

# Grant Vortex Pro

Kitchen/Utility, System and Boiler House Floor Standing 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 / Bio-Kerosene

Nozzle size: \_\_\_\_\_

Pump pressure: \_\_\_\_\_

Air setting: \_\_\_\_\_

Flue gas % CO<sub>2</sub>: \_\_\_\_\_

Net flue gas temp: \_\_\_\_\_

Smoke No: \_\_\_\_\_

System flushed: yes / no

Corrosion inhibitor added: yes / no

Antifreeze added: yes / no

### For Sealed systems only:

Expansion vessel size: \_\_\_\_\_ litres

Expansion vessel charge 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 VORTEX Pro boilers. A User guide for the operation of this boiler is attached to the reverse 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 condensing boiler contains 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 boiler, 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 use of modulating circulating pumps (now widely available) and effective control systems should be considered.

The Grant VORTEX Pro boiler 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 75°C.

### 1.2 Boiler Description

The Grant VORTEX Pro range of automatic pressure jet oil boilers have been designed for use with a fully pumped central heating system with indirect domestic hot water cylinder. They are not suitable for use with either a direct cylinder or a 'primatic' cylinder or gravity hot water.

The boilers are suitable for use on open vented or sealed central heating systems. System models are supplied with the necessary components factory fitted. See Section 7.

Kitchen/Utility models are supplied with the control panel and burner factory fitted. Boiler House models are supplied with a separate burner and dual thermostat (26/36, 36/46 models only). The dual thermostat is supplied factory fitted on the 46/58, 58/70 models.

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 - either internal or external - is required, Grant recommends the use of the 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 in order to correctly connect this system to the boiler.

Flue adaptor kit - Ref. CFA15/70 - is used for all models as they all use the 100 mm 'Green' and 'Orange' system components to construct a flue of maximum vertical height 19 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 9.4.

#### Yellow system

Standard low level concentric balanced flue - components available:

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

#### 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 150 mm, 250 mm, 450 mm, 950 mm
- Adjustable extension 195 to 270 mm
- 45° elbow
- High level terminal
- Vertical terminal

### White system

High level and vertical concentric balanced flue kit-components available:

- Extensions 225 mm, 450 mm, 950 mm
- Adjustable 275 to 450 mm
- Vertical concentric balanced flue kit
- Extensions 225 mm, 450 mm, 950 mm
- Adjustable extension 275 to 450 mm
- 45° elbow

### Red system (15/21 and 15/26 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

All burners are pre-set for use with kerosene and are supplied ready to connect to a single pipe fuel supply system with a loose flexible fuel line and  $\frac{3}{8}$ " to  $\frac{1}{4}$ " BSP male adaptor supplied with the boiler.

If required, an additional flexible fuel line (600 mm) and  $\frac{3}{8}$ " to  $\frac{1}{4}$ " BSP male adaptor are available to purchase from Grant UK, for two-pipe oil supply systems, Part No. RBS104.

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

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  $111^{\circ}\text{C} \pm 3^{\circ}\text{C}$ .

The Kitchen/Utility boiler control panel is fitted with an ON/OFF switch, boiler thermostat control knob and the manual reset button for the overheat thermostat. An optional plug-in programmer is available to purchase from Grant UK which allows the User to set the operating times for central heating and hot water, Part No. EPKIT.

To access the controls remove the front panel (pull the panel forward at the top, then lift off) as shown in Fig. 1.1.

The Boiler House dual thermostat, on top of the boiler, is fitted with a boiler thermostat control knob and the manual reset button for the overheat thermostat. The controls are shown in Fig. 1.2.

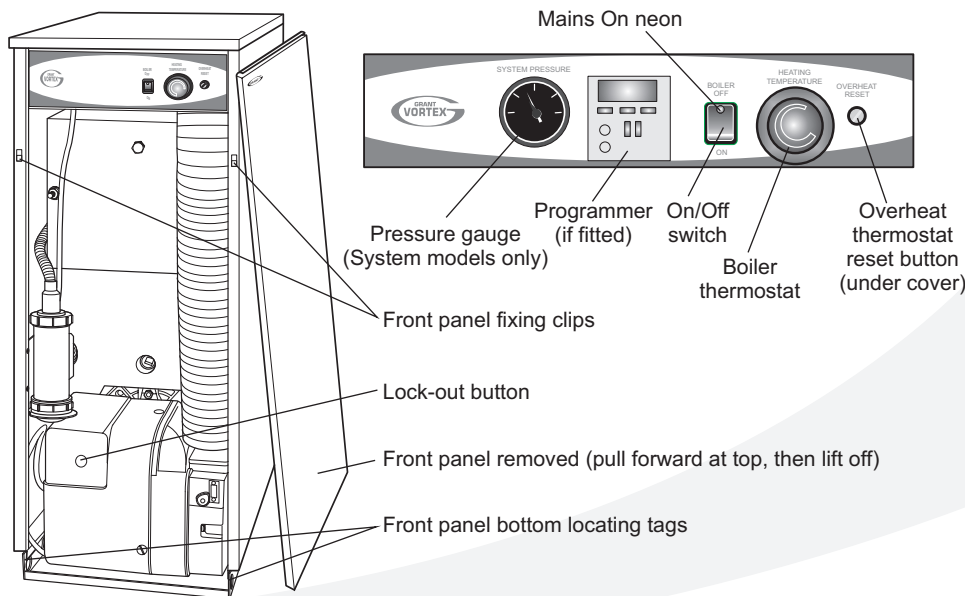


Figure 1-1: Boiler controls (Kitchen/Utility model shown)

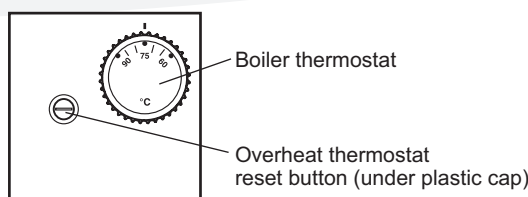


Figure 1-2: Boiler House dual thermostat (on top of boiler)

# 2 Technical Data

## 2.1 Boiler Technical Data - Vortex Pro

Model		Kitchen/Utility						Kitchen/Utility System			Boiler House			
		15/21	15/26	26/36	36/46	46/58	58/70	15/26	26/36	36/46	26/36	36/46	46/58	58/70
Water content	litre	16.5	19	21	21	50	50	19	21	21	21	21	50	50
	gal	3.6	4.2	4.7	4.7	11	11	4.2	4.7	4.7	4.7	4.7	11	11
* Weight (dry)	kg	70	112	134	134	295	299	126.5	142	142	133	133	249	253
	lb	154	246	295	295	649	658	278	312	312	393	393	548	557
Max. heat output (kerosene)	kW	21	26	36	46	58	70	26	36	46	36	46	58	70
	Btu/h	71 650	88 700	122 840	157 000	197 896	238 840	88 700	122 840	157 000	122 840	157 000	197 896	238 840
Flow connection		22 mm	22 mm	28 mm	28 mm	1¼" BSP	1¼" BSP	22 mm	28 mm	28 mm	28 mm	28 mm	1¼" BSP	1¼" BSP
Return connection		22 mm	22 mm	28 mm	28 mm	1¼" BSP	1¼" BSP	22 mm	28 mm	28 mm	1" BSP	1" BSP	1¼" BSP	1¼" BSP
Min. flow rate ( $\Delta T=10^{\circ}\text{C}$ ) l/h	l/h	1 800	2 200	3 000	4 000	5 200	6 000	2 200	3 000	4 000	3 000	4 000	5 200	6 000
Min. flow rate ( $\Delta T=20^{\circ}\text{C}$ ) l/h	l/h	900	1 100	1 500	2 000	2 600	3 000	1 100	1 500	2 000	1 500	2 000	2 600	3 000
Condensate connection		22 mm (only connect plastic pipe)												
Flue diameter (conventional)		100 mm (4 in)				125 mm (5 in)**		100 mm (4 in)				125 mm (5 in)**		
Waterside resistance $\Delta T=10^{\circ}\text{C}$	mbar	26.0						28.5	26.0					
Waterside resistance $\Delta T=20^{\circ}\text{C}$	mbar	9.5						10.0	9.5					
Maximum static head	m	28												
Minimum circulating head	m	1												
Boiler thermostat range	$^{\circ}\text{C}$	65 to 75												
Limit (safety) stat shut off temp	$^{\circ}\text{C}$	111 $\pm$ 3												
Max. hearth temperature	$^{\circ}\text{C}$	Less than 50												
Electricity supply		230/240 V ~ 50 Hz Fused at 5 Amp												
Motor power	Watts	90				150	90	90	90	90	90	90	150	
Starting current	Amps	4.2				6.4	2.6	4.2	2.6	4.2	2.6	4.2	6.4	
Running current	Amps	0.85				1.2	0.85	0.85	0.85	0.85	0.85	0.85	1.2	
Oil connection		¼" BSP Male (on end of flexible fuel hose)												
Conventional flue draught	N/m <sup>2</sup>	Minimum 8.7 - Maximum 37												
	in wg	Minimum 0.035 - Maximum 0.15												
Max operating press - sealed sys	bar	2.5												
Max operating press - open sys	bar	2.5												

\* Weight includes burner but excludes flue.

\*\* 125 mm diameter required for flexible flue liner (Orange system). For rigid flue system (e.g. Green system) 100 mm diameter flue required. Refer to Section 9 Flue System and Air Supply for further details.

## 2.2 Sealed System Data - Kitchen/Utility System Models

	15/26, 26/36, 36/46
Heating system pressure (cold)	Maximum 1.0 bar, Minimum 0.5 bar
Operating pressure of pressure relief valve	2.5 bar
Expansion vessel size (pre-charged at 1 bar)	10 litres (15/26), 12 litres (26/36), 16 litres (36/46)
Max heating system volume (including boiler)*	106 litres (15/26), 128 litres (26/36), 170 litres (36/46) - approximately
Cold water mains connection	15 mm copper pipe
Pressure relief valve discharge connection	15 mm copper pipe

\* Based on vessel charge and system cold fill pressure of 0.5 bar



### 2.3 Vortex Pro Boilers using Class C2 Kerosene

Model and burner type	Heat Output		SEDBUK 2009 efficiency (%)	Nozzle	Oil press. (bar)	Smoke No.	Burner head type	Burner head/disc setting	Fuel flow rate (kg/h)	Flue gas temp. (° C)	CO <sub>2</sub> (%)
	(kW)	(Btu/h)									
15/21 Riello RDB2.2	15.0	51 200	91.2	0.50/80°EH	7.0	0 - 1	T1	Disc setting B	1.29	66	12.0
	18.3	62 400		0.55/80°EH	7.5	0 - 1	T1	Disc setting C	1.56	73	12.0
	* 21.0	71 650		0.60/80°EH	9.0	0 - 1	T1	Disc setting C	1.83	80	12.0
15/26 Riello RDB1	15.0	51 180	91.9	0.50/80°EH	7.0	0 - 1	T1	Fixed	1.25	60 - 65	12.0
	20.0	68 240		0.60/80°EH	8.0	0 - 1	T1	Fixed	1.67	65 - 70	12.0
	* 23.0	78 475		0.65/80°EH	8.5	0 - 1	T2	Fixed	1.94	70 - 75	12.0
	26.0	88 700		0.75/80°EH	8.0	0 - 1	T2	Fixed	2.16	75 - 80	12.0
26/36 Riello RDB2	26.0	88 700	93.3	0.75/80°EH	8.0	0 - 1	T3	Fixed	2.18	65 - 70	12.0
	* 31.5	107 500		0.85/80°EH	9.0	0 - 1	T3	Fixed	2.57	70 - 75	12.0
	36.0	123 000		1.00/80°EH	9.1	0 - 1	T3	Fixed	3.01	75 - 80	12.0
36/46 Riello RDB2.2	36.0	123 000	90.7	1.00/80°EH	9.0	0 - 1	T5	Fixed	3.01	75 - 80	12.0
	* 41.5	142 000		1.20/80°S	8.0	0 - 1	T5	Fixed	3.56	80 - 85	12.0
	46.0	157 000		1.25/80°S	8.0	0 - 1	T5	Fixed	3.90	85 - 90	12.0
46/58 Riello RDB3.2	46.0	156 952	91.7	1.25/80°S	8.0	0 - 1	GIB	Head setting 0	4.01	75 - 80	12.0
	* 52.0	177 424		1.35/80°S	9.5	0 - 1	GIB	Head setting 0	4.47	75 - 80	12.0
	58.0	197 896		1.65/80°S	8.0	0 - 1	GIB	Head setting 0	5.05	75 - 80	12.0
58/70 Riello RDB3.2	58.0	197 896	91.4	1.65/80°S	8.0	0 - 1	GIB	Head setting 0	5.05	75 - 80	12.0
	* 64.0	218 368		1.65/80°S	9.5	0 - 1	GIB	Head setting 0	5.58	75 - 80	12.0
	70.0	238 840		1.75/80°S	9.5	0 - 1	GIB	Head setting 4	6.01	75 - 80	12.0

#### Notes:

- The data given above is approximate only.
- 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 the Grant VORTEX Pro boiler range.
- The net flue gas temperatures given above are ± 10%.
- When commissioning the air damper **must be** adjusted to obtain the correct CO<sub>2</sub> level.
- \* Factory settings: 15/21 - 21 kW, 15/26 - 23 kW, 26/36 - 31.5 kW, 36/46 - 41.5 kW, 46/58 - 52.0 kW, 58/70 - 64.0 kW.
- The combustion door test point may be used for CO<sub>2</sub> and smoke readings only. Do not use this test point for temperature or efficiency readings.
- When setting the 15/21 to 15 kW output the burner air adjuster disc requires repositioning. Refer to Section 10 Commissioning.  
When setting the 15/26 to 15 or 20 kW output the combustion head must be changed. Refer to Section 11.4 Cleaning the burner.  
When setting the 58/70 to 70 kW output the combustion head setting must be changed. Refer to Section 11.4 Cleaning the burner.
- The installer must amend the boiler data label if the output is changed.

### 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 CO<sub>2</sub> 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.

### 2.5 Water Connections

Boiler model	Flow connection			Return connection		
	Size	Fitting	Supplied	Size	Fitting	Supplied
15/21 Kitchen/Utility	22mm pipe	Tectite straight	in fittings kit	22mm pipe	Tectite straight	fitted
15/26 Kitchen/Utility	22mm pipe	Tectite elbow	in fittings kit	22mm pipe	Compression	fitted
15/26 Kitchen/Utility System	22mm pipe	Tectite elbow	fitted	22mm pipe	Compression	fitted
26/36 Kitchen/Utility	28mm pipe	Tectite straight	in fittings kit	28mm pipe	Compression	fitted
26/36 Kitchen/Utility System	28mm pipe	Tectite elbow	fitted	28mm pipe	Compression	fitted
26/36 Boiler House	28mm pipe	Compression	in fittings kit	1" BSP	none	fitted
36/46 Kitchen/Utility	28mm pipe	Tectite straight	in fittings kit	28mm pipe	Compression	fitted
36/46 Kitchen/Utility System	28mm pipe	Tectite elbow	fitted	28mm pipe	Compression	fitted
36/46 Boiler House	28mm pipe	Compression	in fittings kit	1" BSP	none	fitted
46/58 Kitchen/Utility	1¼" BSP	none	-	1¼" BSP	none	-
46/58 Boiler House	1¼" BSP	none	-	1¼" BSP	none	-
58/70 Kitchen/Utility	1¼" BSP	none	-	1¼" BSP	none	-
58/70 Boiler House	1¼" BSP	none	-	1¼" BSP	none	-

## 2.6 Boiler Dimensions

**Note:** The 26/36, 36/46 Dual thermostat is mounted on a bracket and a separate flow pipe is used. See Section 5.4.

The 46/58, 58/70 Dual thermostat is fitted into the top of the boiler and a side flow tapping is used.

Dimension	Boiler House model	
	26/36, 36/46	46/58, 58/70
A	705	1022
B	460	540
C	600	868
D	560	835
E	*782	938
F	*125	285
G	30	30
H	330	415
J	90	115
K	*30	-
L	115	115
M	870	*1072

