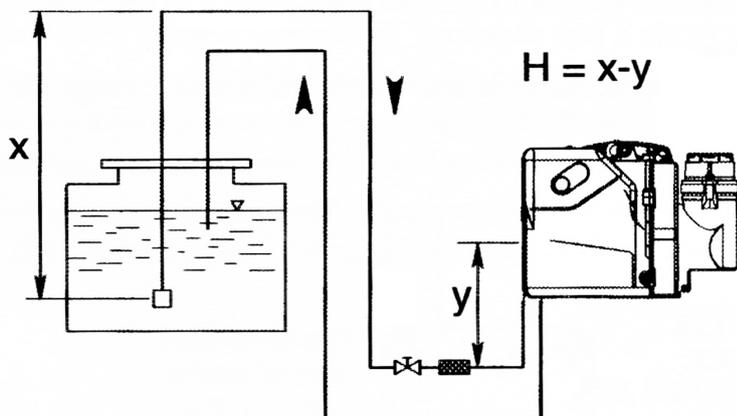
Grandee oil boilers are factory set to burn Kerosene 28c viscosity oil.

The burner is equipped with a high quality long-life flexible oil line to which the oil supply line should be connected.

An oil shut-off valve should be fitted as close as reasonably possible to permit disconnection of the burner and to minimise possible fuel loss or spillage.

An oil filter must also be fitted in the oil supply line outside the building. Absence of a filter can permit the passage of foreign matter or debris which can damage the oil pump or nozzle and for which Grandee will not accept responsibility.

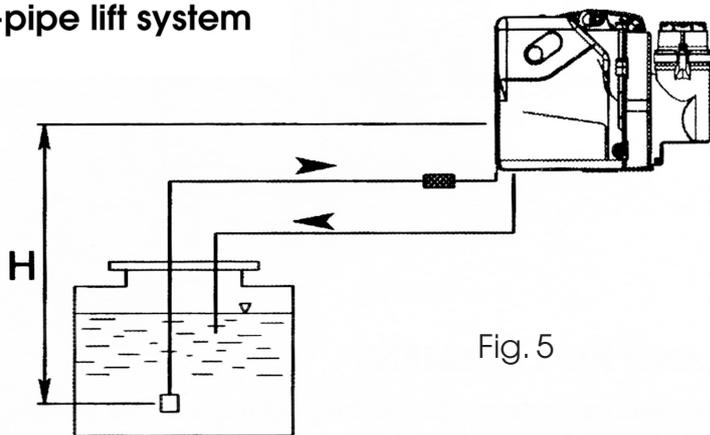
Two-pipe siphon feed system



Maximum lengths of suction lines for two-pipe system Danfoss BFP11 R3

H(m)	Length pipe (m)		
	ø 6mm	ø 8mm	ø 10mm
0.5	19	60	100
1	21	66	100
1.5	23	72	100
2	25	79	100
2.5	27	85	100
3	29	91	100
3.5	31	98	100

Two-pipe lift system

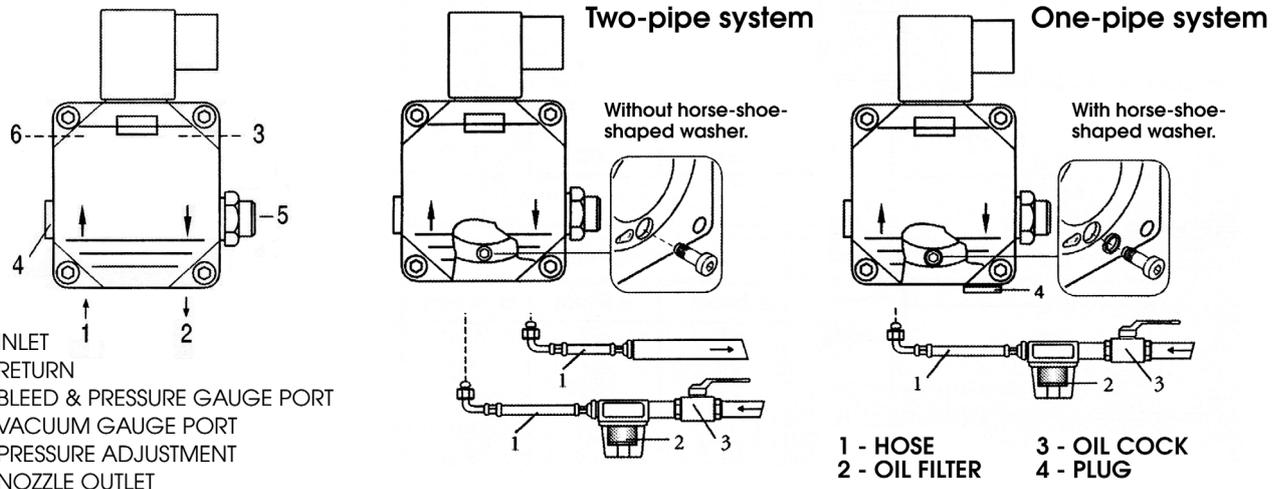


H(m)	Length pipe (m)		
	ø 6mm	ø 8mm	ø 10mm
0.5	15	47	100
1	13	41	99
1.5	11	34	84
2	9	28	68
2.5	7	22	53
3	5	15	37
3.5	-	9	22

