

Grant VORTEX Pro Internal Combi

Combi 21e, Combi 26e and Combi 36e Condensing Oil Boiler Range

Installation & Servicing Instructions



Commissioning Report

For use with Kerosene* only.

After installing the boiler leave these instructions with the User.

This appliance is deemed a controlled service and specific regional statutory requirements may be applicable.

*Operation on Bio-fuel

All Grant Vortex Pro condensing boilers, manufactured since May 2011, are suitable for operation on both standard kerosene (Class C2 to BS2869) and also bio-kerosene – up to a 30% blend (B30K).

All burner settings and nozzle sizes (as detailed in Section 2.3 of this manual) are correct for both standard kerosene and bio-kerosene (B30K).

In order to operate this boiler on bio-kerosene it will be necessary to take the following actions:

- Use a bio-kerosene (B30K) compatible flexible oil line in place of the oil line supplied with this boiler.
- Have your oil storage tank and oil supply line (including all pipework, sight gauges, filters, isolating valves, fire valves, de-aeration devices, etc.) checked for their compatibility with bio-kerosene (B30K).

Where necessary some, or all, of these items may have to be replaced with a bio-kerosene compatible alternative.

- Check the suitability of the flue system with Grant UK.
- Use only bio-kerosene (B30K) that conforms to OPS24.

IMPORTANT

Under no circumstances should the boiler be used with bio-kerosene without the above actions being taken first.

Date: _____

Commissioning engineer: _____

Tel. No: _____

Boiler model: _____ Boiler output: _____ kW

Fuel type: Kerosene

Nozzle size: _____ Pump pressure: _____

Air setting: _____ Flue gas % CO₂: _____

Net flue gas temp: _____ Smoke No: _____

System flushed: Yes / No

Corrosion inhibitor added: Yes / No

Antifreeze added: Yes / No

(where there is a Yes / No - please circle appropriate answer)

For sealed systems only:

Expansion vessel size : _____ litres

Expansion vessel change pressure : _____ bar

Sealed system fill pressure (cold) : _____ bar

Service Log

It is recommended that the boiler should be regularly serviced, at least once a year, and the details entered in the Boiler Handbook by the service engineer.



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1 Introduction

This manual is intended to guide engineers in the installation and maintenance of Grant Pro Internal Combi e boilers. A separate manual is available to guide users in the operation of these boilers, and is printed inverted at the end of this manual.

The following special text formats are used in this manual for the purposes listed below:

WARNING

Warning of possible human injury as a consequence of not following the instructions in the warning.

CAUTION

Caution concerning likely damage to equipment or tools as a consequence of not following the instructions in the caution.

NOTE

Note text. Used for emphasis or information not directly concerned with the surrounding text but of importance to the reader.

1.1 How a Condensing Boiler Works

During the combustion process, hydrogen and oxygen combine to produce heat and water vapour. The water vapour produced is in the form of superheated steam in the heat exchanger. This superheated steam contains sensible heat (available heat) and latent heat (heat locked up in the flue gas). A conventional boiler cannot recover any of the latent heat and this energy is lost to the atmosphere through the flue.

The Grant VORTEX Pro Combi e condensing boilers contain an extra heat exchanger which is designed to recover the latent heat normally lost by a conventional boiler. It does this by cooling the flue gases to below 90° C, thus extracting more sensible heat and some of the latent heat. This is achieved by cooling the flue gases to their dew point (approximately 55° C).

To ensure maximum efficiency, the boiler return temperature should be 55° C or less, this will enable the latent heat to be condensed out of the flue gases.

The boiler will achieve net thermal efficiencies of 100%.

To achieve maximum performance from the Grant VORTEX Pro Combi e boilers, it is recommended that the heating system is designed so that a temperature differential of 20° C between the flow and return is maintained.

The Vortex Pro Combi e boilers will however still operate at extremely high efficiencies even when it is not in condensing mode and therefore is suitable for fitting to an existing heating system without alteration to the radiator sizes. The boiler is capable of a maximum flow temperature of 78° C.

1.2 Boiler Description

The Vortex Pro Combi e boilers are automatic pressure jet oil boilers designed for use with a sealed central heating system and will provide domestic hot water at mains pressure.

All boilers are supplied with the control panel and burner factory fitted.

All boilers can be connected to either a conventional flue system or a balanced flue system, as required.

The boilers are suitable for use in sealed central heating systems only.

All models are supplied with the control panel and burner factory fitted. The boilers can be connected to either a conventional flue system or a balanced flue system, as required.

For Conventional Flue Applications

Where a chimney is to be lined - Grant recommends the use of the Grant 'Orange' flue system, specifically designed for the Vortex range of condensing boilers. Refer to Section 9.2 for further details.

Where a rigid conventional flue - internal to external - is required, Grant recommends the use of a hybrid system consisting of Grant 'Green' and 'Orange' flue system components. As no flue adaptor is supplied with the boiler it will be necessary to purchase the Grant CF adaptor kit to connect this system to the boiler correctly.

Flue adaptor kit - Ref. CFA15/70 - is used for all models as they all use the 100mm 'Green' and 'Orange' system components to construct a flue of maximum vertical height 8 metres.

NOTE

The flue system materials and construction MUST be suitable for use with oil-fired condensing boilers. Failure to fit a suitable conventional flue may invalidate the warranty on the boiler.

For Balanced Flue Applications

The following flue kits are available from Grant UK.

Refer to Section 9 for further details.

Yellow System

Standard low level concentric balanced flue - components available:

- Low level concentric balanced flue short
- Extensions 225mm, 450mm and 675mm
- 90° extension elbow
- 45° extension elbow
- 45° elbow
- Plume Diverter Kit

Green System

Standard external high level/vertical flue starter kit (room sealed) - components available:

- External high level/vertical flue starter kit short (room sealed)
- Extensions 150mm, 250mm, 450mm, 950mm and adjustable 195 to 270mm
- 45° elbow
- High level terminal
- Vertical terminal

White System

High level concentric balanced flue kit - components available:

- Vertical concentric balanced flue kit.
- Extensions 225mm, 450mm, 950mm and adjustable 275 to 450mm.
- 45° elbow.

Red System (for Combi 21e and 26e only)

A flexible vertical balanced flue system designed to be fitted inside an existing masonry chimney.

Consisting of three sections:

- Concentric white painted flue pipe connected to the boiler.
- Vertical concentric flexible flue (flexible stainless steel flue liner inside a flexible plastic air inlet liner).
- Terminal assembly for chimney top mounting.

Flue extensions and 45° elbows from the White system may be used.

Fitting instructions for the Low level, High level and Vertical balanced flue systems are supplied with the kits.

1.3 Boiler Components

The Vortex Pro Combi e boilers are only suitable for use with Kerosene.

All burners are ready to connect to a single pipe system with a loose flexible fuel line (900mm) and $\frac{3}{8}$ " to $\frac{1}{4}$ " BSP male adaptor supplied with the boiler. If required, an additional flexible fuel line (900mm) and $\frac{3}{8}$ " to $\frac{1}{4}$ " BSP male adaptor are available to purchase from Grant Engineering (UK) Limited, for two-pipe oil supply system, Part No. RBS36.

The temperature of the water leaving the boiler to heat the radiators is User adjustable.

The setting of the boiler thermostat on the Vortex Pro Combi boilers has no effect on the hot water performance.

The boiler is fitted with an overheat thermostat (which allows it to be used on a sealed central heating system) which will automatically switch off the boiler if the heat exchanger exceeds a pre-set temperature of $111^{\circ}\text{C} \pm 3^{\circ}\text{C}$.

Figure 1-1 shows the components in the Vortex Pro Combi e boilers and the position of the control panel. Figure 1-2 shows the details of the control panel.

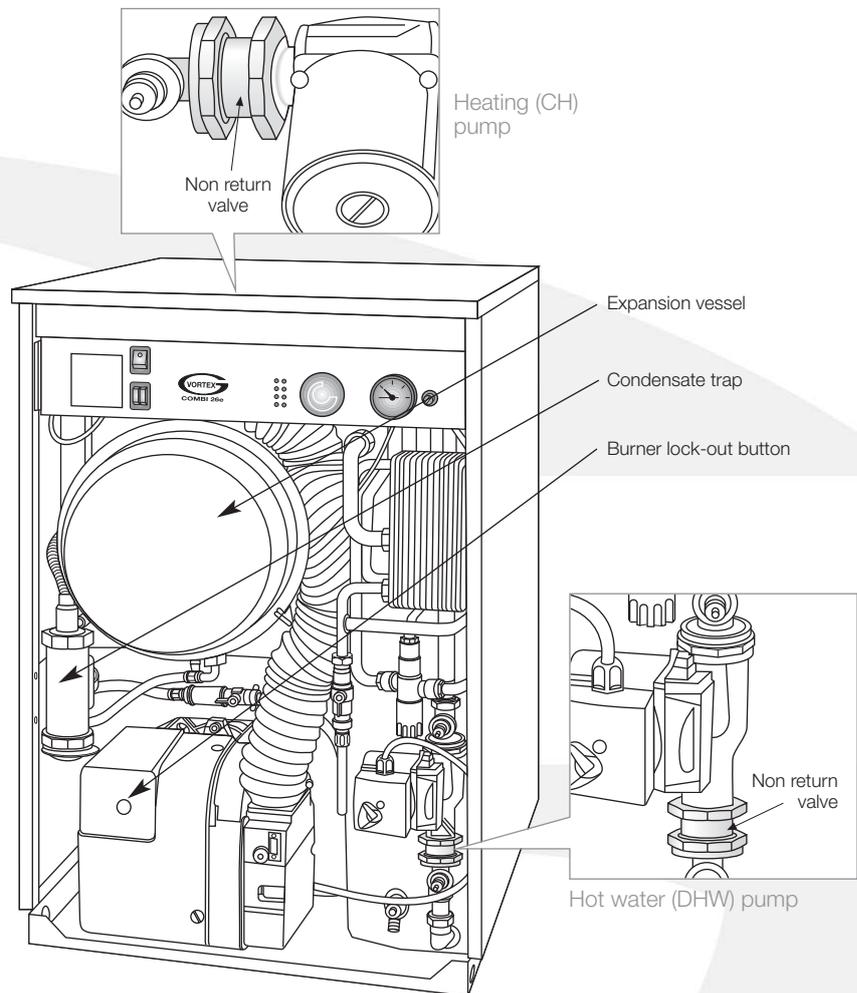


Figure 1-1: Vortex Pro Combi e boiler with front panel removed

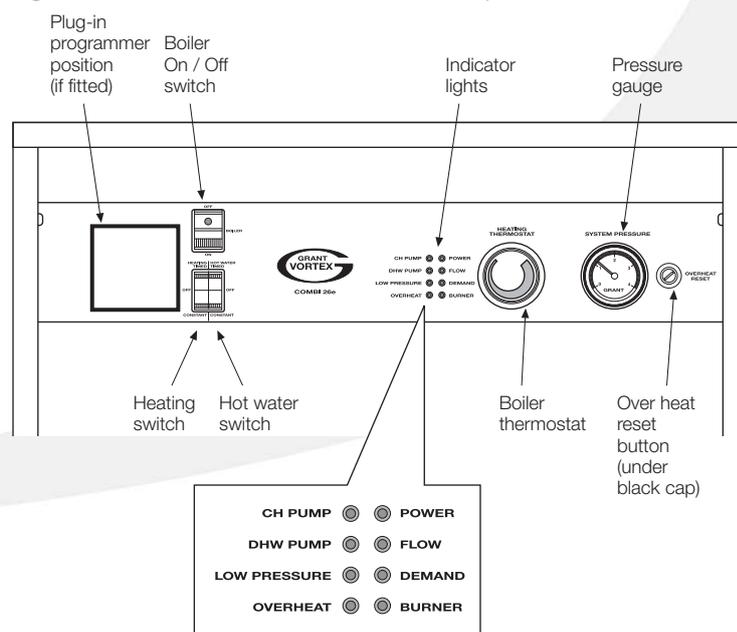


Figure 1-2: Vortex Pro Combi e boiler control panel

The control panel is fitted with an ON/OFF switch, Heating switch, Hot water switch, Indicator lights, Boiler (heating), Pressure gauge and manual reset button for the overheat thermostat.

2 Technical Data

2.1 Boiler Technical Data

Model		Vortex Pro Combi 21e	Vortex Pro Combi 26e	Vortex Pro Combi 36e
Boiler water content (including 32 litre primary store)	Litres	48.0	48.5	53.5
	Gal	10.6	10.7	11.8
Weight (dry)*	kg	146	188	218
	lbs	322	415	481
Connections: Heating flow and return	mm	22	22	28
Cold water mains inlet	mm	15	15	22
Domestic hot water outlet	mm	15	15	22
Pressure relief valve discharge	mm	15		
Condensate connection		22mm plastic pipe		
Flue size (conventional)		100 mm (4 in) diameter		
Waterside resistance Flow/Return temp. diff. of 10°C	mbar	28.5		26.0
Waterside resistance Flow/Return temp. diff. of 20°C	mbar	10.0		9.5
Boiler thermostat range	°C	65 to 78		
Limit (safety) thermostat switch off temp.	°C	111°C +0 -3		
Maximum heating system pressure (cold)	bar	1.0		
Minimum heating system pressure (cold)	bar	0.5		
Pressure relief valve	bar	2.5		
Expansion vessel (pre-charged at 1 bar)	litres	10	12	14
Maximum heating system volume**	litres	106	128	148
Maximum operating pressure	bar	2.5		
Minimum domestic hot water flow rate		3.0 litres/min (0.66 gal/min)		
Maximum domestic hot water temperature	°C	65 (factory set)		
Maximum mains water inlet pressure	bar	8.0		
Minimum recommended mains water inlet pressure	bar	2.5		
Maximum hearth temperature	°C	Less than 50		
Electricity supply		230V ~ 50Hz Fused at 5 Amp		
Motor power		90 W max.		
Starting current	Amp	4.2	2.60	
Running current	Amp	0.85		
Oil connection		1/4" Male BSP (on end of flexible fuel line)		
Conventional flue		Minimum flue draught - 8.7 N/m ² (0.035 in wg) Maximum flue draught - 37 N/m ² (0.15 in wg)		

* Weight includes burner but excludes flue

** Based on expansion vessel charge and initial cold system pressure of 0.5 bar

2.2 Burner Settings

NOTE

Burners are supplied factory set at the outputs shown.

When commissioning, the air damper must be adjusted to obtain the correct CO₂ level and the Installer must amend the data label.

The data given below is approximate only and is based on the boiler being used with a low level balanced flue.

The above settings may have to be adjusted on site for the correct operation of the burner.

Gas Oil is not suitable for use with a Grant Vortex Pro Combi e boiler.

The net flue gas temperatures given above are ± 10%.

When commissioning the air damper must be adjusted to obtain the correct CO₂ level.

The combustion door test point may be used for CO₂ and smoke readings only. Do not use this test point for temperature or efficiency readings.

2.4 Flue Gas Analysis

To allow the boiler to be commissioned and serviced, the boiler is supplied with a combustion test point on the front cleaning door. When this test point is used please note the following:

- The test point is for CO₂ and smoke readings only.
- The boiler efficiency and temperature must be taken from the flue test point on high level, vertical and conventional flue adaptors.
- Concentric low level flues do not contain a test point. The temperature and efficiency readings must be taken from the flue terminal.

2.3 Vortex Combi e Boilers using Class C2 Kerosene

Model	Burner type	Heat output		SEDBUK SAP 2009	Nozzle	Oil pressure bar	Smoke number	Burner head	Fuel flow kg/h	Flue gas temp °C	CO ₂ %
		kW	Btu/h	%							
21e	Riello RDB 2.2	21.0	71,650	89.5	0.60/80°EH	9.0	0-1	T1	1.83	80 (flue) 235 (door)	12
26e	Riello RDB 1	26.0	88,700	90.2	0.75/80°EH	8.0	0-1	T2	2.16	75 - 80	12
36e	Riello RDB 2.2	36.0	123,000	91.6	1.00/80°EH	9.1	0-1	T5	3.01	78	12

NOTE

Vortex Combi e boilers are only for use with kerosene.

3 Oil Storage & Supply System

3.1 Fuel Supply

Fuel Storage

The tank should be positioned in accordance with the recommendations given in BS 5410:1:1997, which gives details of filling, maintenance and protection from fire.

A steel tank may be used and must be constructed to BS 799:5:1987 and OFS T200.



CAUTION

A galvanised tank must NOT be used.

A plastic tank may be used and must comply with OFS T100.



NOTE

Plastic tanks should be adequately and uniformly supported on a smooth level surface, across their entire load bearing base area, that is, the area in contact with the ground.

Fuel Pipes

For gravity fuel supply systems, fuel supply pipes should be of copper tubing with an external diameter of at least 10 mm.



CAUTION

Galvanised pipe **must not** be used.

All pipe connections should preferably use flared fittings. Soldered connections **must not** be used on oil pipes.



CAUTION

Flexible pipes must NOT be used outside the boiler case.

A remote sensing fire valve must be installed in the fuel supply line (outside) where it enters the building, with the sensing head located above the burner.



NOTE

Grant UK recommend that a fire valve with a temperature rating of 95°C be installed on any Grant Vortex Pro Combi.

Recommendations are given in BS 5410:1:1997.

A metal bowl type filter with a replaceable micronic filter must be fitted in the fuel supply line adjacent to the boiler. A shut-off valve should be fitted before the filter, to allow the filter to be serviced.

A flexible fuel line, adaptor and 1/4" BSP isolation valve are supplied loose with the boiler for the final connection to the burner. If a two pipe system or Tiger Loop system is used, an additional flexible fuel line (900mm) and 3/8" to 1/4" BSP male adaptor are available from Grant Engineering (UK) Limited (Part No. RBS36).

Metal braided flexible pipes should be replaced annually when the boiler is serviced. Long life flexible pipes should be inspected annually and replaced at least every 60 months.

Single Pipe System

Where the storage tank outlet is above the burner the single pipe system should be used. The height of the tank above the burner limits the length of pipe run from the tank to the burner.

As supplied the burner is suitable for a single pipe system.

Head A (m)	Max Pipe Length (m)	
	ø 8mm	ø 10mm
0.5	10	20
1	20	40
1.5	40	80
2	60	100

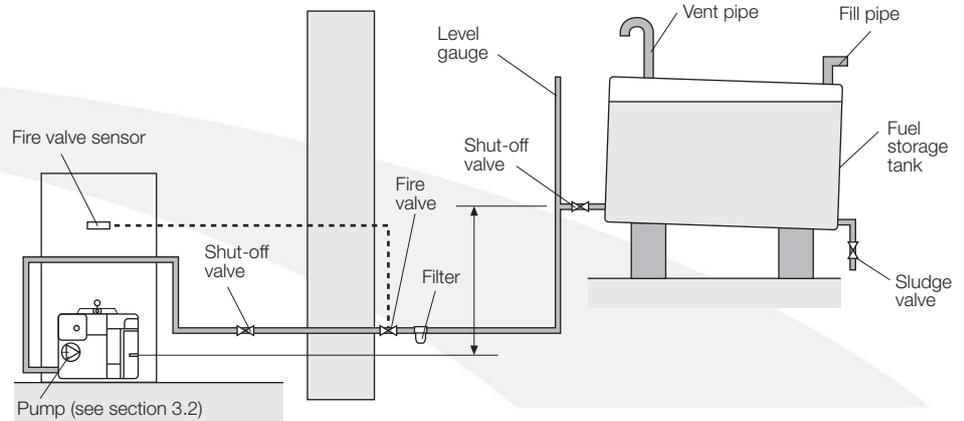


Figure 3-1: Single pipe system

Two Pipe System

With the storage tank outlet below the burner, a two pipe system should be used. The pipe runs should

be as shown in Figure 3-2. The return pipe should be at the same level in the tank as the supply pipe,

both being 75 to 100 mm above the base of the tank. The pipe ends should be a sufficient distance apart

so as to prevent any sediment disturbed by the return entering the supply pipe.

Avoid the bottom of the tank being more than 3.5m below the burner.

A non-return valve should be fitted in the supply pipe together with the filter and fire valve. A non return valve should be fitted in the return pipe if the top of the tank is above the burner.

The pump vacuum should not exceed 0.4 bar. Beyond this limit gas is released from the oil.

For guidance on installation of top outlet fuel tanks and suction oil supply sizing, see OFTEC technical book 3.

Available at www.oftec.org.uk.

Head A (m)	Max Pipe Length (m)	
	ø 8mm	ø 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

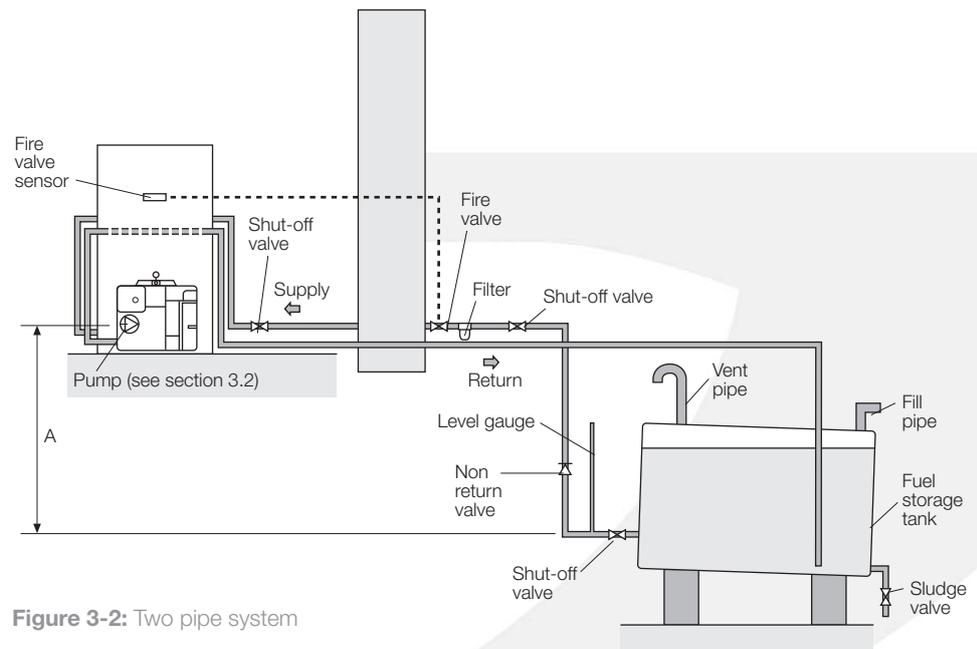


Figure 3-2: Two pipe system

**Tiger Loop System -
(See Figures 3-3 and 3-4)**

When The storage tank is below the burner, an alternative to a two pipe system can be achieved using a 'Tiger Loop' type oil de-aerator. This effectively removes the air from the oil supply on a single pipe lift.

The de-aerator is connected close to the boiler as a two pipe system (omitting the non-return valve) as shown in Fig. 3-3. Refer to the manufacturers instructions supplied with the de-aerator. The de-aerator **must** be mounted vertically, as shown in Figures 3-3 and 3-4.

! WARNING

To prevent any possibility of fuel fumes entering the building, the de-aerator **must** be fitted outside in accordance with BS 5410:1:1997.

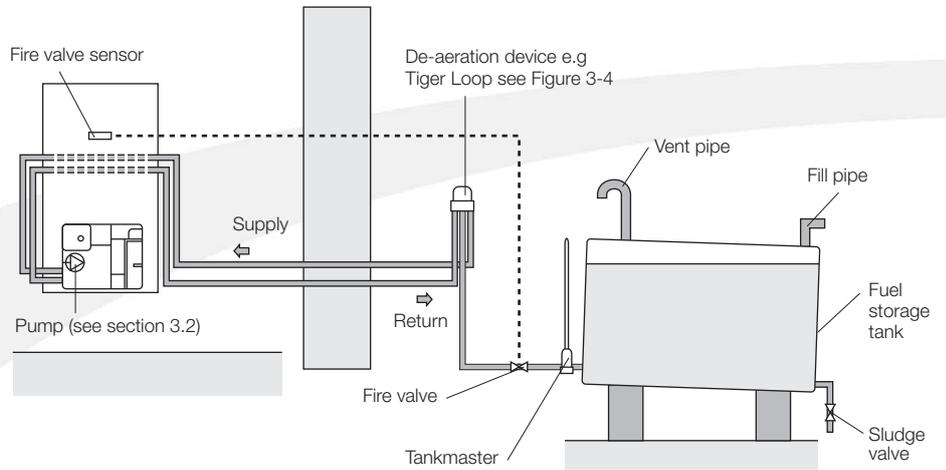


Figure 3-3: De-aeration device system



Figure 3-4: Tiger loop de-aeration device

3.2 Burner Oil Connection

The fuel pump is supplied for use with a single pipe fuel supply system. For use on a two pipe system, it is necessary to fit the By-pass screw into the tapping in the return port. See Figure 3-5.

The By-pass screw is supplied in the boiler accessory pack.

The procedure is as follows:

1. Remove the plastic burner cover (two screws).
2. Remove and discard the blanking plug from the return connection of the pump and fit the By-pass screw using a hexagonal key.
3. Connect the return oil flexible fuel line to the pump.
4. Connect the $\frac{3}{8}$ " to $\frac{1}{4}$ " BSP adaptor to the flexible fuel line.

Flexible fuel lines and adaptors are available to purchase from Grant Engineering (UK) Ltd.

The burner cover may be left off until the boiler is commissioned.

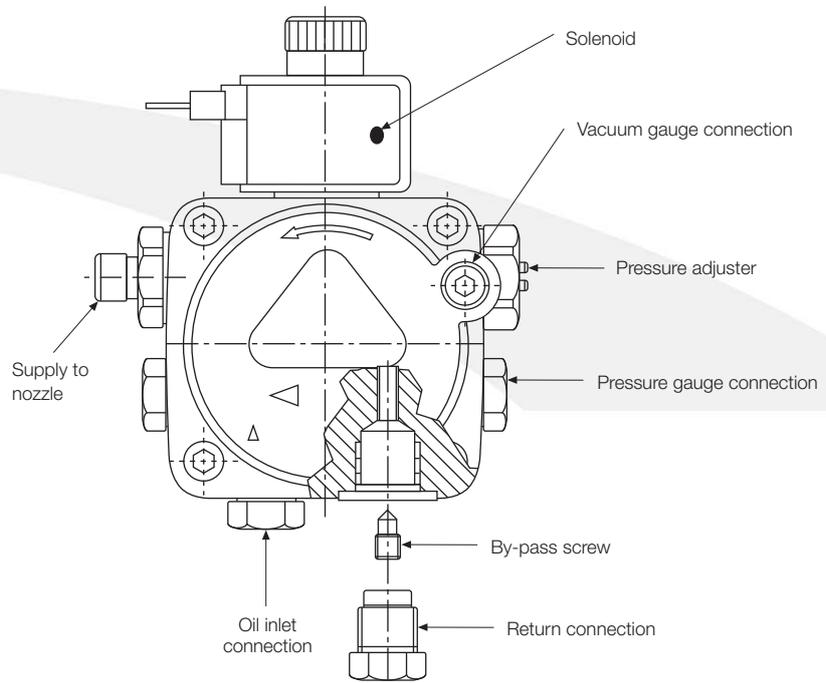


Figure 3-5: Burner pump connections

WARNING

The blanking plug supplied in the inlet (suction) port may now be plastic and will not provide an oil tight seal when the pump is running.