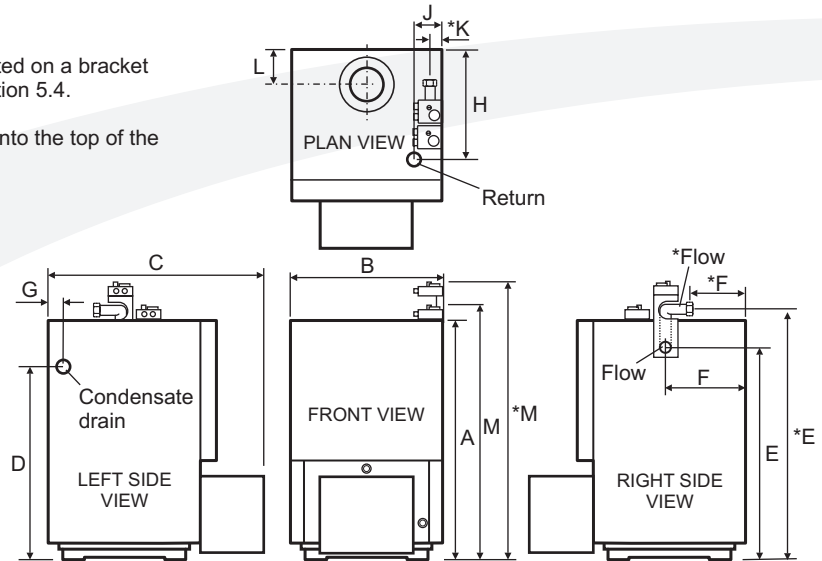


Figure 2-1: 26/36, 36/46, 46/58, 58/70 Boiler House dimensions

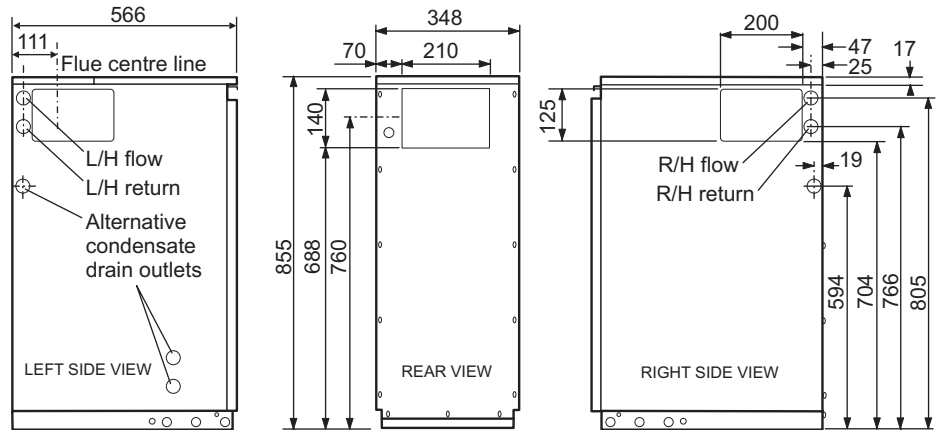


Figure 2-2: 15/21 Kitchen/Utility dimensions

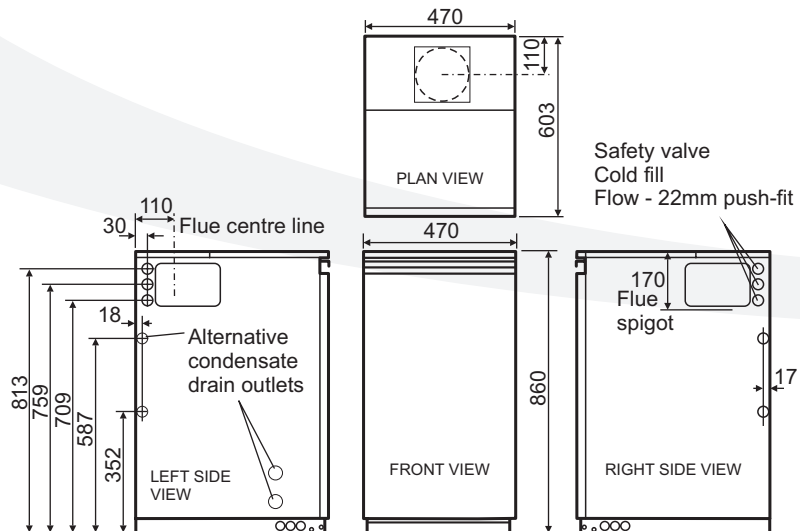


Figure 2-3: 15/26 Kitchen/Utility System dimensions

All dimensions in the diagrams above are in millimetres



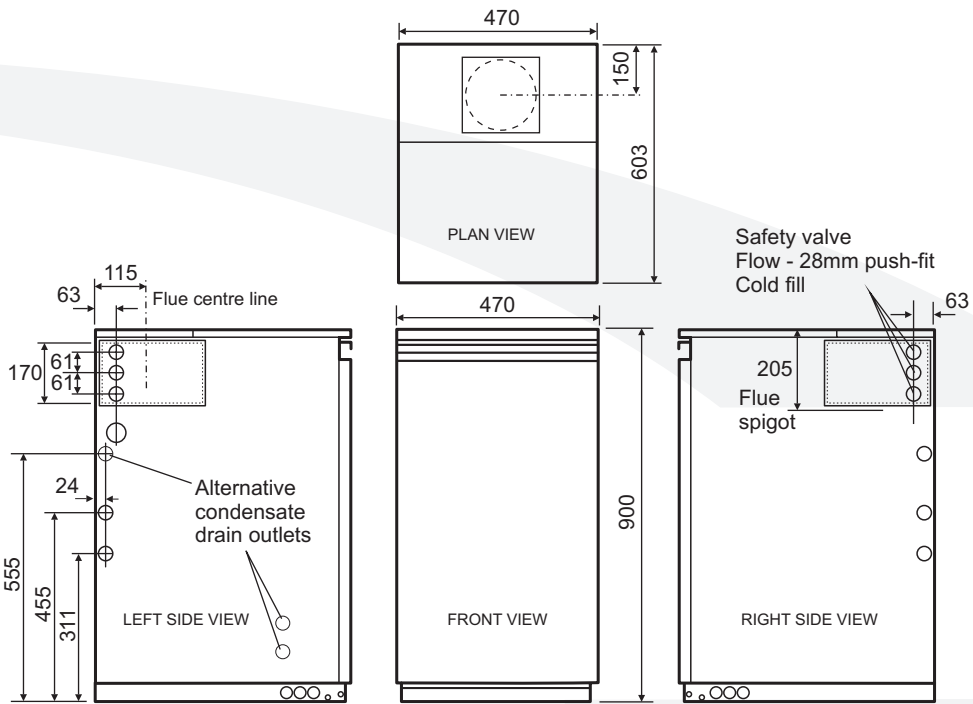


Figure 2-4: 26/36, 36/46 Kitchen/Utility and Kitchen/Utility System dimensions

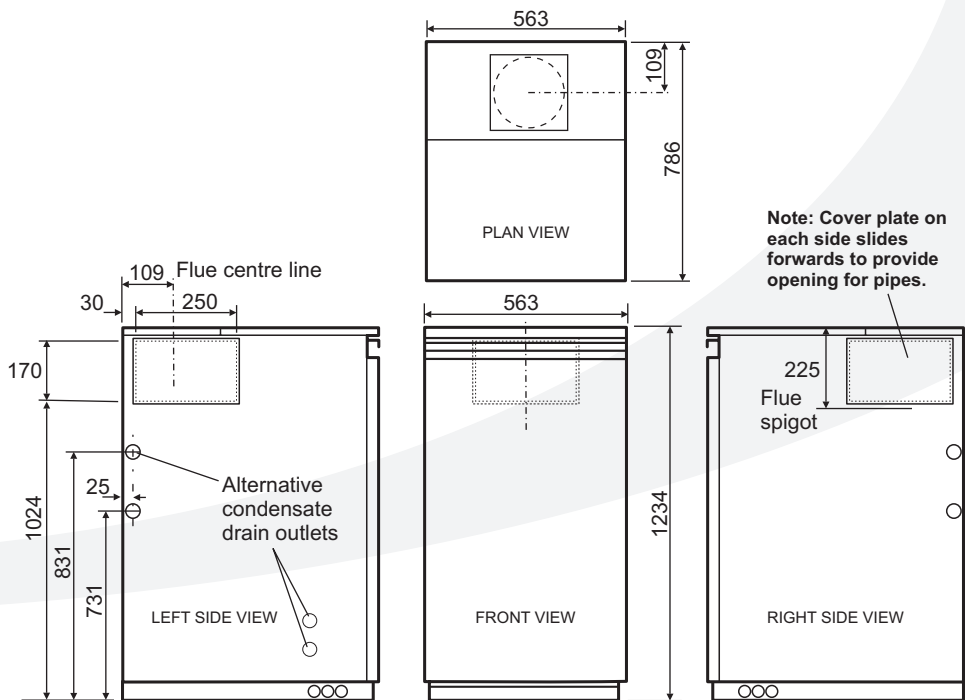


Figure 2-5: 46/58, 58/70 Kitchen/Utility dimensions

All dimensions in the diagrams above are in millimetres

# 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 OFST200.



**A galvanised tank must not be used.**

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



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

### Fuel Pipes

Fuel supply pipes should be of copper tubing with an external diameter of at least 10 mm.

**Galvanised pipe must not be used.**

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



**Flexible hoses must NOT be used outside the boiler case of Kitchen/Utility models.**

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. 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' type de-aerator is used, an additional flexible fuel hose (900 mm) and 3/8" to 1/4" BSP male adaptor are available to purchase from Grant UK, Part No. RBS36.

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

### Single pipe system - (See Figure 3-1)

With the storage tank outlet above the burner a 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

### Two pipe system - (See Figure 3-2)

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 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 3.5 m 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.

To be used with a two-pipe system, the burner **must** be fitted with an additional flexible fuel pipe (a flexible fuel hose (900 mm) and 3/8" to 1/4" BSP male adaptor are available to purchase from Grant UK), Part No. RBS36.

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 from OFTEC.*

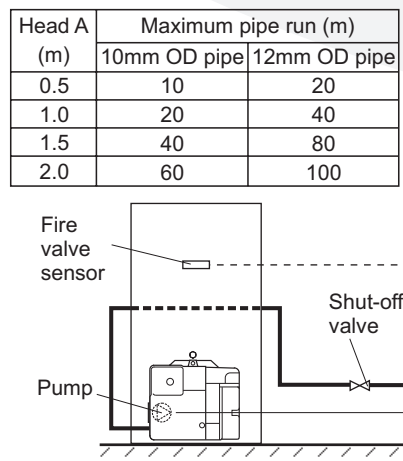


Figure 3-1: Single pipe system

Head A (m)	Maximum pipe run (m)	
	10mm OD pipe	12mm OD pipe
0.5	10	20
1.0	20	40
1.5	40	80
2.0	60	100

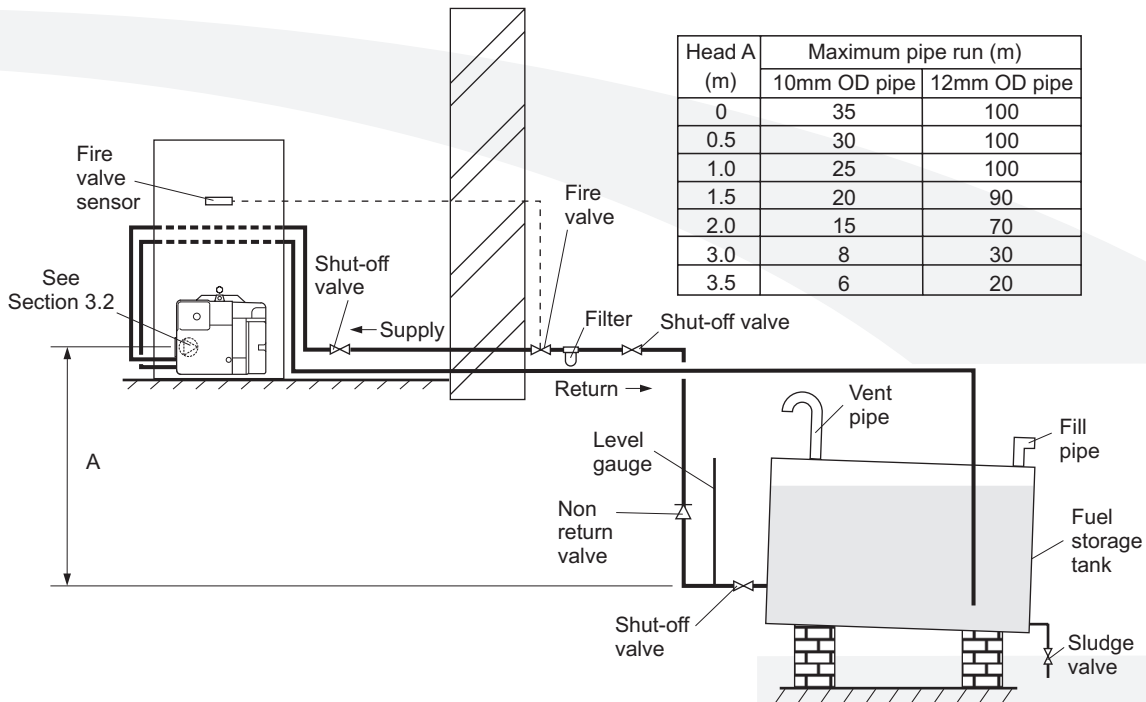


Figure 3-2: Two pipe system

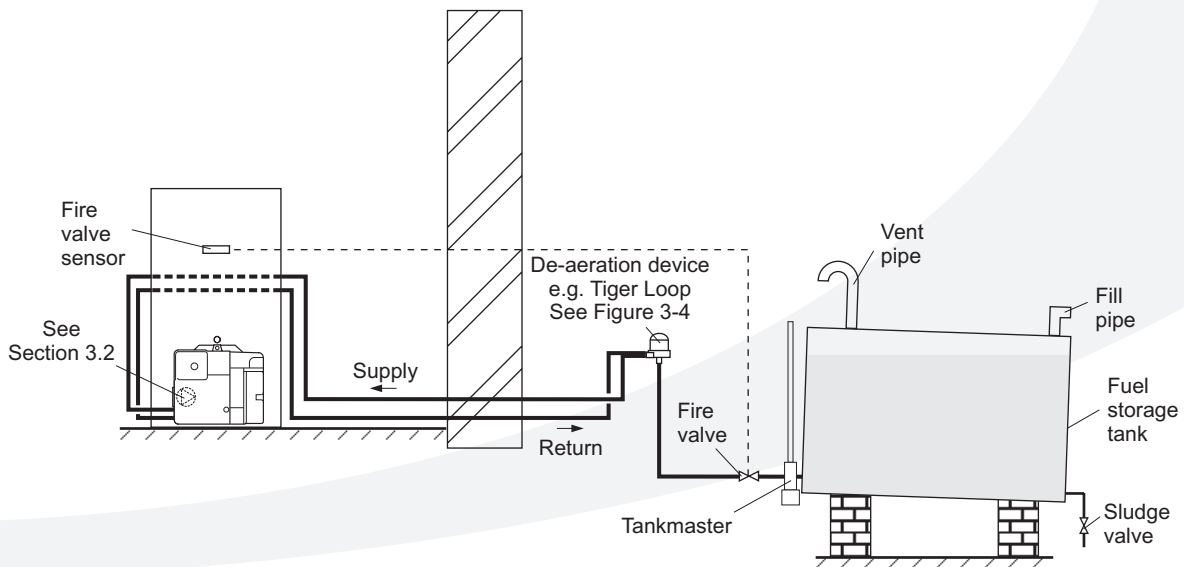


Figure 3-3: De-aeration device system

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

When The storage tank outlet 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 Figure 3-3. Refer to the manufacturers instructions supplied with the de-aerator.

The de-aerator **must** be mounted vertically. See Figure 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.

To be used with a de-aerator, the burner **must** be fitted with an additional flexible fuel hose (a flexible fuel hose (900 mm) and 3/8" to 1/4" BSP male adaptor are available to purchase from Grant UK, Part No. RBS36.

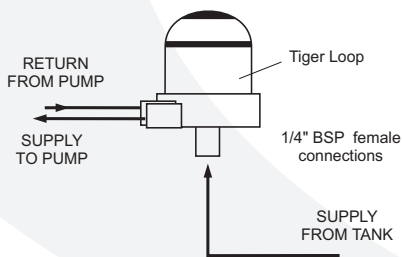


Figure 3-4: Tiger loop de-aeration device

**3.2 Burner Oil Connection**

The burner 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, as shown in Figure 3-5, into the tapping in the return port.

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

**On all models except 46/58 and 58/78:** Remove the plastic burner cover (secured by two screws). To gain access on Kitchen/Utility models, it may be necessary to remove the plinth - loosen the screw securing the right hand side of the plinth, then withdraw the plinth forward from the right and away from the case.

**On 46/58 and 58/70 models only:**

Remove the plastic burner cover (secured by three screws). On Kitchen/Utility models it may be necessary to remove the burner from the boiler to access the cover screws - see below.

For ease of access to the fuel pump, to fit the by-pass screw and connect the oil lines, the burner can be removed from the boiler. To do this, unscrew the single nut at the top of the burner (using a 13 mm spanner) and withdraw the burner from the boiler.

Remove and discard the blanking plug from the return connection of the pump and fit the By-pass screw using an hexagonal key.

Connect the return oil flexible fuel pipe to the pump.

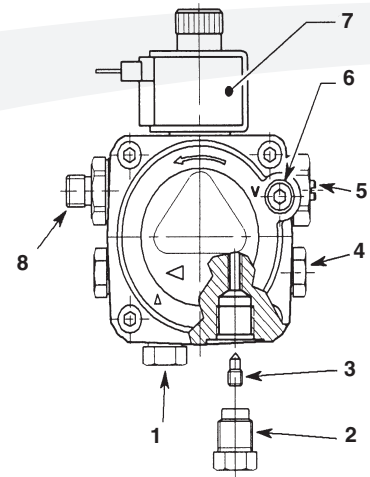


Figure 3-5: Riello RDB pump

Item	Description
1	Inlet (suction) port
2	Return port
3	By-pass screw
4	Pressure gauge port
5	Pressure adjustment
6	Vacuum gauge port
7	Solenoid
8	Nozzle outlet

Connect the 3/8" to 1/4" BSP adaptor to the flexible fuel pipe.

Flexible fuel pipes and adaptors are available to purchase from Grant UK.



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

### Main Burner Components

It may be necessary to remove the burner from Kitchen/Utility boilers to access connections in the fuel pump.

On System models, carefully lift up and remove the expansion vessel from the front of the boiler. Place the vessel on the floor taking care not to strain the flexible hose.

Disconnect the flexible air tube from the burner.

Remove the single nut at the top of the burner (using a 13 mm spanner) and withdraw the burner from the boiler.

### Kitchen/Utility models are supplied with the burner fitted. Fit the burner to a Boiler House model as follows:

Remove and retain the fixing nut from the stud on the burner flange on the front of the boiler, see Figure 3-6. Leave the small nut in position (ensure it is located up against the mounting flange).

### Do not remove the mounting flange from the boiler.

Check that the 'O' ring is in position (around the collar of the burner combustion head). Position the burner on the boiler by sliding the combustion head into the mounting flange on the boiler. With the burner level and correctly located over the fixing stud, secure it in position using the nut previously removed.

**Balanced flue** - Fit the air tube over the air tube spigot and secure in position using the clamp supplied.

### Burner Connection

If a two pipe system is to be used refer to Section 3.2.

Remove and discard the blanking plug from the inlet (suction) port of the pump. Refer to Figure 3-5.

Connect the elbow of the flexible fuel pipe supplied with the boiler to the inlet port.

Connect the other end of the flexible fuel pipe to the rigid supply line using the adaptor supplied. For Kitchen/Utility models the supply enters through one of the holes in the casing plinth.

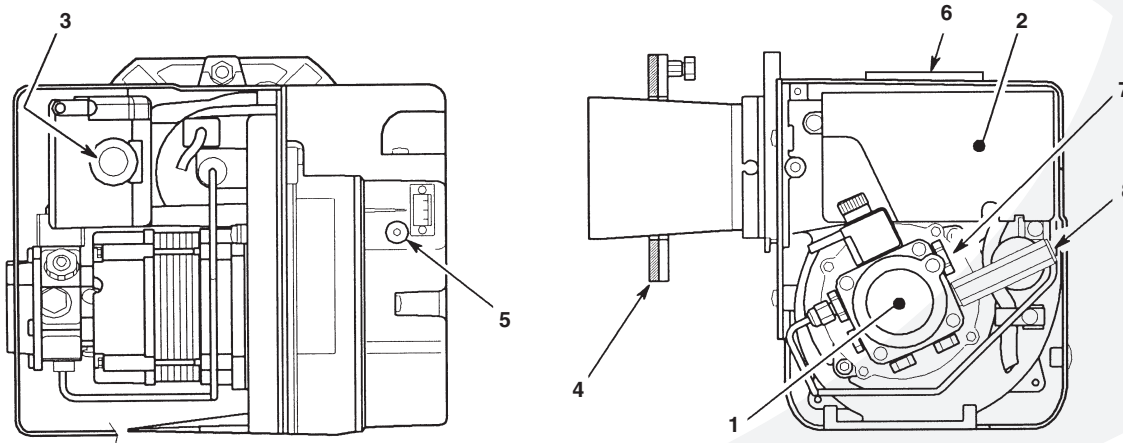


Figure 3-6: Riello RDB burner components

Item	Description
1	Oil pump
2	Control box
3	Reset button with lock-out lamp
4	Flange with gasket (do not remove from boiler)
5	Air damper adjustment screw
6	Air supply tube connection (balanced flue)
7	Pump pressure adjustment screw
8	Pressure gauge connection

# 4 Boiler Installation Information

## 4.1 Introduction

Kitchen/Utility models are supplied fully assembled in a carton.

Boiler House models are supplied in two cartons, one containing the boiler and the other the burner and dual thermostat (26/36, 36/46 only).

## 4.2 Boiler location

The boiler must stand on a firm and level surface. The boiler base temperature is less than 50°C. No special hearth is required for Kitchen/Utility models. Boiler House models **must** stand on a non combustible surface.

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

**Boiler House models** - Sufficient clearance **must** be allowed above the boiler to replace the boiler thermostat/overheat thermostat.

**Kitchen/Utility models** - Once the boiler has been installed, a permanent worktop may be fitted over it as access to the top of the boiler is no longer required after installation.

### NOTE

**System models - A removable section of worktop above the boiler is required to provide access for servicing.**

## 4.3 Preparation for Installation

### Kitchen/Utility models:

1. Carefully remove the packaging from the boiler and remove it from the transit pallet.
2. Pull the front panel forward at the top to disengage the fixing clips then lift it up and off the boiler. Remove the literature packs. Give the User Information pack to the householder.
3. Lift off the case top panel(s) and remove the water connecting fittings.