4.10 Ecoflam Oil Pump

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

Fig. 6

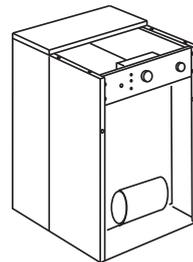


4.11 The Control Panel

Grandee Combi and system appliances are equipped with a standard control panel, see figure 7, which incorporates the following items:-

- a). A control thermostat
- b). A high limit thermostat
- c). An amber neon illuminated light - the mains indicator which confirms that electric power is supplied to the appliance.
- d). A red neon illuminated light - which illuminates only when the control thermostat has failed or that a fault has occurred in the heating system which has caused the boiler to overheat.
- e). A green neon illuminated light - which illuminates when the burner goes to lock out. The customer can reset by pressing the lock out reset button on the burner. Please note: Do not press the lock out reset button more than 3 times and ensure you delay at least 3 minutes before each attempt or you risk damage to the control box.
- f). A High Limit Thermostat Reset Button
- g). A Pressure Gauge (Combi & System).

Fig. 8



Access to the wiring connections

1. Complete panel can be removed by undoing screws.
2. Undo nut on top of control box to access wiring connections.

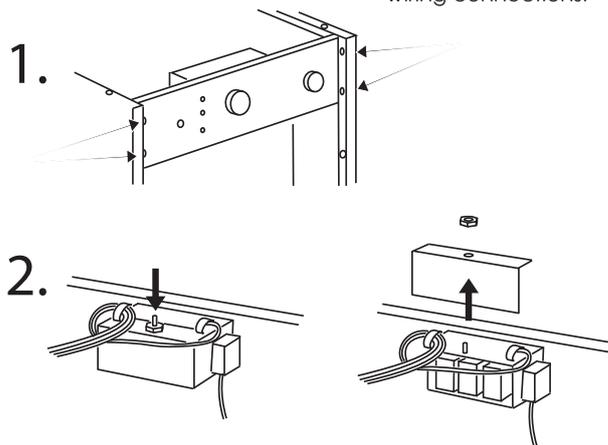


Fig. 7

System and Combi Control Panel



Section 5. Flue Systems

5.1 Conventional flue

Where the Grandee boiler is installed employing a conventional flue or chimney then this should comply with BS5410: Part 1 and satisfy Building Regulations.

There are a number of additional points which the installer should consider carefully.

1. The flue should allow free passage of flue gases and, therefore, the flue should rise as vertically as possible. Any bends, should they be necessary should be gently sweeping 135 degrees to encourage the free flow of flue gases. Sharp right angular bends, and any deviations which are likely to retard flue products must be avoided.

2. The termination of the flue should attempt to avoid areas of potential down draught or turbulent winds. In the event of downdraught a suitable anti downdraught cowl or device should be fitted.

3. Grandee oil boilers are thermally very efficient, often in excess of 90% and flue gas temperatures are relatively low. The flue must be lined with a suitable liner to avoid condensation.

4. Brick chimneys should be lined with a stainless liner, insulated if condensation is a possibility. The flue should be the same diameter as the boiler flue socket.

5.2 Condensate Removal On Conventional Flue Appliances

The flue spigot fitted to Grandee conventional flue appliances is designed to collect condensate which is, in turn, directed through the patented secondary condensation heat-exchanger and is connected to the drain, via the integral condensation trap, as with balanced flue models.

5.3 Balanced Flue

Grandee boilers are available with a variety of balanced flue systems which are often simpler to install than conventional flue models provided that a suitable outside wall is available. These models may be the only ones suitable if no chimney exists.

Balanced flue boilers can be judged to be more stable in burning conditions as they are less affected by flue draught and wind conditions. Air intake and flue discharge are more or less balanced. Also, balanced flue boilers take air for combustion from outdoors and, there-

fore, air change within the dwelling (itself a significant cause of heat loss) is reduced.

Low level balanced flue boilers may only be used with Kerosene. Gas Oil is not permitted. Flue terminals must be protected by a terminal guard which is supplied with the boiler.