Ensure the supply from the tank is connected to this port and the plastic plug is discarded.

4 Boiler Installation Information

4.1 Introduction

The boiler is supplied already fully assembled in a carton which is carefully packed with packing materials. The installation procedure therefore begins with unpacking and uninstalling of the packed boiler.

4.2 Boiler Location

The boiler must stand on a surface that is firm and level. It does not require a special hearth as the temperature of the boiler base is less than 50°C.

Sufficient clearance must be allowed at the front of the boiler to remove the burner and baffles for servicing.

The Vortex Pro Combi 21e and 26e boilers can be serviced from the front, but it is preferable for any worktop above the boiler to be removable.

The Vortex Pro Combi 36e requires a removable section of worktop above the boiler to provide access to components on top of the boiler and for servicing.

Care should be taken when siting the condensate trap if it is to be fitted outside the boiler. Refer to Section 6.

4.3 Preparation for Installation

Carefully remove the packaging from the boiler and remove it from the transit pallet.

Pull off the boiler front panel and remove the literature pack.

Lift off the two parts of the case top and remove the water connecting fittings.

4.4 Installing the Boiler

You are now ready to install the boiler. The main procedures are as follows:

- Make the water connections - see section 5.2.
- Fit flue terminal - see section 9.
- Check the expansion vessel - see section 4.5 below.
- Connect the power supply.
- Connect the fuel supply - see section 3.
- Fill and vent the system - see section 4.5.

4.5 Expansion Vessel

The expansion vessel fitted is supplied with a charge pressure of 1.0 bar (equivalent to a max. static head of 10.2 metres). The charge pressure must not be less than the actual static head at the point of connection. Do not pressurise the vessel above 1.5 bar.



NOTE

The air pressure in the vessel must be checked annually.

The central heating system volume, using the expansion vessel as supplied, must not exceed the recommended volumes. Refer to Section 2.1. If the system volume is greater, an extra expansion vessel (complying with BS4841) must be fitted as close as possible to the central heating return connection on the boiler. The charge pressure of the extra vessel must be the same as the vessel fitted in the boiler.

Refer to BS7074:1:1989 for further guidance.

The air charge pressure may be checked using a tyre pressure gauge on the expansion vessel Schraeder valve. The vessel may be re-pressurised using a suitable pump. When checking the air pressure the water in the heating system must be cold and the system pressure reduced to zero.

4.6 Filling and venting the system

The expansion vessel fitted is supplied with a charge pressure of 1.0 bar (equivalent to a max. static head of 10.2 metres). The charge pressure must not be less than the actual static head at the point of connection. Do not pressurise the vessel above 1.5 bar.

Automatic and Manual Air Vents

The boiler is fitted with two Automatic air vents at the top of the boiler, located as follows:

- One on the top of the primary store.
- One on the heating flow pipe.

Refer to Figure 5-1.

Check that the small black plug on the side of each air vent is screwed in fully.

Then unscrew it one complete turn - the cap remains in this position thereafter.

A single manual air vent is also fitted at the top of the boiler - on the return pipe. Unscrew the cap one turn vent air from the pipe during filling and then fully close the cap.

Filling loop

If the flexible filling loop is used to fill the system, ensure it is connected and that the valve connecting it to the boiler is open and the valve at the front is closed.

A valve is open when the operating lever is in line with the valve, and closed when it is at right angles to it.

Ensure that the mains cold water supply valve is open (operating lever in line with the valve), then turn on the mains cold water supply and gradually open the front valve on the filling loop until water is heard to flow.

Vent each radiator in turn, starting with the lowest one in the system, to remove air.

It is important the circulating pumps are properly vented to avoid them running dry and the bearings being damaged.

To gain access to the heating pump in the Vortex Pro Combi e, it is necessary to lower the control panel.

Loosen (but do not remove) the four fixing screws securing the control panel to the side panels, hinge the panel forward to gain access to the pump.

Unscrew and remove the plug from the centre of the pump. Using a suitable screwdriver rotate the exposed spindle about one turn. When water starts to trickle out, replace the plug.

The Hot water pump must also be vented as described above.

Check the operation of the safety valve by turning the head anticlockwise until it clicks. The click is the safety valve head lifting off its seat allowing water to escape from the system. Check that this is actually happening.

Continue to fill the system until the pressure gauge indicates between 0.5 and 1.0 bar. Close the fill point valve and check the system for water soundness, rectifying where necessary. Water may be released from the system by manually operating the safety valve until the system design pressure is obtained.

The system design pressure (cold) should be between 0.5 bar and 1.0 bar. The pressure is equivalent to the maximum static head in bar + 0.3 (1 bar = 10.2 metres of water), where the static head is the vertical height from the centre of the expansion vessel to the highest point of the system.

Close the valves either side of the filling loop and disconnect the loop.

4.7 Regulatory Compliance Requirements

Installation of a Grant VORTEX Pro Combi e boiler must be in accordance with the following recommendations:-

- Building Regulations for England and Wales, and the Building Standards for Scotland issued by the Department of the Environment and any local Byelaws which you must check with the local authority for the area.
- Model and local Water Undertaking Byelaws.
- Applicable Control of Pollution Regulations.
- The following OFTEC requirements:
 - OFS T100 Polythene oil storage tanks for distillate fuels.
 - OFS T200 Fuel oil storage tanks and tank bunds for use with distillate fuels, lubrication oils and waste oils.

Further information may be obtained from the OFTEC Technical Book 3 (Installation requirements for oil storage tanks) and OFTEC Technical Book 4 (Installation requirements for oil fired boilers).

The installation should also be in accordance with the latest edition of the following British Standard Codes of Practice:

- BS 715 Metal flue pipes, fittings, terminals and accessories.
- BS 799:5 Oil storage tanks.
- BS 4543:3 Factory made insulated chimneys for oil fired appliances.
- BS 4876 Performance requirements for oil burning appliances.
- BS 5410:1 Code of Practice for oil firing appliances.
- BS 5449 Forced circulation hot water systems.

- BS 7593 Code of Practice for treatment of water in heating systems.
- BS 7671 Requirements for electrical installations, IEE Wiring Regulations.



NOTE

Failure to install and commission appliances correctly may invalidate the boiler warranty.



WARNING

Before starting any work on the boiler, or fuel supply please read the health and safety information given in Section 14.

4.8 Completion

Please ensure that the OFTEC CD/10 installation completion report (provided with the boiler) is completed in full.

Leave the top copy with the User.

Retain the carbon copy.

Ensure that the User Information pack (supplied with the boiler) is handed over to the Householder.

4.9 Before you Commission

To avoid the danger of dirt and foreign matter entering the boiler the complete heating system should be thoroughly flushed out - before the boiler is connected and then again after the system has been heated and is still hot. This is especially important where the boiler is used on an old system.

For optimum performance after installation, this boiler and its associated central heating system must be flushed in accordance with the guidelines given in BS 7593:1992 'Treatment of water in domestic hot water central heating systems'.

This must involve the use of a proprietary cleaner, such as Betz Dearborn's Sentinel X300 or X400, or Fernox Restorer. Full instructions are supplied with the products, but for more details of Betz Dearborn's products, view the website www.sentinel-solutions.net and for more details of Fernox products view the website www.fernox.com.

For Long term protection against corrosion and scale, after flushing, it is recommended that an inhibitor such as Betz Dearborn's Sentinel X100 or Fernox MB-1 is dosed in accordance with the guidelines given in BS 7593:1992.

Failure to implement the guidelines will invalidate the warranty.

4.10 Underfloor Heating Systems

In underfloor systems it is essential that the return temperature must be maintained above 40°C to prevent internal corrosion of the boiler water jacket.

4.11 Pipework Materials

In Grant boilers are compatible with both copper and plastic pipe. Where plastic pipe is used it must be of the oxygen barrier type and be of the correct class (to BS 7291:Part 1:2001) for the application concerned.



NOTE

The first metre of pipework connected to both the heating flow and return connections of the boiler must be made in copper on all types of system - sealed or open-vented.

4.12 Sealed Systems

If plastic pipe is used, the installer must check with the plastic pipe manufacturer that the pipe to be used is suitable for the temperature and pressures concerned.

Plastic pipe must be Class S to BS 7291: Part 1:2001.



WARNING

The boiler incorporates a low-pressure switch to shut off power to the boiler if the system pressure drops below 0.2 bar.

4.13 Underfloor Pipework

Plastic pipe may be used on Underfloor systems where the plastic pipe is fitted after the thermostatic mixing valve. Copper tube must be used for at least the first metre of flow and return primary pipework between the boiler and the underfloor mixing/blending valves.

5 Pipe Connections

5.1 Water Connections

Water connections may be from the rear, left or right hand side. If using low level side exit flue, connections must be on the opposite side to the flue.

Flow and return connections - All models are supplied with a push-fit elbow connection for the heating flow and return - 22 mm (Vortex Pro Combi 21e and 26e) or 28 mm (Vortex Pro Combi 36e).

Hot water connections - All models are supplied with push-fit elbow connections for the cold water mains inlet pipe and hot water outlet pipe. These are 15mm for the Vortex Pro Combi 21e and 26e, and 22mm for the Vortex Pro Combi 36e.



CAUTION

All pipes to be fitted into the push-fit connectors provided should be cut using a pipe slicer or pipe cutter - to leave the pipe ends with a slight radius and free from any burrs or sharp edges.

Pipes to be used with these fittings should not be cut square using a hacksaw.

All Models

A 15 mm discharge pipe must be connected to the safety valve outlet connection. The pipework between the safety valve and the boiler must be unrestricted, that is, no valves. The discharge pipe should be run to the outside of the building and terminate so that it cannot cause injury to persons or property.

A drain tap is provided at the bottom on the front of the boiler (and also on the hot water store on the Vortex Pro Combi e).

5.2 Making the Water Connections

Flow and return pipework can be routed to either side of the boiler, dependant on the flue system used, from the push-fit elbows (supplied) on the flow and return connection. Refer to Figure 5-1.

Holes are provided in the rear of the casing side panels to allow the condensate pipe to be run through the back of the boiler. It will be necessary to

remove the back panel from the boiler casing to fit this pipework, and to refit the panel before placing the boiler in its final position. See Figure 6-3.

If access will be restricted, make any connections to the boiler before placing it in its final position.

If using a balanced flue system - Install the balanced flue system before connecting the heating system pipework to the boiler.

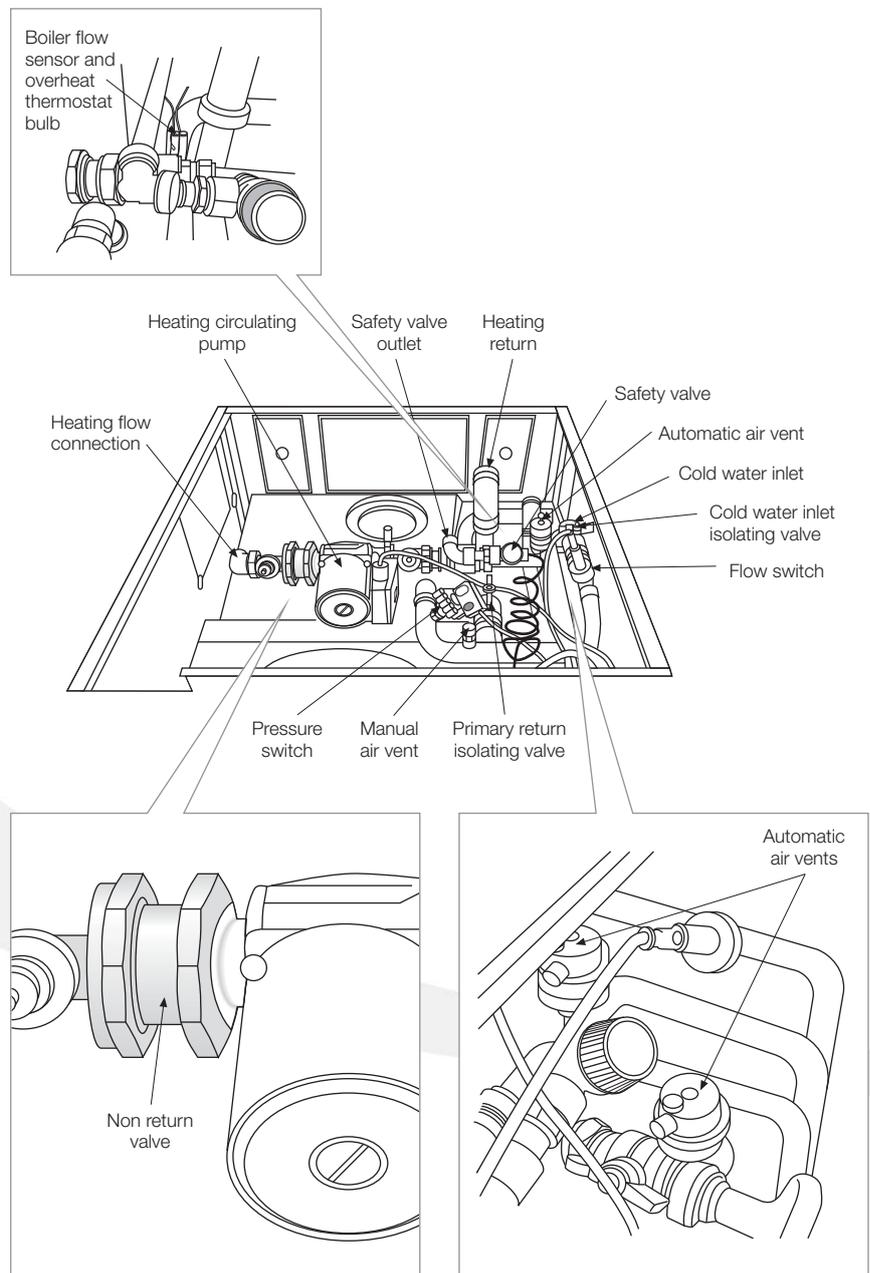


Figure 5-1: Vortex Pro Combi e pipe positions

5.3 Domestic Hot Water System

To maintain a longer and more consistent hot water temperature, a flow restrictor is factory fitted to all models except the Vortex Pro Combi 36e, to limit the flow rate to approximately 15 litres/minute.

The flow restrictor is located in the outlet side of the cold water inlet isolating valve.

The incoming mains water pressure should be between 1 and 8 bar to ensure efficient operation.

If the pressure is above 8 bar a pressure reducing valve must be fitted.

The boiler may still operate down to a pressure of 1.0 bar but with a reduced flow rate. The minimum flow rate needed for the flow switch to operate is 3 litres/minute.

To ensure economic use, the pipe runs between the boiler and hot taps should be as short as possible and in 15 mm copper pipe or 22 mm for the Vortex Pro Combi 36e only. Where possible the pipework should be insulated to reduce heat loss.

All taps and mixing valves used in the domestic hot water system must be suitable for operating at a mains pressure of up to 8 bar.

If required, a shower may be fitted in the domestic hot water system. It is recommended that thermostatically controlled shower valves are used to protect against a flow of water at too high a temperature. If a fixed head type shower is used, no anti-syphonage devices are required. If a loose or flexible head type shower is used, it must be arranged so that the head cannot fall closer than 25 mm above the top of the bath, thereby preventing immersion in the bath water. If this is not practicable, an anti-syphonage device must be fitted at the point of the flexible hose connection.

The supply of hot and cold mains water direct to a bidet is allowed (subject to local Water Undertaking requirements) provided that the bidet is of the over-rim flushing type. The outlets should be shrouded and unable to have a temporary hand held spray attached. Arrangements for antisiphonage are not necessary.

Before the mains water supply pipe is connected to the boiler, it should be thoroughly flushed out to avoid the danger of dirt or foreign matter entering the boiler.

The mains water connection to the boiler must be the first connection from the mains supply.

NOTE

A water hardness test kit is supplied with the boiler. Should the total hardness of the water supply exceed 125 ppm, an in-line scale inhibitor should be fitted in the cold water supply to the boiler.

Consult the local Water Undertaking if in doubt.

Do not immerse the test strip in running water and avoid contact.

5.4 To use the Water Hardness Kit

Fill a clean container with a sample of water from the mains cold water supply to the boiler.

Immerse the test strip in the water for approximately one second, ensuring that all the test zones are fully wetted.

Shake off the surplus water and wait for one minute.

Assess the colouration of the test zones using the following chart.

Green Areas	Violet Areas	Hardness	Total Hardness mg/l (ppm)
4	0	Very Soft	<50 mg/l calcium Carbonate
3	1	Soft	<70 mg/l calcium Carbonate
2	2	Medium	<125 mg/l calcium Carbonate
1	3	Hard	<250 mg/l calcium Carbonate
0	4	Very Hard	<370 mg/l calcium Carbonate

Note: (1mg/l = 1 ppm (part per million))

If the hardness reading is found to be in the medium to very hard range (the shaded area), it is essential that some form of water conditioner or softener is fitted to reduce scale formation within the combination boiler. Failure to do so may invalidate both the manufacturer's warranty and any extended warranty covering the appliance.

The water conditioner or softener should be fitted to the cold water supply serving the appliance and in accordance with the manufacturer's instructions. Grant Engineering (UK) Ltd. cannot be held responsible for any damage or misuse caused by the fitting of any water conditioning device.

CAUTION

Please protect the domestic hot water system from harmful effects of scale. Problems caused by the build-up of limescale are not covered under the terms of the warranty.

6 Condensate Disposal

6.1 General Requirements

When in condensing mode the Grant Vortex PRO Combi e boilers produce condensate from the water vapour in the flue gases. This condensate is slightly acidic with a pH value of around 3 (similar to vinegar). Provision must be made for the safe and effective disposal of this condensate.

Condensate can be disposed of using one of the following methods of connection:

Internal Connection (preferred option):

- Into an internal domestic waste system (from kitchen sink, washing machine, etc.).
- Directly into the soil stack.

External Connection:

- Into an external soil stack.
- Into an external drain or gully.
- Into a rainwater hopper (that is part of a combined system where sewer carries both rainwater and foul water).
- Purpose made soakaway.

All condensate disposal pipes **must** be fitted with a trap - whether they are connected internally or externally to a domestic waste system/soil stack or run externally to a gully, hopper or soakaway.

6.2 Connections

Connections into a rainwater hopper, external drain or gully should be terminated inside the hopper/drain/gully below the grid level but above the water level.

Condensate disposal pipes should not be connected directly into rainwater downpipes or to waste/soil systems connected to septic tanks.

Condensate should not be discharged into 'grey water' systems that re-use water used in the home (not including water from toilets).

It should be noted that connection of a condensate pipe to the drain may be subject to local Building Control requirements.

6.3 Pipework

Condensate disposal pipework must be plastic (plastic waste or overflow pipe is suitable).

NOTE

Copper or steel pipe is NOT suitable and MUST NOT be used.

Condensate disposal pipes should have a minimum 'nominal' diameter of 22mm ($\frac{3}{4}$ ") - e.g. use 21.5mm OD polypropylene overflow pipe.

Condensate disposal pipes must be fitted with a fall (away from the boiler) of at least 2.5° (~45mm fall per metre run).

NOTE

Where it is not possible for the pipe to fall towards the point of discharge - either internally into a waste system or externally to a gully (e.g. for boilers installed in a basement), it will be necessary to use a condensate pump.

Condensate disposal pipes should be kept as short as possible and the number of bends kept to a minimum.

Pipes should be adequately fixed to prevent sagging, i.e. at no more than 0.5 metre intervals.

6.4 External Pipework

Ideally, external pipework, or pipework in unheated areas, should be avoided. If unavoidable, external pipework should be kept as short as possible (less than 3 metres) and 32mm waste pipe used to minimise the risk of ice blocking the pipe in freezing conditions.

The number of bends, fittings and joints on external pipes should be kept to a minimum to reduce the risk of trapping condensate.

NOTE

For a boiler installed in an unheated area such as an outhouse or garage, all condensate pipework should be considered as an 'external'.

6.5. Condensate Soakaway

To keep external pipework to a minimum, locate the soakaway as close as possible to the boiler but ensure it is at least 500mm from building foundations and away from other services, e.g. gas, electricity, etc.

The condensate pipe may be run above or below ground level and can enter either the top or side of the soakaway tube. Refer to Figure 6-1.

Ensure that the drainage holes in the soakaway tube face away from the building.

Backfill both the soakaway tube and the hole around it, with 10mm limestone chippings.

Only use a soakaway where the soil is porous and drains easily. Do not use in clay soils or where the soil is poorly drained.

CAUTION

Any damage due to condensate backing up into the boiler due to a high water table, in the case of a soakaway, or flooded drains when the condensate disposal is via a gully or soil stack, is not covered by the Grant product warranty.

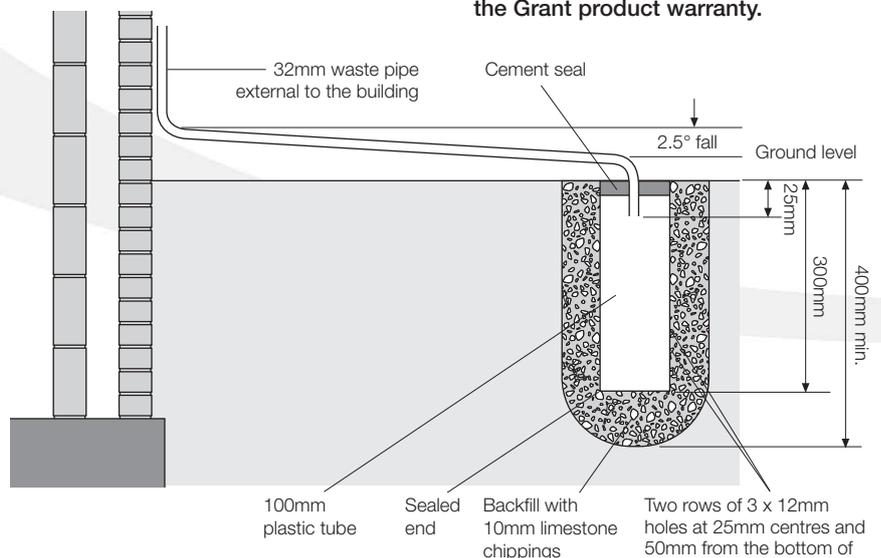


Figure 6-1: Purpose made condensate soakaway

6.6 Condensate Trap

Grant Vortex PRO boilers are supplied with a factory-fitted condensate trap to provide the required 75mm water seal in the condensate discharge pipe from the boiler.

This trap incorporates a float (which will create a seal when the trap is empty) and an overflow warning outlet (fitted with a plastic sealing cap). See Figure 6-2.

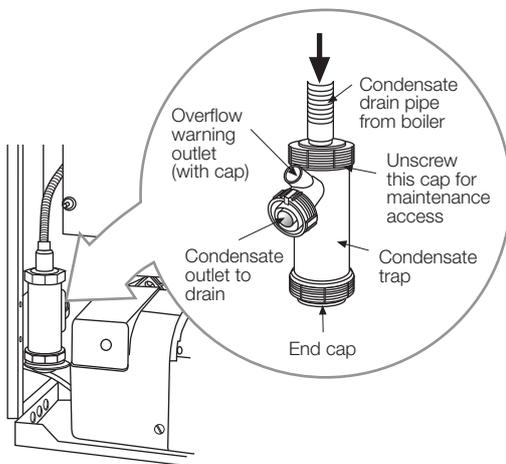


Figure 6-2: Condensate trap

The trap is factory-fitted inside the boiler casing - mounted on the inside of the left side panel - in an accessible position to allow for routine maintenance.

NOTE

If required, this condensate trap may be re-located outside the boiler casing. Refer to procedure given in 'external condensate trap'. This procedure **must** be carried out before the boiler is installed.

A flexible hose connects the outlet of the condensing heat exchanger to the trap inlet. Ensure the straight connector on the hose is fully pushed onto the 'top hat' inlet connector of the trap.

With the trap fitted inside the boiler casing, the sealing cap must be fitted. If the trap is re-located outside the boiler then the following applies:

- If connecting the condensate discharge - either internally or externally - into a waste system or soil stack - the sealing cap must be fitted in the trap outlet.
- On external discharge systems to a hopper, gully or soakaway, the sealing cap should be removed from the trap outlet.
- If there is any discharge of condensate from the overflow outlet, this could indicate a blockage (possibly due to freezing). Turn off the boiler and investigate the cause. If necessary contact your service engineer for assistance.

WARNING

Care should be taken when siting the trap such that the overflow outlet is readily visible and that any condensate overflowing from the outlet cannot cause either a hazard to persons or damage to surrounding property or equipment.

NOTE

End cap is sealed to trap body. DO NOT attempt to remove it for cleaning.

6.7 Condensate Disposal Pipework

The condensate trap outlet is at an angle of 48° below the horizontal. This is to automatically give a 3° fall on any 'horizontal' runs of condensate disposal pipe. Refer to Figure 6-1 and see trap outlet/pipe.

The outlet of the trap will accept 21.5mm OD to 23mm OD Polypropylene overflow pipe for the condensate discharge pipe.

This discharge pipe can exit through the left side of the boiler through one of two pre-cut 'knock-outs' in the lower part of the left casing panel. Push out the 'knock-out' from the required hole taking care not to distort the side panel. Refer to Figure 2-1 for this on the Pro Combi 21e or 26e, or Figure 2-2 for this on the Pro Combi 36e.

6.8 Inspection and Cleaning of Trap

The trap **must** be checked at regular intervals (e.g. on every annual service) and cleaned as necessary to ensure that it is clear and able to operate.

NOTE

The bottom bowl is sealed to the trap body and cannot be removed.

To inspect and clean the trap, perform the following procedure:

1. Disconnect flexible condensate hose from inlet connector.
2. Unscrew the inlet connection nut.
3. Remove the 'top hat' inlet connector and nut from trap.
4. Disconnect the condensate disposal pipe from the trap outlet.
5. Remove trap from bracket.
6. Remove float from trap - clean if necessary.
7. Inspect inside of trap and clean as necessary.
8. Re-assemble trap, re-fit to boiler and re-connect flexible hose. Ensure that hose is fully pushed onto the 'top hat' inlet connector.

NOTE

Failure to regularly check and clean the condensate trap may result in damage to the boiler and will not be covered by the Product Warranty.

6.9 External Condensate Trap Fitting

To re-locate the factory-fitted trap outside the boiler casing, use the following procedure:

6 Condensate Disposal

! NOTE

This procedure **must** be carried out before the boiler is installed.