### Boiler House models:

1. The Boiler House model comes in two separate cartons, one containing the boiler and the other containing the burner and drain trap. The dual thermostat and flow pipe are also included with the burner for 26/36, 36/46 models.
2. Carefully remove the packaging from the boiler and unpack the carton containing the remaining items.

## 4.4 Installing the Boiler

1. Having decided upon the position of the boiler and type of flue, prepare the wall as described in Section 9. Ensure that the flue terminal position complies with the necessary clearances.
2. Make the water connections as described in Section 5. If access will be restricted, make any connections to the boiler before placing it in its final position. Refer to Section 7 if the boiler is to be used on a sealed system.

### NOTE

**If using a balanced flue system - Install the balanced flue system before connecting the heating system pipework to the boiler. Once the flue system is fitted then complete the water connections and fill the heating system.**

3. Ensure the requirements are met for the disposal of condensate as described in Section 6.
4. Connect the power supply as described in Section 8.
5. Connect the flue and ensure there is an adequate air supply as described in Section 9.

## 4.5 Regulations Compliance

Installation of a Grant VORTEX Pro 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 1181 Clay flue linings and flue terminals.
- 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.**



#### 4.6 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.

#### 4.7 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 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 BetzDearborn's Sentinel X300 or X400, or Fernox Restorer. Full instructions are supplied with the products, but for more details of BetzDearborn's products, view the website [www.sentinel-solutions.net](http://www.sentinel-solutions.net) and for more details of Fernox products view the website [www.fernox.com](http://www.fernox.com).

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

Failure to implement these guidelines will invalidate the warranty.

#### 4.8 Heating System Design Considerations

To achieve the maximum efficiency possible from the Grant VORTEX Pro boiler, the heating system should be designed to the following parameters:

##### Radiators:-

- Flow temperature 70°C
- Return temperature 50°C
- Differential 20°C

##### Underfloor:-

- Flow temperature 50°C
- Return temperature 40°C
- Differential 10°C

Size radiators with a mean water temperature of 60°C.

Design system controls with programmable room thermostats or use weather compensating controls to maintain return temperatures below 55°C.

#### NOTE

**The boiler should not be allowed to operate with return temperatures of less than 40°C when the system is up to operating temperature.**

The use of a pipe thermostat is recommended to control the return temperature when using weather compensating controls.

Refer to Section 2.5 for the size and type of the connections and Section 5 for the position of the connections.

#### 4.9 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.

#### 4.10 Pipework Materials

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.

#### WARNING

**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.**

#### 4.11 Sealed Systems

If plastic pipe is to be 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 system must incorporate a low-pressure switch to shut off power to the boiler if the system pressure drops below 0.2 bar. A suitable low pressure switch kit is available to purchase from Grant UK, Part No. MPCBS 62.**

#### 4.12 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

The Flow and Return pipework can be routed to either side of the boiler, dependant on the type and direction of the flue system used.

For condensate disposal pipework refer to Section 6.

A drain cock is fitted at the bottom on the front of the boiler to allow the heating system to be drained, on the Boiler House models the drain cock is supplied in the accessories pack and requires to be fitted.

### **!** NOTE

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.

## Pipe entry/exit holes in case

All Kitchen/Utility models except the 46/58 and 58/70 have holes to enable the pipework to exit the boiler casing. On the 15/21 and 15/26 models these holes are pre-cut knock-outs located at the rear of both side panels and on the 26/36 and 36/46 models these pre-cut holes are in the removable flue outlet cover plates.

Push out the 'knock-out' from the required holes, taking care not to distort the side panel.

On the 46/58 and 58/70 models the flue outlet cover plates can be repositioned to provide a vertical 'letterbox' pipe opening, on either side of the boiler as required. To do this, first remove both casing top panels. Slacken the nuts on the four fixing studs on the side cover plate to be moved. Slide the plate forwards by approximately 50 mm and re-tighten nuts.

## 5.2 Water Connections - System Models

A 15 mm discharge pipe must be connected to the safety valve outlet connection. This pipe must be unrestricted, i.e. 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 15 mm double check valve ballcock type valve is provided on the flexible filling loop hose for connection of the cold mains supply to the heating system. The cold mains supply should terminate inside the boiler casing.

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.

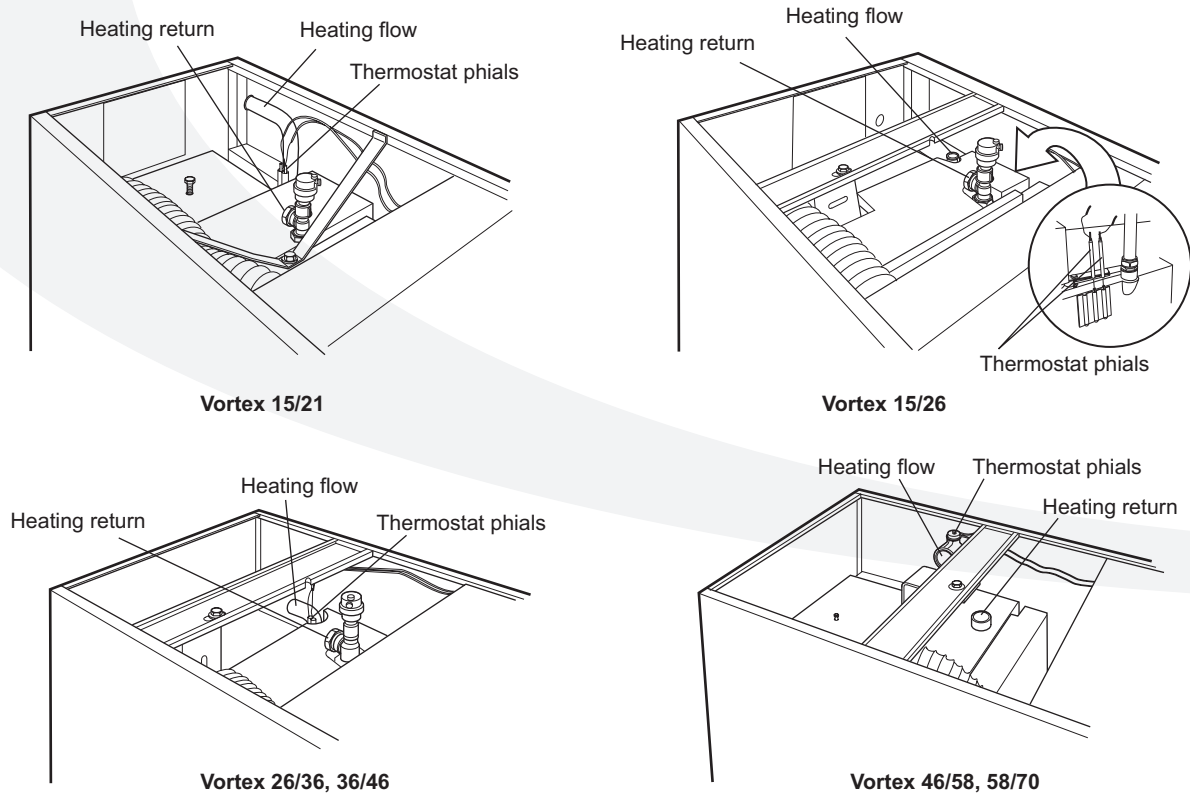


Figure 5-1: Water connections and thermostat phial positions (Kitchen/Utility models)

### 5.3 Water Connections - Boiler House Models

**26/36, 36/46 Flow connection:** A 28 mm pipe is provided for the flow connection. This is located on the right hand side of the boiler. This flow pipe will need to be vented, as it is the highest point on the primary heat exchanger.

**If a Grant low level balanced flue (Yellow system) or external balanced flue (Green system) is used, and the flue points to the right of the boiler (viewed from the front), the Heating flow pipe MUST be set to point towards the front of the boiler to avoid clashing with the flue.**

**26/36, 36/46 Return connection:** A 1" BSP socket is located on top of the boiler. This return pipe will also need to be vented at some point, as it is the highest point on the secondary heat exchanger.

**46/58, 58/70 Flow connection:** A 1¼" BSP socket is provided for the flow connection. This is located on the right hand side of the boiler. This flow pipe will need to be vented, as it is the highest point on the primary heat exchanger.

**46/58, 58/70 Return connection:** A 1¼" BSP socket is located on top of the boiler. This return pipe will also need to be vented at some point, as it is the highest point on the secondary heat exchanger.

### 5.4 Fit the flow pipe and dual thermostat - 26/36, 36/46 Boiler House Models

1. Fit the flow pipe (supplied with the burner) into the flow connection of the boiler. Ensure it is vertical and fully inserted.
2. Rotate the pipe to the required direction and fully tighten the nut.
3. Remove and retain the two screws shown from the side panel (required to secure bracket).

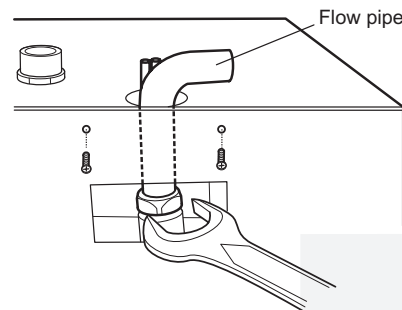


Figure 5-3: Fit flow pipe and remove screws

4. Remove and retain the split pin from the pockets on the flow pipe.
5. Insert the phials of the dual thermostat (supplied with the burner) into the pockets on the flow pipe. Replace the split pin to retain the phials.

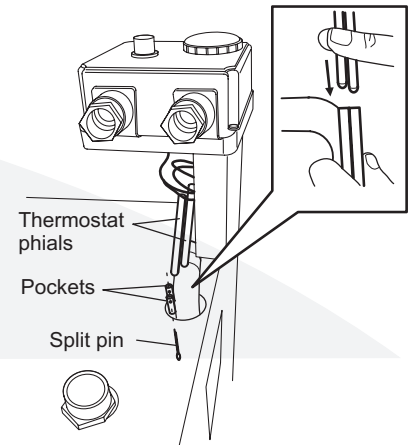


Figure 5-4: Remove split pin and fit phials

6. Place the dual thermostat and bracket in position and secure using the two screws previously removed.
7. Use the 28 mm straight connection supplied with the boiler to connect the flow pipe.

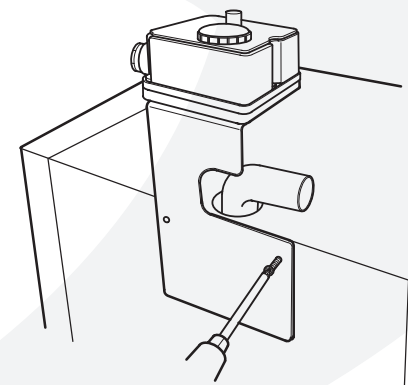
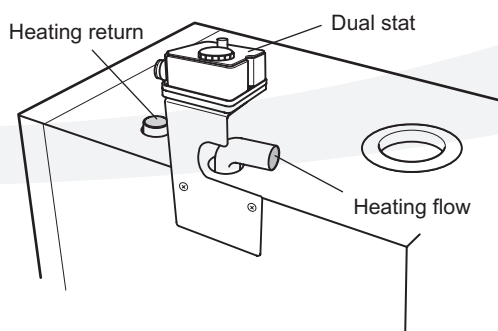
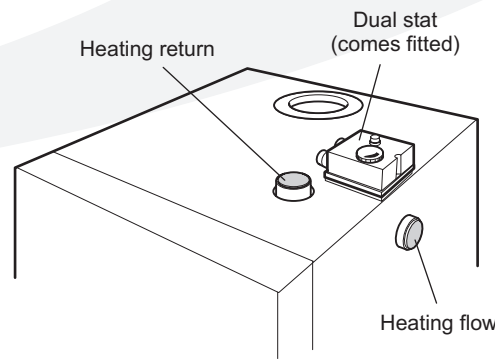


Figure 5-5: Secure dual thermostat bracket



Vortex 26/36, 36/46 Boiler House



Vortex 46/58, 58/70 Boiler House

Figure 5-2: Water connections and thermostat phial positions (Boiler House models)

# 6 Condensate Disposal

## 6.1 General Requirements

When in condensing mode the Grant VORTEX Pro 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

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

Condensate disposal pipes should have a minimum 'nominal' diameter of 22 mm (¾") - e.g. use 21.5 mm OD polypropylene overflow pipe.

Condensate disposal pipes must be fitted with a fall (away from the boiler) of at least 2.5° (~45 mm 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 32 mm 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 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 500 mm 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 10 mm 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.**

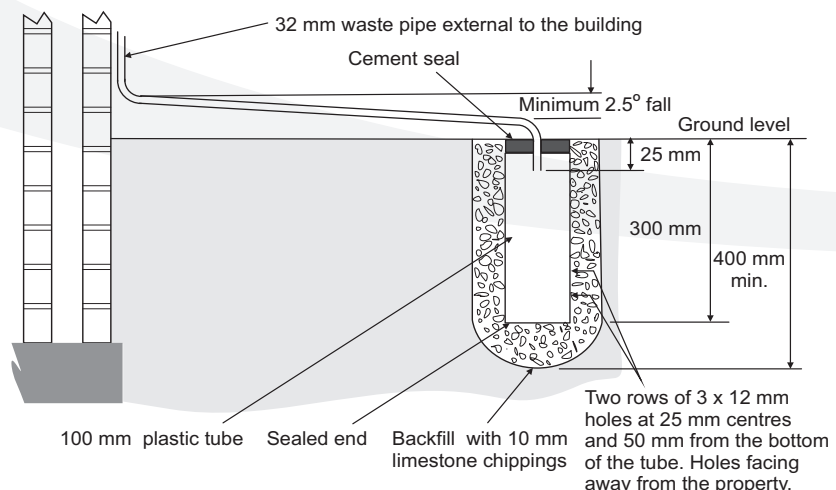


Figure 6-1: Purpose made condensate soakaway

## 6.6 Condensate Trap

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

The condensate trap for the Boiler House models is supplied loose in the burner box and needs to be fitted as shown in Figure 6-3.

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.

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 Section 6.9. 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:

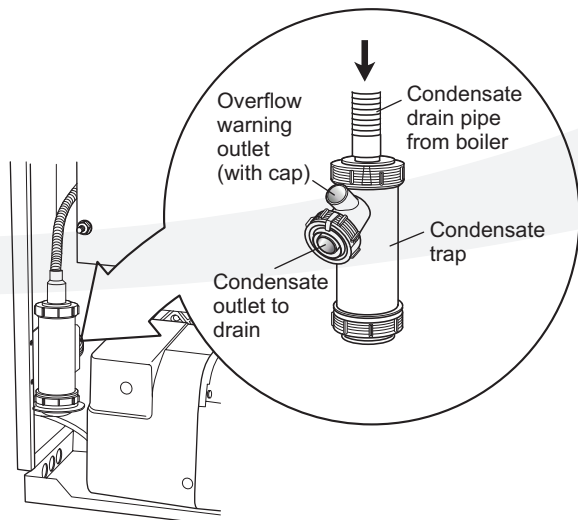


Figure 6-2: Condensate trap - Kitchen/Utility models

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.

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.

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 6-2.

## 6.7 Condensate Disposal Pipework

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 (see to Figures 2-1 to 2-4). Push out the 'knock-out' from the required hole taking care not to distort the side panel.

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

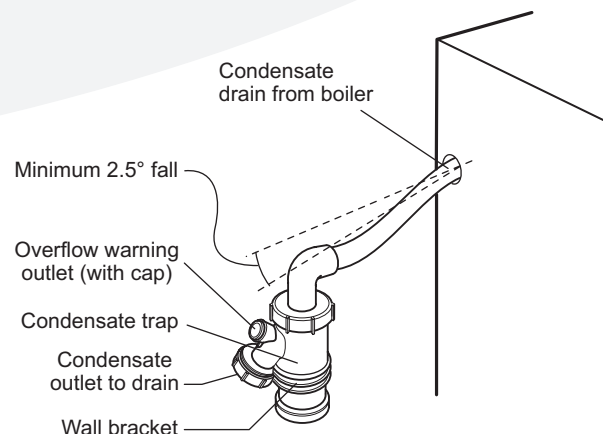


Figure 6-3: Condensate trap - Boiler House models

### ! NOTE

**When connecting plastic discharge pipe, ensure that the pipe is fully pushed into the outlet end on the flexible hose to prevent the possibility of leakage.**

## 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.

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

To inspect and clean the trap:

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

### ! CAUTION

**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 Relocate the Trap

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

### ! NOTE

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

1. Remove 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 6-4).
4. Push out pre-cut 'knock-out' from the condensate outlet hole in the rear of left side casing panel.
5. Remove the right angle end of the flexible condensate discharge hose from the outlet connection on the condensing heat exchanger.
6. From the front of boiler, remove the straight connector end of the flexible hose from the top of the condensate trap.
7. Reverse the 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 - push on at least 20 mm.
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.

### ! CAUTION

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

### ! NOTE

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

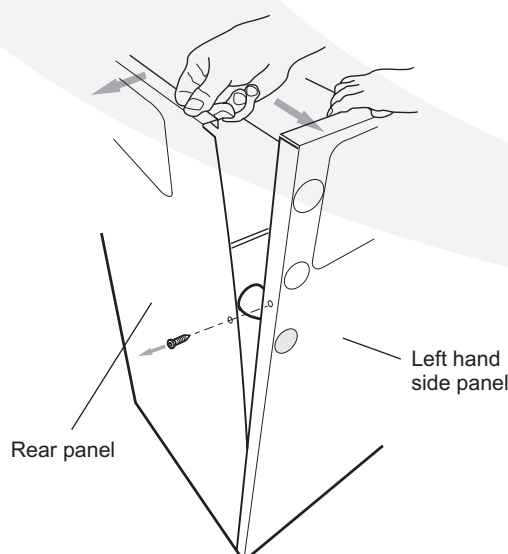


Figure 6-4: Remove the condensate trap



# 7 Sealed Systems

## 7.1 Sealed System Installation

See Figure 7-1

All Grant VORTEX Pro boilers are suitable for use with sealed systems complying with the requirements of BS 5449.

The maximum temperature of the central heating water is 75°C.

The system must be provided with the following items:-

- Diaphragm expansion vessel complying with BS 4814.
- Pressure gauge.
- Safety valve.
- Approved method for filling the system.

### ! NOTE

**Ensure that the expansion vessel used is of sufficient size for the system volume. Refer to BS 7074:1:1989 or The Domestic Heating Design Guide for sizing the required vessel.**

The expansion vessel can be fitted in either the return or flow pipework in any of the recommended positions as shown in Figure 7-1. To reduce the operating temperature of the expansion vessel diaphragm, position it below the pipe to which it is connected. The expansion vessel may be positioned away from the system, providing the connecting pipe is not less than 13 mm diameter.

The pressure gauge should have an operating range of 0 to 4 bar.

The safety valve, set to operate at 2.5 bar, should be fitted in the flow pipework near to the boiler.

The pipework between the safety valve and boiler must be unrestricted, i.e. no valves. The safety valve should be connected to a discharge pipe which will allow the discharge to be seen, but cannot cause injury to persons or property.

Provision should be made to replace water lost from the system. This can be done manually (where allowed by the local water undertaking) using an approved filling loop arrangement incorporating a double check valve assembly (as supplied fitted on System models).

An automatic air vent should be fitted to the highest point of the system.

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 7-2.

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 further information if required.

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

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.