Balanced flue terminals must be 600mm from any opening door to window. Avoid positioning where flue discharge or noise could cause inconvenience or objection. Avoid narrow alleyways or confined spaces which could cause ingress of flue products, pollution, which could cause malfunction of the boiler. Also take care not to allow contact between the flue and combustible material.

Contact manufacturer for full details as site conditions vary considerably with Grandee boilers and balanced flue systems can be supplied to specific requirements.

5.4 Balanced Flue Terminals - Recommendations

These recommendations relate to basic safety requirements and should assist the installer in the siting of the boiler.

The principles are to :-

a). Avoid combustion products from drifting into the dwelling.

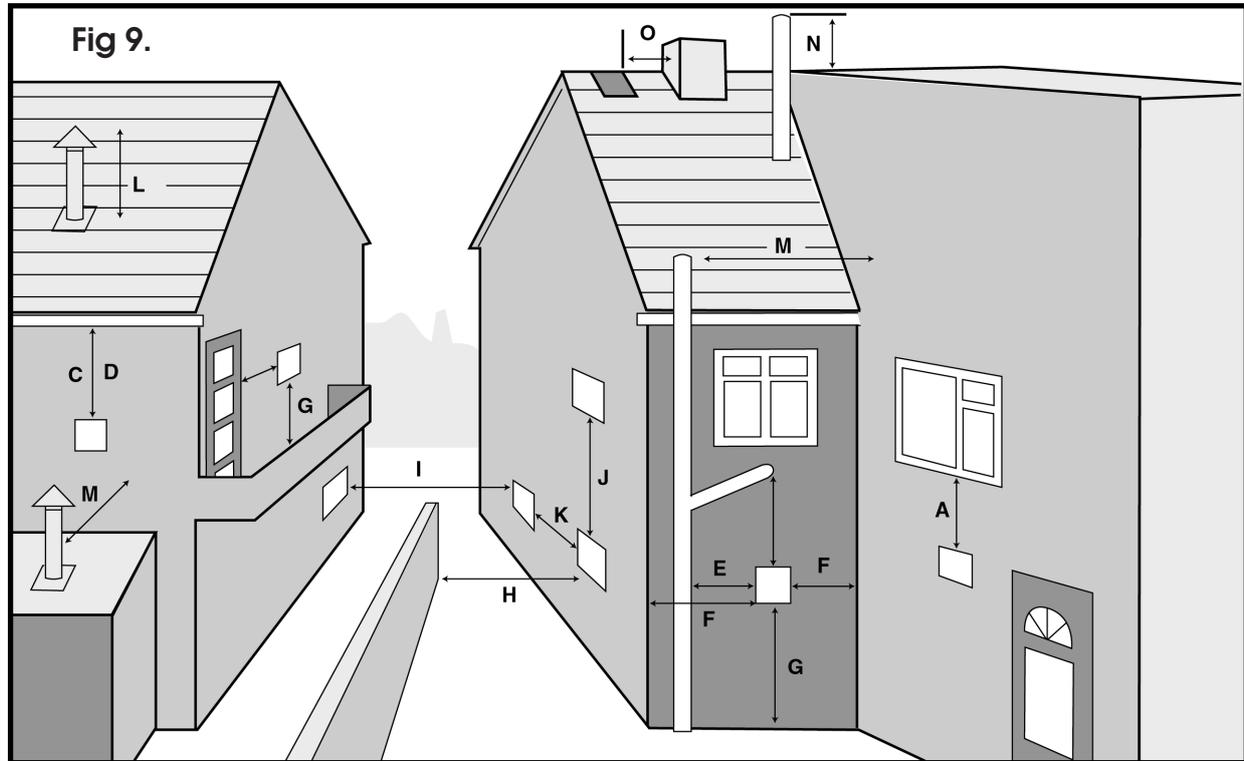
b). To avoid possible combustion with materials such as plastic drain pipes, wooden eaves or other combustible material.

c). To prevent any person, particularly children from accidental burning from the flue terminals. If a flue terminal is less than 2 metres from ground level a flue guard must be fitted.

Flue guards are supplied as standard equipment with all Grandee boilers.

Recommended clearances for Balanced flue terminals are listed on the following page, figure 9.