1. Remove both the top casing panel(s) from the boiler.
2. Unscrew and remove the screws fastening the left side panel to the rear casing panel of the boiler.
3. Carefully separate the left side and rear panels just enough to gain access to the condensate outlet on the left rear of the condensing heat exchanger (see Figure 6-3).
4. Push out pre-cut 'knock-out' from condensate outlet hole in rear of left side casing panel.
5. Remove right angle end of flexible condensate discharge hose from outlet connection on condensing heat exchanger.
6. From front of boiler, remove straight connector end of flexible hose from top of condensate trap.
7. Reverse flexible hose and pass the straight connector end through the new hole in the left hand casing panel. Push the straight connector firmly onto the condensate outlet connection of the condensing heat exchanger as far as possible.
8. Refit the left hand casing panel to the rear panel using the reverse procedure, ensuring all fixing screws are used.
9. Remove the trap from the mounting bracket.
10. Unscrew and remove the trap mounting bracket from the left side panel.
11. Fix the trap mounting bracket to the wall adjacent to the boiler in the required position.

12. Re-fit the trap to the mounting bracket. The mounting bracket supplied with the trap **must** be used - the trap should **not** be supported by the condensate pipework only.
13. Connect the flexible condensate hose to the trap - pushing the right angle hose connector onto the trap inlet connection.

! NOTE

The flexible hose must fall continuously from the outlet to the top of the trap.

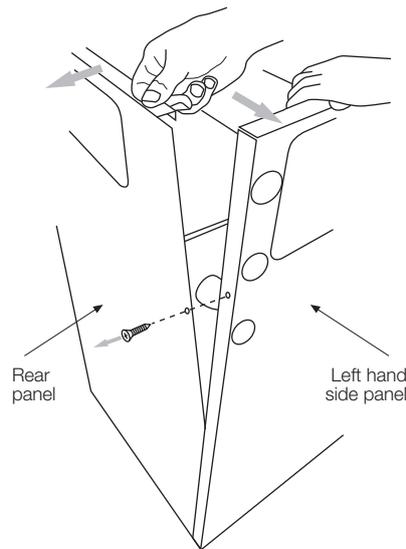


Figure 6-3: Gaining access to the condensate outlet

! NOTE

The top of the trap must be below the condensate connection on the boiler.

7 Sealed Systems

7.1 System Models

All Grant Vortex Pro Combi e boilers are supplied for use as part of a sealed system complying with the requirements of BS 5449.

The maximum temperature of the central heating water is 78° C.

! NOTE

When designing a system, the pump head, expansion vessel size, and radiator mean temperature are amongst the factors that must be considered. See Section 4.5.

The boilers are supplied with the following items factory fitted:

- A diaphragm expansion vessel complying with BS 4814, pre-charged at 1.0 bar, size as follows:
10 litre for Vortex Pro Combi 21e
12 litre for Vortex Pro Combi 26e
14 litre for Vortex Pro Combi 36e.
System pressure gauge, with an operating range of 1 to 4 bar.

- Pressure relief safety valve complying with BS 6759 and set to operate at 2.5 bar. The discharge pipe must be routed clear of the boiler to a drain, in such a manner that it can be seen, but cannot cause injury to persons or property.
- Automatic air vent, fitted to the top of the boiler, ensures the boiler is vented.
- Filling loop. This **must be** isolated and disconnected after filling the system.

Refer to Section 4.5 for further details of the expansion vessel.

! NOTE

Ensure that the expansion vessel is of sufficient size for the system volume (including the volume of the boiler). If necessary a second vessel may need to be fitted to the system. Refer to Section 2.1 for system volume. To determine total vessel volume required refer to BS7074:1:1989 or the Domestic Heating Design Guide.

The expansion vessel charge pressure should always be slightly greater than the maximum static head of the system, in bar, at the level of the vessel (1 bar = 10.2 metres of water). See Figure 7-1.

The system fill pressure (cold) should be 0.2-0.3 bar greater than the vessel charge pressure - giving typical system fill pressures of approx 0.5 bar for a bungalow and 1.0 bar for a two-storey house. Refer to the Domestic Heating Design Guide for more information if required.

If thermostatic radiator valves are fitted to all radiators, a system by-pass must be fitted. The bypass must be an automatic type.

Provision should be made to replace water lost from the system. This may be done manually (where allowed by the local Water Undertaking) using the filling loop arrangement supplied with the boiler.

Filling of the system must be carried out in a manner approved by the local Water Undertaking.

Where allowed, the system may be filled via the filling loop supplied (the loop arrangement includes a double check valve assembly).

All fittings used in the system must be able to withstand pressures up to 3 bar.

Radiator valves must comply with the requirements of BS 2767(10):1972.

One or more drain taps (to BS 2879) must be used to allow the system to be completely drained.

The expansion vessel is connected via a flexible hose to allow it to be moved to gain access to the baffle cleaning cover. When replacing the vessel, care should be taken to ensure that the flexible connecting hose is not twisted.

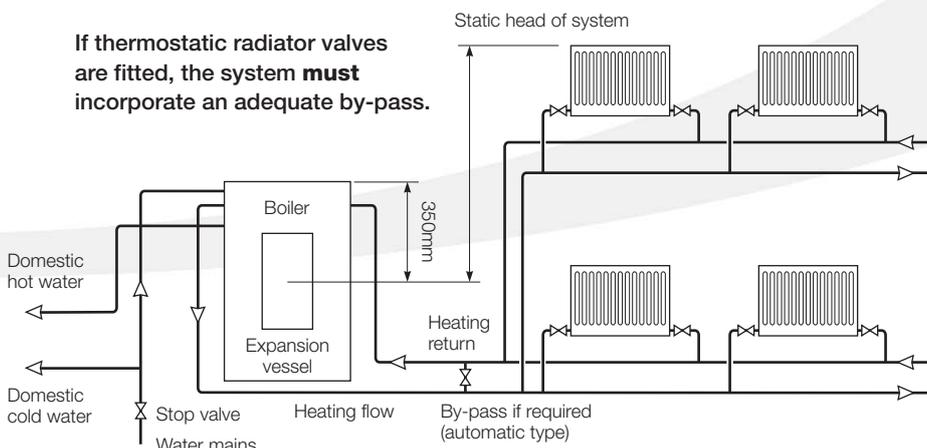


Figure 7-1: Sealed system

8 Electrical



WARNING

Ensure that the electrical supply has been isolated before making any connections to the boiler.

8.1 Connecting the Power Supply

A three core cable is required to connect the boiler terminal block to the live supply. Refer to Figure 8-1 for boiler wiring terminal details.

The procedure for connecting the boiler power supply is as follows:

1. Loosen (do not remove) the four screws securing the control panel to the side panels, hinge the panel forward and allow it to drop down to gain access to the top of the panel.
2. Remove the two screws securing the terminal block cover and lift off the cover.
3. Remove the screws securing the cable clamp and open clamp.
4. Connect the power supply cable to the left hand terminal block as follows:
 - Brown to mains Live (terminal 3)
 - Blue to mains Neutral (terminal 2)
 - Green/Yellow to mains earth (terminal 1)



WARNING

After completing electrical connections and **before** reconnecting the electrical supply to the boiler, replace the terminal block cover and secure it using the screws provided.

8 Electrical

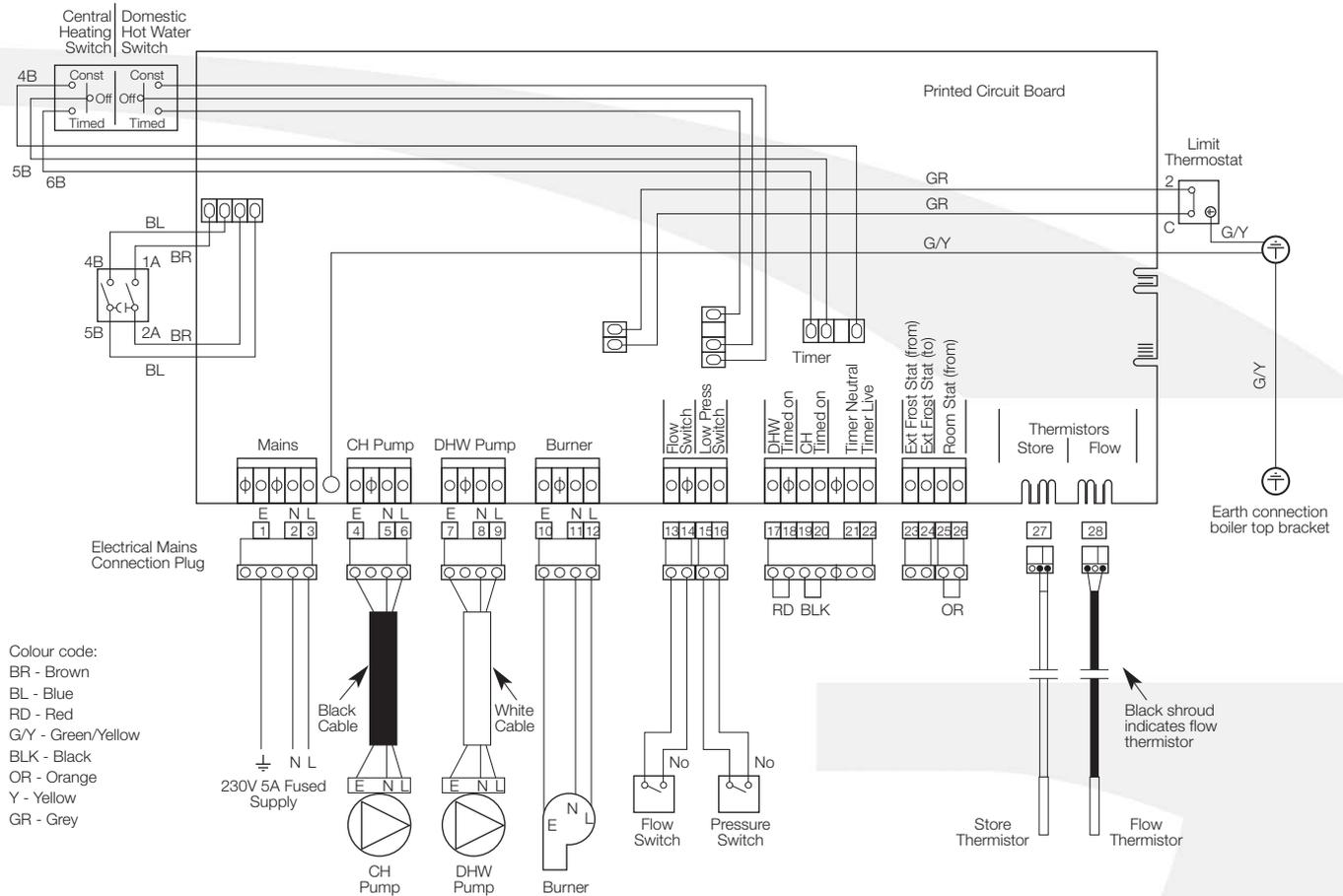


Figure 8-1: Boiler wiring diagram

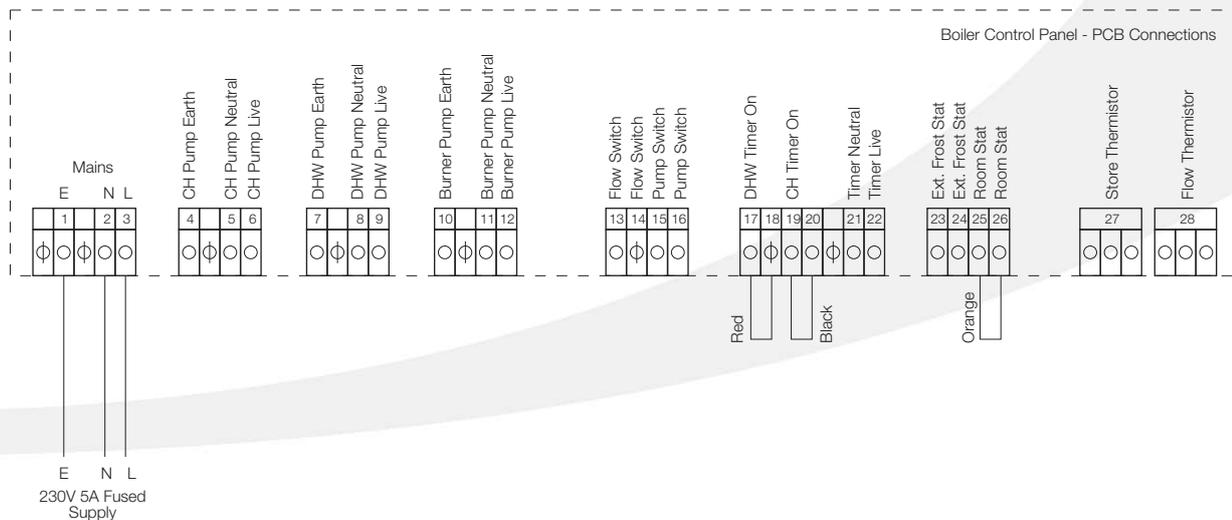


Figure 8-2: Vortex Pro Combi e wiring terminals

8 Electrical

8.2 Connecting the Controls - Heating Only

To control the central heating on/off periods only (and not the domestic hot water), it is recommended to use one of the following options:

- A remote single channel timer and room thermostat.
- A 'plug-in' Grant Mechanical 24-hour timer (Ref. MTKIT) and room thermostat.
- A 'plug-in' Grant Electronic 7-day timer (Ref. ETKIT) and room thermostat.
- A Grant programmable room thermostat.

With any of these options the timer, room thermostat or programmable room thermostat should be sited at a suitable and convenient location within the property.

Connection of an External Remote Timer and Room Thermostat



WARNING

Any remote timer must be of a single channel 230V type with voltage free output contacts.

Pass a 3-core cable (or 3-core and earth if the room thermostat to be used has an earth connection) through the cable clamp on the control panel.

Remove the Orange room thermostat link wire from terminals 25 & 26 on the connection block and connect the wires from the room thermostat. Refer to Figure 8-3 for further details.

Connect the room thermostat to the terminal block in accordance with the room thermostat manufacturer's instructions.

Pass a 4-core cable (or 4-core and earth if the timer to be used has an earth connection) through the cable clamp on the control panel.

Remove the Black link wire from terminals 19 & 20 on the connection block. Connect the two switch wires from the timer.

Connect the live, neutral (and earth if required) from the timer to terminals 3, 2 & 1 respectively on the boiler terminal block. Refer to Figure 8-3 for further details.

Re-fit terminal block cover on control box and fasten with the two screws previously removed.

Hinge the control panel back into position on the two retaining screws. Replace top casing panels.

Re-connect electrical supply and check operation of the timer and room thermostat.

Refer to the Fitting and User Instructions supplied with the timer for operating and setting.

Leave the Timer and Room Thermostat Fitting and User instructions with the user after installation.

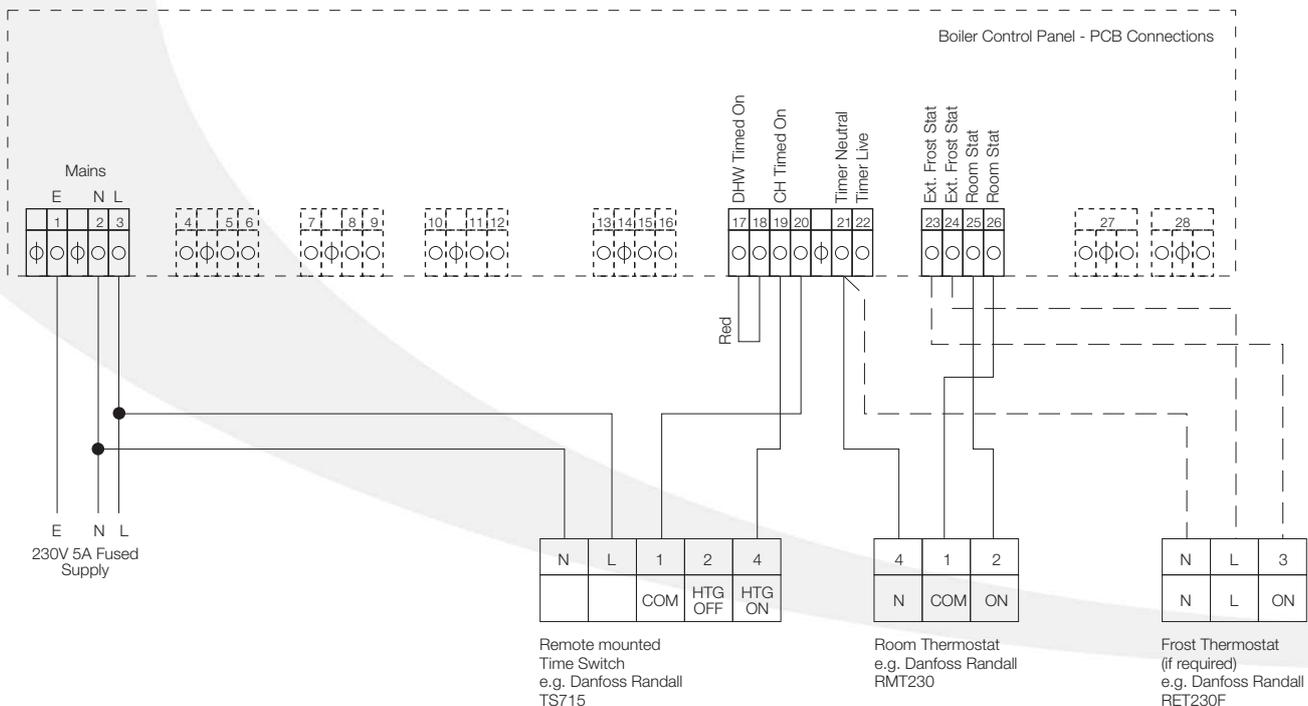


Figure 8-3: Connections for a remote timer and room thermostat

Fitting and connection of a Grant 'plug-in' 24-hour timer (MTKIT) and room thermostat

Pass a 3-core cable (or 3-core and earth if the room thermostat to be used has an earth connection) through the cable clamp on the control panel.

Remove the Orange room thermostat link wire from terminals 25 & 26 on the connection block and connect the wires from the room thermostat. Refer to Figure 8-4 for further details.

Connect the room thermostat to the terminal block in accordance with the room thermostat manufacturer's instructions.

Fit and connect the 'plug-in' timer as follows:

1. Remove front and top boiler casing panels. Loosen (do not remove) the four screws securing control panel to the side panels. Hinge the panel forward to access top and rear of control panel.
2. Remove the two screws and lift off the terminal block cover from top of control panel.
3. Remove the four screws from the rear of the control panel and remove the rear access cover.

4. Remove the Black wire links from terminals 19 & 20 on control panel.
5. Carefully push through and remove square pre-cut 'knockout' section in the control panel front.
6. Feed the wires through hole in control panel front and then up through rectangular opening in control panel top. Connect wires to terminals on control panel as follows:
 - Brown wire (from Terminal 5 on timer) to Terminal 20 on PCB plug.
 - Brown wire (from Terminal 3 on timer) to Terminal 19 on PCB plug.
 - Blue wire (from Terminal 1 on timer) to Terminal 21 on PCB plug.
 - Red wire (from Terminal 2 on timer) to Terminal 22 on PCB plug.

Refer to Figure 8-4 for the connection diagram.

7. Carefully fit the timer into the square hole in the control panel.

8. From the rear of the control panel fit the two fixing clamps - one into the slot on each side of the timer housing - with the two 'legs' towards the front of the timer.
9. With the front of the timer held against the control panel fascia, push both clamps towards the front of the timer as far as possible to firmly secure it in place.
10. Re-fit the rear access cover to the control panel and secure with the four screws previously removed.
11. Re-fit terminal block cover on control box and fasten with the two screws previously removed.
12. Hinge the control panel back into position on the two retaining screws. Replace top casing panels.
13. Re-connect electrical supply and check operation of the timer.

Refer to the Fitting and User Instructions supplied with the timer for setting.

Leave the Timer Fitting & User instructions with the user after installation.

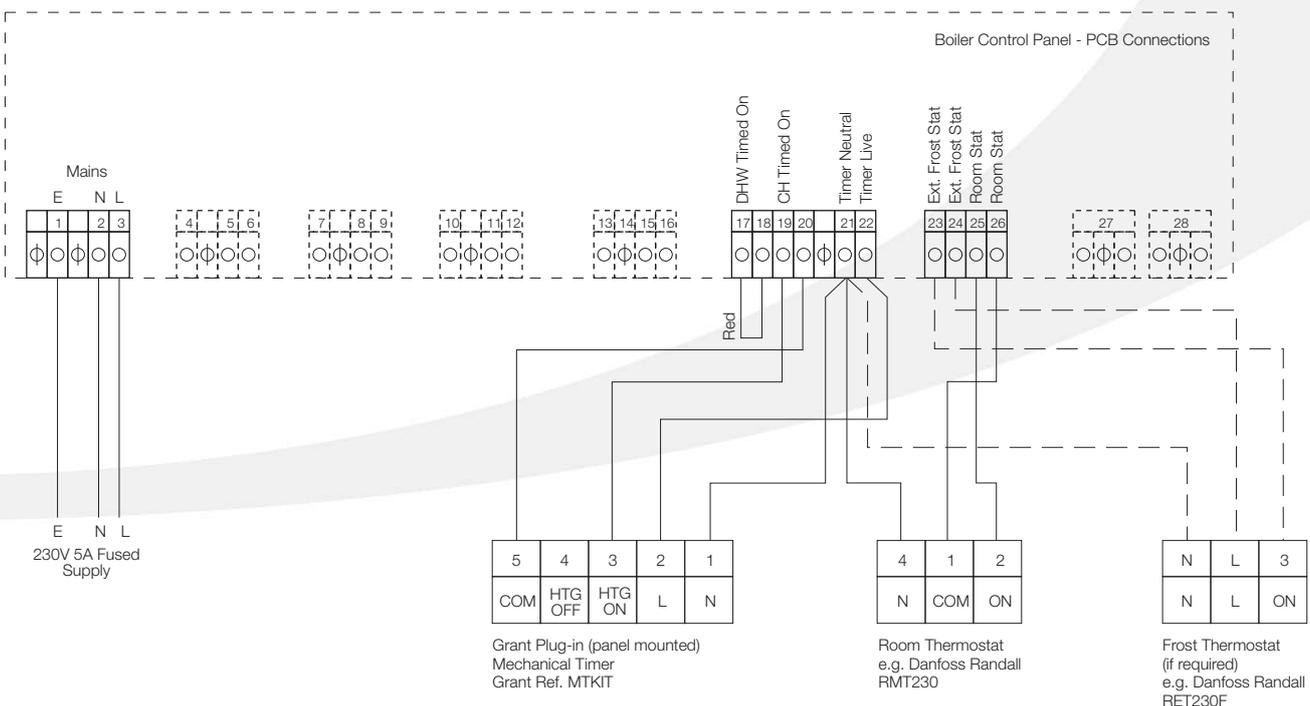


Figure 8-4: Connections for Grant 24-hour mechanical timer (MTKIT) and room thermostat

8 Electrical

Fitting and connection of a Grant 'plug-in' 7-day timer (ETKIT) and room thermostat

Pass a 3-core cable (or 3-core and earth if the room thermostat to be used has an earth connection) through the cable clamp on the control panel.

Remove the Orange room thermostat link wire from terminals 25 & 26 on the connection block and connect the wires from the room thermostat. Refer to Figure 8-5 for further details.

Connect the room thermostat to the terminal block in accordance with the room thermostat manufacturer's instructions.

Fit and connect the 'plug-in' timer as follows:

1. Remove front and top boiler casing panels. Loosen (do not remove) the four screws securing control panel to the side panels.
2. Hinge the panel forward to access top and rear of control panel.
3. Remove the two screws and lift off the terminal block cover from top of control panel.

4. Remove the Black wire link from terminals 19 & 20 on control panel. **Do not** remove the Red link from terminals 17 & 18.

5. Carefully push through and remove square pre-cut 'knockout' section in the control panel front. Disconnect and remove the plug from the end of the wiring harness. Do not disconnect any of the four wires from the terminals of the electronic timer. They must be connected as shown below.

6. Feed the wires through hole in control panel front and then up through rectangular opening in control panel top. Connect wires to terminals on control panel as follows:

- Brown wire (from Terminal 3 on timer) to Terminal 20 on PCB plug.
- Brown wire (from Terminal 4 on timer) to Terminal 19 on PCB plug.
- Blue wire (from Terminal 1 on timer) to Terminal 21 on PCB plug.

- Red wire (from Terminal 2 on timer) to Terminal 22 on PCB plug.

Refer to Figure 8-5 for the connection diagram.

7. Locate the electronic timer in the square aperture in the control panel front. Secure by pressing in and turning the two screws (in upper right and lower left corners) a quarter turn clockwise.
8. Re-fit terminal block cover on control box and fasten with the two screws previously removed.
9. Hinge the control panel back into position on the two retaining screws. Replace top casing panels.
10. Re-connect the electricity supply and check the operation of the timer and room thermostat.

Refer to the Fitting and User instructions supplied with the timer for operating and setting.

Leave the Timer and Room Thermostat Fitting and User instructions with the user after installation.