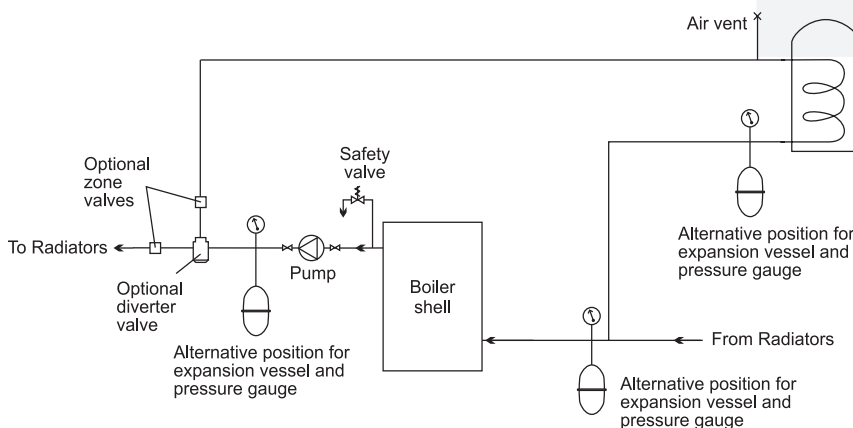


Figure 7-1: Scaled system

If thermostatic radiator valves are fitted, the system **must** incorporate an adequate by-pass.

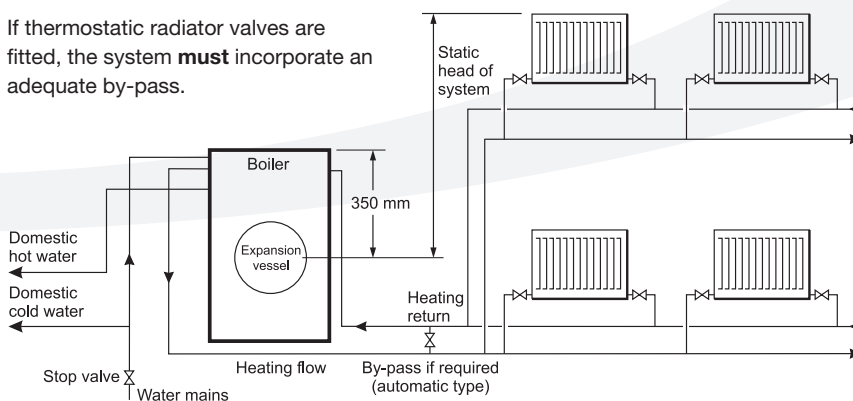


Figure 7-2: Sealed system boilers

## 7.2 System Models

All System models have the following sealed system components factory fitted (refer to Figure 7-3):-

- A diaphragm expansion vessel complying with BS 4814, pre-charged at 1.0 bar. Refer to Section 2.2.
- 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.
- Automatic air vent, fitted to the flow pipe of the boiler, ensures the boiler is vented.
- Filling loop. This **must** be isolated and disconnected after filling the system.

Refer to Section 2.2 for system volumes and BS 7074: for further guidance and for further details of the expansion vessel.

The expansion vessel fitted, is supplied with a charge pressure of 1.0 bar (equivalent to a maximum 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 value. Refer to Section 2.2. If the system volume is greater, an extra expansion vessel (complying with BS 4841) 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 either BS 7074:1:1989 or The Domestic Heating Design Guide for the required total expansion vessel volume for the system concerned.**

## ! NOTE

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.

## 7.3 Fill the Sealed System

Automatic air vent(s) are fitted to the top of the boiler (see Figure 7-3). Check that the small cap on the top of each air vent is screwed on fully, then unscrew it one complete turn - the cap remains in this position from now on.

The procedure for filling the sealed system is as follows:

1. Only ever fill or add water to the system when it is cold and the boiler is off. Do not overfill.
2. Ensure that the flexible filling loop supplied with the boiler is connected and that the double check shut off valve connecting it to the water supply 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.
3. Open the fill point valve.
4. Gradually open the double check valve from the water supply until water is heard to flow.
5. When the white needle of the pressure gauge is between 0.5 and 1.0 bar, close the valve.
6. Vent each radiator in turn, starting with the lowest one in the system, to remove air.

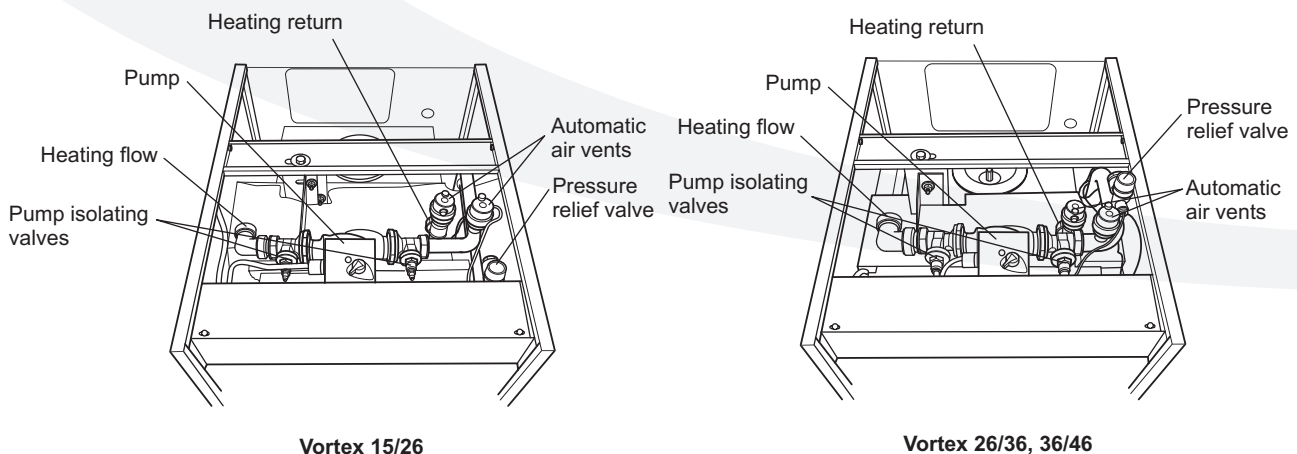


Figure 7-3: Sealed system components

7. Continue to fill the system until the pressure gauge indicates between 0.5 and 1.0 bar. Close the fill point valve.
8. Repeat steps 4 and 5 as required.
9. Close the fill point and double check valves either side of the filling loop and disconnect the loop.

#### 7.4 Vent the Pump

It is important that the pump is properly vented to avoid it running dry and damaging its bearings. To gain access to the pump for venting it is necessary to remove the control panel. The procedure is as follows:

1. Loosen the four fixing screws securing the panel to the casing, push the panel towards the rear of the boiler and lower the control panel to expose the pump.
2. Remove the cap, then unscrew and remove the plug from the centre of the pump.

3. Using a suitable screwdriver rotate the exposed spindle about one turn.
4. Replace the plug and cap.

#### 7.5 Pressure Relief Safety Valve

Now the pressure relief safety valve operation must be checked and set. The procedure is as follows:

1. Check the operation of the safety valve (see Figure 7-3) 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.
2. Check that the water is escaping from the system.
3. Continue to fill the system until the pressure gauge indicates between 0.5 and 1.0 bar.
4. Close the fill point valve and check the system for water soundness, rectifying where necessary.

5. 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.

Now close the valves either side of the filling loop and disconnect the loop.

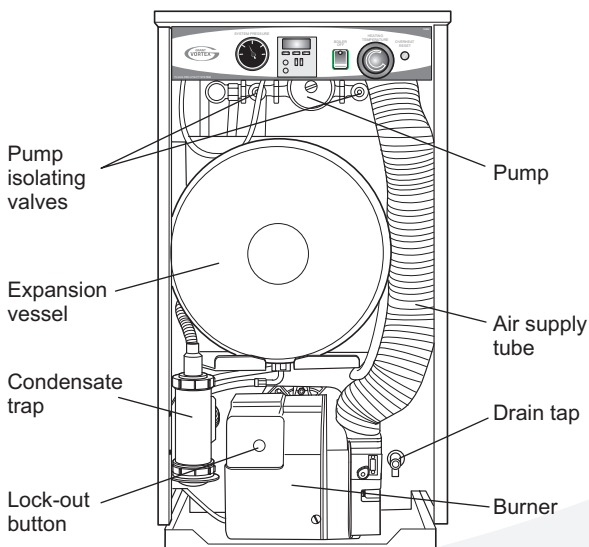


Figure 7-4: System model (also refer to Figure 7-3)

# 8 Electrical

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

Refer to Figures 8-1 to 8-5 for typical control system wiring diagrams for all models.

Refer to Figures 8-6 and 8-7 for wiring diagrams for all models.

## WARNING

**The VORTEX Pro boiler contains electrical switching equipment and must be earthed.**

The supply must be fused at 5 Amp and there must only be one common isolator for the boiler and control system, providing complete electrical isolation.

A fused double pole switch or a fused three pin plug and shuttered outlet socket should be used for the connection.

The power supply cable should be at least 0.75 mm<sup>2</sup> PVC as specified in BS 6500, Table 16.

All the wiring and supplementary earth bonding external to the boiler must be in accordance with the current I.E.E. Wiring Regulations.

Any room thermostat or frost thermostat used must be suitable for use on mains voltage.

In the event of an electrical fault after installation of the boiler, the following electrical system checks must be carried out:

- Short circuit
- Polarity
- Earth continuity
- Resistance to earth

## 8.1 Connecting the Power Supply (Kitchen/Utility models only)

It is recommended that the boiler should be connected to a switched mains power supply from a programmer or control system. If a Grant plug-in programmer is used, a permanent 240 V mains supply (fused at 5 Amp) must be taken to the boiler. A three core cable is required to connect the boiler terminal block to the live supply. Refer to Figures 8-1 to 8-4 for typical control system wiring diagrams.

## NOTE

**Ensure that the route and length of the supply cable is such that the boiler front cover plate can be easily removed without disconnecting the supply cable from the terminal block.**

The procedure is:

1. Lift off the boiler case top panel, if it has not already been removed.
2. Remove the top of the control panel and open the cable clamp. Route the supply cable through the hole in the rear panel (using the grommet supplied) up to the control panel, pass it through the cable clamp and connect to the boiler terminal block as follows:-
  - Brown to live (terminal 1)
  - Blue to mains neutral (terminal 2)
  - Green/Yellow to mains earth (terminal 3)

## NOTE

**If the Grant plug-in programmer is not fitted, ensure that the BROWN wire link, between terminals 1 and 4 on the boiler terminal block is fitted.**

3. If the optional plug-in electronic programmer is to be fitted, follow the fitting instructions given in Section 8.2 at this point.
4. Secure the cable in the cable clamp.
5. Place the wiring cover in position over the terminal block, taking care not to trap any wires and secure in position with the two M4 screws provided.

6. Ensure that all external wiring is adequately supported.

**Do not switch on the electricity supply at this stage.**

## 8.2 Fit the Programmer (Kitchen/Utility models only)

## CAUTION

**Ensure the electrical supply to the boiler has been isolated before fitting the programmer.**

Remove the screws holding the back of the control panel in place and move it back enough to allow access to the rear of the timer aperture and proceed as follows:

1. From underneath the control panel, remove the screw securing the bracket behind the timer aperture. Withdraw and discard the bracket.
2. Remove the blanking piece from the timer aperture, in the control panel fascia, by firmly pressing on the centre of the square until it is detached from the rear of the fascia. Remove the blanking piece from the panel and discard.
3. Refer to the wiring diagrams in Figures 8-5 or 8-6 and wire the programmer to the boiler terminal block.
  - Programmer terminal N - Blue wire to boiler terminal 1
  - Programmer terminal L - Brown wire to boiler terminal 2
  - Programmer terminal CH ON - Red wire to boiler terminal 5
  - Programmer terminal HW OFF - Yellow wire to boiler terminal 6

## NOTE

**Remove the BROWN link between the boiler terminal 1 and 4.**

4. Carefully fit the programmer into the aperture and gently push fully home.
5. Connect the control system wiring to the boiler terminal block. Refer to Figures 8-1 to 8-4 for details of typical system control wiring diagrams.

- Replace the back of control panel and complete the electrical connection procedure from paragraph 2 of Section 8.1. Refer to the User's Operating Instructions provided with the boiler for the operation and setting of the programmer.

### 8.3 Connect The Power Supply (Boiler House models only)

It is recommended that the boiler should be connected to a switched mains power supply from an external programmer or control system. Fit and connect the dual thermostat control as follows:

- For 26/36 and 36/46 models – First fit the flow pipe and then the dual thermostat and bracket. Refer to Section 5.4. Fit the thermostat phials of the combined boiler/overheat thermostat into the thermostat pockets on the flow pipe. Refer to Figure 5-4.
- For 46/58 and 58/70 models – Fit the thermostat phials of the combined boiler/overheat thermostat into the thermostat pocket in the top of the boiler. Refer to Section 5.4. Push the assembly fully home into the pocket, and secure in position by tightening the two fixing screws. Refer to Figure 5-2.
- Undo the three screws securing the combined boiler/overheat thermostat cover and lift off the cover.
- Withdraw the cable support bushes from the cover. Pass the burner supply cable through one of the bushes and connect it to the boiler (control) thermostat (refer to Figure 8-5) as follows:  
Live (Brown) to terminal 1 on the control thermostat  
Green/Yellow to the earth terminal, marked  $\perp$ , on the control thermostat

- Pass a switched mains power supply through the other cable support bush and connect it to the overheat thermostat (refer to Figure 8-8) as follows:

Switched live (Brown) to terminal C on the overheat thermostat

Earth (Green/Yellow) to the earth terminal (marked  $\perp$ ) on the overheat thermostat

One of the two Earth 'flying leads' (Green/Yellow) from casing to earth terminal, marked  $\perp$ , on the overheat thermostat

The remaining Earth 'flying lead' (Green/Yellow) from casing to earth terminal (marked  $\perp$ ) on the control thermostat

Neutral (Blue) wire from incoming switched mains supply must be linked to the neutral (Blue) wire to the burner using a single connector (not supplied).

Refer to Figure 8-5 for typical system wiring diagram.

For other systems not covered, contact Grant Engineering (UK) Ltd.

## WARNING

**DO NOT connect the neutral wires to either of the two thermostats.**

- Connect a link between terminal 2 on the overheat thermostat and terminal C on the control thermostat.
- There are NO connections to terminal 1 on the overheat thermostat and terminal 2 on the control thermostat.
- Position the support bushes so as not to strain the connections when the cover is replaced. Place the cover in position locating the bushes at the same time.

## NOTE

It may be necessary to rotate the thermostat knob to engage it on the operating spindle as the cover is replaced.

- Secure the cover in position by tightening the three screws. Tighten the cable support bush nuts to secure the cables.
- Ensure that all external wiring is adequately supported. Do not switch on the electricity supply at this stage.

### 8.4 Frost Protection

For additional protection of either the entire heating system, or the boiler and localised pipework, it is recommended that a frost thermostat be installed.

Refer to Figures 8-1 to 8-5 (as appropriate) for connection details.

To protect the heating system, the 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, i.e. in a room with a radiator.

Where the frost thermostat is installed outside the house (to protect a boiler installed in an external boiler room or garage) or in an attic, it is recommended that it be used in conjunction with a pipe thermostat to avoid unnecessary and wasteful overheating of the property. The pipe thermostat should be located on the boiler return pipe, and set to operate at 25°C.

Refer to Figures 8-1 to 8-5 (as appropriate) for connection details.