5.5 Flue Terminating Positions for Oil Fired Appliances



Appliance Burner Type:

Pressure Jet

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

Location	mm.
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
I..... From a terminal facing the terminal.....	1200
J..... Vertically from a terminal on the same wall.....	1500
K..... Horizontally from a terminal on the same wall.....	750
L..... Above the highest point of an intersection with the roof.....	600
M..... From a vertical structure on the side of the terminal.....	750
N..... Above a vertical structure less than 750mm from the side of the terminal.....	600
O..... From a ridge terminal to a vertical structure on the roof.....	1500

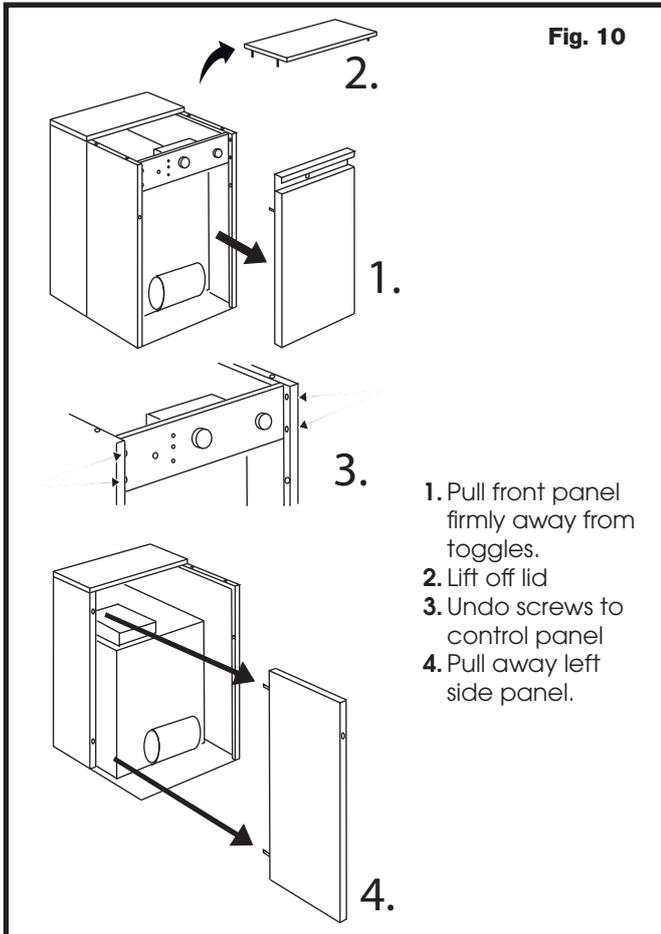
Notes: These notes form an integral part of the information shown above.

- Terminals should be positioned so as to avoid products of combustion accumulating in stagnant pockets around the building or entering into buildings.
- Appliances burning Class D oil have additional restrictions, see clauses 9.6.2 and 11.1.
- Vertical structure in N, O and P include tank or lift rooms, parapets, dormers etc.
- Terminating positions A to L are only permitted for appliances that have been approved for low level flue discharge when tested to a standard listed in Annex A.1.2 or A.2.
- 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.
- Where a flue is terminated less than 600mm 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.
- For terminals used with vapourising burners, a horizontal distance of at least 2300mm is required between the terminal and the roof line.
- 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.

6.1 Standard and System Floor Boilers - Balanced Flue

Step 1:

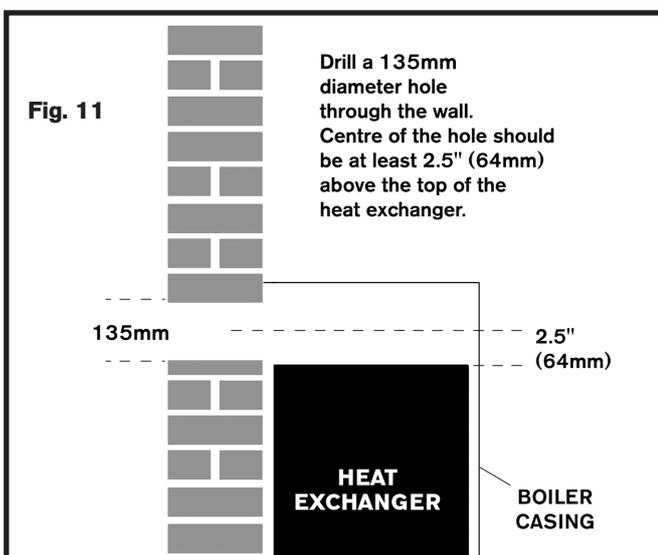
Remove casing. See Fig. 10.



b). Note centre line of 5" (128mm) hole must be a minimum of 2.5" (64mm) above the top of the heat exchanger. See fig. 11. Drill hole.

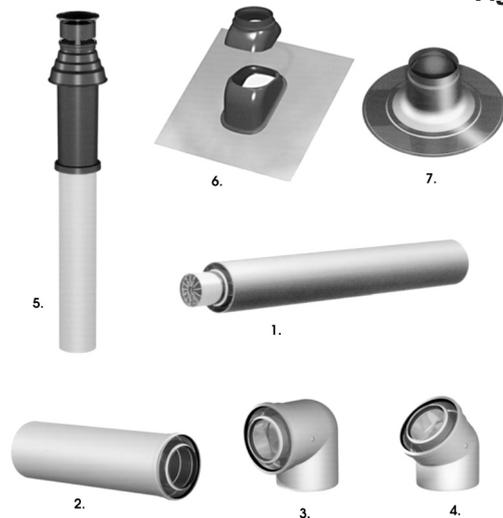
Step 2:

a). Place boiler in final position. Decide on most favourable position for flue/air inlet terminal. See fig. 13.