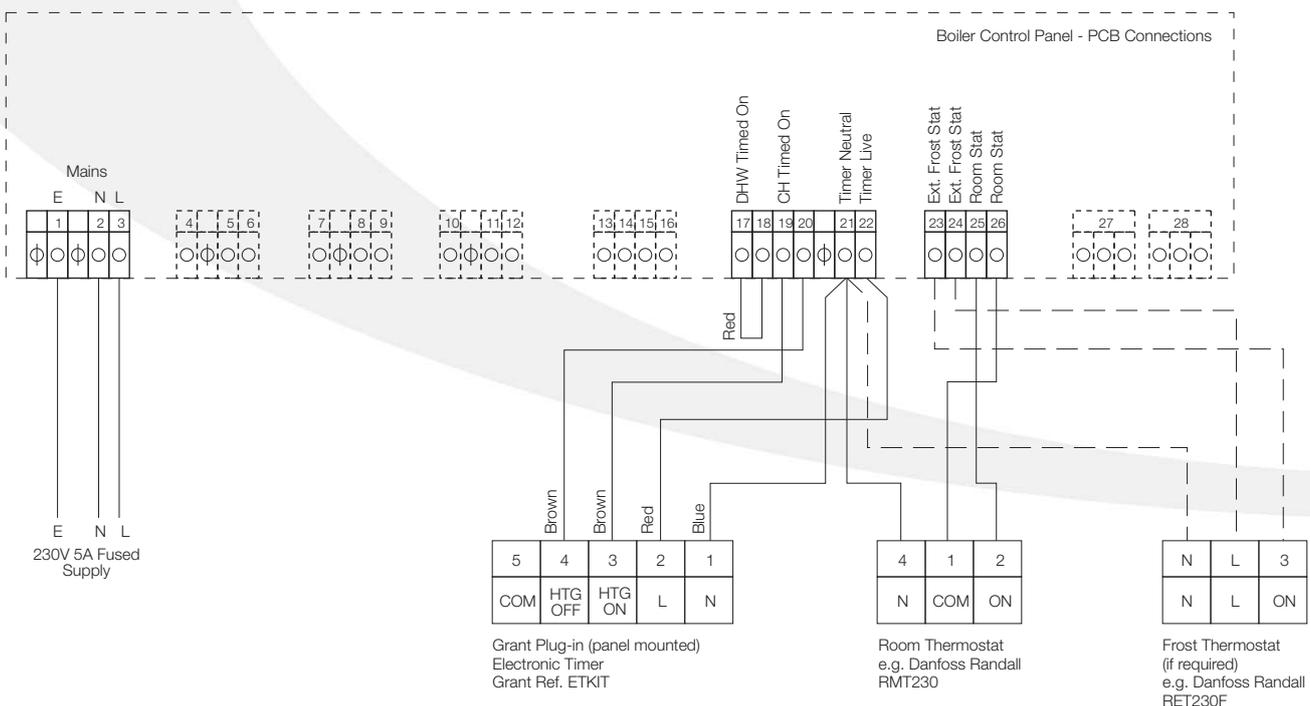


Figure 8-5: Connections for Grant 7-day electronic timer (ETKIT) and room thermostat

Connection of a Grant Programmable Room thermostat (RSKIT)

Connect the programmable room thermostat as follows:

1. Remove front and top boiler casing panels. Loosen (do not remove) the four screws securing control panel to the side panels.
2. Hinge the panel forward to access top and rear of control panel.
3. Remove the two screws and lift off the terminal block cover from top of control panel.
4. Remove the Orange room thermostat link wire from terminals 25 & 26 on the connection block and connect the two wires from the programmable room thermostat.
5. Refer to Figure 8-6 for the thermostat connection details.
6. Re-fit terminal block cover on control box and fasten with the two screws previously removed.
7. Hinge the control panel back into position on the two retaining screws. Replace top casing panels.
8. Re-connect the electricity supply and check the operation of the programmable room thermostat.

Refer to the Fitting and User instructions supplied with the programmable room thermostat for operating and setting.

Leave the Programmable Room Thermostat Fitting and User instructions with the user after installation.

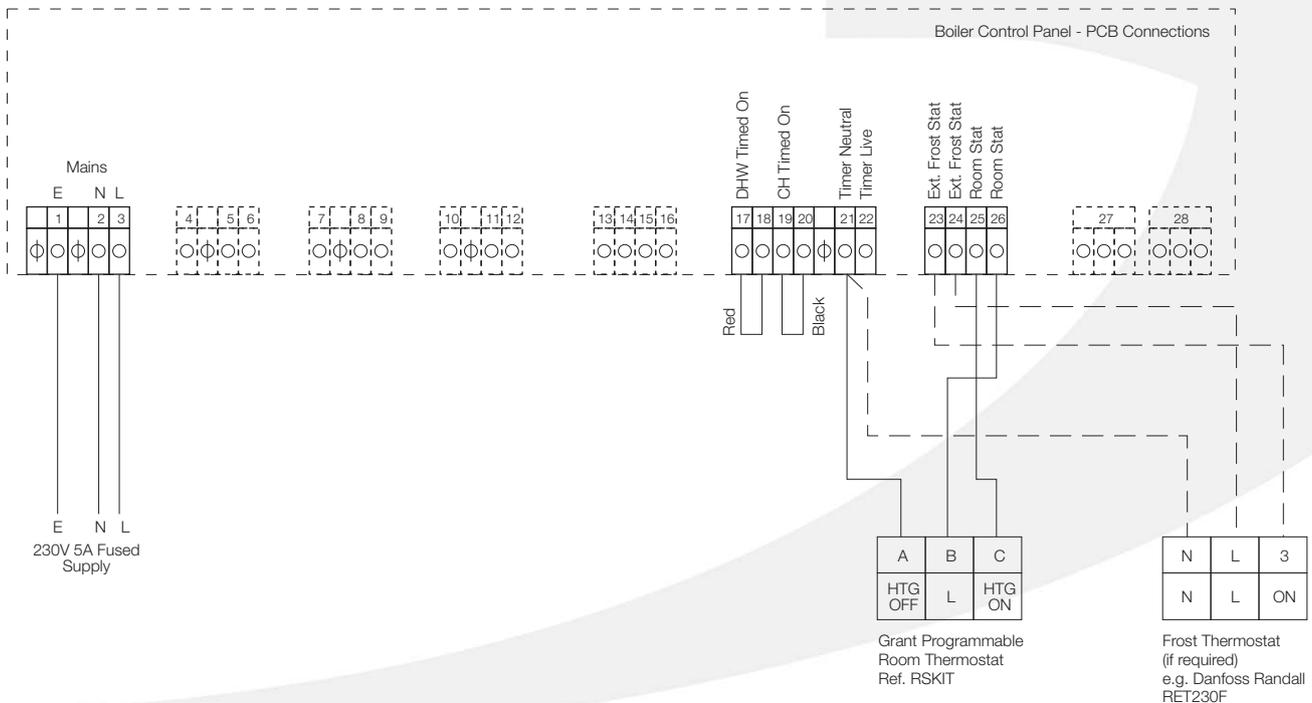


Figure 8-6: Connections for the Grant Programmable Room Thermostat (RSKIT)

8 Electrical

8.3 Connecting the Controls - Heating and Hot Water

If control of both heating and hot water operation of the boiler is required, it is recommended to use one of the following options:

- A Grant 'plug-in' two channel programmer (Ref. EPKIT) and room thermostat.
- A Grant 'wireless' RF two-channel programmable room thermostat (Ref. RFTKIT).
- A Grant two-channel remote programmer (Ref. ESKIT) and room thermostat.

Fitting and connection of a Grant 'plug-in' electronic programmer (EPKIT) and room thermostat

Pass a 3-core cable (or 3-core and earth if the room thermostat to be used has an earth connection) through the cable clamp on the control panel.

Remove the Orange room thermostat link wire from terminals 25 & 26 on the connection block and connect the wires from the room thermostat. Refer to Figure 8-7 for further details.

Connect the room thermostat to the terminal block in accordance with the room thermostat manufacturer's instructions.

Fit and connect the 'plug-in' programmer as follows:

1. Remove front and top boiler casing panels. Loosen (do not remove) the four screws securing control panel to the side panels
2. Hinge the panel forward to access top and rear of control panel. Remove the two screws and lift off the terminal block cover from top of control panel.
3. Remove both the Red and Black wire links from terminals 17 & 18 and 19 & 20 on control panel.
4. Carefully push through and remove square pre-cut 'knockout' section in the control panel front.
5. Connect four wires provided to terminals of the electronic programmer as shown below.

Note that the Yellow wire supplied in the kit must not be used.

6. Feed the wires through hole in control panel front and then up through rectangular opening in control panel top. Connect wires to terminals on control panel as follows:

- Orange wire (from Terminal 3 on programmer) to Terminal 17 on PCB plug.
- Red wire (from Terminal 5 on programmer) to Terminal 19 on PCB plug.

- Blue wire (from Terminal 2 on programmer) to Terminal 21 on PCB plug.
- Brown wire (from Terminal 1 on programmer) to Terminal 22 on PCB plug.

Refer to Figure 8-7 for connection diagram.

7. Locate the electronic programmer in the square hole in control panel front - with the terminals pointing to the right. Secure by turning the two screws (in upper right and lower left corners) a quarter turn clockwise.
8. Re-fit terminal block cover on control box and fasten with the two screws previously removed.
9. Hinge the control panel back into position on the two retaining screws. Replace top casing panels.
10. Re-connect electrical supply and check operation of the programmer and room thermostat.

Refer to the Fitting and User Instructions supplied with the programmer for operating and setting.

Leave the Programmer and Room Thermostat Fitting & User instructions with the user after installation.

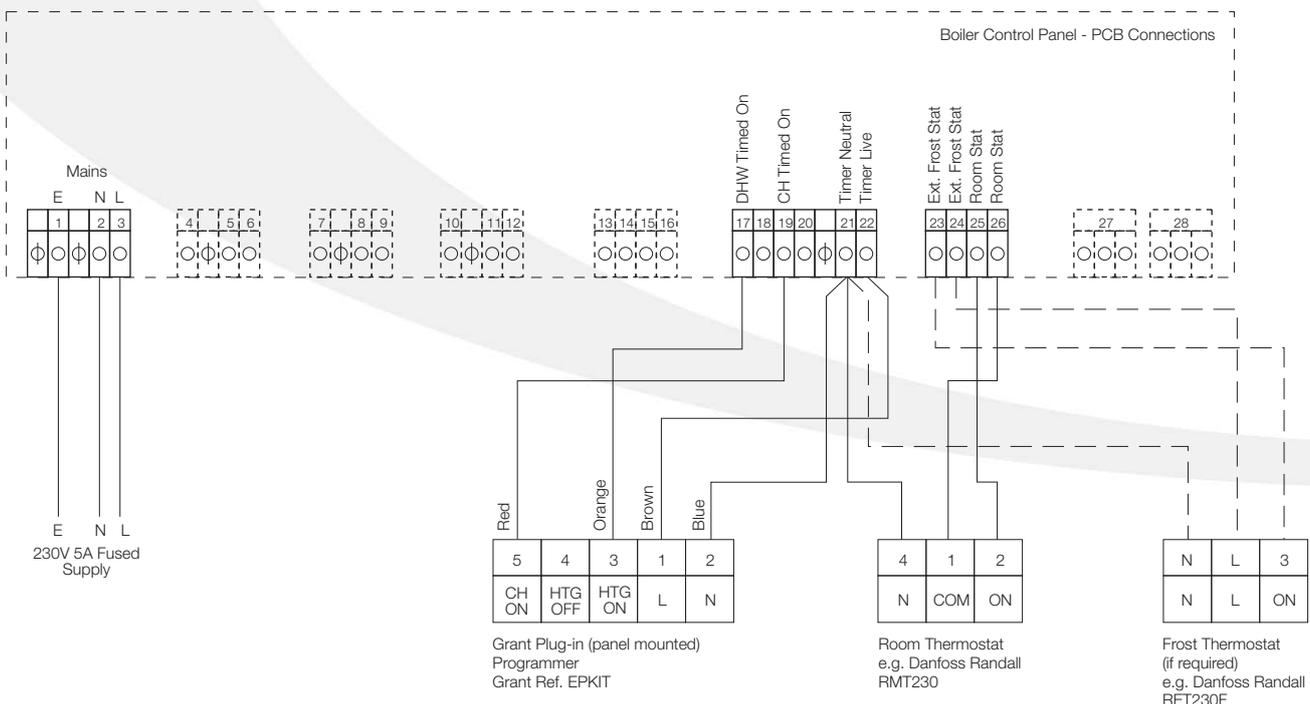


Figure 8-7: Connections for the Grant Plug-In 2-channel Programmer (EPKIT) and room thermostat

Fitting and connection of a Grant 'plug-in' FM/2 Receiver Unit - for Grant Twin-channel 'wireless' Programmable Room Thermostat (RFTKIT)

1. Remove front and top boiler casing panels. Loosen (do not remove) the four screws securing control panel to the side panels. Hinge the panel forward to access top and rear of control panel.
 2. Remove the two screws and lift off the terminal block cover from top of control panel.
 3. Remove both the Red and Black wire links from terminals 17 & 18 and 19 & 20 on control panel.
 4. Carefully push through and remove square pre-cut 'knockout' section in the control panel front.
 5. Connect four wires provided to terminals of FM/2 Receiver unit - refer to Figure 8-8.
 6. Note that the Yellow wire supplied in the kit must not be used.
 7. Feed the wires through hole in control panel front and then up through rectangular opening in control panel top. Connect wires to terminals on control panel - refer to connection diagram in Section 1.3.
 8. Locate FM/2 unit in square hole in control panel front - with the terminals pointing to the right. Secure by pressing in and turning the two screws (in upper right and lower left corners) a quarter turn clockwise.
 9. Re-fit terminal block cover on control box and fasten with the two screws previously removed.
 10. Hinge the control panel back into position on the two retaining screws. Replace top casing panels.
 11. Re-connect electrical supply and check operation of the programmable room thermostat.
- Refer to the Fitting and User Instructions supplied with the programmable room thermostat for operating and setting.
- Leave the Programmable Room Thermostat Fitting & User instructions with the user after installation.

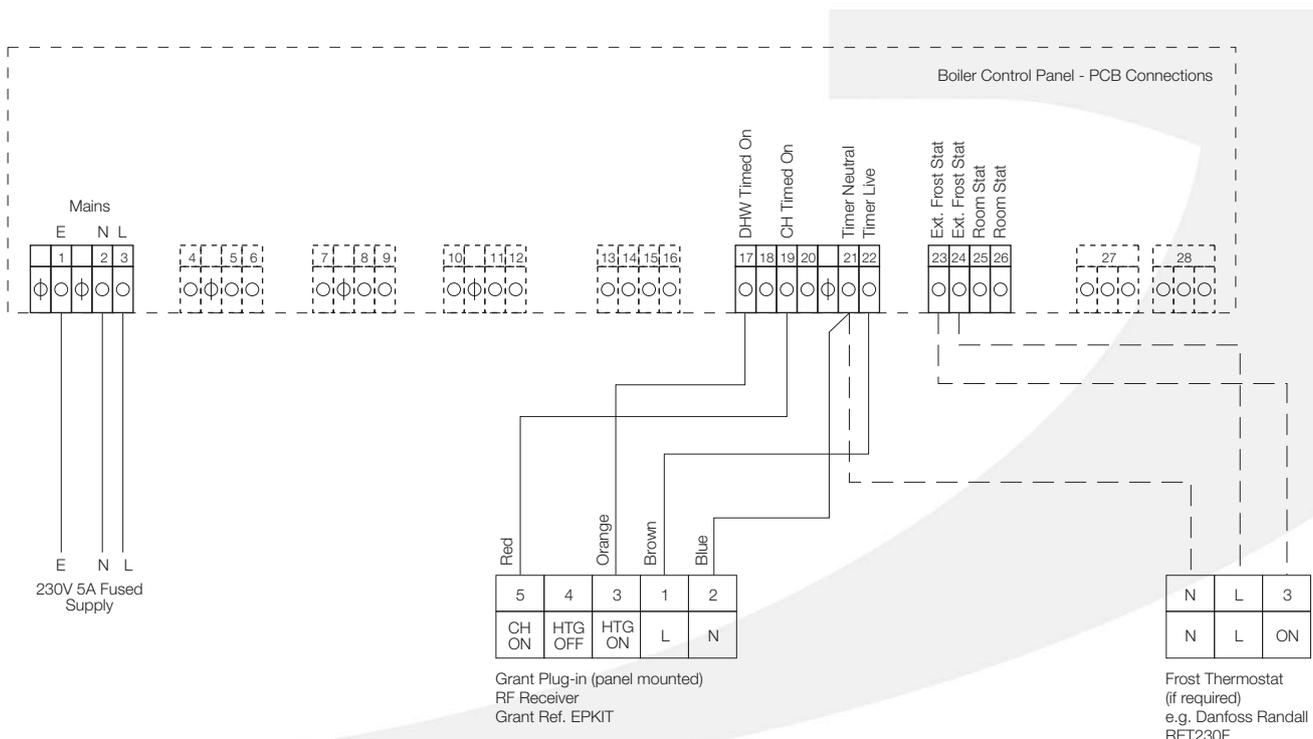


Figure 8-8: Connections for the Grant wireless 2-channel Programmable room thermostat (RFTKIT)

8 Electrical

Connection of a remote two-channel programmer (for example Grant ESKIT) and room thermostat

Pass a 3-core cable (or 3-core and earth if the room thermostat to be used has an earth connection) through the cable clamp on the control panel.

Remove the Orange room thermostat link wire from terminals 25 & 26 on the connection block and connect the wires from the room thermostat. Refer to Figure 8-9 for further details.

Connect the room thermostat to the terminal block in accordance with the room thermostat manufacturer's instructions.

Connect the remote programmer as follows:



NOTE

Any remote two-channel programmer must be suitable for 230 V and internally linked - for example, Grant Type ESKIT programmer.

1. Pass a 4-core cable (or 4-core and earth if the timer to be used has an earth connection) through the cable clamp on the control panel.
2. Remove the Red link wire from terminals 17 & 18 and the Black link wire from terminals 19 & 20 on the connection block. Connect the two wires from the programmer to terminals 17 & 19. Refer to Figure 8-9.
2. Connect the live, neutral (and earth if required) from the programmer to terminals 3, 2 & 1 respectively on the boiler terminal block. Refer to Figure Figure 8-9 for further details.
4. After making the electrical connections to the boiler, re-tighten the cable clamps.
5. Re-fit terminal block cover on control box and fasten with the two screws previously removed.
6. Hinge the control panel back into position on the two retaining screws. Replace top casing panels.
7. Re-connect electrical supply and check operation of the programmer and room thermostat.

Refer to the Fitting and User Instructions supplied with the programmer for operating and setting.

Leave the Programmer and Room Thermostat Fitting & User instructions with the user after installation.

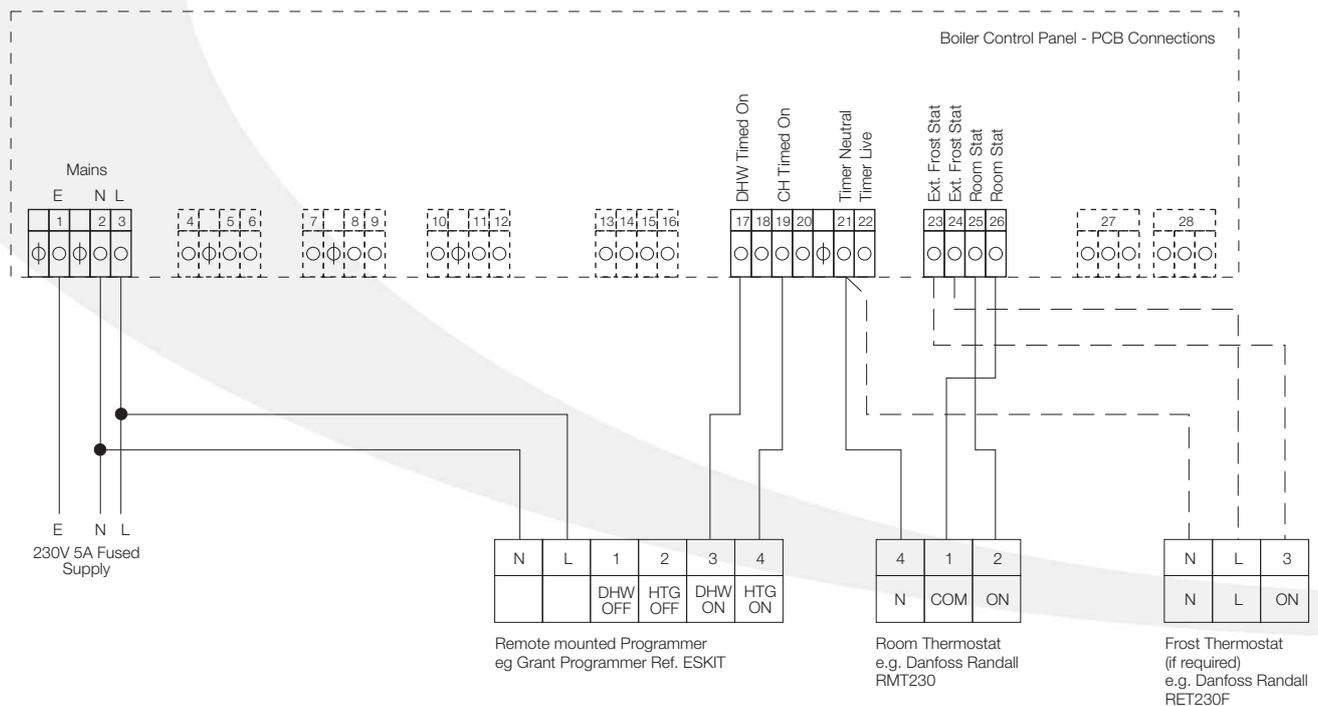


Figure 8-9: Connections for the remote Grant 2-channel Programmer (ESKIT) and room thermostat

8.4 Connecting an External Frost Thermostat

The boiler is fitted with a pre-set internal frost protection thermostat. Should either the air temperature around the boiler, or the water temperature within the boiler, fall to below 5°C then this thermostat will be activated to protect the boiler from freezing.

If necessary, to protect any exposed heating system and any exposed pipework, an external frost thermostat can also be connected to the boiler. This frost thermostat should be sited within the house in such a place that it can detect any rise and fall in the ambient air temperature, such as, in a room with a radiator. It is connected to the boiler as follows:

1. Connect the wires from the frost thermostat to terminals 23 & 24 on the connection block. Refer to Figure 8-6, Figure 8-3 and Figure 8-9 for further details.
2. Connect the frost thermostat in accordance with the frost thermostat manufacturer's instructions.

This external frost thermostat will operate in parallel with the internal frost thermostat.

9 Flue System and Air Supply

9.1 Air Supply

A sufficient permanent air supply to the boiler should be provided for the following reasons:

- For proper combustion of fuel and effective discharge of combustion products to the open air.
- For the ventilation of any confined space in which the boiler is installed to prevent overheating of the boiler any equipment in and near the boiler.
- For the satisfactory operation of any draught stabiliser that may be fitted.

It should be both the designer's and installer's concern that the air required for these functions be introduced so as to cause as little discomfort as possible to the building occupants and thus to offer them the least temptation to obstruct the ventilators.

Further details may be obtained from BS 5410:1:1997.

! NOTE

For a boiler fitted in a compartment, which is ventilated as shown, no additional allowance is necessary.

Open flue - Extract fans, where needed, should be in accordance with Section 4.4.7 in BS 5410 Part 1 1997.

All ventilation is given for domestic applications. For all other cases refer to BS 5410 Part 2 1978.

Minimum Size of Air Vents Required

The table below right shows the minimum size of air vents required as illustrated in Figure 9-1 and Figure 9-2 above.

! NOTE

In compliance with Approved Document L1A 2006, the above ventilation areas are based on the total appliance output without deducting the 5 kW allowance for adventitious ventilation.

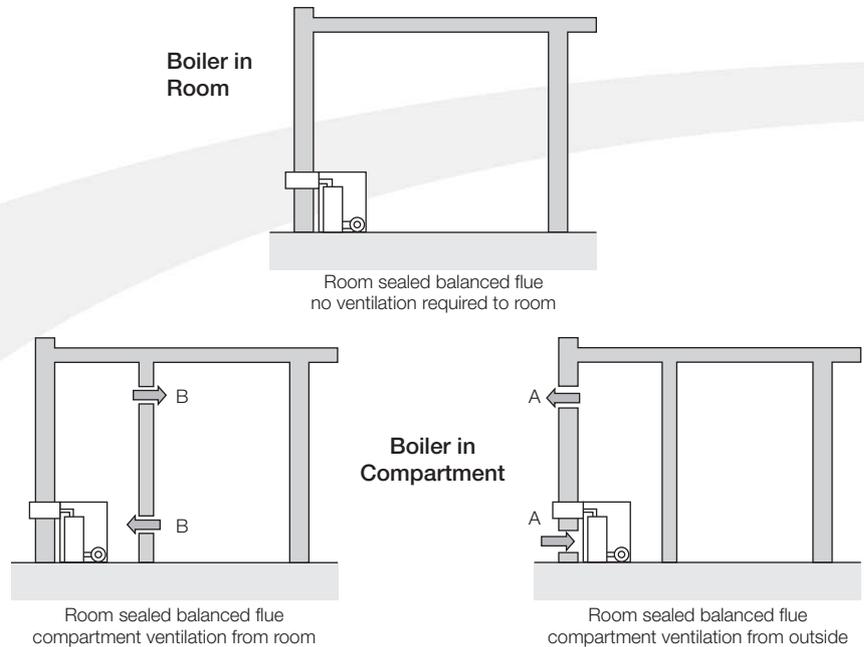


Figure 9-1: Air supply for room sealed balanced flue boilers

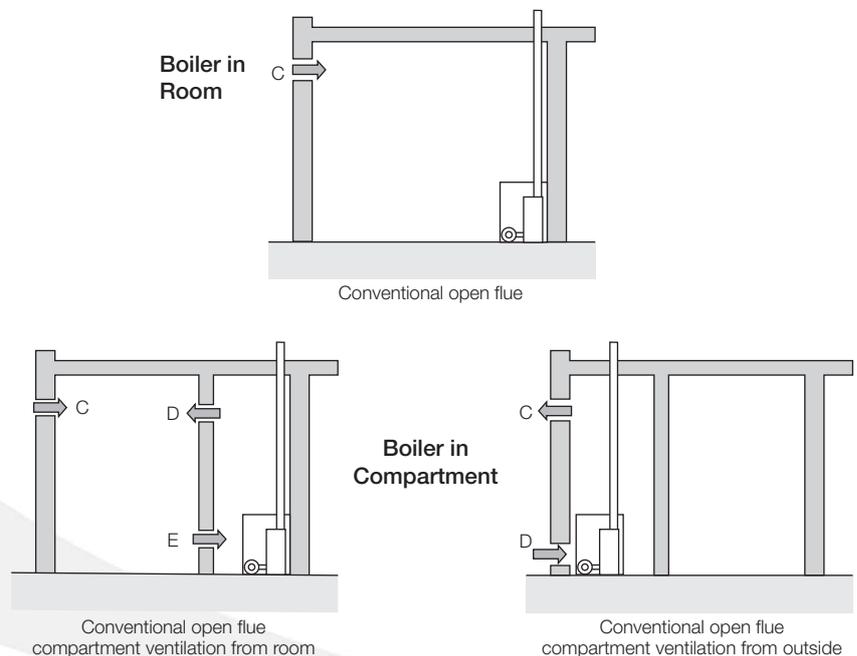


Figure 9-2: Combustion and ventilation air supply for conventional flue boilers

Vent	Pro Combi 21e		Pro Combi 26e		Pro Combi 36e	
	cm ²	in ²	cm ²	in ²	cm ²	in ²
Vent A	116	18	143	22	198	31
Vent B	231	36	286	44	396	61
Vent C	116	18	143	22	198	31
Vent D	231	36	286	44	396	61
Vent E	347	54	429	67	594	92

9.2 Conventional Flue Systems

NOTE

Under no circumstances can Grant Vortex boilers be installed with existing flue systems. Only flue systems and components suitable for wet flues should be used.

Failure to install the correct type of flue system will invalidate the warranty.

Grant condensing boilers have high operating efficiencies and low flue gas temperatures. Care must be taken to ensure the flue system is suitable for the very low flue gas temperatures and condensate in the flue gases.

Suitable conventional flue systems are available from Grant UK.

The flue must terminate in a down draught free area, i.e. at least 600mm above the point of exit through the roof or preferably above the ridge level.