### 8.5 Control System Wiring Diagrams

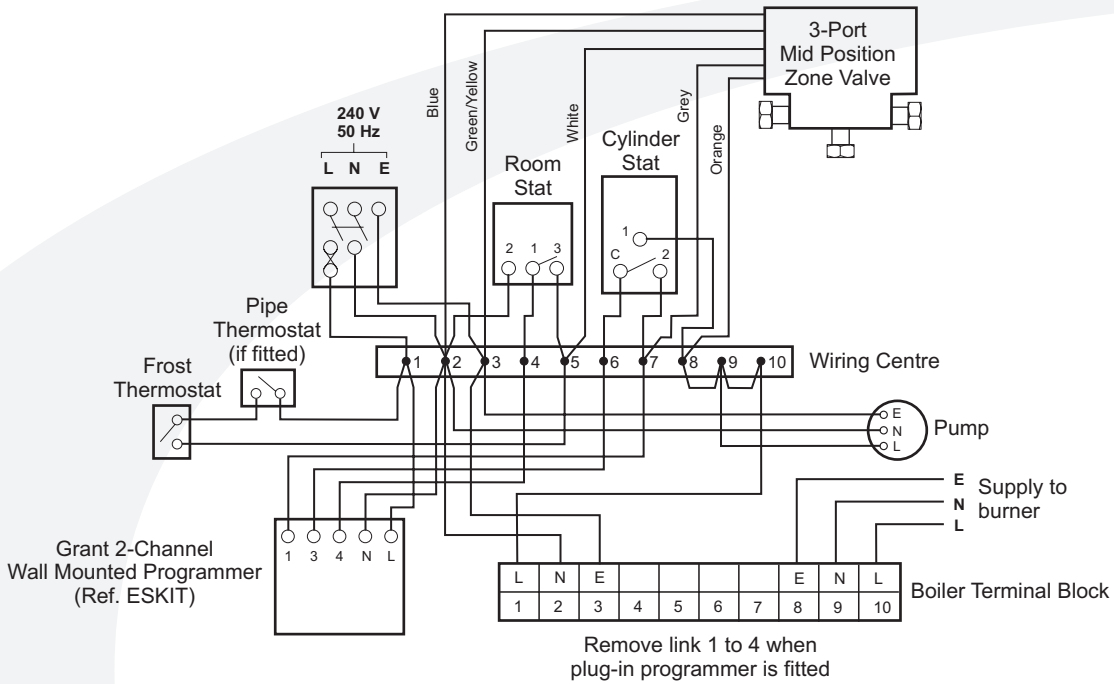


Figure 8-1: Kitchen/Utility models with 3-port valve control system

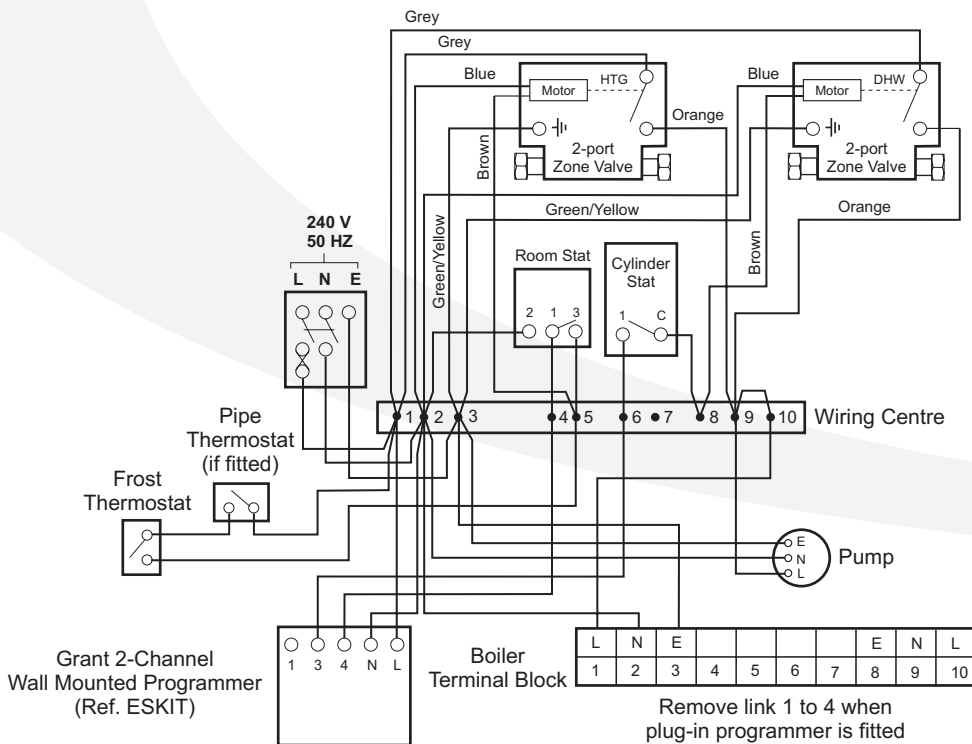


Figure 8-2: Kitchen/Utility models with 2 X 2-port valve control system



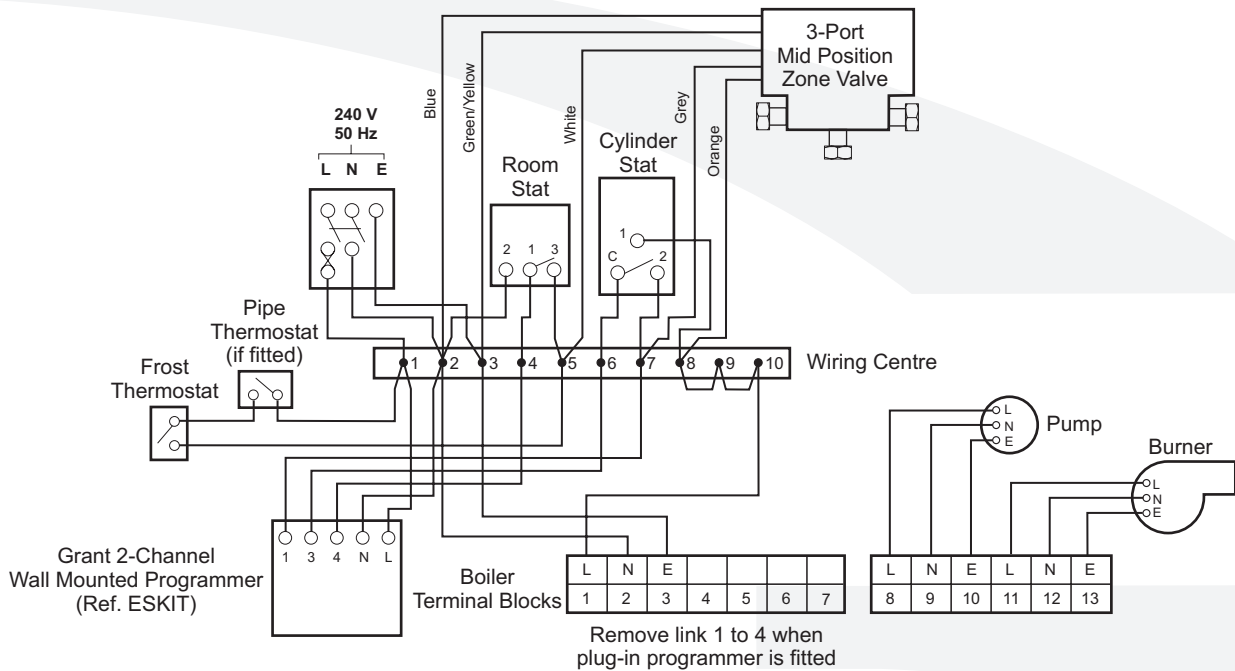


Figure 8-3: System models with 3-port valve control system

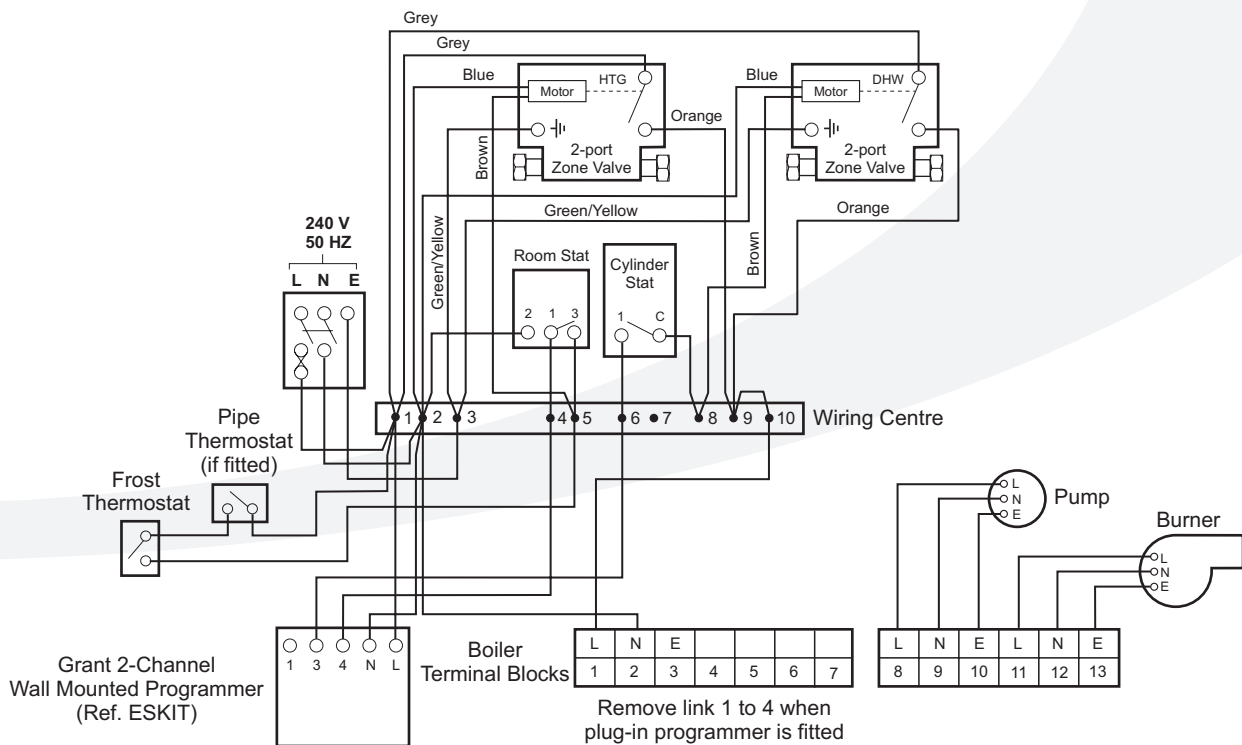


Figure 8-4: System models with 2 X 2-port valve control system

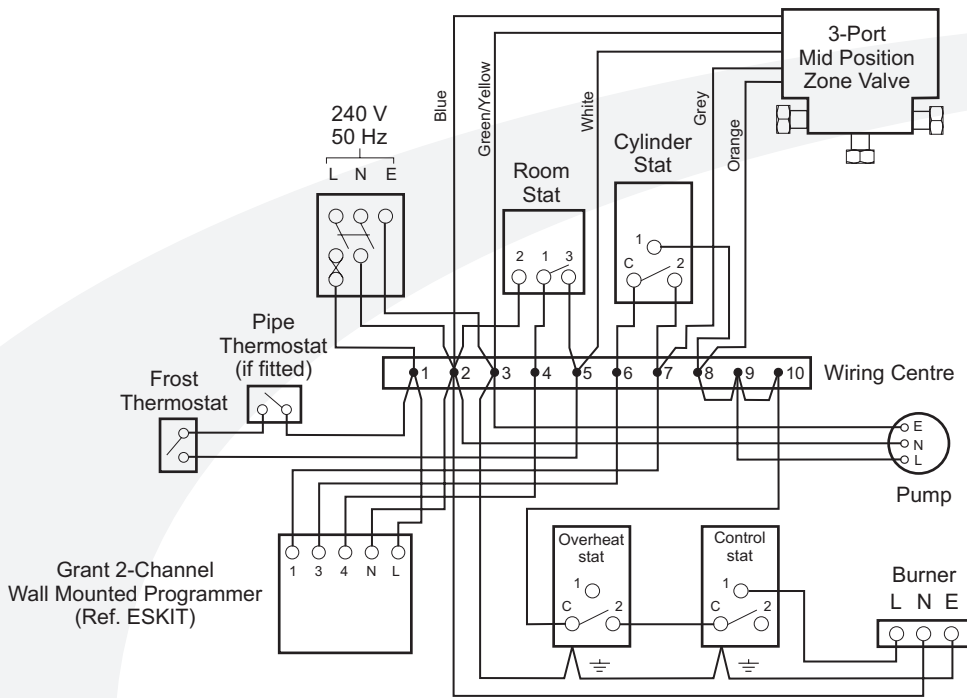


Figure 8-5: Boiler House models with 3-port valve control system

### 8.6 Boiler Control Panel Wiring Diagrams

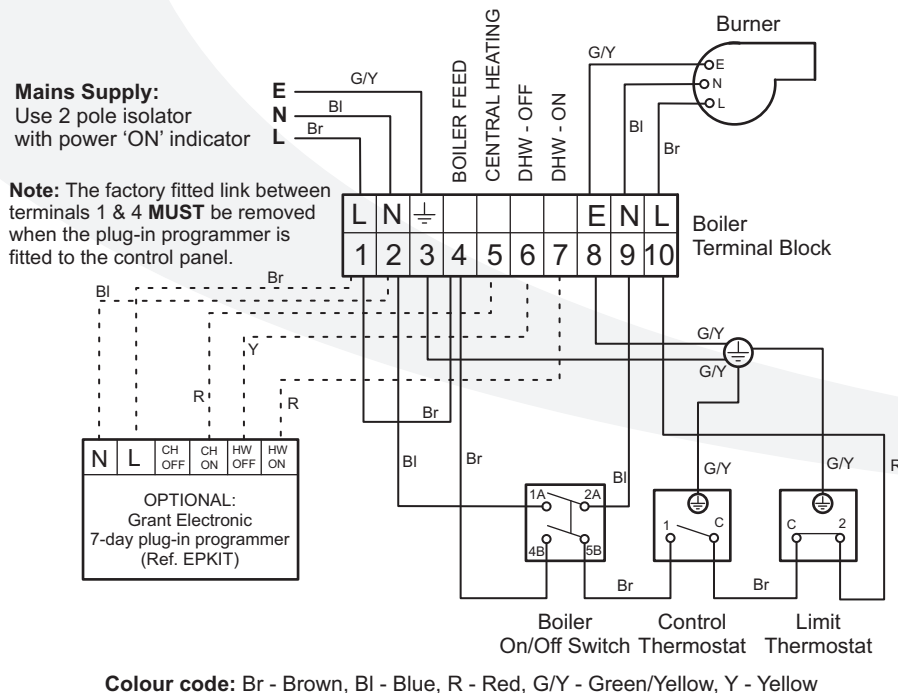


Figure 8-6: Wiring Diagram - Kitchen/Utility models

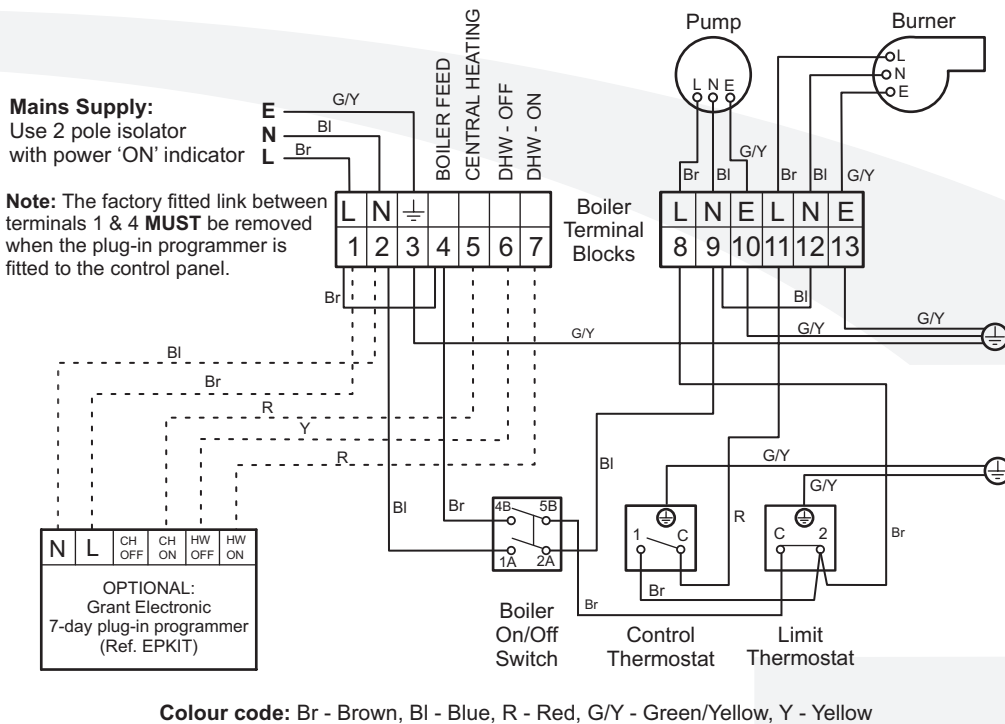


Figure 8-7: Wiring Diagram - System models

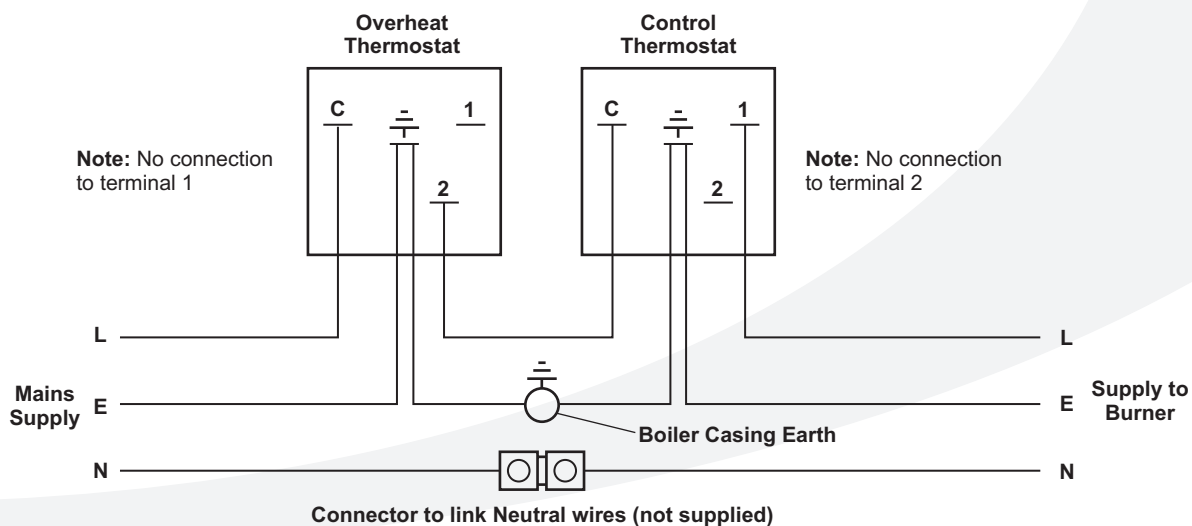


Figure 8-8: Dual Thermostat Wiring Diagram - Boiler House models

# 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 and any equipment in and near the boiler.

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 in BS 5410 Part 1 1997.

All ventilation areas given are for domestic applications and relate to the full output rating of the boiler. For installations in older dwellings (constructed prior to the introduction of Approved Document L1A 2006) the first 5 kW of output can be ignored. For all other cases refer to BS 5410 Part 2 1978.

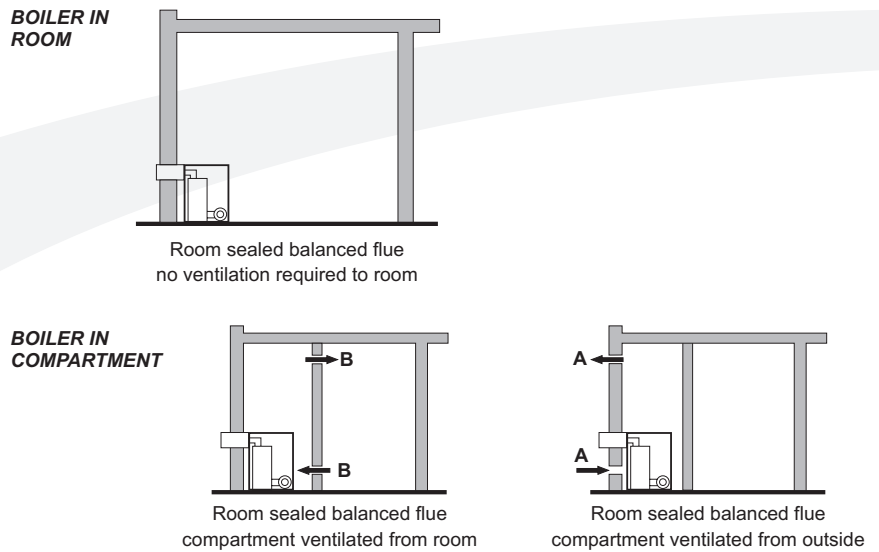


Figure 9-1: Air supply for room sealed balanced flue boilers

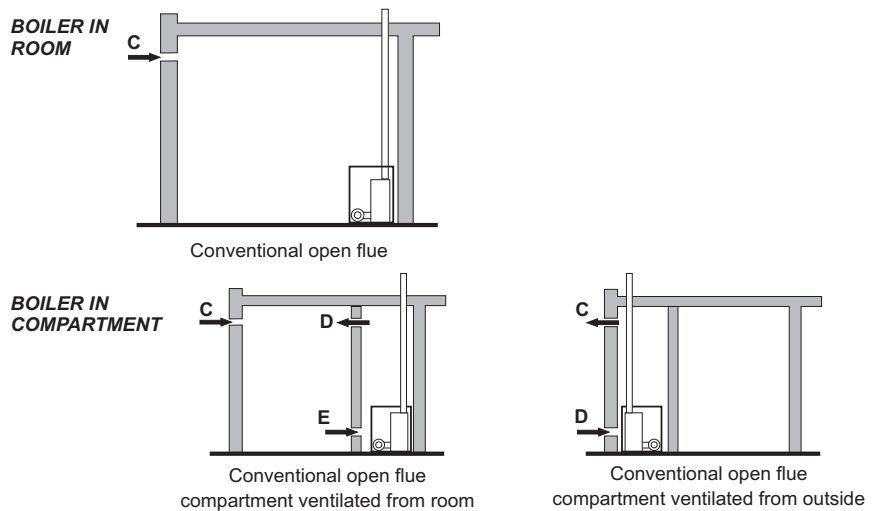


Figure 9-2: Air supply for conventional flue boilers

VORTEX Pro boilers - Ventilation areas												
Output	15/21 kW		15/26 kW		26/36 kW		36/46 kW		46/58 kW		58/70 kW	
Area	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>
Vent A	116	18	143	23	198	31	253	40	319	50	385	60
Vent B	232	36	286	46	396	62	506	80	638	100	770	120
Vent C	116	18	143	23	198	31	253	40	319	50	385	60
Vent D	232	36	286	46	396	62	506	80	638	100	770	120
Vent E	348	54	429	69	594	93	759	120	957	150	1155	180

## 9.2 Conventional Flue Systems

### NOTE

**Under no circumstances can Grant VORTEX Pro 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 600 mm 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 600 mm from any opening into the building, and 600 mm above any vertical structure or wall less than a horizontal distance of 750 mm 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 and liner diameter for all models up to 46 kW output must be 100 mm (4 in) and for the 46/58 and 58/70 models 125 mm (5 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 liner is directional. The arrows marked on the liner **MUST** be pointing vertically upwards, following the direction of the flue gases. Failure to comply with this instruction could lead to a leakage of condensate from the flue liner.