Flue parts available

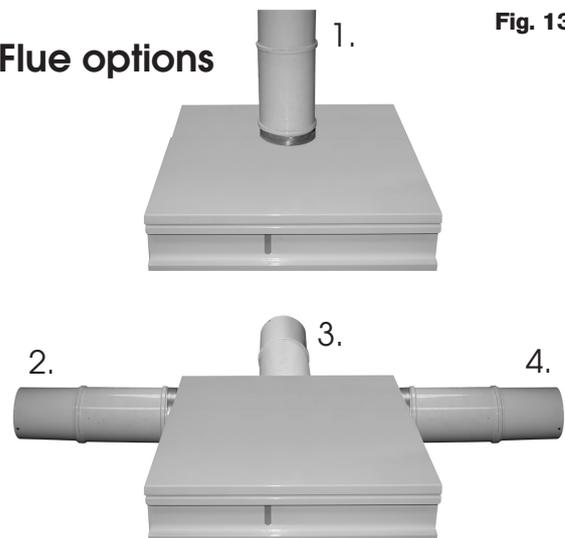
Fig. 12



1. Horizontal Flue Terminal. Part No. GBF10100 **2. 250mm Extension.** Part No. GBF10104. **(500mm Extension.** Part No. GBF10105). **(1000mm Extension.** Part No. GBF10106). **3. 90° Bend.** Part No. GBF10102. **4. 45° Bend.** Part No. GBF101103. **5. Vertical Flue Terminal.** Part No. GBF10101. **6. Lead Flashing.** Part No. GBF10107. **7. Roof Flashing.** Part No. GBF10108. **8. 125mm Diameter Support Bracket.** Part No. GBF10109.

Flue options

Fig. 13



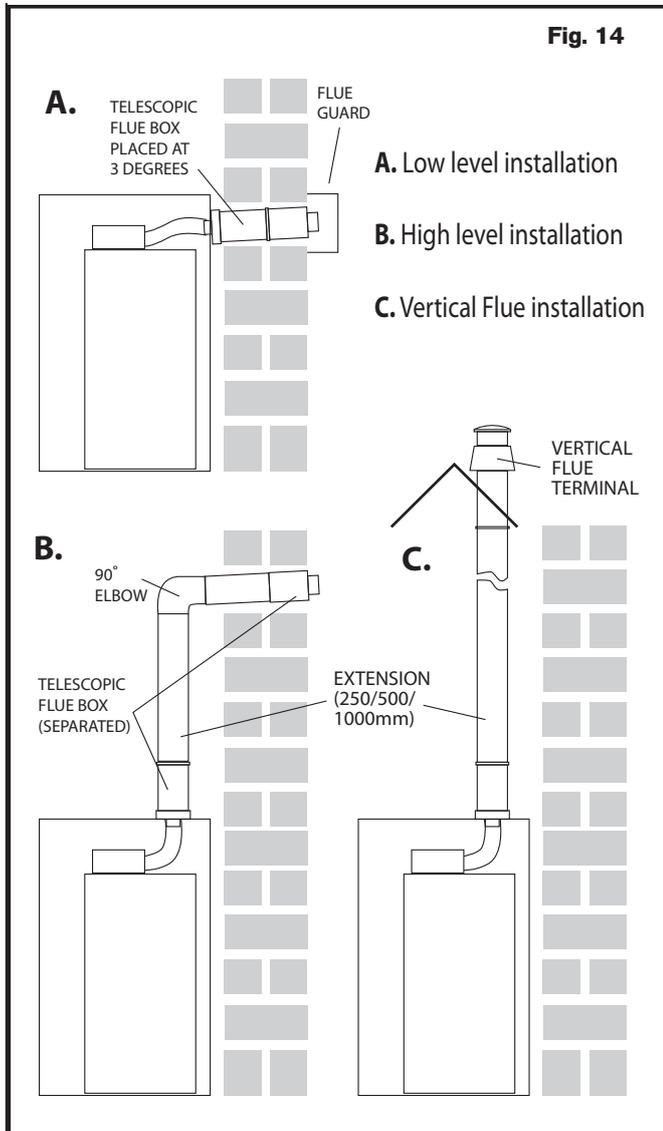
1. From top of boiler
2. Left hand fitting
3. Rear fitting
4. Right hand fitting

The maximum height the vertical flue kit can go from the top of the boiler is 5 metres. The horizontal flue extends from 225mm to 350mm.