The condensate may be allowed to run back into the boiler. A condensate drain at the base of the flue system is not required.

The high level flue terminal must be at least 600mm from any opening into the building, and 600mm above any vertical structure or wall less than a horizontal distance of 750mm from the terminal.

If an existing chimney is to be used, it must be lined with a smooth bore stainless steel liner suitable for use with oil fired condensing boilers. The top and bottom of the annular space must be sealed.

Grant recommends the use of the Grant 'Orange' flue system, specifically designed for the Vortex range of condensing boilers.

The internal flue liner diameter for all models is 100mm (4 in).

The maximum vertical height (from the top of the boiler to the terminal) for the 'Orange' system is 19 metres.

NOTE

The Grant "Orange" system flexible stainless steel flue liner is directional. The arrows indicated on the liner must be facing vertically up the chimney, following the direction of the flue gases. Failure to comply with this instruction could lead to a leakage of condense from the flue system.

If a rigid flue is used externally, it must be of the twin-wall type incorporating seals at all joints, constructed with a stainless steel inner skin and be suitably insulated and weatherproofed. The internal flue diameter for a rigid flue for all models is 100mm (4 inches).

Grant recommends the use of a hybrid system using Grant 'Green' and 'Orange' flue system components for this application. Refer to Section 1.2 for details.

NOTE

As no flue adaptor is supplied with the boiler, in order to correctly connect the hybrid system, it will be necessary to purchase the Grant CF adaptor kit (Ref. CFA15/70).

If required, it is possible to use the white painted single-wall straight flue extensions, adjustable extensions and elbows from the Grant 'Orange' system for the internal section of the flue system, see Fig 9-5. These components can be fitted between the boiler connector and flue adaptor. The flue adaptor, to which the external twin-wall 'Green' flue components are connected, can therefore be situated just before the flue system passes through the wall.

NOTE

Grant 'Orange' system single-wall flue components must not be used externally.

The maximum vertical height (from the top of the boiler to the terminal) for the 100mm diameter hybrid 'Green/Yellow' system is 8 metres.

Grant 'Green' twin-wall flue is recommended for externally run flues to reduce the possibility of the condensate freezing in the flue.

No part of any flue system should be made of an asbestos material; aluminium must not be used in any part of the flue. Only stainless steel flue components should be used.

If the draught conditions are satisfactory, the flue should terminate with a standard cowl.

Refer to the locally applicable Building Regulations, BS 5410:1 and OFTEC Installation Requirements (OFTEC Books 2 and 3) for further guidance on conventional flue systems.

CAUTION

It is important to ensure that the flue system is sealed and that condensate cannot escape. Up to 1.5 l/h of condensate can be produced in a conventional flue system.

Use only flue systems suitable for oil fired condensing boilers.

Do not use fire cement. The use of high temperature silicone sealants is recommended.

NOTE

To comply with the requirements of the Building Regulations Approved Document J - conventional flue systems must have a flue data plate. A suitable data plate is supplied with the current orange flue system and should be displayed next to the boiler or flue.

9 Flue System and Air Supply

Flue Lining Kits

Grant EZ-Fit Flexi Pack conventional flue system (Orange System)

A range of Flexi pack conventional flue lining kits are available from Grant UK. The packs have been specifically produced for Grant Vortex oil fired condensing boilers.

The pack includes a terminal/top plate/flexi flue adaptor, stainless steel smooth bore flexible flue liner, a rigid to flexi adaptor and a boiler flue connector.

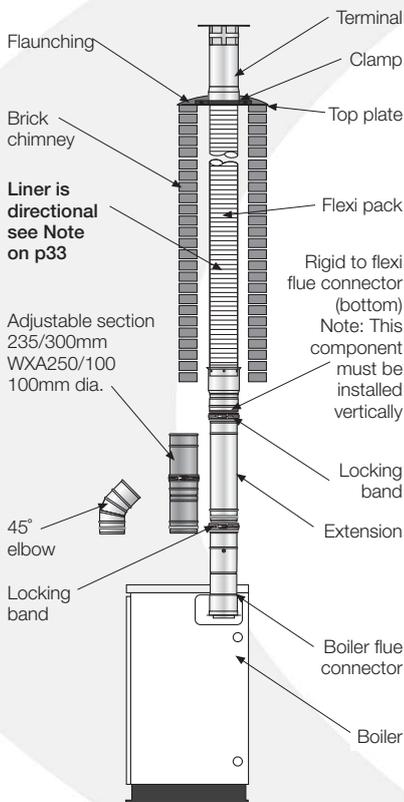


Figure 9-3: Grant 'Orange' flue system in a typical brick chimney

The 'Orange' system kits components with their part codes follows:

Part Number	Flexi Pack (Orange System)
GFKIT 6/100	100mm dia. x 6m length
GFKIT 8/100	100mm dia. x 8m length
GFKIT 10/100	100mm dia. x 10m length
GFKIT 11/100	100mm dia. x 11m length
GFKIT 12/100	100mm dia. x 12m length
GFKIT 14/100	100mm dia. x 14m length
GFKIT 16/100	100mm dia. x 16m length

Extensions

A range of white powder coated single wall extensions are available to connect the boiler to the flexible liner.

The external diameter of the extensions is 100mm.

Extensions are supplied with locking bands.

The 'Orange' system extension components with their part codes follows:

Part Number	Flexi Pack (Orange System)
WX150/100	100mm dia. x 150mm
WX250/100	100mm dia. x 250mm
WX450/100	100mm dia. x 450mm
WX950/100	100mm dia. x 950mm



CAUTION

Flue extensions cannot be cut.

Also available are:

- An adjustable extension.
- 45° elbow are also available.



NOTE

The rigid flue between the boiler and flexible flue liner should incorporate an adjustable section to allow removal for inspection and cleaning of the flue system

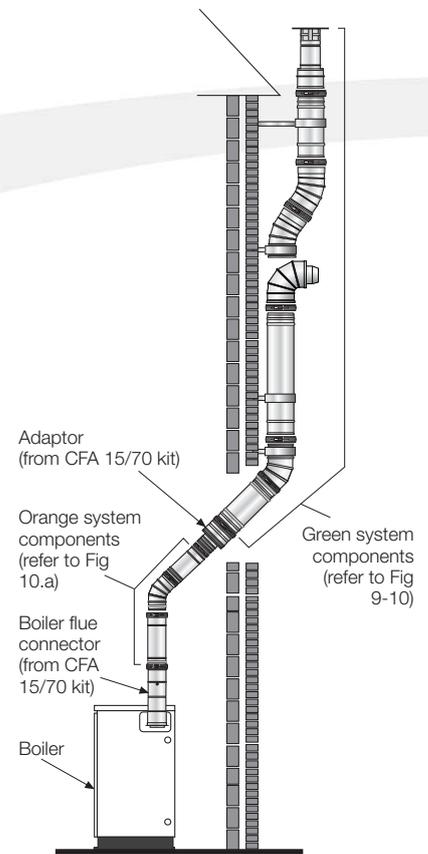


Figure 9-4: Hybrid flue system using Grant 'Orange' and Grant 'Green' system components

9.3 Connecting a Conventional Flue

1. Unscrew and remove top casing panel.
2. Push out the pre-cut blanking panel.

If the Grant 'Orange' flue system is being used, follow the instructions supplied with the flue kit.

If the Grant 'Green' system (100mm rigid twin wall flue) is to be fitted to the boiler then the Grant CF adaptor kit (Ref. CFA15/70) must be used - refer to Section 1.2.

To fit the adaptor kit, proceed as follows:

1. Fully screw the length of threaded studding (provided in the kit) into the nut located in the centre of the boiler flue outlet.
2. Fit the boiler connector (from the CF adaptor kit) over the threaded studding.
3. Position flange on to the neoprene gasket around the boiler flue outlet, ensuring that small spigot on the base of the connector is located in the hole in the centre of the neoprene gasket and that the end of the studding passes through the hole in the base of the spacer bracket.

4. Fit the washer and wing nut provided onto end of threaded studding and secure the connector in position by tightening down on the wing nut - as shown in Figure 9-5.

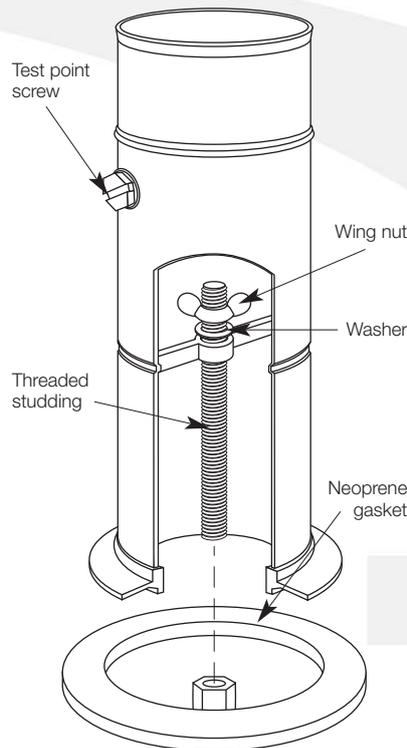


Figure 9-5: Boiler flue connector

5. Re-fit the top casing panel to the boiler - fitting it over the boiler connector.
6. Fit the flue adaptor (from the adaptor kit) into the boiler connector.

NOTE

Lubricate the seal on the flue connector using the lubricant provided before attempting to fit the flue connector.

7. Fit the first section of flue into the flue adaptor and secure using the clamp band provided.
8. Assemble the remainder of the flue system as required, lubricating the seal on each component before fitting.

9.4 Balanced Flue Systems

Apart from a conventional flue, several balanced flue options are available for use with the Grant Vortex Pro Combi e boilers. All are suitable for use with Class C2 kerosene.

NOTE

None of the flue sections in the following system can be cut.

Low Level Horizontal Balanced Flue (Yellow system)

The Grant 'Yellow' system low level balanced flue is available in either Short (for single thickness brick walls) and Standard kits.

Extensions are available which extend the flue by 225mm, 450mm or 675mm.

90° and 45° elbows are also available.

The maximum flue length - from the centre of the boiler flue outlet to the outer face of the wall - is 4 metres (with or without elbows included). No more than 2 x 45° or 1 x 90° elbow should be fitted per system.

The 'Yellow' system low level balanced flue is supplied with a stainless steel guard. This must be fitted in all circumstances to prevent objects from entering the flue outlet.

The guard must be fitted centrally over the flue terminal and securely fixed to the wall.

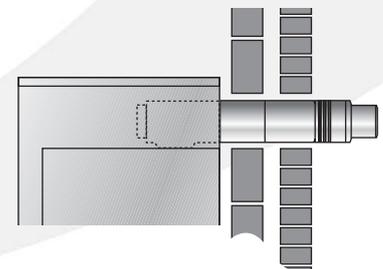


Figure 9-6: Low level balanced flue ('Yellow' system)

9 Flue System and Air Supply

Vertical Balanced Flue (White system)

Allows the flue to rise vertically from the boiler to exit through the roof.

The maximum flue length - from the top of the boiler flue outlet to the terminal - is 12 metres for all Vortex boilers.

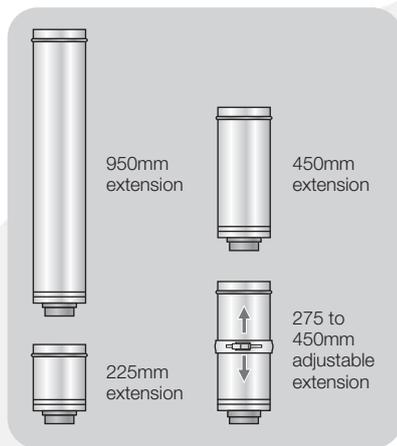


Figure 9-7: White system extensions

The following items are additionally available:

- Extensions to extend the flue by 225mm, 450mm or 950mm.
- An adjustable extension of 275 to 450mm.
- A 45° elbow - No more than 6 x 45° elbows should be fitted per system. Each elbow reduces the overall maximum length of the system by 1 metre.

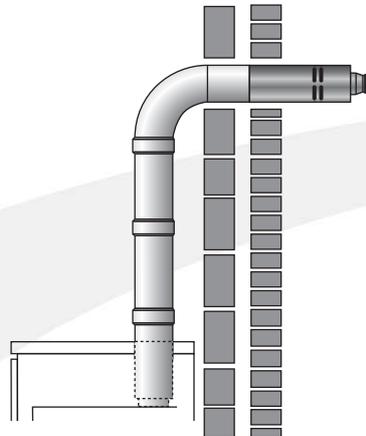


Figure 9-8: High level balanced flue 'White' system

Flexible Vertical Balanced Flue (Red System) - for Combi 21e & 26e only

This is a flexible vertical balanced flue system designed to be fitted inside an existing masonry chimney. See Figure 9-10.

It basically consists of three sections:

- Concentric white painted flue pipe connected to the boiler.
- Vertical concentric flexible flue (flexible stainless steel flue liner inside a flexible plastic air inlet liner).
- Terminal assembly for chimney top mounting.

NOTE

The Grant "Red" system flexible stainless steel flue liner is directional. The arrows indicated on the liner must be facing vertically up the chimney, following the direction of the flue gases. Failure to comply with this instruction could lead to a leakage of condense from the flue system.

The flue pipe seals are factory fitted and must be lubricated with the lubricant supplied before assembly.

The Red system is supplied as a separate kit. Flue extensions and 45° elbows from the White system may be used to extend the flue between the boiler and the flexible section of the system.

The maximum vertical straight length of flue, from the top of the boiler to the top of the terminal, is 20 metres - using no more than four 45° elbows. Deduct 1 metre of straight flue length for every elbow used.

NOTE

If the flexible liners have to pass around an offset inside the chimney deduct 2 metres of straight flue length to compensate for this.

Flue extensions cannot be cut, use adjustable extensions where required.

Three types of locking band are supplied with the kit.

The first type is for connecting flue sections that butt together (2 of this type of locking band are supplied).

The second type is to cover the joint on the adjustable (telescopic) section.

NOTE

The locking band for the adjustable section is labelled for easy identification.

The third locking band is plastic and supplied in two halves. This is to secure the plastic flexible liner to the adaptor.

White System Components

Item - for models up to 26 kW output	Part No. Combi 21e and 26e	Part No. Combi 36e
High level flue kit - 1.2 metre	HL K01 50/90	HL K02 90/200
Vertical flue kit - 3 metre	VT K05 50/90 V	T K06 90/200
225mm extension	EXT K31 225/90	EXT K32 225/200
450mm extension	EXT K09 450/90	EXT K10 450/200
950mm extension	EXT K11 950/90	EXT K12 950/200
275-450mm adjustable extension	EXT K13 ADJ/90	EXT K14 ADJ/200
45°elbow	ELB K21 45/90	ELB K22 45/200
Pitched roof flashing - aluminium (for VT K05 50/90)	VT MF 90	VT MF200
Pitched roof flashing - lead (for VT K05 50/90)	VT K25 P90	VT K26 P200
Flat roof flashing - aluminium (for VT K05 50/90)	VT K27 F90	VT K28 F200
Wall bracket	BRK 29 90	BRK 30 200

The flue kit includes a Black coated terminal with upstand and is designed to be fixed (using the screws provided) to the top of a masonry chimney.

The flue system may be offset using 45° elbows (Ref. ELB K2145/90).

No more than a maximum of four elbows should be used per system.

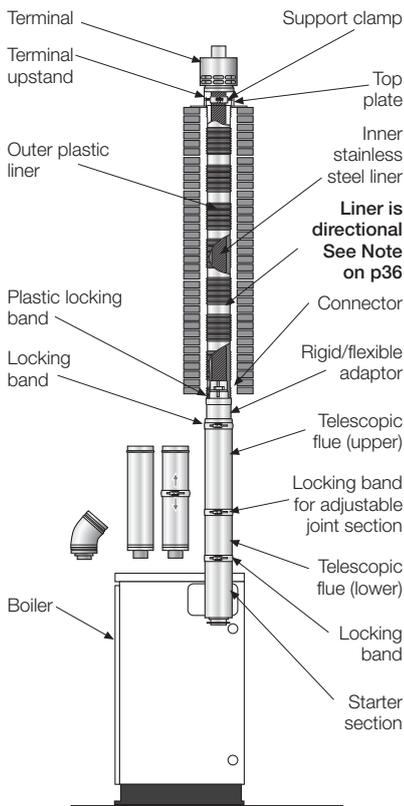


Figure 9-9: Red system balanced flue

External Balanced Flue (Green system)

Where it is not practical to use a low level (Yellow system) or internal high level/vertical (White system) balanced flue, the boiler can be fitted with an external vertical/high level flue (Green system). See Figure 9-10.

The Starter kit fits to the boiler in the same way as a low level balanced flue (Yellow system) and the external Tee allows the connection of a twin wall insulated flue pipe and a combustion air inlet - providing a room sealed flue system.

The external system can terminate at either high level or vertically (above roof level) as required.

The minimum dimensions for locating the terminal from building features (windows, doors, etc.) are shown in Figure 9-11.

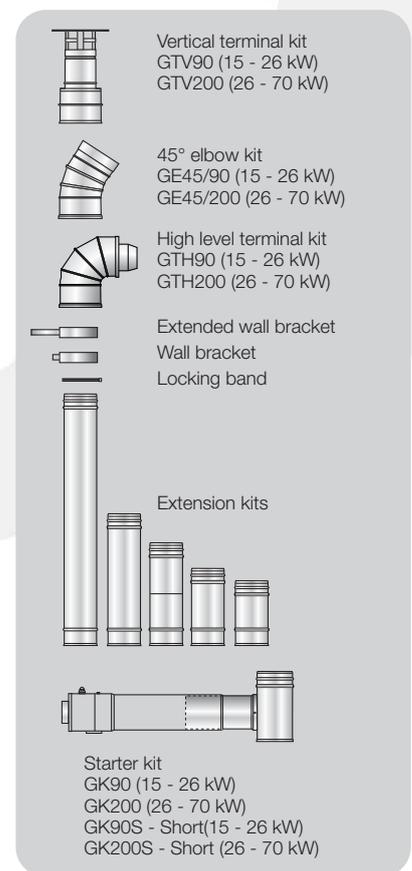
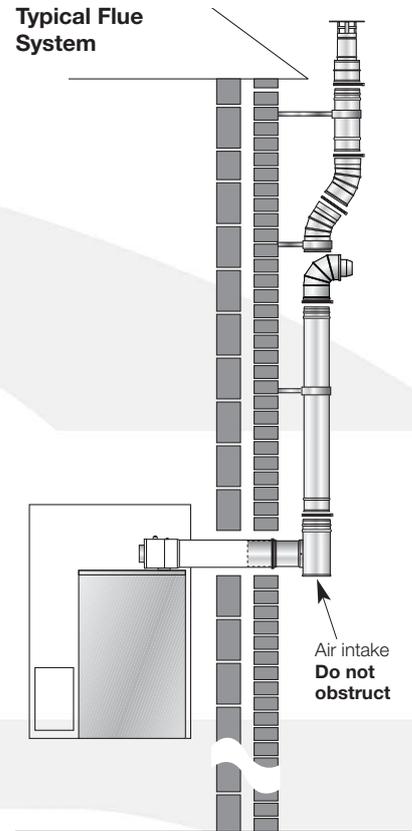
If the flue terminal is fitted less than 2 metres above a surface to which people have access, the terminal must be protected by a guard. The guard must be fitted centrally over the flue terminal and securely fixed to the wall.

The low level balanced flue (Yellow system) is supplied with a stainless steel guard. This must be fitted in all circumstances to prevent objects from entering the flue outlet.

The terminal must be positioned so as to avoid products of combustion accumulating in stagnant pockets around the buildings or entering into buildings. Care should be taken that the plume from condensed flue gases does not cause a nuisance.

Figure 9-10 shows the external flue (Green system) components that are available from Grant UK.

Typical Flue System



Green System Components		
Item - for models up to 26 kW output	Part No. Combi 21e and 26e	Part No. Combi 36e
Starter kit - standard	GK90	GK200
Starter kit - short	GK90S	GK200S
150mm extension	GX150/90	GX150/200
250mm extension	GX250/90	GX250/200
450mm extension	GX450/90	GX450/200
950mm extension	GX950/90	GX950/200
195-270mm adjustable extension	GXA250/90	GXA250/200
45° elbow	GE45/90	GE45/200
High level terminal	GTH90	GTH200
Vertical terminal	GTV90	GTV200
Wall bracket - standard	GWB90	GWB200
Wall bracket - extended	GEB90	GEB200

Figure 9-10: External balanced flue (Green system)

9 Flue System and Air Supply

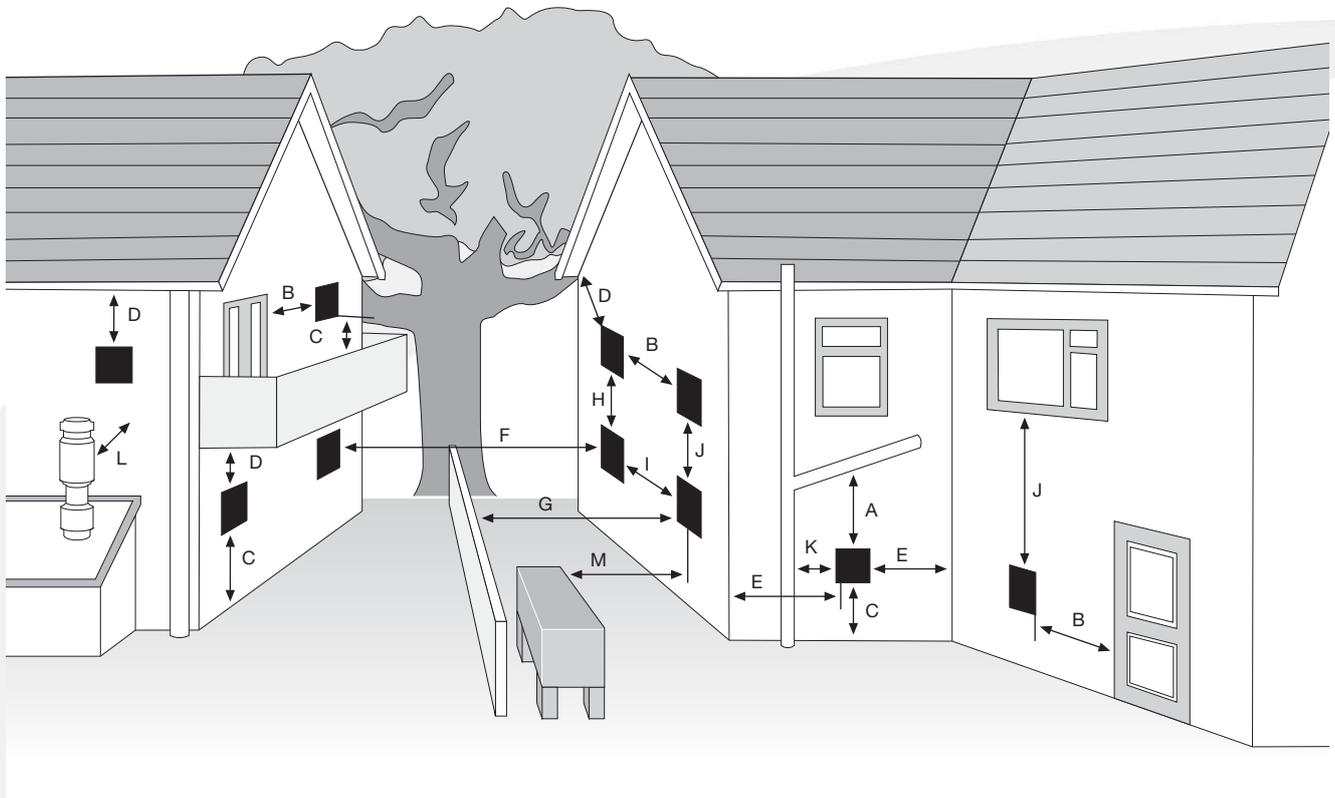


Figure 9-11: Clearances for Balanced flue terminals

The minimum distances as shown in Figure 9-11 are given in the table below:

Terminal position	Min. distance (mm)
A Below a gutter or sanitary pipework	600*
B Horizontal from an opening, air brick or window	600
C Above ground or balcony level	300
D Below eaves or balcony	600*
E From an internal or external corner	300
F From a terminal facing the terminal	1200
G From a surface facing the terminal	600
H Vertical from terminals on the same wall	1500
I Horizontal from terminals on the same wall	750**
J Below an opening, air brick, window, etc.	600
K From vertical sanitary pipework	300
L Vertical flue from wall	750
M From an oil storage tank	1800

Notes:

* 75mm with protection.

** Only applies if one or both terminals are balanced flues.

Distances measured to rim of terminal.

Clearances recommended by Grant Engineering (UK) Limited in accordance with British Standards and Building Regulations.

! NOTE

1. An opening means an openable element, such as an openable window, or a permanent opening such as a permanently open air vent.
2. Notwithstanding the dimensions given, a terminal should be at least 300mm from combustible material, e.g. a window frame.
3. A way of providing protection of combustible material would be to fit a heat shield at least 750mm wide.

9.5 Prepare the Wall

If the boiler is to be used with a low level balanced flue (Yellow system) make the hole in the wall for the flue as shown in Figure 9-12.

NOTE

Dimension B given in Figure 9-12 includes an extra 10mm over the size of the terminal to provide clearance for fitting.

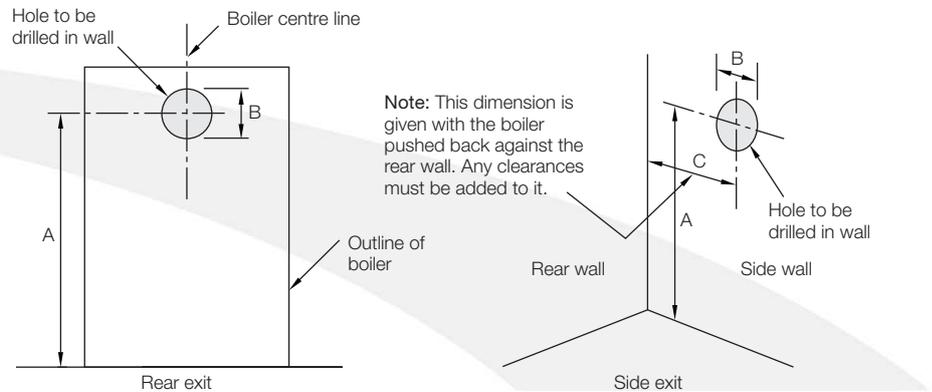


Figure 9-12: Flue hole dimensions and position for low level systems (Yellow and Green)

Model	Dimension (mm)		
	A	B	C
Pro Combi 21e and 26e	768	127	115
Pro Combi 36e	780	162	105

9.6 High Level and Vertical Balanced Flue

If the boiler is to be used with the high level balanced flue (White system) make the hole in the wall as shown in Figure 9-13.