**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 - up to and including the 58/70 - is 100 mm (4 in). Use the larger '200' size of 'Green' system components as listed in Figure 9-9.

Grant recommends the use of the 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 Figure 9-4. 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 100 mm 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 Technical Books 2 and 4) 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.**

Only use 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 Grant Orange flue system and should be displayed next to the boiler or flue.

### 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.

Two diameters are available, a 100 mm for models up to 46 kW and 125 mm for models above 46 kW.

Part No.	Flexi Pack (Orange System)
GFKIT 6/100	100mm dia. x 6 metre
GFKIT 6/125	125mm dia. x 6 metre
GFKIT 8/100	100mm dia. x 8 metre
GFKIT 8/125	125mm dia. x 8 metre
GFKIT 10/100	100mm dia. x 10 metre
GFKIT 10/125	125mm dia. x 10 metre
GFKIT 11/100	100mm dia. x 11 metre
GFKIT 11/125	125mm dia. x 11 metre
GFKIT 12/100	100mm dia. x 12 metre
GFKIT 12/125	125mm dia. x 12 metre
GFKIT 14/100	100mm dia. x 14 metre
GFKIT 14/125	125mm dia. x 14 metre
GFKIT 16/100	100mm dia. x 16 metre
GFKIT 16/125	125mm dia. x 16 metre

Part No.	Extensions (Orange System)
WX 150/100	100mm dia. x 150mm
WX 150/125	125mm dia. x 150mm
WX 250/100	100mm dia. x 250mm
WX 250/125	125mm dia. x 250mm
WX 450/100	100mm dia. x 450mm
WX 450/125	125mm dia. x 450mm
WX 950/100	100mm dia. x 950mm
WX 950/125	125mm dia. x 950mm

### Extensions

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

The nominal diameter of the extensions is 100 mm or 125 mm.

Extensions are supplied with locking bands.

### Flue extensions cannot be cut.

Also available are:

- An adjustable extension
- 45° elbow

**!** **NOTE**

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

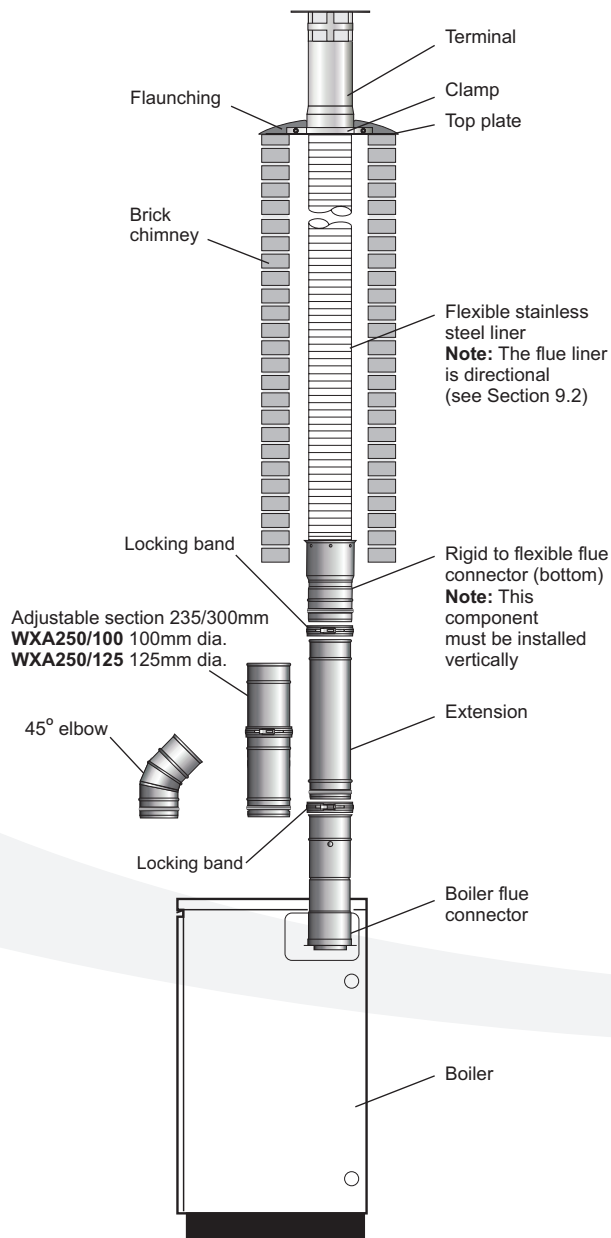
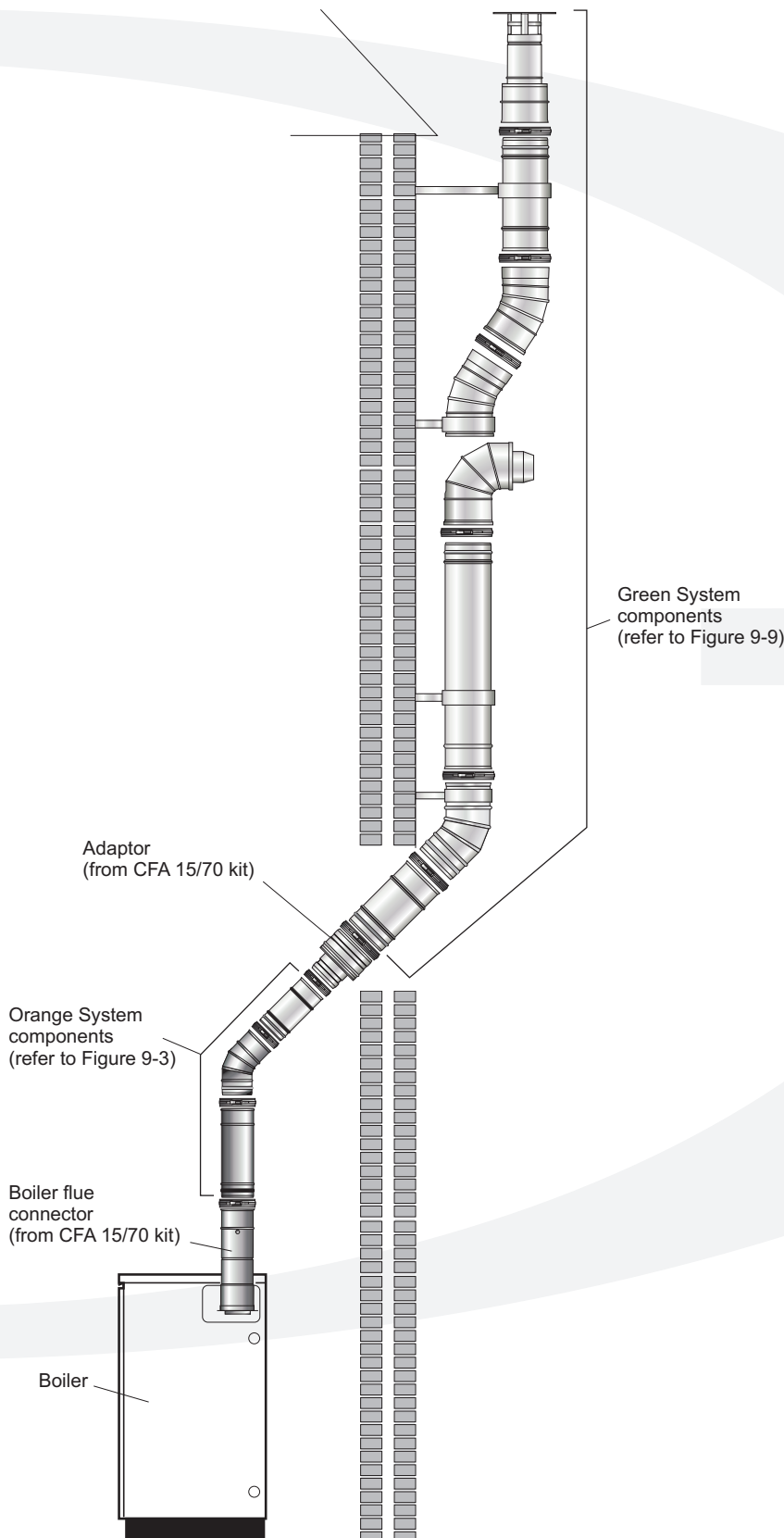


Figure 9-3: Grant Orange flue system in a typical brick chimney





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

### 9.3 Connecting a Conventional Flue

#### 1 - 4 Kitchen/Utility models only.

1. Lift off upper rear casing panel.
2. Remove the insulation from the underside of the panel (do not discard it). Carefully press out the pre-cut flue opening in the top panel.
3. Unscrew the protective covers from the studs on the flue dress panel supplied in the literature pack. Place the dress panel in position in the rear casing top panel and secure in place using the nuts and washers previously removed.
4. Re-fit the insulation to the panel with the foil surface facing outwards. With a sharp knife cut around the edge of the round opening in the dress plate to leave a round hole through the insulation for the flue.

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

If the Grant 'Green' system (100 mm 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 end of studding passes through the hole in the of the spacer bracket.
4. Fit washer and wing nut provided onto the end of threaded studding and secure connector in position by tightening down on wing nut – as shown in Figure 9-5.
5. **Kitchen/Utility models only** - Re-fit the rear top casing panel to the boiler – fitting it over the boiler connector.

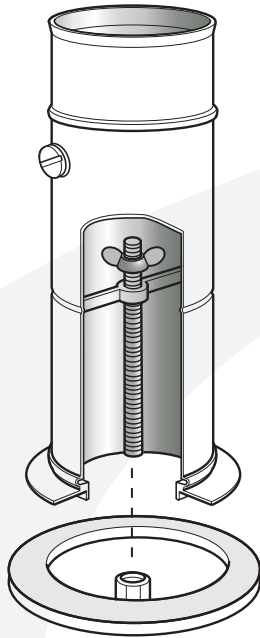


Figure 9-5: Boiler flue connector

6. Fit the flue adaptor (from the adaptor kit) into the boiler connector.

## ! NOTE

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

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 System

Apart from a conventional flue, several balanced flue options are available for use with the Grant VORTEX 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)

Available in Short (for single thickness brick walls) and Standard kits.

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

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

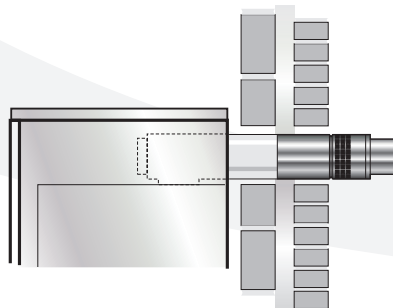


Figure 9-6: Low level balanced flue

#### High level (horizontal) balanced flue (White system)

The High Level (horizontal) balanced flue (White system) allows the flue to rise vertically within the building before exiting through the wall horizontally.

The maximum flue length - from the top of the boiler flue outlet to the outer face of the wall - is 10 metres for all VORTEX boilers.

The following items are additionally available:

- Extensions to extend the flue by 225 mm, 450 mm or 950 mm.
- An adjustable extension of 275 to 450 mm.
- 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.

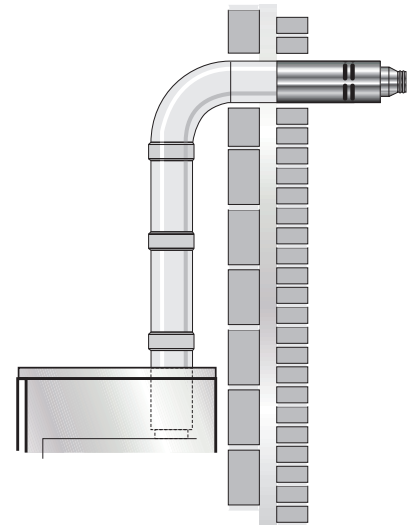


Figure 9-7: High level balanced flue

White System Components - Part numbers		
Item	Models up to 26 kW output	Models 26 TO 70 kW output
High level flue kit - 1.2 metre	HL K01 50/90	HL K02 90/200
Vertical flue kit - 3 metre	VT K05 50/90	VT K06 90/200
225 mm extension	EXT K31 225/90	EXT K32 225/200
450 mm extension	EXT K09 450/90	EXT K10 450/200
950 mm extension	EXT K11 950/90	EXT K12 950/200
275 - 450 mm 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	
Pitched roof flashing - lead (for VT K05 50/90)	VT K25 P90	
Flat roof flashing - aluminium (for VT K05 50/90)	VT K27 F90	
Pitched roof flashing - aluminium (for VT K06 90/200)		VT MF 200
Pitched roof flashing - lead (for VT K06 90/200)		VT K26 P200
Flat roof flashing - aluminium (for VT K06 90/200)		VT K28 F200
Wall bracket	BRK 29 90	BRK 30 200

### 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.

The following items are additionally available:

- Extensions to extend the flue by 225 mm, 450 mm or 950 mm.
- An adjustable extension of 275 to 450 mm.
- 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.

### Flexible vertical balanced flue (Red system)

This is a flexible vertical balanced flue system (for the 15/21 and 15/26 models only) designed to be fitted inside an existing masonry chimney. See Figure 9-8.

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.

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.**

The Grant Red system flexible stainless steel liner is directional. The arrows marked on the liner **MUST** be pointing vertically upwards, following the direction of the flue gases. Failure to comply with this instruction could lead to a leakage of condensate from the flue liner.

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 adapter.

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 models up to 26 kW output or ELB K22 145.200 for models 26 to 70 kW output).

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

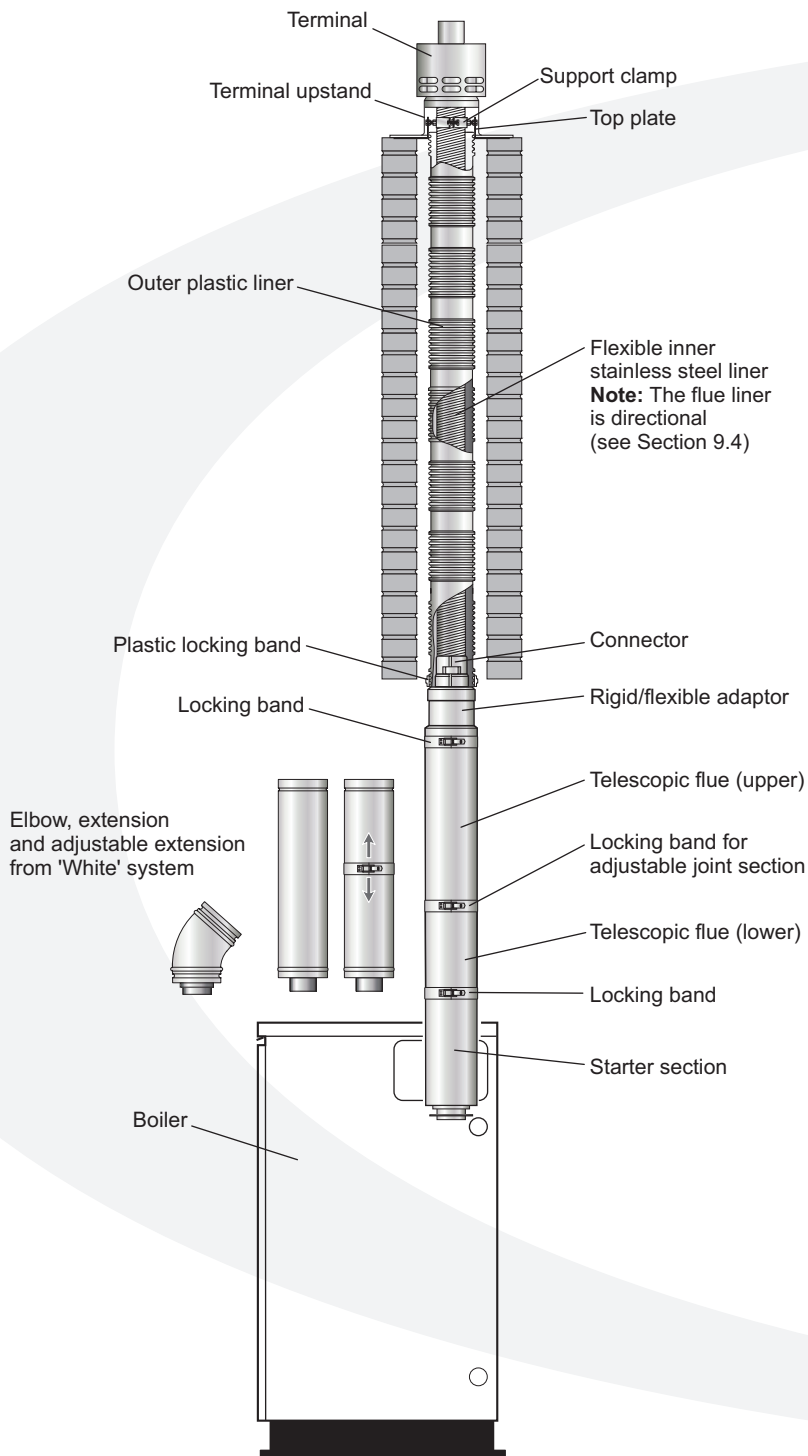


Figure 9-8: Red system balanced flue (15/21 and 15/26 only)

**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 9-9.

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.

See Figure 9-9.

The minimum dimensions for locating the terminal from building features (windows, doors, etc.) are shown in Figure 9-10.

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.

The components listed on the following page for the external flue (Green system) components are available from Grant UK.