Step 3:

FITTING FLUE USING VARIOUS OPTIONS

Decide which Flue option; Low level, High level, Rear, Left, Right or Vertical is appropriate. See Fig. 13.



Step 4:

There are three types of Balanced Flue available. See Fig. 15.

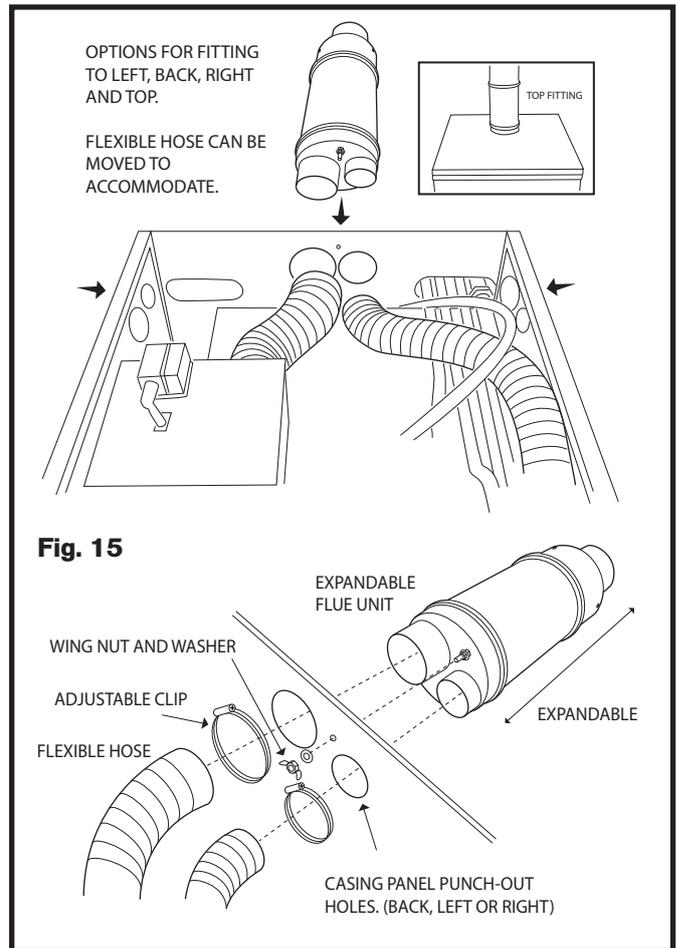
NOTE: All Horizontal flues must be at an angle of 3° or more to the boiler to allow condense to drain back to the boiler for safe discharge via the condensate waste pipe.

When fitting the flue ensure that the 'Sealing Rings' are fitted in the correct groove and use a mild detergent as a lubricant to ease assembly.

It is a mandatory requirement that any terminal of a balanced flue, that can be touched, is fitted with a terminal guard. See Fig. 14.

A. Low Level Installation - This illustration shows a typical rear outlet flue. See Fig. 14.

The flue comes in two telescopic parts. A flue connector



and a flue terminal. Push the flue connector through the flue holes in the boiler casing, securing via the wing nut. Connect the flexible air and flue pipes to the flue connector using the clips provided. See Fig. 15.

Ensuring the sealing rings are lubricated, push the flue terminal onto the flue connector to the desired length.

B. High Level Installation - Using a Horizontal Flue Kit and a 90° bend. See Fig. 14.

Knock out the flue holes on the rear top panel of the boiler and connect the flue connector securing via the wing nut. Connect the flexible air and flue pipes to the flue connector using the clips provided. See Fig. 16. Ensuring that all sealing rings are lubricated, use the telescopic extension to the desired height (max 2 metres). Fit the 90° elbow and connect to the flue terminal. Secure all sections with self-tapping screws.

C. Vertical Flue Installation - Using a Vertical Balanced Flue. See Fig. 14.

Knock out the flue holes on the rear top panel of the boiler and connect the flue connector securing via the wing nut. Connect the flexible air and flue pipe to the flue connector using the clips provided. See Fig. 15. Ensuring that all the sealing rings are lubricated, use the telescopic extensions to the desired height (max 5m including terminal) securing with self-tapping screws. Attach the Vertical Flue Terminal also securing with self-tapping screws.

BEWARE! condensation collects at lowest point

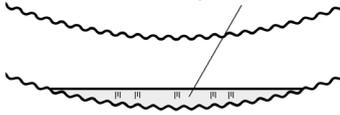


Fig. 16

VERY IMPORTANT NOTICE!