NOTE

Dimension B given in Figure 9-13 includes an extra 10 mm over the size of the terminal to provide clearance for fitting.

Fitting instructions for the high level balanced flue and vertical balanced flue are supplied with the flue kits.

Adjustable Extensions

The adjustable extensions are telescopic. The wall terminal section is adjustable and is suitable for a wall thickness of 215mm to 450mm.

Simply adjust to the required length using a twisting motion. The outer pipes must overlap by a minimum of 25mm.

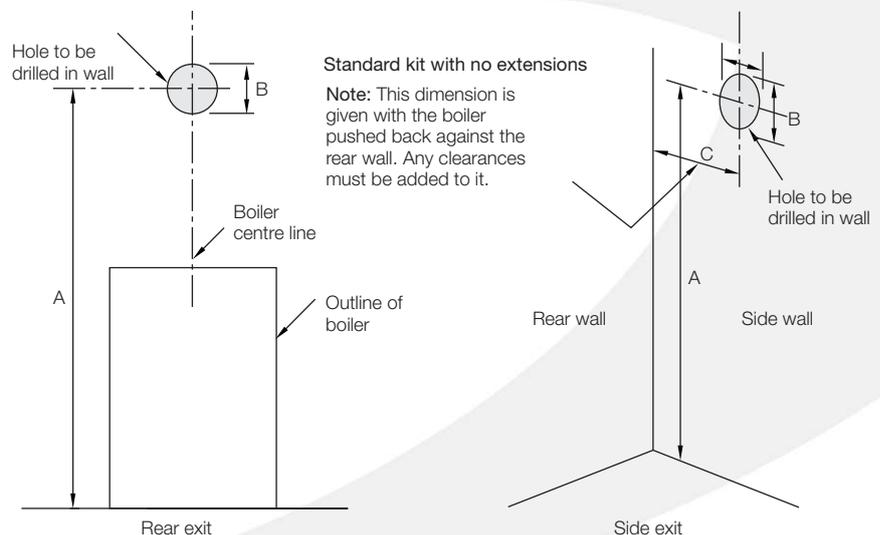


Figure 9-13: Flue hole dimensions and position for high level system (White)

Model	Dimension (mm)			
	A	B dia	C	
Pro Combi 21e and 26e	1215*	1715 - 2115	175	115
Pro Combi 36e	1280*	1700 - 2020	200	105

*Dimension A for Starter section and elbow/terminal only

10 Commissioning

It is important that the following commissioning procedure is carried out to ensure safe and efficient operation of the boiler.

To access the controls, remove the front panel (pull forward at the top and then lift off).

The controls are shown in Figure 10-1.

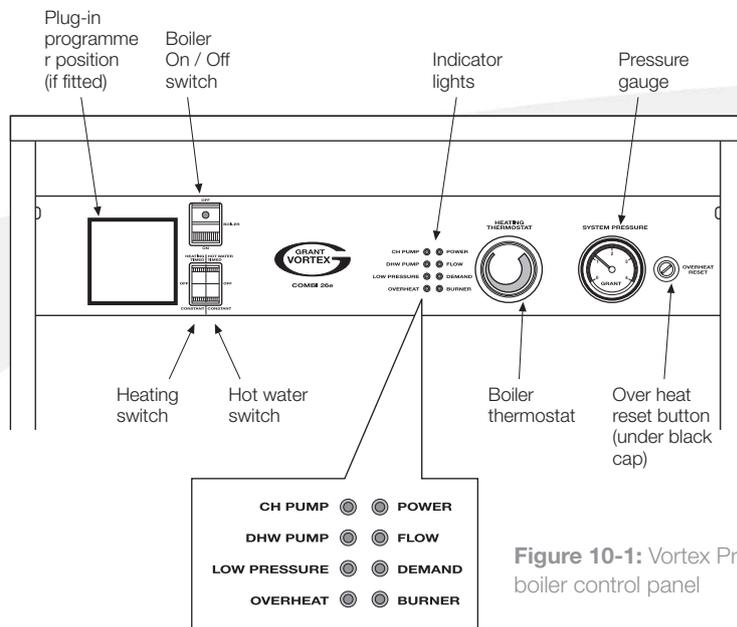


Figure 10-1: Vortex Pro Combi e boiler control panel

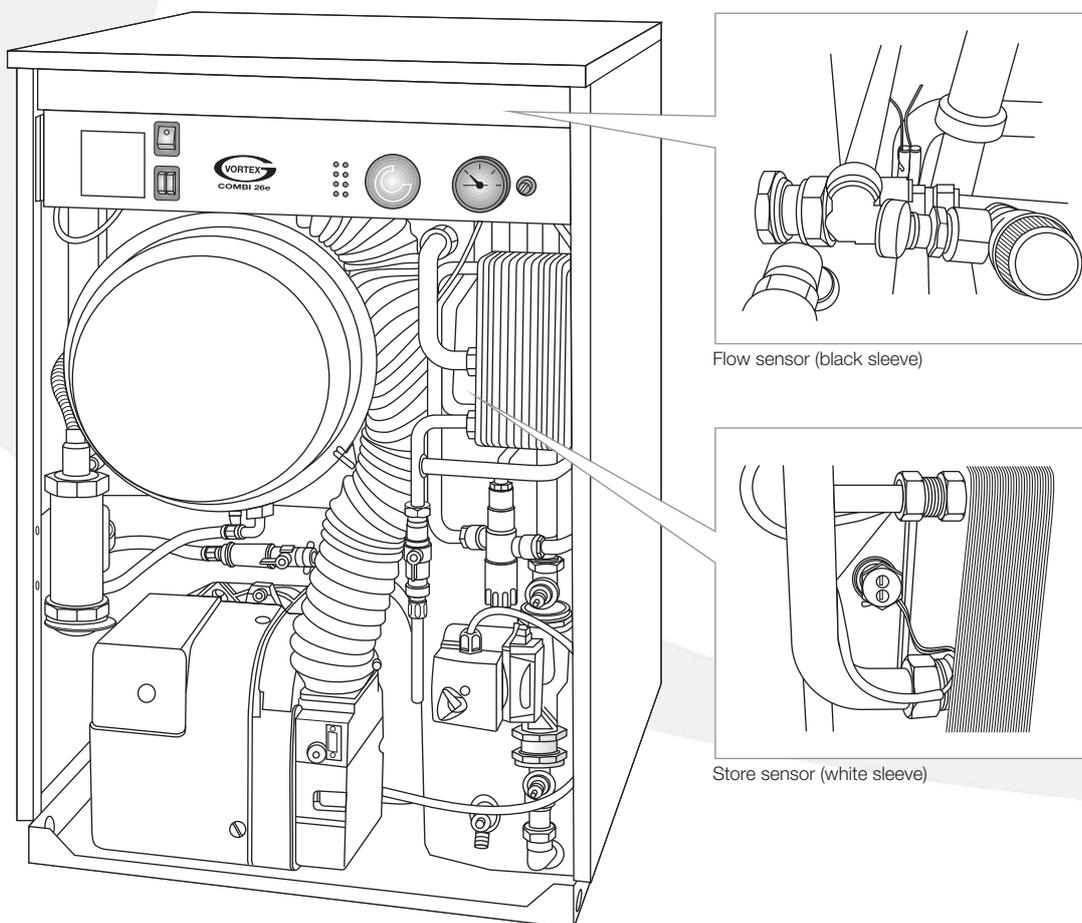


Figure 10-2: Position of boiler components - Vortex Pro Combi e boilers

10.1 Before Switching On

1. Ensure the boiler On/Off switch is set to OFF.
2. Check that the high limit thermostat bulb and both thermistor sensors are correctly located in their respective pockets. Refer to Figure 10-2. Check condition of both thermistor cables and thermostat capillary. Ensure they are not damaged, broken, kinked or crushed.
3. Remove the nuts and washers securing the front cleaning door. Withdraw the door – take care as it is HEAVY!
4. Check that the turbulators are in position and that the ends are vertical. Refer to Figure 11-4.
5. Check that the baffles are in position. Refer to Figures 11-1, 11-2, or 11-3 as required.
6. Re-fit cleaning door and check it is fitted correctly and that a good seal is made.
7. Remove and check the burner. Check burner head is correct. Refer to Section 2.3 and Figures 13-2, 13-3 or 13-4 as required.
Check electrodes are set correctly. Refer to Figure 11-5.
Check the nozzle is correct for the output rating required. Refer to Section 2.3.
Check burner air adjuster disc is set to setting C (Vortex Combi 21e only). Refer to Figure 10-4.
8. Check that the sealed system has been vented and pressurised and there are no leaks.
9. Ensure both automatic air vents, and also the manual vent on the flow pipe, are open.
10. Check that all fuel line valves are open.
11. Remove the plastic burner cover if it was not previously removed.
12. Connect a combined vent manifold and pressure gauge to the pressure gauge connection port on the oil pump. See Figure 10-3.
13. Check that all system controls are calling for heat and turn the boiler thermostat to maximum.

10.2 Switching On

1. Switch on the electricity supply to the boiler.
2. Set the boiler On/Off switch to ON. A neon on the switch lights when it is in the ON position.
Note that the neon lights when the boiler is switched on, but does not necessarily indicate the burner is firing.
Set both the Hot Water and Heating switches to ON.
The burner should then fire.
Open the vent screw on the vent manifold to vent the supply while the oil pump is running.
3. Fully open a hot tap and allow it to run for a few moments to vent the internal primary circuit. The Hot Water pump will operate and the burner should light within about 12 seconds.
If the burner does not light and the 'Lock-out' reset button lights, wait for about 45 seconds then press the reset button to restart the ignition process. This procedure may have to be repeated during first lighting.
4. Close the hot tap. The burner will continue to fire to heat the primary water in the boiler or primary store until the required temperature is reached.

! NOTE

Grant Vortex e Combi boilers incorporate a “pump overrun” feature, within the control circuit board, that operates as follows –

When reheating the Primary Hot Water store;

the burner will cut out when the boiler reaches 83°C (as detected by the boiler “flow” thermistor).

If there is a demand for Central Heating;

the hot water “store” pump will run on for 90 seconds before it stops and the “central heating” pump then comes in.

If there is no demand for Central Heating;

the hot water “store” pump will continue to run until the temperatures in the Primary Hot Water store and the boiler

have equalised. **The adjustable Boiler thermostat on the control panel regulates the boiler temperature when in Heating mode only. The recommended flow temperature setting is 70°C.**

The Primary Hot Water store temperature is controlled via the “store” thermistor and control circuit board. The control thermostat has NO influence on either the store temperature or the hot water temperature at the tap.

! NOTE

The Hot Water pump will continue to run for a short period after the burner has stopped.

The boiler will now be operating in the central heating mode.

! NOTE

The burner may not fire immediately in the central heating mode.

5. With the burner alight, check the fuel pressure. Refer to the Technical Information, Section 2.3.
6. Adjust the pressure if necessary - see Figure 10-3.

! NOTE

It is important that the oil pressure is correctly set.

7. Operate the boiler until it reaches normal operating temperature. Check oil supply/return pipe for leaks, rectifying where necessary.
8. Check the operation of the boiler thermostat. Ensure that by turning it anticlockwise it switches the burner off.
9. With the burner alight, re-check the fuel pressure and re-adjust if necessary. Turn the boiler off, remove the pressure gauge and replace the plug in the pump.
10. Ensure that there are no oil leaks, replace the burner cover.

10 Commissioning

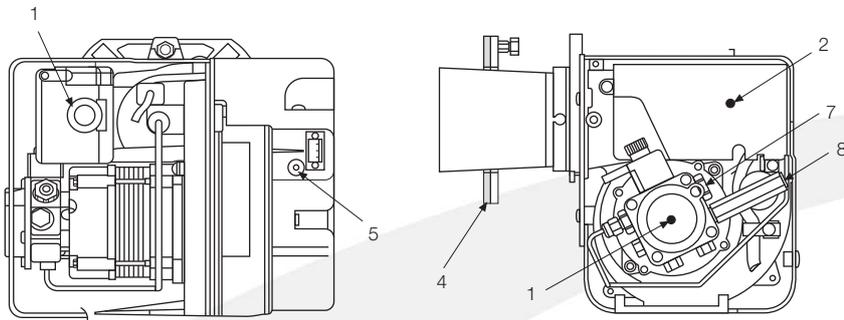


Figure 10-3: RDB burner components

1. Pump
2. Control box
3. Reset button with lockout lamp
4. Flange with gasket
5. Air damper adjustment screw
6. Air supply tube connection (balanced flue)
7. Pump pressure adjustment screw
8. Pressure gauge connection

10.3 Running the Boiler

1. Relight the boiler and allow it to run for at least 20 minutes.
2. Check the smoke number, if satisfactory check the CO₂. Set the CO₂ to the value given in Section 2.3 for the boiler concerned.
3. Use the hexagonal key supplied to adjust the burner air damper (see Figure 10-3) as required. Turning the screw anti-clockwise closes the damper and increases CO₂ level, turning the screw clockwise opens the damper and reduces CO₂ level.
4. Re-check the smoke number if the damper has been moved. Under no circumstances must the smoke number be above 1.

NOTE

It is important that the air damper is correctly set.

10.4 Balancing the System

1. When the boiler has been adjusted and is running satisfactorily, balance the central heating system by adjusting the radiator lock shield valves. Start with the radiator nearest the boiler and adjust the valves to achieve the required temperature drop across each radiator. If thermostatic radiator valves have been installed, check the system bypass.
2. Switch off the boiler.

10.5 Completion

1. With the system hot, check again for leaks, rectifying where necessary. Drain the system while it is hot to complete the flushing process. Refill and vent the sealed system.
2. A suitable central heating system inhibitor must be added to protect the system against the effect of corrosion.
3. A suitable antifreeze should be used to prevent damage to the boiler in areas where electrical power failure can occur in winter months.
4. Replace the top, front and rear panels as necessary.

NOTE

After commissioning the boiler complete the Commissioning Report in the front of this manual and the OFTEC CD/11 commissioning report. Leave the top copy with the User and retain the carbon copy.

If the boiler is to be left in service with the User, set the controls and room thermostat (if fitted) to the User's requirements.

If the boiler is not to be handed over immediately, close the boiler fuel supply valve and switch off the electricity supply.

CAUTION

If there is any possibility of the boiler being left during frost conditions, then the boiler and system should be drained. Alternatively, a suitable antifreeze should be used.

NOTE

To allow the boiler to be commissioned and serviced correctly a combustion test point is provided on the front cleaning door.

The CO₂ and smoke test may all be carried out using this test point.

The test point is not suitable for measuring boiler efficiency or conventional flue draught.

When using the test point on the cleaning cover note that the flue gas temperature reading will be higher than that measured in the flue thus resulting in an inaccurate efficiency reading.

To obtain an accurate flue gas temperature and efficiency, the reading can only be measured outside through the low level flue terminal (or the test point on the conventional flue starter section when used).

10.6 Air Adjuster Disc – Combi 21 only

The Riello RDB 2.2 burner fitted to this boiler incorporates a secondary air adjustment shutter located within the air inlet housing.

It is essential that this internal shutter disc be correctly set to position 'C'. Refer to Figure 10-4.

To access the air adjuster disc:

1. Ensure the boiler is isolated from the electrical supply.
2. Remove the burner from the boiler.
3. Undo the four screws and remove the air inlet cover from the side of the burner.
4. The secondary air shutter disc is factory set in position 'C' – i.e. with the cut-out marked C located against the die-cast boss on the fan housing. See Figure 10-4.
5. If not set to position 'C': remove the screw from the centre of the air shutter disc, and re-position it such that the cut-out 'C' is located against the cast boss on the fan housing. Replace the screw in the centre of the air shutter disc and tighten.
6. Re-fit the air inlet cover to the side of the burner and reassemble in reverse order.

10.7 Information for the User

The User must be advised (and demonstrated if necessary) of the following important points:-

- How to start and switch off the boiler and how to operate the system controls.
- The precautions necessary to prevent damage to the central heating system and to the building, in the event of the boiler not being in operation during frost conditions.
- The importance of servicing the boiler to ensure safe and efficient operation. This should normally be required only once a year.
- The type of fuel used.
- That any servicing or replacement of parts must only be carried out by a suitably qualified engineer.
- Ensure that the boiler controls and room thermostat (if fitted) are set to the User's requirements.
- Tell the User the system pressure and show them the position of the safety valve discharge pipe.
- Show the User how to reset the overheat thermostat and how to restart the boiler if it goes to 'Lock-out'.



NOTE

Leave this Instruction manual with the User.

Ensure the User information pack has been given to the Householder.

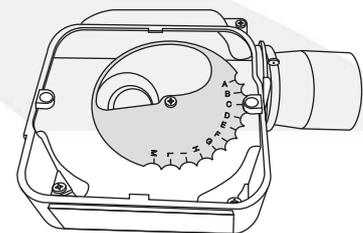


Figure 10-4: Burner air adjuster disc (shown set to position C)

11 Boiler Servicing

To ensure efficient operation of the boiler it is recommended that it is checked and serviced as necessary at regular intervals. The frequency of servicing will depend upon the particular installation conditions and usage, but in general once per year should be adequate.

Servicing and replacement of parts must only be carried out by a suitably qualified engineer.



CAUTION

Details of every service should be entered in the Service Log, in the Boiler Handbook.

This information may be required to validate the Grant extended warranty.



WARNING

Before starting any work on the boiler, or fuel supply please read the health and safety information given in Section 14.

11.1 Checking Before Servicing

The following sequential checks should be made before any servicing:

1. Check the flue terminal and ensure it is not blocked or damaged.
2. Run the boiler and check the operation of its controls.
3. Ensure that all water/fuel system connections and fittings are sound. Remake any joints and check the tightness of any fittings that may be leaking.
4. The boiler is part of a sealed central heating system, check the system pressure, check the operation of the pressure relief valve and check the expansion vessel air charge. See Section 7.
5. Refill, vent and re-pressurise the system as necessary. See Section 7.
6. Check that any ventilation openings are adequate and are clear. See Section 9.
7. Remove any sludge/water from the fuel tank by opening the sludge valve at the lower end of the tank.

8. With the fuel supply valve closed, clean/replace the filter element and clean the filter bowl.

Braided flexible fuel supply hoses as supplied with the boiler should be replaced annually when the boiler is serviced. If long-life hoses have been installed, these should be inspected annually. If in doubt replace the hoses. In any event, these hoses must be replaced every five years.



WARNING

Before servicing, set the boiler On/Off switch to Off, isolate the electricity supply and close the fuel supply valve.

Allow the boiler to cool.

The data label on the inside of the case side panel will indicate the fuel used and the nozzle fitted.

11.2 Dismantling Prior to Servicing

The procedure for dismantling the boiler is as follows:

1. Remove the front panels.
2. Carefully lift up the expansion vessel and remove it from the boiler. Place it on the floor, taking care not to strain the flexible pipe.
3. Disconnect the flexible air tube from the burner.
4. Remove the burner fixing nut (top of mounting flange) and withdraw the burner. If required, disconnect the flexible oil line(s), use a suitable container to prevent any oil spillage.



NOTE

With two flexible hoses connected to the burner, identify (mark if necessary) which is the inlet and return if they are to be disconnected.

11.3 Cleaning the Boiler

The procedure for cleaning the boiler is as follows:

1. Remove the nuts and washers securing the front cleaning door and withdraw the door. Take care - it is heavy.
2. Remove the baffles as shown in Figure 11-1, Figure 11-2 and Figure 11-3.
3. Remove all deposits from the baffle plates and all the boiler internal surfaces using a stiff brush and scraper if necessary.
4. Check the condition of the flue, clean as necessary.
5. Check the condition of the front cleaning door seal and replace if necessary.
6. Replace the baffles, ensuring they are correctly fitted. See Figure 11-1, Figure 11-2 or Figure 11-3, as appropriate. Pull out the spiral turbulators from the heat exchanger tubes. See Figure 11-4.
7. Clean the turbulators using a stiff brush.
8. Test the heat exchanger condensate drain by pouring water into one of the lower tubes and observe whether the water discharges from the 22 mm condensate outlet. Replace the turbulators.
9. Replace the front cleaning door, ensuring the seal is in good condition and secure it in position with the nuts and washers previously removed. Tighten to form a seal.
10. Remove the condensate trap and check that it is not blocked and is operating correctly, i.e. the float is free to move. Clean the trap and float as required.
11. Check that the boiler condensate outlet is unobstructed. Clean if necessary.



NOTE

The condensate trap and condensate outlet must be checked on every service and cleaned as necessary. The end cap is sealed to the trap body. Do NOT attempt to remove it for cleaning.

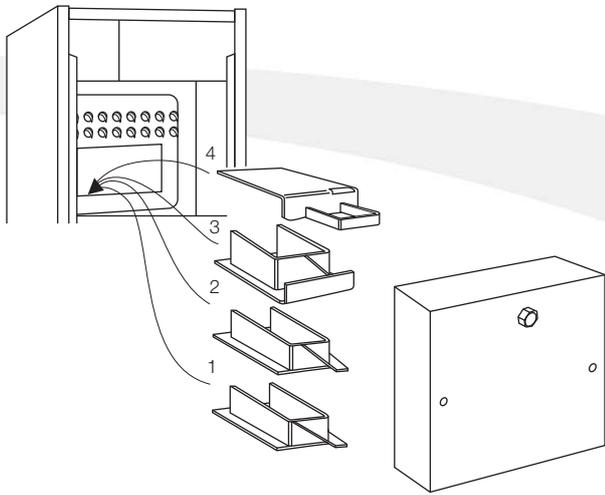


Figure 11-1: Baffles in Vortex Pro Combi 21e

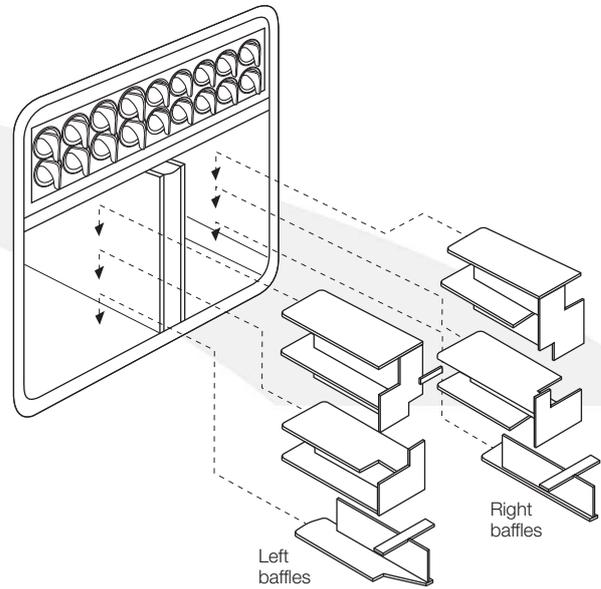


Figure 11-2: Baffles in Vortex Pro Combi 26e

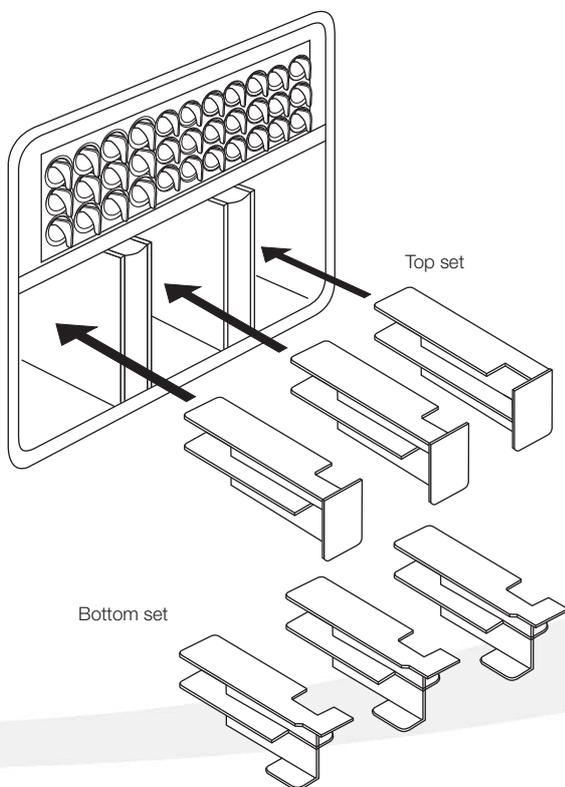


Figure 11-3: Baffles in Vortex Pro Combi 36e

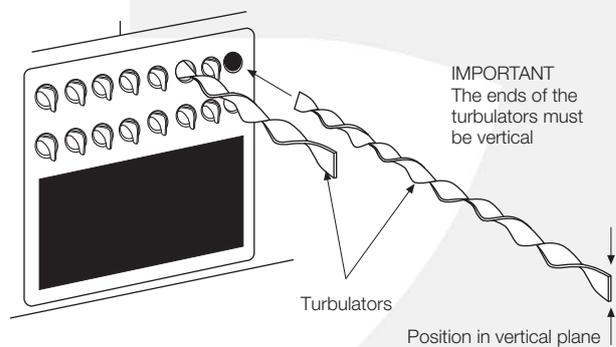


Figure 11-4: Turbulators in Vortex Pro Combi e boilers

11 Boiler Servicing

11.4 Cleaning the Burner

The procedure is:

1. Combustion head - Loosen the two screws securing the combustion head and withdraw the head.
2. Clean the combustion head.
3. Inspect the ignition electrodes - Loosen the electrode clamp screw and withdraw the electrode assembly. Wipe clean and check for any cracks in the ceramic insulation. Replace if necessary.
4. Check the electrode settings as shown in Figure 11-5.
5. Nozzle - The nozzle should be replaced on an annual service - Check that the nozzle size and type are correct, refer to table in Section 2.3 and boiler data label.
6. With the combustion head removed, loosen the electrode assembly clamp screw and slide the electrodes away from the nozzle.
7. Do **not** attempt to clean the nozzle.
8. Remove the nozzle using a good fitting spanner (16 mm).



The use of an ill-fitting spanner will damage the nozzle and could lead to an incorrect flame pattern.

9. Always check the electrode settings after replacing the nozzle, see Figure 11-5.
10. Refit the combustion head.

All models

Photocell - The photocell is a push-fit in the burner body. Carefully pull out the photocell to clean.

Burner fan - Remove the air intake from the burner. Check, inspect and clean the fan as required. Replace the cover.

Pump filter - Remove the four screws securing the pump end cover. Remove the filter and wash in kerosene. Replace the filter and end cover, ensure the 'O' ring is in position.

Re-assemble in reverse order.



To ensure safe and efficient operation of the boiler it is important that recommissioning is carried out, especially combustion checks (CO₂ level, flue gas temperature and smoke number) after the boiler has been serviced.

Refer to the Commissioning instructions in Section 10.