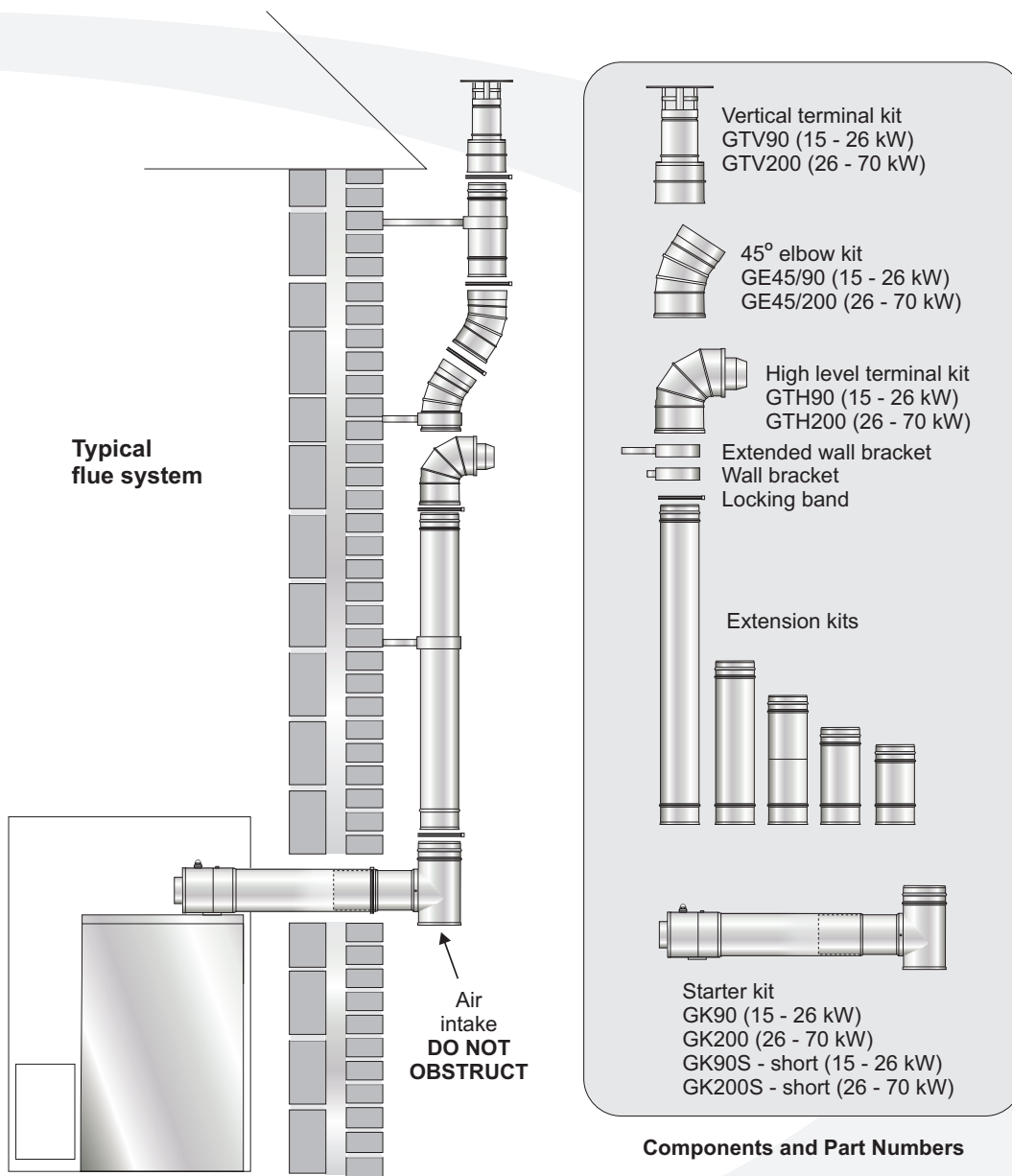


Figure 9-9: External balanced flue (Green system)

Green System Components			
Item - for models up to 26 kW output	Part No.	Item - for models 26 to 70 kW output	Part No.
Starter kit - standard	GK90	Starter kit - standard	GK200
Starter kit - short	GK90S	Starter kit - short	GK200S
150 mm extension	GX150/90	150 mm extension	GX150/200
250 mm extension	GX250/90	250 mm extension	GX250/200
450 mm extension	GX450/90	450 mm extension	GX450/200
950 mm extension	GX950/90	950 mm extension	GX950/200
195-270 mm adjustable extension	GXA250/90	195-270 mm adjustable extension	GXA250/200
45° elbow	GE45/90	45° elbow	GE45/200
High level terminal	GTH90	High level terminal	GTH200
Vertical terminal	GTV90	Vertical terminal	GTV200
Wall bracket - standard	GWB90	Wall bracket - standard	GWB200
Wall bracket - extended	GEB90	Wall bracket - extended	GEB200

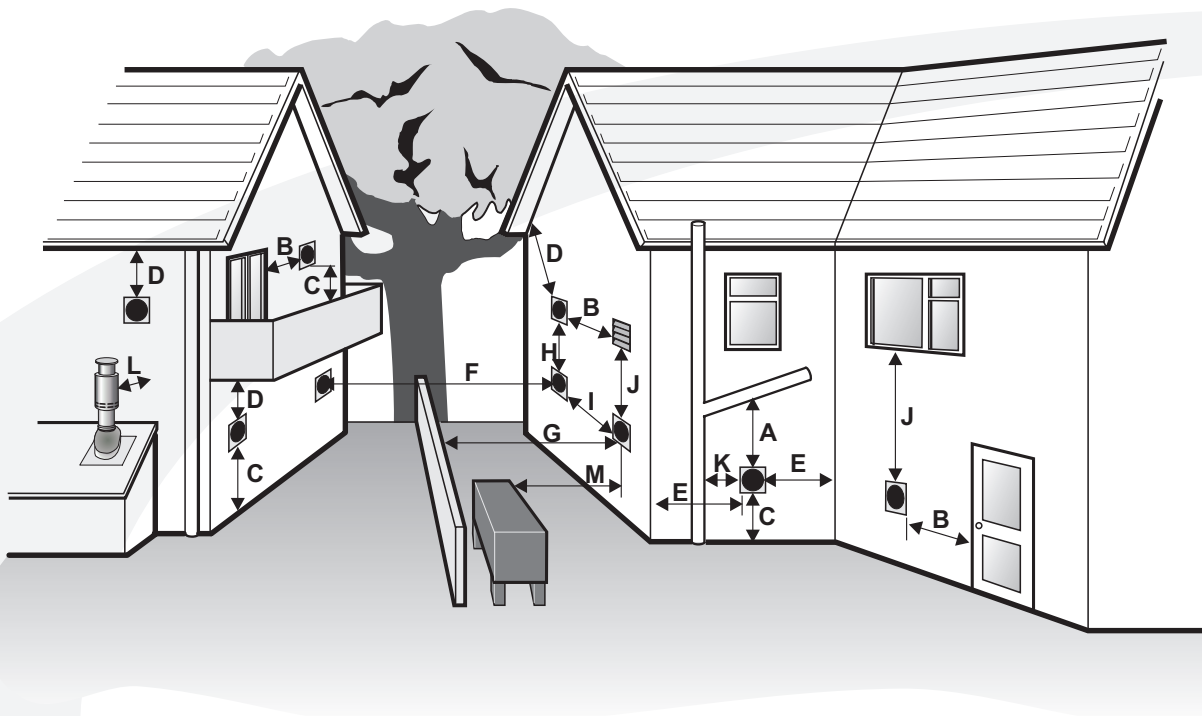


Figure 9-10: Clearances for Balanced flue terminals

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 a wall	750
M From an oil storage tank	1800

**Notes:**

\* 75 mm with protection.

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

Distances measured to rim of terminal.

Clearances recommended by Grant UK 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 300 mm 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 750 mm 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 9-11.

#### ! NOTE

Dimension B given in Figure 9-11 includes an extra 10 mm over the size of the terminal to provide clearance for fitting.

### 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 9-12.

#### ! NOTE

Dimension B given in Figures 9-12 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 215 mm to 450 mm.

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

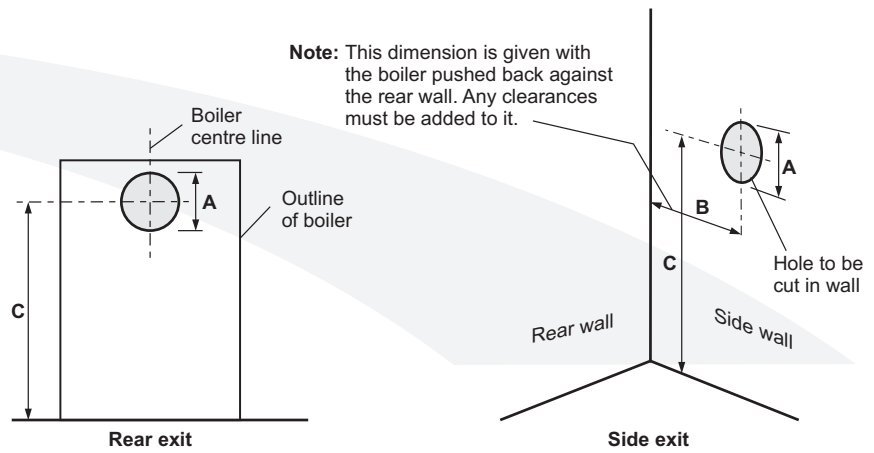


Figure 9-11: Flue hole dimensions and position for low level systems

Model	Dimension (mm)		
	A dia	B	C
15/21, 15/26	127	115	768
26/36, 36/46	162	115	780
46/58, 58/70	162	112	1102

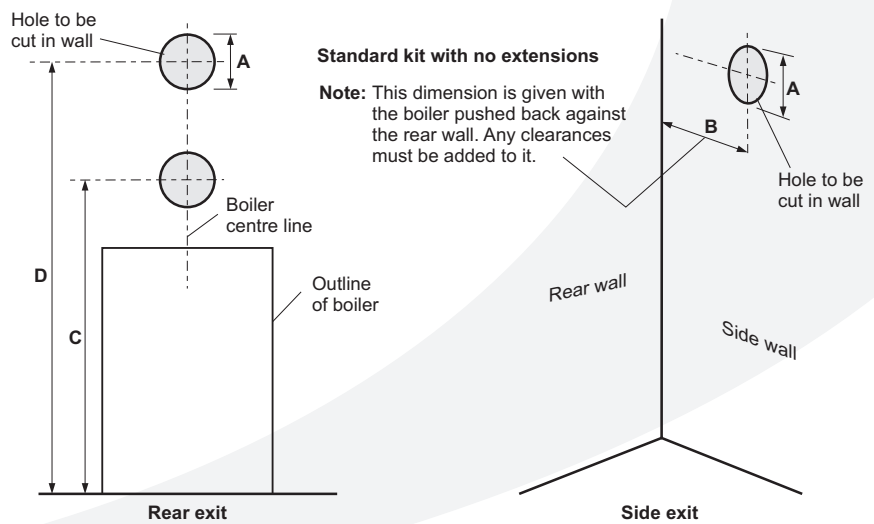


Figure 9-12: Flue hole dimensions and position for high level system

Model	Dimension (mm)			
	A dia	B	C	D
15/21, 15/26	175	115	1215*	1715 - 2115
26/36, 36/46	200	115	1280*	1700 - 2020
46/58, 58/70	200	112	1595*	2015 - 2335

\*Dimension C for Starter section and elbow/terminal only

# 10 Commissioning

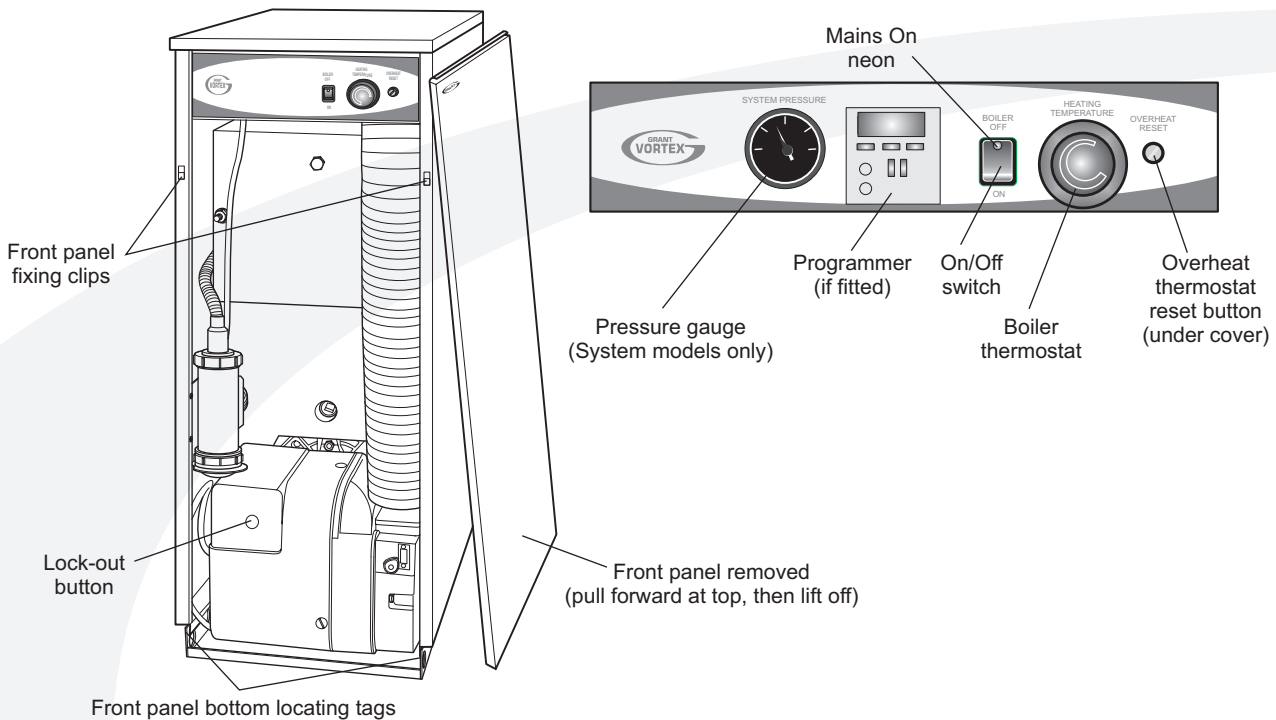


Figure 10-1: Boiler controls (Kitchen/Utility model shown)

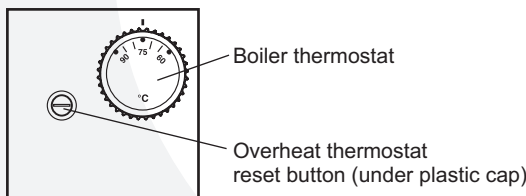


Figure 10-2: Boiler House dual thermostat (on top of boiler)

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 then lift off).

The controls are shown in Figure 10-1.

## 10.1 Before Switching On

1. Ensure the boiler On/Off switch (Kitchen/Utility models only) is set to OFF. For Boiler House models, check that all system controls are set to OFF.
2. Check that the high limit thermostat bulb and both thermistor sensors are correctly located in their respective pockets. Refer to Figures 5-1 or 5-4 as required.

Check condition of both thermostat capillaries, 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.
5. Check that the baffles are in position. Refer to Figures 11-1, 11-2, 11-3 or 11-4 as required.
6. Re-fit the 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 (and set correctly on the 48/58 and 58/70 models). Refer to Section 2.3 and figure 11-8.

Check electrodes are set correctly. Refer to Figure 11-5 or 11-7 as required. Check the nozzle is correct for the output rating required. Refer to Section 2.3

## ! NOTE

**If the 15/21 model is down rated to 15 kW, the burner air adjuster disc must be adjusted to setting B as described in Section 10.6. Refer also to Section 2.3.**

**If a 15/26 model is down rated to 20 or 15 kW, the burner head must also be changed to a T1 head. See Section 11.4. Refer also to Section 2.3.**

8. Check that the water system has been vented (and pressurised if sealed system) and there are no leaks.

9. Ensure the automatic air vent on the condensing heat exchanger is 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 3-6. Open the vent screw on the vent manifold to vent the supply while the pump is running.
13. Set the boiler On/Off switch to Off (Kitchen/Utility models only). 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.
2. Set the boiler On/Off switch to ON (Kitchen/Utility models only). A neon in the switch lights when it is in the ON position.  
The boiler will now light automatically. Note that the neon lights when the boiler is switched on, but does not necessarily indicate the burner is firing. Boiler House models will start as soon as the electricity supply to the boiler is switched on.
3. Set the boiler On/Off switch to On (Kitchen/Utility models only). The burner fan should start 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 several times during first lighting.
4. With the burner alight, check the fuel pressure.
5. Refer to the Technical Information, Section 2.3.
6. Adjust the pressure if necessary - see Figure 3-6. Note that the 'Mains On' neon lights when the boiler is switched on (Kitchen/Utility models only), but does not necessarily indicate the burner is firing. It merely indicates that the power is connected.

## ! 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. Ensure the flexible air tube is connected to both the burner and flue system (balanced flue models).

### 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 CO<sub>2</sub>. Set the CO<sub>2</sub> 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 3-6) as required. Turning the screw anti-clockwise closes the damper and increases CO<sub>2</sub> level, turning the screw clockwise opens the damper and reduces CO<sub>2</sub> 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.**

5. Check the flue gas temperature by placing the combustion analyser in the low level flue terminal (or into the test point on the starter elbow if either the Green system or Hybrid system is used).

### 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 by-pass.
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 (and pressurise if a sealed system) the system.
2. A suitable central heating system inhibitor must be added to protect the system against the effect of corrosion.
3. Consideration should be given to using a suitable antifreeze to prevent damage to the boiler installed in garages, out houses, etc. 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, timer (If optional programmer is fitted, see instructions supplied in kit) 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 CO<sub>2</sub> 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. For high level and vertical balanced flues the reading may be taken from the flue kit test point provided. Refer to Section 2.3.

For Conventional flues, flue draught, combustion and efficiency measurement, a test point is provided in the conventional flue connector section. See Figure 9-5.

### 10.6 Air Adjuster Disc - 15/21 only

To adjust the 15/21 air adjuster disc when downrating - See Figure 10-2

1. Ensure the boiler is isolated from the electrical supply.
2. Remove the burner from the boiler.
3. Undo the two 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 - suitable for outputs of 18.3 and 21 kW only. See Figure 10-2.
5. Remove the screw from the centre of the air shutter disc, and re-position the disc such that the cut-out marked 'B' (corresponding to 15 kW output setting - See Section 2.3) 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.

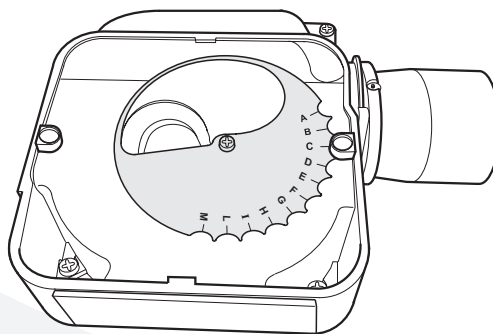


Figure 10-2: 15/21 air adjuster disc at position 'C'

# 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. If the boiler is used on 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 7.2.
5. Refill, vent and re-pressurise the system as necessary. See Section 7.3.
6. Check that any ventilation openings are adequate and are clear. See Section 9.1.
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.
9. Braided flexible fuel supply hoses (as supplied with the boiler) should be replaced annually. 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 (Kitchen/Utility models only), 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 (Kitchen/Utility models) or on the front panel (Boiler House models) 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. Kitchen/Utility models - Pull the front panel forward at the top to disengage the fixing clips then lift it up and off the boiler.
2. On System models, carefully lift up and remove the expansion vessel from the front of the boiler. Place the vessel on the floor taking care not to strain the flexible hose.
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 hose(s), use a suitable container to prevent any oil spillage.

## NOTE

If two flexible hoses are 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 Figures 11-1, 11-2, 11-3 or 11-4.
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, replace if necessary.
6. Replace the baffles, ensuring they are correctly fitted. See Figures 11-1, 11-2, 11-3 or 11-4.
7. Pull out the spiral turbulators from the heat exchanger tubes. See Figure 11-3.
8. Clean the turbulators using a stiff brush
9. 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.
10. 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.
11. 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. Refer to Section 6.8.
12. 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.