The flue pipe must not be allowed to sag or droop down in ANY place as this could lead to condensate collecting as illustrated. This could obstruct the flow of flow gas and in extreme cases block the flue totally.

Consideration has to be given to the connection of the outlet pipe from the condensation trap to a suitable soil pipe/soak away etc.

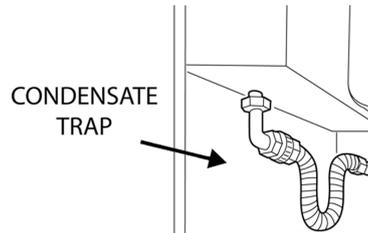


Fig. 17



COMMISSIONING, SERVICE AND MAINTENANCE

Section 7. Commissioning, Service and Maintenance

7.1 Commissioning Procedure

Grandee boilers must be commissioned by a qualified heating engineer, preferably OFTEC registered. This is the responsibility of the installer and failure to do so may nullify the manufacturer's warranty.

Supplied with each boiler is data relating to the commissioning figures. These indicators are those which the commissioning engineer must use. From time to time technical advances or specifications of components progress perhaps beyond the publication of this manual. At the time of print typical combustion figures are as indicated in the separate table.

- a). Check that the boiler and system are full of water and that valves are open.
- b). Check that flues, inspection doors and all flue and water connections are sound.
- c). Check that the electrical connections are correct and that the supply is properly fused with a 5 amp fuse.
- d). Check that adequate combustion air is available and that, on balanced flue models, there are no blockages in the flue pipe or air inlet duct.
- e). Check that baffles are correctly positioned inside the heat exchanger. Usually they are stuck in position with silicone at the factory to minimise movement during transit. The silicone will soon burn off.
- f). Bleed oil to ensure that oil is running freely without air locks. A purpose supplied nipple and short hose are fitted to the oil pump for the commissioning engineers convenience. Grandee wall appliances are supplied with a clear flexible oil hose to the burner so that evidence of air (i.e. bubbles) is

immediately apparent. This oil line should be fully charged with oil and free from air. If air is present check that all joints on the oil line are properly sealed until air is **totally** removed.

- g). Check that the time clock or programmer is set on.
- h). Turn the operating thermostat so that the boiler calls for heat and the boiler should switch on. It is possible for air trapped in the oil line or oil pump to cause initial locking out until all is purged. Wait at least one minute before pushing the illuminated reset button on the control box to allow the control sequence to be completed.
- i). When the burner has operated at least 20 minutes check the readings and compare with commissioning data. Adjust as necessary. This testing can only be conducted with a professional testing kit. These settings are approximate allowances for tolerances of nozzle, oil pump and fan motor may necessitate adjustment. It is not normally necessary, however, to adjust the oil pump pressure which is factory set.
- j). Check the heating system and bleed to remove air.
- k). Remove operating thermostat phial from its pocket to test the working of the protective high limit thermostat.
- l). Complete the Commissioning Report supplied with the boiler and return to the manufacturer. Combustion readings (balanced flue models) must be taken at flue terminal.

7.2 Servicing & Maintenance

Grandee boilers should be routinely serviced at least once a year

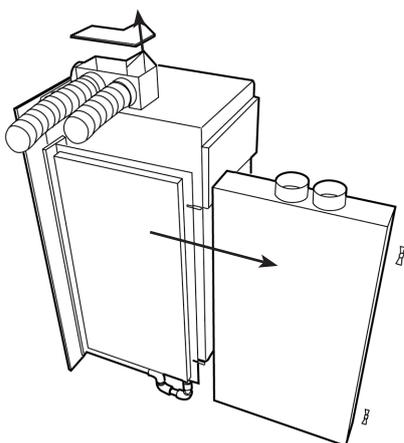
- a). Carry out combustion checks before servicing to compare against commissioning data.
- b). Switch off electrics.
- c). Inspect boiler generally looking for breakages or leaking pipes, flues or inspection doors. Check for tell tale signs of smoke discolouration.
- d). Make sure the boiler is cool before dismantling to prevent

accidental burning.

- e). Remove burner carefully and replace nozzle.
- f). Check the position of the ignition electrodes and clean thoroughly. Also check for cracks in the ceramic insulation sleeves. Replace if damaged or suspect.
- g). Clean photo cell.
- h). Check that all wires are firmly fixed and that there are no loose connections.
- i). Check oil hose for leaks and replace if necessary.
- j). Make sure that the burner and fan impeller is thoroughly clean and that any debris or lint is removed.
- k). Remove inspection doors to heat exchanger and lift out baffles. Replace if badly distorted or worn.
- l). Make sure heat exchanger is thoroughly clean and that any debris or soot is brushed from surfaces and vacuumed.
- m). Re-assemble carefully and double check that all parts and inspection doors are replaced properly.