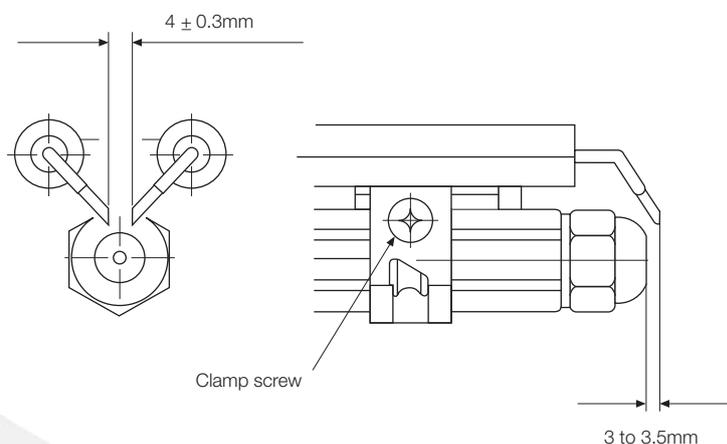


Figure 11-5: Electrodes showing settings

12 Fault Finding

12.1 Initial Checklist - for Installer or Service Engineers

If the Boiler Fails to Light

First follow the procedure below

Power Supply	<p>Check that fused spur for heating system and boiler is switched on.</p> <p>Check that fuse has not blown.</p> <p>Check that electricity supply has not failed: check circuit breaker in consumer unit.</p>
Heating System Controls	<p>Check that timer or programmer is working and set to an 'ON' period.</p> <p>Check that all thermostats are set to the required temperature and are 'calling' for heat.</p>
Boiler Controls	<p>Check boiler 'On/Off' switch is set to 'ON'.</p> <p>Check that "POWER" indicator on the control panel is lit.</p> <p>Check that "DEMAND" indicator is lit.</p>
Burner	<p>Check if the burner 'Lockout' reset button (on front face of burner) is lit.</p> <p>If YES: press in the reset button to start the burner.</p> <p>If burner fails to light and goes to 'Lockout' again refer to section 12.4.</p>
Heating System	<p>Check Heating System water pressure.</p> <p>Check if "LOW PRESSURE" indicator is lit.</p> <p>If YES: system water pressure has fallen to below 0.2 bar and the low pressure cut-out has been activated.</p> <p>Re-fill system to increase pressure to between 0.5 and 1.0 bar.</p>
If Burner Still Fails to Light	<p>Follow the 'BURNER NOT OPERATING' procedure in Section 12.2(C).</p>

For Hot Water – ALL the following indicator lights MUST be lit

POWER	<p>If NOT lit this indicates a problem with power supply to the boiler - switched off or possibly a blown fuse.</p>
DHW PUMP	<p>If FLASHING this indicates either a 'Store' thermistor or PCB fault.</p> <p>Refer to 'Is the "DHW PUMP" Indicator flashing' procedure in Section 12.2 (B)</p>
FLOW	<p>If not lit when a hot tap is opened this indicates either lack of water flow or possible flow switch problem.</p>
DEMAND	<p>If not lit this indicates either timer/programmer is not 'calling' for hot water or 'Hot Water' switch is not set to 'CONSTANT'.</p>
BURNER	<p>If flashing this indicates PCB fault.</p> <p>Refer to 'Is the "BURNER" indicator lit' procedure in Section 12.2 (B)</p>

NOTE: There may be a delay before the "BURNER" indicator is lit when the store is up to temperature

12 Fault Finding

For Night Time Hot Water Function – ALL the following indicator lights **MUST** be lit

POWER	If NOT lit this indicates a problem with power supply to the boiler - switched off or possibly a blown fuse.
DHW PUMP	If FLASHING this indicates either a store thermistor or PCB fault. Refer to ' Is the "DHW PUMP" Indicator flashing ' procedure in Section 12.2 (B)
FLOW	If not lit this indicates either a lack of water flow or a possible flow switch problem.
DEMAND	If not lit this indicates either timer/programmer is not 'calling' for hot water or 'Hot Water' switch is not set to 'CONSTANT'.
BURNER	If flashing this indicates PCB fault. Refer to ' Is the "BURNER" indicator lit ' procedure in Section 12.2 (B)

NOTE: The "DHW PUMP" indicator may be lit if the boiler is operating to heat the store which has priority over the CH operation. There may be a delay before the "BURNER" indicator is lit when the the store is up to temperature.

For further guidance refer to the Main Fault Finding Procedures – Section 12.2.

12.2 Main Fault Finding Procedures

A. No Central Heating - but Hot Water OK

First - Set Hot Water switch to OFF

Is the "DEMAND" indicator lit?	NO	Check programmer/timer and room thermostat are calling for heating.
	NO	Check 'Heating' switch is set to 'TIMED'.
Is the "CH PUMP" indicator lit?	YES PCB is supplying voltage to the CH pump – but pump is not working.	Check electrical connections at the pump. Check for 230V at the pump terminals. Check if CH pump is stuck: Remove pump vent screw and check for Rotation of shaft/impeller. If stuck: Rotate shaft manually to restart. If still not operating; Replace the CH pump. NOTE: A 6 metre pump must be used.
	YES CH pump is working but no circulation.	Check both pump valves are open. Check Non-return valve on CH pump is operational (not sticking). Check there are no air locks in the system. (if removal of air lock is difficult – see additional check list). Check the pump impeller is attached to the shaft.
Is the "CH PUMP" indicator lit?	NO	Check Non-return valve on CH pump - is it stuck blocked open - check/rectify. Note – CH return will be hotter than flow if CH non-return valve is jammed open. Check by closing one heating pump valve to stop circulation - does the store then come up to temperature? If problem is not due to CH non-return valve - continue to next check.
Is the "CH PUMP" indicator flashing?	YES Fast or Slow flash.	First – set boiler 'On/Off' switch to 'OFF'. Wait 5 seconds. Then set 'On/Off' switch back to 'ON'.
If the "CH PUMP" continues flashing.	Fast flash (twice per second): Indicates a possible fault with the 'Flow' thermistor.	Check CH 'Flow' thermistor connection to PCB. Replace 'Flow' thermistor.
	Slow flash(once every 2 seconds): Indicates a possible fault with the PCB (relay).	Replace PCB.
Is the "BURNER" indicator lit?	YES	Is burner firing? If NO: Refer to ' BURNER NOT OPERATING ' Procedure - Section 12.2 (C).

B. No Hot Water - but Central Heating OK

First - Set Heating switch to OFF

Is the "DEMAND" indicator lit?	NO	Check programmer is calling for hot water. If no programmer is fitted: Check 'Hot Water' switch is set to 'CONSTANT'.
	NO	Check 'Heating' switch is set to 'TIMED'.
Is the "FLOW SWITCH" indicator lit?	NO	Check hot water tap is open. Check water flow rate is at least 3 ltr/min.
	Cannot achieve 3 ltr/min	Check the mains stop tap open fully. Check cold water isolation valve in boiler is open. Check if the flow restrictor (located in the cold water isolation valve) is clear. If not, clean restrictor or remove from valve. NOTE: No flow restrictor is fitted to the Combi 36e model.
	Is the water pressure OK? Low water pressure = low water flow rate	Check standing water pressure. 2 bar minimum standing pressure required Check running (dynamic) pressure. 1 bar minimum dynamic pressure required.
	If pressure is OK.	Check for blockage in plate heat exchanger unit. NOTE: In hard water areas scale will be produced that can block the plate heat exchanger if no anti-scale protection has been installed. Refer to Section 5 for further details.
	If plate heat exchanger is OK.	Check flow switch is correctly positioned: the arrow (on flow switch body) must point in direction of flow (i.e. towards front of boiler). Check switch is free to operate: Close cold water isolation valve, remove flow switch from pipe work – manually operate switch paddle to check. Remove any debris/blockage from the pipework body or switch paddle. Check for electrical continuity between flow switch terminals when switch is closed. No continuity – replace flow switch. Check for 230V at flow switch terminals. No 230V – check connections at PCB. If still no 230V – replace PCB.
Is the "FLOW SWITCH" indicator lit?	YES	Flow switch is activated. Continue to the next check.
Is the "DHW PUMP" indicator lit?	NO	Continue to next check.
Is the "DHW PUMP" flashing?	YES Fast or Slow flash	First – set boiler 'On/Off' switch to 'OFF'. Wait 5 seconds. Then set 'On/Off' switch back to 'ON'.
If the "DHW PUMP" indicator Continues flashing.	Fast flash (twice per second): Indicates a possible fault with the 'Store' thermistor.	Check DHW 'Store' thermistor connection to PCB. Replace 'Store' thermistor.
	Slow flash (once every 2 seconds): Indicates a possible fault with the PCB (relay).	Replace PCB.

12 Fault Finding

B. No Hot Water - but Central Heating OK continued

Is the "DHW PUMP" indicator lit?	YES PCB is supplying voltage to the DHW pump – but pump is not working.	Check electrical connections at the pump. Check for 230V at the pump terminals. Check if CH pump is stuck: Remove pump vent screw and check for Rotation of shaft/impeller. If stuck: Rotate shaft manually to restart. If still not operating; Replace the DHW pump. NOTE: A 6 metre pump must be used.
	YES DHW pump is working but no circulation.	Check both pump valves are open. Check Non-return valve on DHW pump is operational (not sticking). Check there are no air locks in the system. (If removal of air lock is difficult – see additional check list). Check the pump impeller is attached to the shaft.
	YES DHW pump is working and water is circulating.	Hot or warm water should be present at hot tap. If not refer to ' Poor Hot Water ' Check List.
Is the "BURNER" indicator lit?	YES	Is burner firing? If NO: Refer to ' BURNER NOT OPERATING ' Procedure - Section 12.2 (C).

C. Burner not Operating

First - Set either Hot Water or Heating to ON

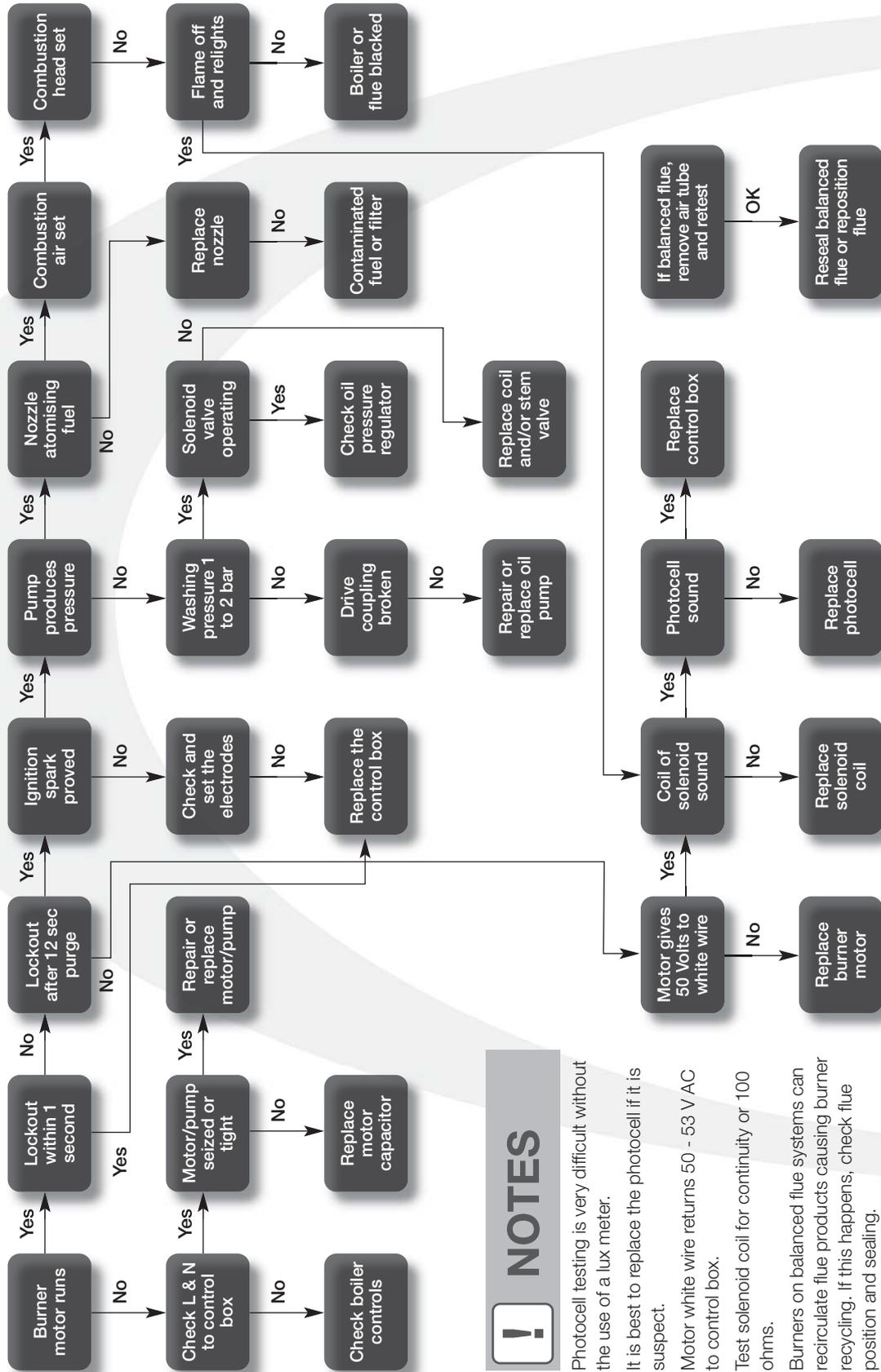
Is the "BURNER" indicator lit?	NO	Refer to ' Initial Checklist ' for guidance.
	NO	Continue to next check.
Is the "BURNER" indicator flashing?	YES Fast or Slow flash.	First – set boiler 'On/Off' switch to 'OFF'. Wait 5 seconds. Then set 'On/Off' switch back to 'ON'.
If the "BURNER" indicator continues flashing.	Slow flash (once every 2 seconds): Indicates a possible fault with the PCB (relay).	Replace PCB.
Is the "BURNER" indicator lit?	YES PCB is supplying voltage to the Burner – but burner is not working.	Check all electrical connections to burner control Box. Check for 230V at L & N terminals in control box. Is Lockout button (on control box) lit? If YES: Press 'Lockout' button to reset burner. If burner does not fire – refer to Section 12.4 Burner Fault Finding.

12.3 Poor Hot Water Checklist – Always check the basics before changing parts!

Burner	If heat energy input is incorrect: heat energy output will be Incorrect. Poor heat input = poor hot water!	Check nozzle is correct size. Check oil pump pressure is correct. Check combustion is correctly set.
DHW Pump	Plate heat exchanger requires water circulation from primary store to operate	Check pump speed setting: it must be maximum. Check pump valves are fully open.
Thermistors	DHW “Store” and CH “Flow” thermistors must detect temperatures correctly	Check both are fully inserted in their pockets.
Water Flow Rate at Hot Tap	Excessive flow rate exceeds heat input from burner Excessive flow rate=poor hot water!	Check flow rate at tap. Combi 21e – 12 ltrs/min maximum Combi 26e – 15 ltrs/min maximum Combi 36e – 18 ltrs/min maximum
Water Pressure	Excessive pressure has a major influence on flow rate.	Check standing and operating water pressure. 2 bar minimum standing pressure required 8 bar maximum standing pressure. If greater than 8 bar: fit a pressure reducing valve on the cold supply to the boiler. 1 bar minimum dynamic pressure required.
Water Condition	Scale forming in the plate heat exchanger = poor heat transfer in plate = poor hot water temperature.	Check for scale in plate heat exchanger. Replace plate heat exchanger if necessary. In hard water areas some form of anti-scale device or water softener MUST BE FITTED . NOTE: Faults due to hard water scaling are not covered by the Grant Product warranty.
Thermostatic Blending Valve	Must be correctly set to provide Optimum hot water.	Check if blending valve is scaled up (see ‘ Water Condition ’ section above). Clean or replace as necessary.

12 Fault Finding

12.4 Riello RDB Burner Fault Finding



NOTES

Photocell testing is very difficult without the use of a lux meter.

It is best to replace the photocell if it is suspect.

Motor white wire returns 50 - 53 V AC to control box.

Test solenoid coil for continuity or 100 ohms.

Burners on balanced flue systems can recirculate flue products causing burner recycling. If this happens, check flue position and sealing.

13 Spare Parts

Figure 13-1 is an exploded view of the Riello RDB burner as used in the Grant VORTEX Pro Combi 21e, 26e and 36e boilers, and the associated parts list follows the figure.

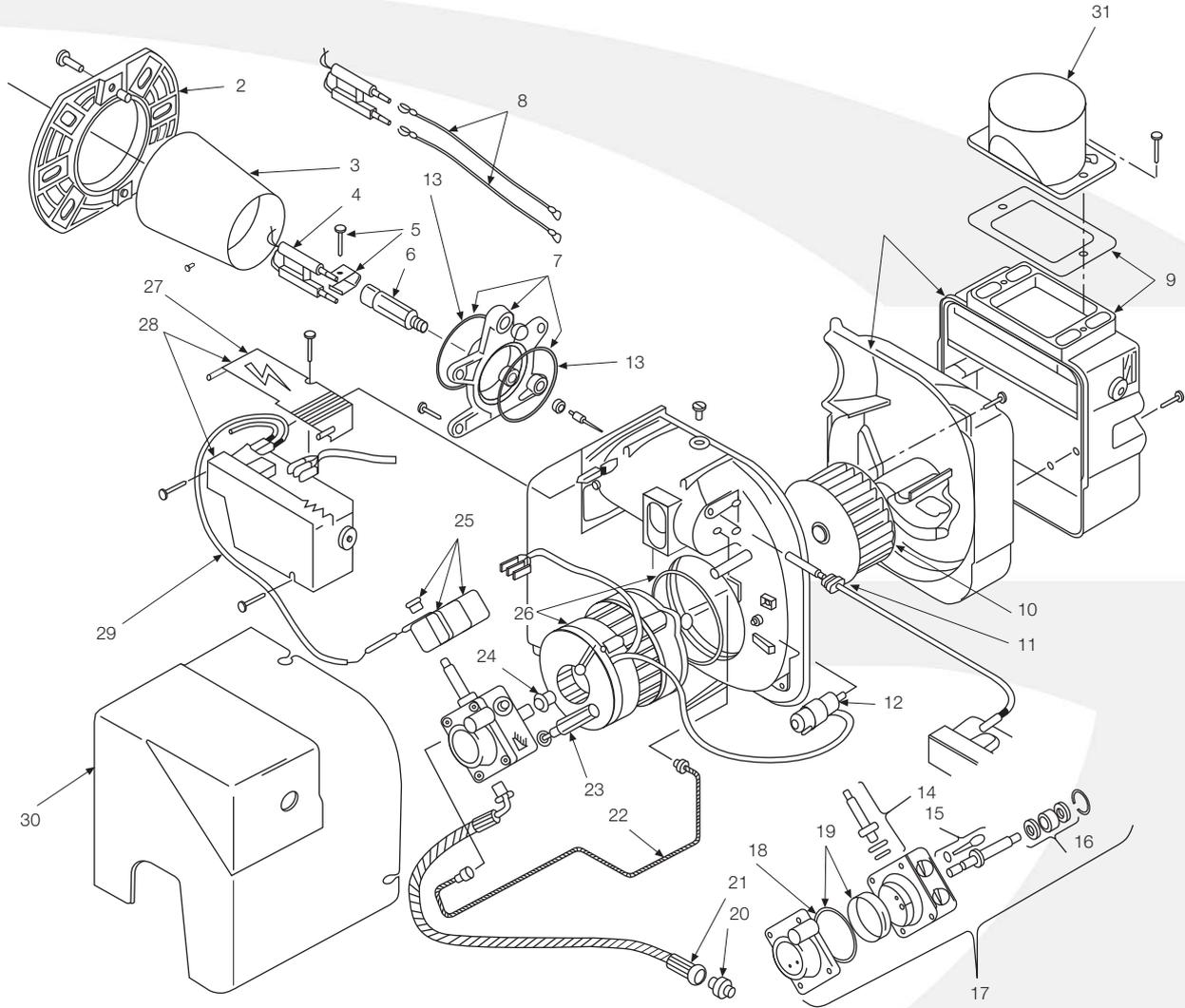


Figure 13-1: Riello RDB burner exploded view

13 Spare Parts

Key No.	Description	Riello Part No.	Grant Part No.	Key No.	Description	Riello Part No.	Grant Part No.
1	Not applicable			15	Regulator	3008651	RBS120
2	Flange 3005786	RBS28		16	Pump seal	3000439	RBS14
3	Combustion head T1 (Combi 21e)	3002507	RBS146	17	Pump	3008654	RBS101
3	Combustion head T2 (Combi 26e)	3002423	RBS147	18	O' ring	3007162	RBS08
3	Combustion head T5 (Combi 36e)	3002533	RBS150	19	Filter - 'O' ring	3008653	RBS122
4	Electrode assembly	3007513	RBS108	20	Connector	3003602	RBS35
5	Electrode bracket	3006552	RBS29	21	Flexible hose	3007672	RBS36
6	Nozzle holder	3008642	RBS111	22	Tube	3008644	RBS113
7	Collar	3008643	RBS112	23	Pressure gauge connector	3008876	RBS138
8	High voltage lead	3008794	RBS129	24	Drive coupling	3000443	RBS16
9	Air damper assembly	3008647	RBS116	25	Solenoid	3008648	RBS117
10	Fan (Combi 26e)	3005708	RBS39	26	Motor RBS102	3002836	RBS102
10	Fan (Combi 21e/36e)	3005788	RBS151	27	Cover	3008649	RBS118
11	Photocell	3008646	RBS115	28	Control box assembly	3008652	RBS103
12	Capacitor 4.5 μ F	3002837	RBS149	29	Solenoid lead	3008851	RBS139
13	Seal kit	3008878	RBS140	30	Cover	3008879	RBS141
14	Needle valve	3007582	RBS109	31	Air tube spigot	3062774	RBS143

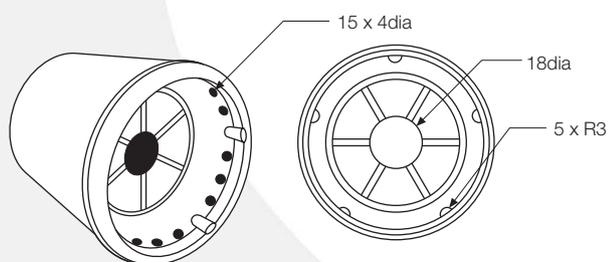


Figure 13-2 T1: Combustion head Vortex Pro Combi 21e

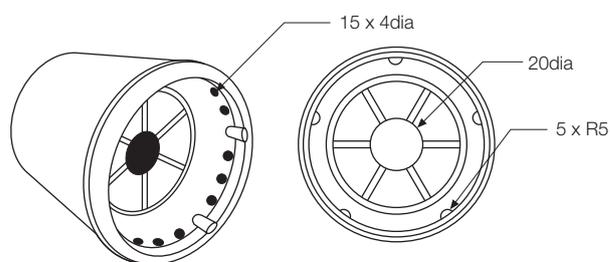


Figure 13-3 T2: Combustion head Vortex Pro Combi 26e

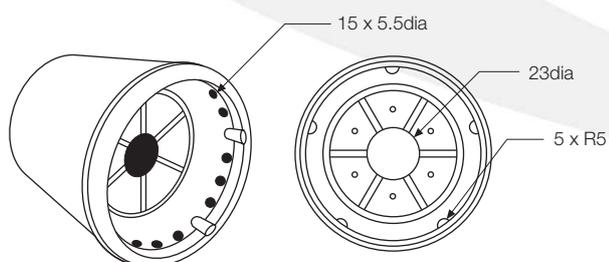


Figure 13-4 T5: Combustion head Vortex Pro Combi 36e

14 Health and Safety Information

Under the Consumer Protection Act 1987 and Section 6 of the Health & Safety at Work Act 1974, we are required to provide information on substances hazardous to health (COSHH Regulations 1988).

Adhesives, sealants and paints used in the manufacture of the product are cured and present no known hazards when used in the manner for which they are intended.

The following other materials are present in the product:

14.1 Insulation Materials

Material Types: Ceramic fibre board, mineral wool.

Description: Rigid board, slabs, sleeves, gaskets, ropes.

Known Hazards: May cause temporary irritation or rash to skin. High dust levels may irritate eyes and upper respiratory system.

Precautions: Avoid unnecessary or rough handling, or harsh abrasion of boards. Normal handling and use of material should not produce high dust levels.

Avoid inhalation, and contact with skin and eyes.

After handling always follow normal good hygiene practices.

Protection: Use disposable gloves, face mask and eye protection.

First Aid: Eyes - If irritation occurs, wash eyes with copious amounts of water. If symptoms persist, seek immediate medical advice.

Skin - If irritation occurs, wash under running water before washing with soap and water.

Inhalation - Remove to fresh air, drink water to clear throat and blow nose to remove dust/fibres.

Ingestion - Drink plenty of water.

14.2 Insulation Materials

Material Types: Silicone elastomer.

Description: Sealant and adhesive.

Known Hazards: Irritation to eyes.

Precautions: Avoid inhalation of vapour, contact with eyes and prolonged or repeated contact with skin.

After handling always follow normal good hygiene practices.

Protection: Use eye protection. Rubber or plastic gloves should be worn where repeated contact occurs and a face mask worn when working in confined spaces.

First Aid: Eyes - Flush eyes with water for 15 minutes. Seek immediate medical attention.

Skin - Wipe off and wash with soap and water.

Inhalation - Remove to fresh air.

14.3 Kerosene and Gas Oil Fuels (mineral oils)

Known Hazards: The effect of mineral oils on the skin vary according to the duration of exposure and the type of oil.

The lighter fractions remove the protective grease naturally present on the skin, leaving it dry, liable

to crack and more prone to damage by cuts, abrasions and irritant chemicals.

Skin rashes (Oil acne) most often on arms, but also on any part of the body in contact with oil or oily clothing.

Contact with fuel oils can cause dermatitis.

Precautions: Avoid as far as possible any skin contact with mineral oil or with clothing contaminated with mineral oil.

The use of a lanolin-based barrier cream is recommended, in conjunction with regular washing with

soap and rinsing with water to ensure all oil is removed from the skin.

Take care to prevent clothing, especially underwear, from becoming contaminated with oil.

Do not put oily rags or tools in pockets, especially trouser pockets.

Have first-aid treatment at once for an injury, however slight.

Do not inhale any vapours from mineral oils.

15 EC Declaration of Conformity

We declare that the Grant Vortex range of Oil Boilers equipped with Riello RDB burners approved to EN 267: 1991 satisfy the requirements of the following European Directives:-

1. 89/336/EEC - Electromagnetic Compatibility Directive
Referred to the generic standards EN 55014: 1993, EN 50082: 1: 1992
2. 73/23/EEC - Electrical Equipment Safety Regulations Directive
Referred to the generic standard NO: 3260: The Electrical Equipment (Safety) Regulations: 1994
3. 92/42/EEC - Hot Water Boiler Efficiency Directive
Referred to the generic standard The Boiler (Efficiency) (Amendment) Regulations 1994 (SI 1994/3083).