SOOTING:

In the unlikely event that the appliance should soot-up (i.e. mal-commissioned) it may be necessary to remove the lid of the flue diverter for cleaning. Also to remove condensing unit outer assembly. See below.



7.3 Baffle Design and Positioning

See illustration adhered to the inside of the boiler casing. Failure to fit baffles correctly can cause boiler failure and significantly reduce efficiency.

7.4 Fault Finding

1. Burner will not fire

Possible Cause	Remedy
Programmer switched off	Switch on
Electric supply interrupted	Check fuse
No oil	Check mains supply
	Fill tank
	Check valves are open
	and oil line is clear
Faulty control box	Check fire valve
Photo cell not fitted correctly	Replace
Control box in 'lock-out' mode	Fit properly
	Press the illuminated reset button
Burner motor seized	Loosen or replace

2. Burner starts but fails to establish

Oil supply interrupted	Check oil tank
	Check for blocked oil filter and oil supply
	Check oil grade

Possible Cause

Trapped air in oil line or pump	Check fire valve
No ignition	Bleed oil through oil pump, pump into a container till air is removed
Blocked nozzle	Check electrodes
Faulty oil solenoid valve	Check ignition transformer
	Replace

3. Burner locks out after flame established

Water in oil	Drain water from storage tank
Wrong grade of oil	Check grade
Photo electric cell faulty or dirty	Clean thoroughly and fit properly
Too much air	If this does not then operate, replace
Faulty control box	Reduce air input using adjuster
	Re-commission
	Replace

4. Burner fires but creates smoke

Wrong oil grade	Provide correct oil
Air adjustment incorrect	Check against data
Baffles misaligned	check oil pressure, re-commission
Oversized nozzle	Fit according to figures
Air inlet blocked	Replace with correct nozzle
	Check against data
	Clear

5. Lockout in morning or cold starts

Air in oil line	Check oil line
Low voltage	Check non return valve (wall mounted)
Excessive combustion air	Make sure all joints are sealed air tight
Oil pump sticking after prolonged shutdown	Check supply with local electricity supplier
	Commission properly
	Replace oil pump

6. Limit light illuminates

Faulty control thermostat	Replace
No bypass in system, particularly where thermostat radiator valves are fitted	
Water not being circulated away from the boiler	Check heating system
	Check motorised valve system
	Check feed/expansion tank for correct operation
	Normally, if the limit light illuminates there is a problem with the heating system not the boiler.
Faulty electricians	Thoroughly check all connecting wires
	Search for loose connections.

7. Insufficient Hot Water

Flow switch faulty	Replace
Boiler not up to temperature	Try after 20 minutes
Control Thermostat set too low	Turn to setting 3 or more
Air trapped within appliance	Bleed air properly
Circulating pump set too low causing poor circulation	increase to setting 3
Motorised valve faulty	Check and replace if necessary
Plate heat-exchanger scaled-up	Clean or replace
Mixing valve scaled-up	Replace
Burner does not fire when reasonable amounts of hot water are drawn off	Faulty Control Thermostat
Hot water and central heating not operating	Circulating pump faulty. Replace.
Air in system	Bleed thoroughly

8. Pressure of system keeps falling

Leaks in system	Check and replace radiator valves.
	Check for any leaks and rectify
	Check that pressure relief valve is not passing
	Check that expansion vessel is charged to 1 bar pressure.

IMPORTANT

HOUSEHOLDER: Should you experience problems with your Grandee appliance the manufacturer will require a pre-paid payment or credit card details for site attendance unless this commissioning document is returned. Most boiler failures occur through faulty installation or commissioning for which the manufacturer does not accept responsibility.

This document must be completed by your installer or commissioning agent to prove that the appliance has been properly commissioned otherwise your manufacturers warranty will be invalid.

Should you contact the manufacturer for assistance in remedying appliance problems you will be required to provide a credit card number or payment details before a site visit is arranged.

If the fault, during the warranty period, is the responsibility of the manufacturer no charge will be made. However, if the origin of the fault lies with the installation, commissioning or operation (e.g., running out of oil, wrong fuel, incorrect wiring, fire valves closed etc, etc) you will be charged for the visit.

Ask your installer to complete this information and retain

Boiler Model _____

Serial Number _____

Burner Type _____

Fuel _____

Installers Name and Address

Commissioning Data:-

Nozzle size and Type _____

Oil Pump Pressure _____

Air Setting _____

CO₂ _____

CO _____

Flue Gas Temperature _____

Service Engineers

name and address



Grandee Limited
Excelsior Works, Eyre Street,
Birmingham B18 7AD.
Tel: 0121 454 2244 Fax: 0121 454 4488