In EU Countries

The following information is provided to enable regulatory compliance with the European Union (EU) directives identified and any amendments made to

these directives when using electrical or electronic equipment in EU countries.

Disposal of Electrical and Electronic Equipment

European Union (EU) Directive 2002/96/EC Waste Electrical and Electronic Equipment (WEEE).

Do not dispose of electrical or electronic equipment in landfill sites. In the EU, it is the individual recipient's responsibility to ensure that discarded electrical or electronic materials are collected and recycled according to the requirements of EU environmental law.

Disposal of Surplus Packaging

European Parliament and Council Directive 94/62/EC Packaging and Packaging Waste.

Do not dispose of surplus packaging in landfill sites. In the EU, it is the individual recipient's responsibility to ensure that packaging materials are collected and recycled according to the requirements of EU environmental law.



In non-EU Countries

In non-EU countries, dispose of electrical and electronic equipment and all surplus packaging in accordance with national and regional regulations.

Complies with EC Low voltage Electromagnetic compatibility and Boiler efficiency Directives.



16 Warranty

16.1 The Vortex Oil Boiler Warranty

Dear Customer

You are now the proud owner of a Grant Vortex Pro condensing Combi Boiler from Grant Engineering (UK) Ltd, that has been designed to give years of reliable, trouble free operation.

Grant Engineering (UK) Ltd. guarantees the manufacture of the boiler including all electrical and mechanical components for a period of twelve months from the date of purchase provided the boiler is installed in full accordance with the installation instructions provided. This will be extended to a period of two years if the boiler is registered with Grant UK within thirty days of installation and it is serviced at twelve month intervals. See Terms and Conditions below.

IMPORTANT

Please register your Grant Vortex Pro Combi boiler with Grant UK within thirty days of installation. To do so visit www.grantuk.com and follow the links to the 'Householder Zone', where you can register your boiler for a further one year warranty (giving two years from the date of purchase). This does not affect your statutory rights.

Breakdown during the Manufacturer's Warranty

If your Grant boiler should fail within the first two years, you must contact Grant Engineering (UK) Ltd, who will arrange for the repair under the terms of their Warranty, providing that the boiler has been correctly installed and commissioned, serviced (if older than twelve months) and the fault is not due to tampering, running out of oil, oil contamination, system water

contamination, misuse, or the failure of any external components not supplied by Grant UK (e.g. fire valve, motorised valve, etc.). This extended two year warranty only applies if the boiler is registered with Grant UK within thirty days of installation.

In the first Instance:

Contact your installer or commissioning engineer to ensure that the fault does not lie with the system or any other components, or any incorrect setting of the system controls.

If a Fault is Found:

Ask your installer to contact Grant Engineering (UK) Ltd Service Department on 01380 736920 who will arrange for a qualified service engineer to attend to the fault.

16 Warranty

Free of Charge Repairs:

During the first two years no charge for parts or labour will be made provided that the boiler has been installed and commissioned correctly in accordance with the manufacturer's instructions, it was registered with Grant UK within thirty days of installation and, for boilers over twelve months old, details of annual maintenance is available.

The following documents must be made available to Grant UK on request:

- Proof of purchase
- CD10 Installation Completion form
- CD11 Commissioning report form
- Service documents (CD11 or equivalent document)

Chargeable Repairs:

A charge may be made (if necessary following testing of parts at Grant UK) if the cause of the breakdown is due to any of the following:

- Faults caused by the plumbing or heating system, e.g. contamination of parts due to system contamination, debris or trapped air.
- Faults due to incorrectly sized expansion vessel(s) or incorrect vessel charge pressure.
- Faults caused by external electrics and external components.
- The boiler has not been commissioned, or serviced in accordance with the installation and servicing manual.
- Problems caused by lack of oil or faults with the oil supply system.
- The flue system has been incorrectly fitted or does not meet installation requirements.
- The boiler has been installed for over two years and no extended warranty cover has been taken.

Note: The nozzle supplied with the boiler is only covered for the period up to the time of the first service (twelve months).

Remember - before you contact Grant:

Ensure the boiler has been commissioned and serviced in accordance with the Installation and servicing manual.

Ensure there is oil to supply the burner.

Ensure the problem is not being caused by the heating system or its controls.

Consult the boiler handbook for guidance.



NOTE

Do not wait until the fuel supply runs out before you order some more. Sludge in the bottom of the tank may be drawn into the fuel lines. It is recommended that the boiler is switched off when the new supply is delivered and that the fuel is allowed to settle for an hour before restarting the boiler.

Terms of Manufacturer's Guarantee

1. The Company shall mean Grant Engineering (UK) Limited.
2. The boiler is guaranteed for two years from the date of purchase providing that after twelve months the annual service has been completed and the boiler registered with the Company within thirty days of the installation date. Any work undertaken must be authorised by the Company and carried out by an approved service agent.
3. The shell (heat exchanger) of the oil boiler supplied by the Company is covered by a five year parts only guarantee from the date of purchase subject to correct operation of the boiler. Proof of annual maintenance must be provided.
4. This guarantee does not cover breakdowns caused by incorrect installation, neglect, misuse, accident or failure to operate the boiler in accordance with the manufacturer's instructions.
5. The boiler is registered with the Company within thirty days of installation. Failure to do so does not affect your statutory rights.
6. This guarantee is not transferable unless sanctioned by the Company.
7. The Company will endeavour to provide prompt service in the unlikely event of a problem occurring, but cannot be held responsible for any consequences of delay however caused.
8. This guarantee applies to Grant boilers installed on the UK mainland, Isle of Man and Channel Islands only. Provision of in-warranty cover

elsewhere in the UK is subject to agreement with the Company.

9. All claims under this guarantee must be made to the Company prior to any work being undertaken. Invoices for call out/repair work by any third party will not be accepted unless previously authorised by the Company.
10. Proof of purchase and date of installation, commissioning and service documents must be provided on request.
11. If a replacement boiler is supplied under the warranty (due to a manufacturing fault) the product warranty continues from the installation date of the original boiler, and not from the installation date of the replacement.

Hard Water Advice

If you live in a hard water area, protection against scaling must be given to the domestic hot water heat exchanger of your combination boiler. You should fit an appropriate scale inhibitor or water softener as **any breakdown caused by water scaling is not covered by either the manufacturer's guarantee or insurance.** Ask your installer for advice.

16.2 Extended Warranty

For further peace of mind Grant Engineering (UK) Ltd offer the option to insure all the components of your Grant Vortex Pro Combi boiler for a further three years, following on from the two year product warranty period. For a single premium payment (inclusive of Insurance Premium tax) you get five years of protection against breakdown costs. At the end of this period you will have the opportunity to continue this cover on an annual basis.

To access full details and an application form for this extended cover, first visit www.grantuk.com.

Follow the links to the 'Householder Zone', register your Grant Vortex pro boiler for a further one year product warranty (giving two years from the date of purchase), and then download the extended warranty details and application form.

Please note that this special offer is only available if the application form is submitted to Bluefin Insurance Services Ltd. within three months of the installation date.

Notes

Notes



User Instructions

You may have to wait for the boiler to cool down before the button will reset. If this condition repeats, contact your Service engineer.

Check the system pressure and re-pressurise as necessary before attempting to reset the overheated thermostat. Refer to Sealed central heating system in these instructions for details on re-pressurising the system.

Ventilation - Always ensure that the boiler has adequate ventilation. Any ventilation openings in the boiler casing must not be obstructed. Periodically check that they are clear. Do not attempt to 'box in' the boiler or build a compartment around it. Do not place any combustible material on or around the boiler.

Flue terminal - The flue terminal must not be obstructed or damaged. In severe conditions check that the terminal does not become blocked with snow. Do not place any combustible material on or around the flue terminal.

Frost Protection - Your boiler is fitted with a pre-set internal frost protection thermostat. Should either the air temperature around the boiler, or the water temperature within the boiler, fall to below 5°C then this thermostat will be activated. The boiler will then operate briefly to prevent it from freezing. Your boiler may also be fitted with a remote frost protection thermostat; check with your installer. If you are intending to be away for a long period, the boiler and system should be drained. Contact your Service engineer for draining and filling the system.

Cleaning and servicing - Lightly wipe over the case with a damp cloth and a little detergent. Do not use abrasive pads or cleaners. You should have your boiler serviced at least once a year to ensure safe and efficient operation. Contact your Service engineer for further details.

Failure of electricity supply - If the electricity supply fails, the boiler will not operate. It should relight automatically when the supply is restored.

NOTE



The time and on/off settings on a 7-day or 24-hour timer or a 2-channel programmer may need to be reset after a power failure.

The Grant Programmable Room

Thermostat and Wireless

Programmable Room Thermostat are

battery powered and will be

unaffected by a power failure.

Electricity Supply

The boiler requires a 230/240 V - 50 Hz supply. It must be protected by a 5 Amp fuse.

WARNING



The Vortex boiler contains electrical switching equipment and must be earthed.

Electricity Connection

The Vortex Pro Combi boilers can be serviced from the front, but it is preferable for any worktop above the boiler to be removable to provide the best access for servicing.

General Notes and Care of your System

Boiler controls - Refer to the section Boiler controls.

Pressure switch - If the heating system water pressure falls below 0.2 bar the boiler pressure cut-out switch will activate and the red 'LOW PRESSURE' indicator on the control panel (see Figure 2) will flash.

The system must be recharged to between 0.5 to 1 bar. If the heating system loses pressure on a regular basis then contact your installer to investigate the cause.

Boiler Lock-out reset button - If there is a burner malfunction, a built-in safety circuit switches the burner off and the 'Lock-out' reset button on the burner will light. Usually such malfunctions are short lived and pressing the reset button will restore normal operation.

The reset button should not be pressed more than twice in attempting to start the burner.

If the burner continually goes to 'Lock-out' a fault exists or the fuel supply is low. If you have checked that you have sufficient fuel, you will need to call your Service engineer.

Overheat thermostat - Your boiler is fitted with a safety overheat thermostat which will automatically switch off the boiler in the case of a control malfunction causing overheating. The red 'OVERHEAT' indicator on the control panel (see Figure 2) will flash indicating the overheat thermostat has operated.

If your boiler goes off and you try to light it but nothing happens and the 'Lock-out' reset button on the burner is not lit, the overheat thermostat has probably operated. The boiler will not light until the thermostat is reset. To reset, unscrew the small plastic cap (see Figure 2), and press the button and the 'OVERHEAT' indicator should go off. Replace the plastic cap.

NOTE

Your sealed system may incorporate a 'Top-up' vessel. Advice on how to use this should be obtained from your installer.

The boiler is fitted with a safety (or pressure relief) valve to automatically release excess pressure from the system. If the water or steam is emitted from the end of the safety valve discharge pipe, switch off the boiler and contact your installer or Service Engineer.

The Expansion vessel air charge must be checked annually. Failure to maintain an adequate air charge in the vessel may invalidate the warranty.

To Re-pressurise the System by adding Water

WARNING

Add water to the system only when it is cold and the boiler is switched off. Do not overfill.

The procedure is as follows:

1. Ensure the flexible filling loop is connected and that the shut off valve connecting it to the boiler is open and the double check valve at the front is closed. A valve is open when the operating lever is in line with the valve, and closed when it is at right angles to it.
2. Gradually open the double check valve on the front of the filling loop until the water is heard to flow.
3. Vent each radiator in turn, starting with the lowest one in the system, to remove air.
4. Continue to fill the system until the pressure gauge indicates the required pressure between 0.5 and 1.0 bar. Close the fill point valve.
5. Close the valves either side of the filling loop and disconnect the loop.

Sealed Central Heating System

The boiler operates on a sealed heating system. Your installer will have

pressurised the system and set the white pointer on the pressure gauge (see Figure 2) to indicate a system pressure (when cold) of usually between 0.5 and 1.0 bar. Do not adjust this pointer.

The white pointer indicates the actual system pressure which will increase slightly when the boiler is operating. If the white pointer falls below the red pointer (when the boiler is switched off and cold), you should contact your installer to check the heating system for leaks.

If the heating system water pressure falls below 0.2 bar the boiler low pressure cut-out will be activated, cutting power to the burner, and the red 'LOW PRESSURE' indicator on the control panel (see Figure 2) will flash. The system must be re-charged to between 0.5 and 1 bar. If the heating system loses pressure on a regular basis then contact your installer to investigate and rectify the cause.

The boiler is fitted with an automatic air vent which removes air trapped in the boiler. Any air trapped in the radiators needs to be removed by venting the radiators via the vent screw at the top of each radiator. Only vent a radiator if the top is cool when the bottom is hot. Venting will reduce the system pressure, as indicated on the pressure gauge, so only vent when necessary and check the system pressure as mentioned above.

User Instructions

Lighting your Boiler

Before lighting your boiler, ensure that:

- There is sufficient fuel in the supply tank;
- All fuel supply valves are open.
- The water supply is on.
- The electricity supply to the boiler is off.
- The Boiler On/Off switch is set to OFF.
- The Heating switch is set to TIMED or CONSTANT.
- The Hot Water switch is set to TIMED or CONSTANT.
- The Hot Water switch is set to TIMED or CONSTANT.
- The white pointer on the pressure gauge is not below the red pointer.
- The room thermostat is at the desired setting.
- The timer or programmer is correctly set.

Switch on the electricity supply to the boiler.

Set the On/Off switch to ON. Refer to Figure 2.

The boiler will light automatically to heat the water stored in the boiler. If the Programmer or Timer is set to a heating 'on' period and the room thermostat is 'calling' for heat, the boiler will continue to run to provide central heating, after the store reaches temperature.

Once the store has reached temperature, if a hot tap is opened the boiler will supply hot water.

Turning off your Boiler

For short periods - Set the On/Off switch to OFF. Refer to Figure 2.

To re-start the boiler, simply set the switch to ON.

For long periods - Set the On/Off switch to OFF and switch off the electricity supply to the boiler. If required, the fuel supply valve may be closed and the water and electrical supplies turned off at the mains. To re-start the boiler, refer to the full lighting instructions above.

Points to Check if the Boiler

Fails to Light

Perform the following checks if your boiler fails to light:

1. Ensure that a fuse has not blown or that the electricity supply has not failed.
 2. Check that the boiler On/Off switch is set to ON and that the POWER indicator on the control panel is lit.
 3. Check that the timer or programmer is working and is in an 'on' period.
 4. Check that all thermostats are set to the desired setting and are 'calling' for heat.
 5. Check the DEMAND indicator on the control panel is lit.
 6. Check if the burner 'Lock-out' reset button (on the front face of the burner) is lit. Refer to Figure 1.
 7. If it is, press in the button to start the burner. If the burner fails to light and goes to 'Lock-out' again, check that you have sufficient fuel in the storage tank and the fuel supply valves are open.
 8. Check that remote fire valve has not 'tripped'. Reset if necessary.
 9. Check to see if the red OVERHEAT indicator on the control panel is flashing - indicating that the overheated thermostat has operated. See Overheat Thermostat under General Notes and care of your system.
 10. Check the heating system water pressure. If it falls below 0.2 bar the boiler low pressure cut-out will be activated, cutting power to the burner, and the red 'LOW PRESSURE' indicator on the control panel (see Figure 2) will flash. The system must be re-charged to between 0.5 and 1 bar. If the heating system loses pressure on a regular basis then contact your installer to investigate the cause.
- If the burner still fails to light after carrying out these checks then a fault exists. Switch off the electricity supply to the boiler and contact your service engineer.

Domestic Hot Water System

The boiler will supply domestic hot

water whenever a hot tap is opened, provided the boiler On/Off switch is set to ON and the Hot Water switch is set to either CONSTANT or TIMED. If a 2-channel programmer is fitted (either a 'plug-in' or remote programmer), the Hot water setting on the programmer must be 'on' for the boiler to provide continuous hot water when the Hot Water switch is set to TIMED.

'Night time' Hot Water Function

This is a feature built in to your boiler allowing a limited amount of hot water to be drawn off during periods when either the hot water programmer channel is 'off' (for example, during the night) or the Hot Water switch is set to OFF - provided that the primary store in the boiler is hot. When a hot tap is opened during this period, the flow switch activates the hot water store pump and the incoming mains cold water is heated using whatever heat is present in the primary store. The burner will not fire and so the heat in the store will gradually be used up and the hot water temperature will reduce with time.

If a 2-channel programmer is fitted - either a 'plug-in' or remote programmer, or the remote 'wireless' programmable room thermostat - the Hot water setting on the programmer must be 'on' for the boiler to provide continuous hot water when the Hot Water switch is set to TIMED.

NOTE



The flow of water from the taps (hot or cold) depends on the mains pressure, and in some homes it may not be possible to use more than one tap at a time.

'Plug-in' two-channel programmer - allows separate timed control of the on/off times for both central heating and hot water. Refer to the operating instructions provided with the plug-in programmer.

NOTE

The Hot water setting on the programmer must be 'on' for the boiler to provide continuous hot water when the Hot Water switch is set to **TIMED**.

'Plug-in' single-channel 24-hour mechanical timer (if fitted) - allows timed control of the on/off times for central heating but does not provide control over hot water operation. Refer to the operating instructions provided with the plug-in programmer.

'Plug-in' single-channel 7-day electronic timer (if fitted) - allows timed control of the on/off times for central heating but does not provide control over hot water operation. Refer to the operating instructions provided with the plug-in programmer.

'Plug-in' wireless receiver module (if fitted) - operated by the remotely mounted wireless programmable room thermostat unit gives separate timed control of the on/off times for both central heating and hot water. Refer to the operating instructions provided with the 'Wireless' Programmable Thermostat kit.

About your Fuel

Grant Vortex Pro Combi e boilers only operate on Class C2 Kerosene to BS2869:1998. You should always quote the type of fuel you require when ordering from your supplier.

Do not wait until the fuel runs out before you order some more. Sludge in the bottom of the tank may be drawn into the fuel lines. If it is possible, switch off the boiler when the new supply is delivered and leave the fuel to settle for an hour before restarting the boiler.

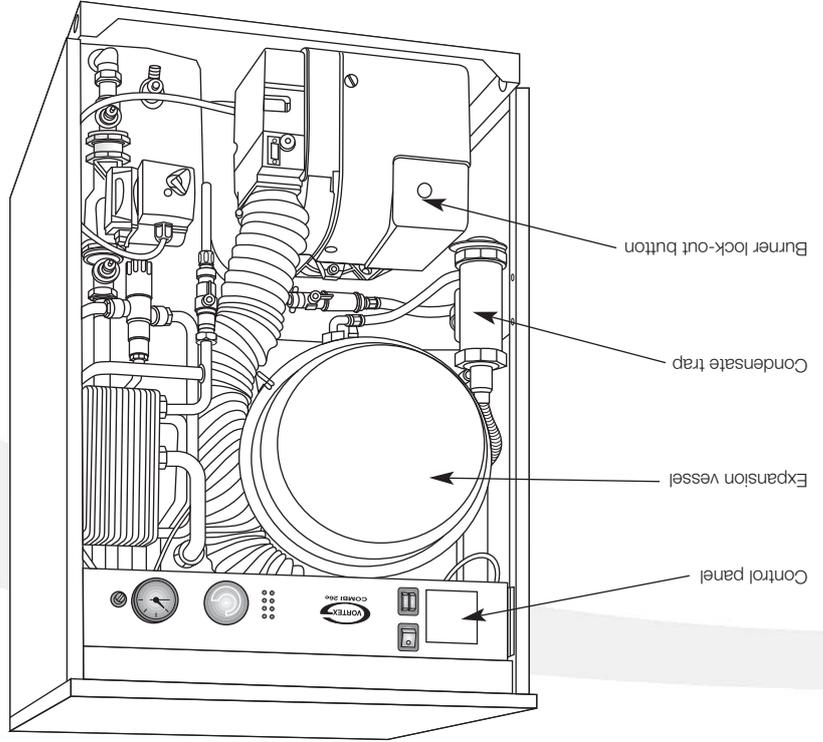


Figure 1: Pro Combi e internal boiler with front panel removed showing position of control panel

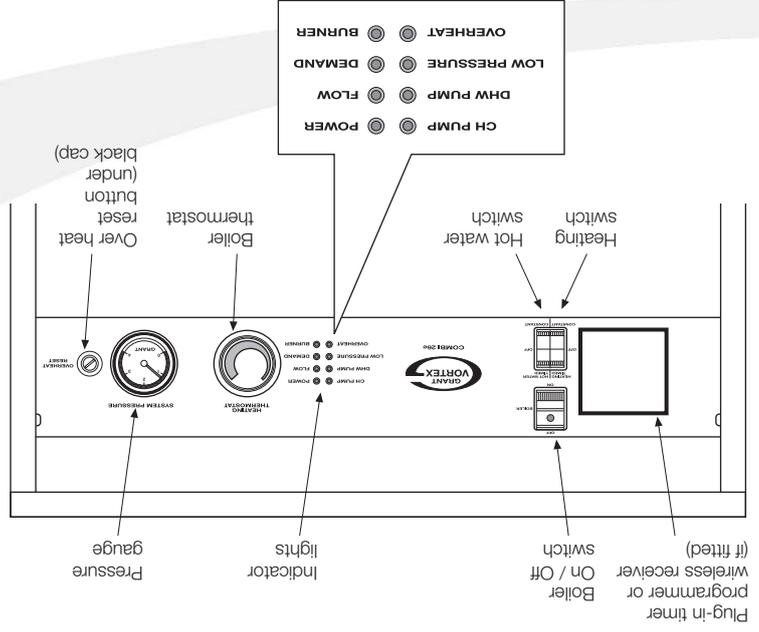


Figure 2: Vortex Pro Combi control panel

User Instructions

Introduction

This User Guide is intended to assist the user in the operation of the Grant VORTEX Pro Combi boilers. The engineers manual for the installation and maintenance of this boiler is attached to the reverse of these instructions.

The following special text formats are used in this manual for the purposes listed below:

WARNING

Warning of possible human injury as a consequence of not following the instructions in the warning.

NOTE

Note text. Used for emphasis or information not directly concerned with the surrounding text but of importance to the reader.

About your Boiler

Your Grant Vortex Pro Combi boiler is fully automatic and when the boiler On/off switch is set to ON, will provide domestic hot water at mains pressure on demand and central heating when the hot water and heating system controls call for it.

Your boiler may be fitted with one of the following control options, located either on the boiler control panel or in a convenient position remote from the boiler:

- Option A Programmable room thermostat only.
- Option B Remote timer and room thermostat.
- Option C Boiler-mounted 'plug-in' single channel 24-hour mechanical timer and remote room thermostat.
- Option D Boiler-mounted 'plug-in' single channel 7-day electronic timer and remote room thermostat.
- Option E Remote two-channel programmer and room thermostat.
- Option F Boiler mounted 'plug-in' two-channel electronic programmable timer and remote room thermostat.

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- Option E Remote two-channel programmer and room thermostat.
- Option F Boiler mounted 'plug-in' two-channel electronic programmable timer and remote room thermostat.

- Option G Remote 'wireless' two channel programmable room thermostat (with boiler mounted 'plug-in' receiver unit).

Whatever type of control is connected to your boiler, it will allow you to set the operating times of your central heating.

In the case of options A, B, C and D - continuously, providing the boiler is switched on, irrespective of the heating control settings.

In the case of options E, F and G, you can set the operating times for both heating and hot water using the heating and hot water settings respectively on the programmer, or wireless two-channel programmable room thermostat.

NOTE

The boiler will produce a limited amount of hot water during the 'off' Hot Water periods set on the programmer. Refer to 'Night time' hot water operation - Section 'Night time' hot water function.

Boiler Controls

To access the controls, pull off the front door from the boiler.

Boiler On/Off switch: This switches the boiler on and off. The boiler On/Off switch incorporates a 'mains on' neon; see Figure 2, which lights when the boiler is switched on. Please note that the 'mains on' neon does not necessarily indicate that the burner is firing.

NOTE

When the On/Off switch is set to ON the POWER indicator on the control panel will light.

The boiler will not supply central heating or domestic hot water if this switch is set to OFF, and also the built in frost thermostat will not operate.

Heating switch: When set to TIMED,

the boiler will only provide central heating when either the Programmer or Timer is in a 'heating' 'on' period and the room thermostat is 'calling' for heat.

When set to OFF, the boiler will not provide central heating at all. When set to CONSTANT, the boiler provides central heating continuously when the room thermostat is calling, overriding all of the Timer or Programmer heating settings.

For Summer time operation, when central heating is not required, set the Heating switch to OFF.

Hot Water switch: Allows the hot water operation of the boiler to be manually switched off if hot water is not required. With the switch set to OFF, the burner will not fire to maintain the water temperature in the store and the hot water (store) pump will not operate.

If a programmer or 'wireless' two channel programmable room thermostat is connected to the boiler (as options D, E and F defined under About your boiler), when the switch is set to TIMED, the boiler will provide hot water only during the 'on' periods set on the programmer. When the switch is set to CONSTANT the boiler provides hot water continuously on demand, overriding any programmer settings.

Also refer to the section 'Night time' hot water function for further information.

Boiler indicator lights: These 8 red lights indicate the operating situation of the boiler.

Boiler (heating) thermostat: Controls

the temperature of the water leaving the boiler to the radiators can be increased by turning the boiler (heating) thermostat clockwise. Figure 1 shows the components in the Vortex Pro Combi e internal boilers and the position of the control panel. Figure 2 shows the details of the control panel.

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For use with Kerosene* only.**After installing the boiler leave these instructions with the User.**

This appliance is deemed a controlled service and specific regional statutory requirements may be applicable.

requirements may be applicable.

***Operation on Bio-fuel**

All Grant Vortex Pro condensing boilers, manufactured since May 2011, are suitable for operation on both standard kerosene (Class C2 to BS2869) and also bio-kerosene – up to a 30% blend (B30K).

All burner settings and nozzle sizes (as detailed in Section 2.3 of this manual) are correct for both standard kerosene and bio-kerosene (B30K).

In order to operate this boiler on bio-kerosene it will be necessary to take the following actions:

- Use a bio-kerosene (B30K) compatible flexible oil line in place of the oil line supplied with this boiler.
- Have your oil storage tank and oil supply line (including all pipework, sight gauges, filters, isolating valves, fire valves, de-aeration devices, etc.) checked for their compatibility with bio-kerosene (B30K).

Where necessary some, or all, of these items may have to be replaced with a bio-kerosene compatible alternative.

- Check the suitability of the flue system with Grant UK.
- Use only bio-kerosene (B30K) that conforms to OPS24.

IMPORTANT

Under no circumstances should the boiler be used with bio-kerosene without the above actions being taken first.

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Service Log

It is recommended that the boiler should be regularly serviced, at least once a year, and the details entered in the Boiler Handbook by the service engineer.



User Instructions

Grant VORTEX Pro Internal Combi
Combi 21e, Combi 26e and Combi 36e Condensing Oil Boiler Range