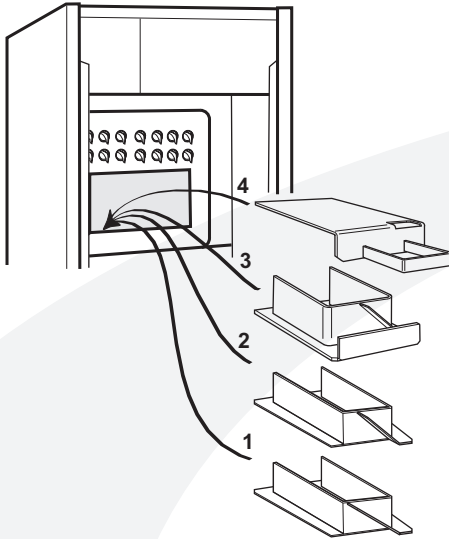


Figure 11-1: 15/21 baffles

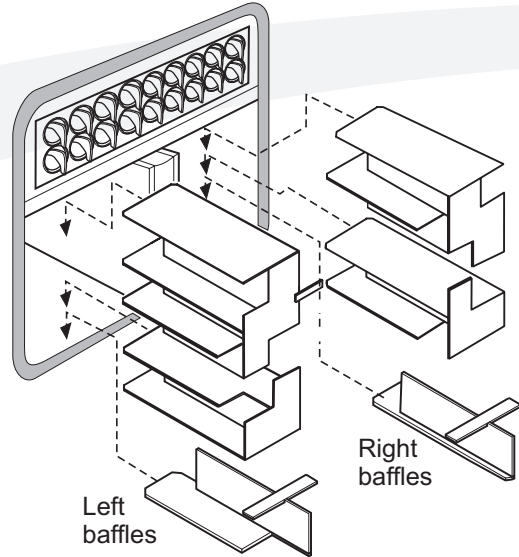


Figure 11-2: 15/26 baffles

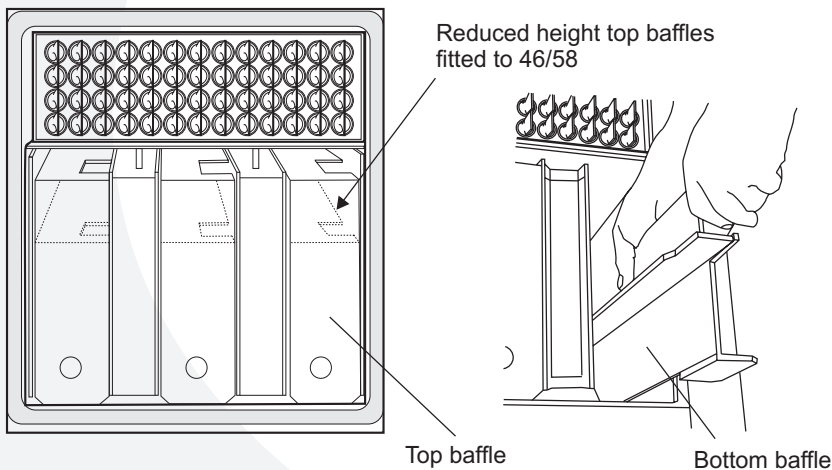


Figure 11-3: 46/58 and 58/70 baffles (58/70 shown) and turbulators (all models)

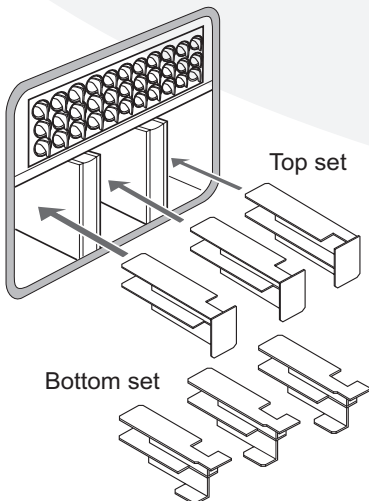


Figure 11-4: 26/36 and 36/46 baffles

#### 11.4 Cleaning the Burner

15/21, 15/26, 26/36, 36/46 models  
The procedure is as follows:

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 cracks in the ceramic insulation. Replace if necessary.

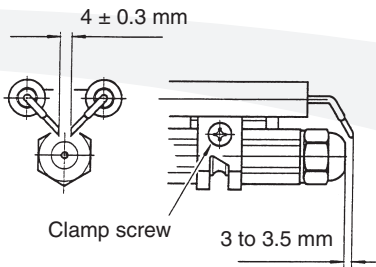
4. Nozzle: The nozzle should be replaced on an annual service. Check that the nozzle size and type are correct, refer to table in Section 2.3 and boiler data label.
5. With the combustion head removed, loosen the electrode assembly clamp screw and slide the electrodes away from the nozzle.
6. Do **not** attempt to clean the nozzle.
7. 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.**

8. Always check the electrode settings after replacing the nozzle, see Figure 11-5.



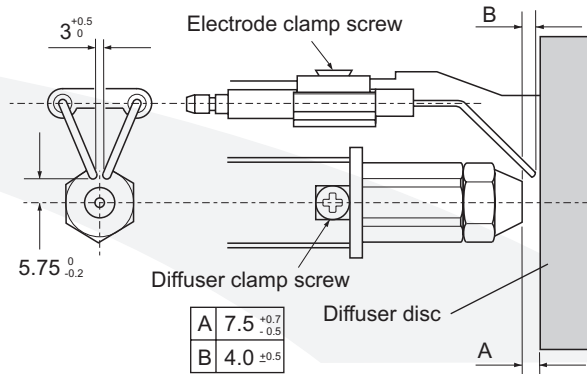


**Figure 11-5:** 15/21, 15/26, 26/36, 36/46 electrode settings

46/58 or 58/70 models

The procedure is as follows:

1. Combustion head: Loosen the two screws securing the combustion head (**not** the screws in the slotted ring, Figure 11-8) and withdraw the head.
2. Clean and refit the combustion head.
3. Inspect the ignition electrodes: Loosen the electrode clamp screw, disconnect the leads and withdraw the electrode assembly. Wipe clean and check for any cracks in the ceramic insulation. Replace if necessary.
4. Check the electrode and diffuser settings: Figure 11-7.
5. To adjust the diffuser disc: Loosen the diffuser clamp screw and slide the disc along the nozzle holder to achieve the gap 'A' in Figure 11-7, tighten the screw.
6. To adjust the electrodes: Loosen the electrode clamp screw and move the electrode unit to achieve the gap 'B' in Figure 11-7, tighten the screw.
7. The combustion head position is adjustable on the 46/58 and 58/70 burners. Check that it is fully closed (position 0), or the 4th line if the 58/70 has been set to maximum output (70 kW).
8. To adjust the head setting, refer to Figure 11-8 and proceed as follows: Loosen the two screws in the slotted ring - **not** the two fixing screws, and turn the blast tube until '0' or the 4th line lines up with the edge of the slotted ring (see paragraph 7 above). Tighten the two screws.



**Figure 11-7:** 46/58, 58/70 electrode settings

**All models**

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

**Burner fan** - With the air intake grille or spigot removed, remove the screws securing the fan housing cover (R/H side of burner) and remove the cover. Inspect the fan and housing and clean as necessary. Replace the cover.

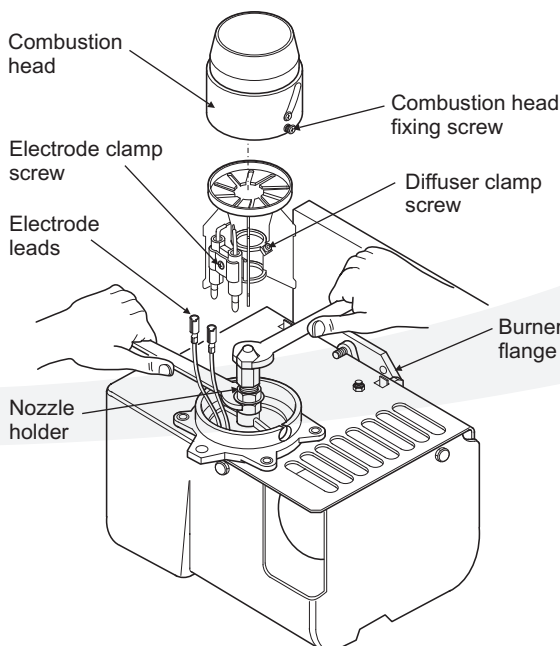
**Pump filter** - With the burner cover removed, remove the four screws securing the pump end cover. Remove the filter and wash in kerosene. Replace the filter and end cover, ensure the 'O' ring is in position.

Re-assemble in reverse order.

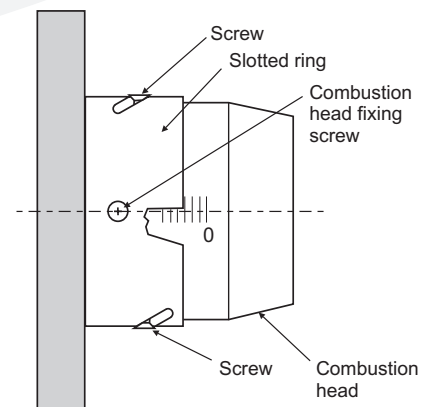
**! WARNING**

To ensure safe and efficient operation of the boiler it is important that re-commissioning is carried out, especially combustion checks (CO<sub>2</sub> level, flue gas temperature and smoke number) after the boiler has been serviced.

Refer to the Commissioning instructions in Section 10.



**Figure 11-6:** 46/58, 58/70 burner



**Figure 11-8:** 46/58, 58/70 head settings

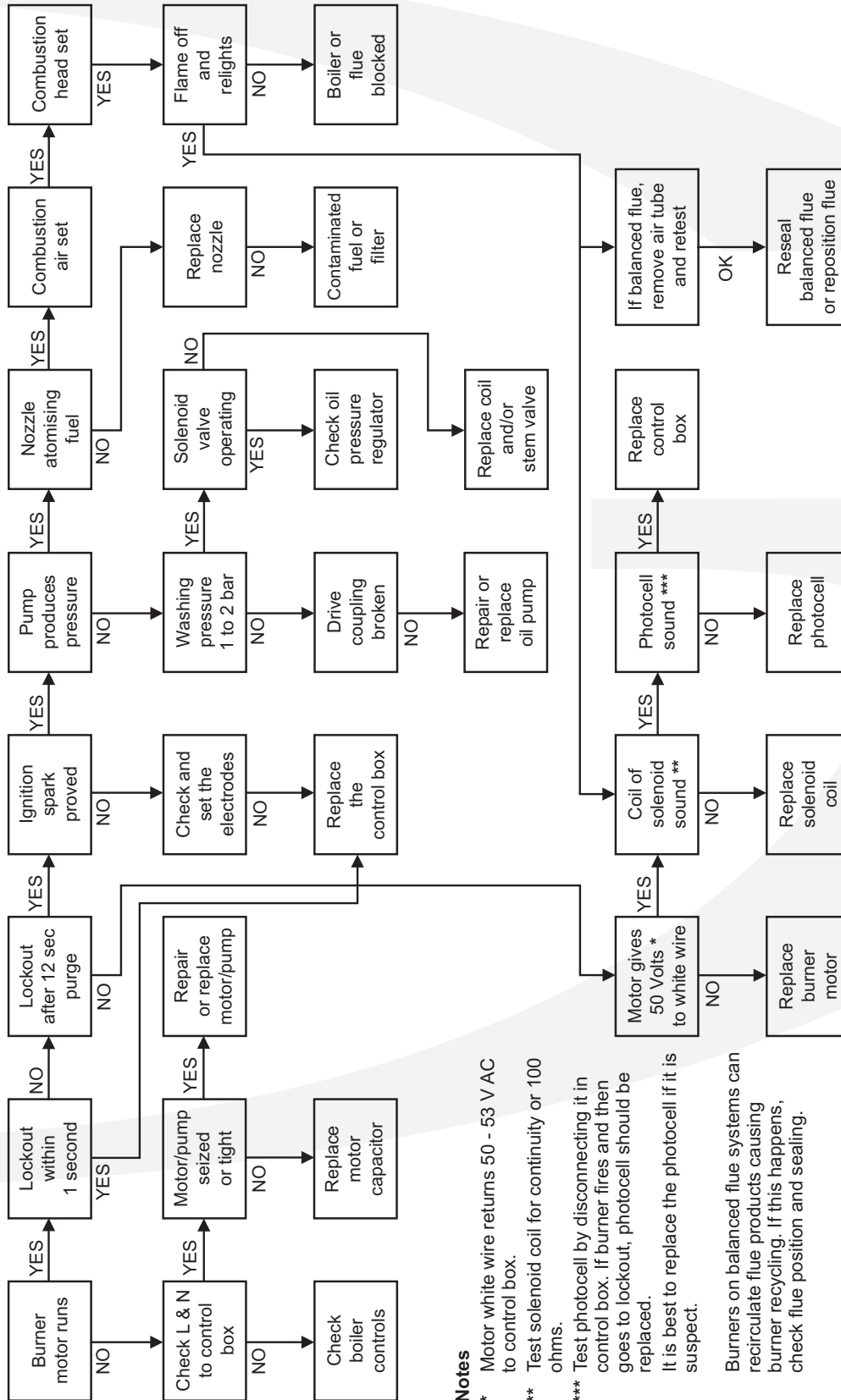
# 12 Fault Finding

## 12.1 Boiler Fault Finding

Always isolate the electricity supply to the boiler before working on the boiler.

Fault	
Boiler will not start:	Remedies
1 No fuel supply.	Ensure that an adequate supply of fuel is available and that the fuel supply valve is open. Check the condition of the fuel filter, clean if necessary. Ensure fuel supply is reaching burner and vent pump.
2 No electricity supply.	Ensure electricity supply to the boiler is switched on and that all controls are calling for heat. Ensure that the overheat thermostat has not tripped, reset if necessary. Check that a mains supply is present at the burner terminal block. If not, check the boiler and overheat thermostat.
3 Burner not starting - fuel and electricity supplies present.	Press the reset button on the burner control box if it is lit. Refer to burner fault finding charts.
4 Burner lights but goes to lock-out.	If the flame is unstable, check the combustion settings. Refer to burner fault finding charts.
Boiler works but:	
5 Visible smoke from flue or high smoke number.	Insufficient air supply - check the air damper setting and the condition of the fan. Check room ventilation is adequate, see Section 9.1. Check the nozzle size and type. Fuel pressure may be too high - check and adjust.
6 Burner pulses.	Insufficient air supply - check the air damper setting and the condition of the fan. Check room ventilation is adequate, see Section 9.1. Check the nozzle size and type.
7 Flame slow to stabilise during start up.	Insufficient air supply - check the air damper setting and the condition of the fan. Check room ventilation is adequate, see Section 9.1. Check the nozzle size and type. Fuel pressure may be too low - check and adjust. Insufficient draught - clean boiler heat exchanger and check condition of flue.
8 Water temperature low.	Undersize nozzle and/or low fuel pressure. Check condition of boiler heat exchanger and clean if necessary. Check the boiler thermostat. Check the combustion settings. Check the condition of the fuel filter.
9 Boiler operating on overheat thermostat.	Faulty boiler thermostat. No circulation, check circulating pump. Check for air lock.
10 Fumes and puffing during starting (conventional flue)	Check the condition of the chimney, ensure it is not blocked and is high enough to produce the required draught. Check that there is an adequate air supply near the burner and that a kitchen fan is not drawing products out of the burner.
11 Oil odours.	Check all fuel line connections, remake as necessary.
12 Combustion fumes smell.	Check boiler cleaning cover and seal are correctly fitted. Check burner is correctly fitted onto flange. Check flue is correctly sealed into flue outlet of boiler. Check the condensate pipe and trap are operating correctly.

## 12.2 Burner Fault Finding - Riello RDB burners



### Notes

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

\*\* Test solenoid coil for continuity or 100 ohms.

\*\*\* Test photocell by disconnecting it in control box. If burner fires and then goes to lockout, photocell should be replaced. It is best to replace the photocell if it is suspect.

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

# 13 Spare Parts

This section gives exploded views of the Riello burners in the Grant VORTEX Pro boilers, and parts lists associated with them

## 13.1 Riello RDB1, RDB2 and RDB2.2 burners

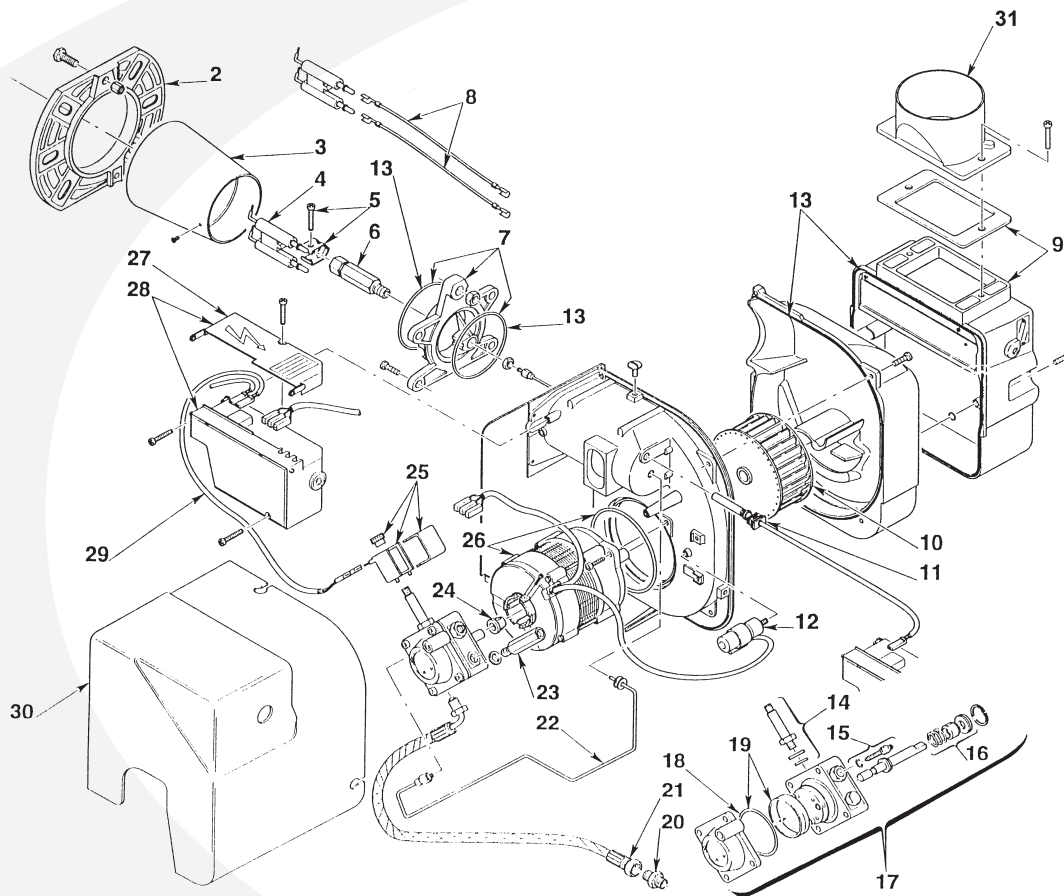


Figure 13-1: Riello RDB1, RDB2 and RDB2.2 burner components diagram

### Riello RDB1, RDB2 and RDB2.2 burner parts list

Key No.	Description	Riello Part No.	Grant Part No.
1	Not applicable	-	-
2	Flange	3005786	RBS119
3	Combustion head T1 - 15/21 kW	3002507	RBS146
3	Combustion head T2 - 15/26	3002423	RBS147
3	Combustion head T3 - 26/36	3002447	RBS144
3	Combustion head T5 - 36/46	3002533	RBS150
4	Electrode assembly	3007513	RBS108
5	Electrode bracket	3006552	RBS29
6	Nozzle holder	3008642	RBS111
7	Collar	3008643	RBS112
8	High voltage lead	3008794	RBS129
9	Air damper assembly	3008647	RBS116
10	Fan - 15/26	3005708	RBS39
10	Fan - 26/36	3008645	RBS142
10	Fan - 15/21, 36/46	3005788	RBS151
11	Photocell	3008646	RBS115
12	Capacitor 4.5 $\mu$ F	3002837	RBS149
13	Seal kit	3008878	RBS140
14	Needle valve	3007582	RBS109
15	Regulator	3008651	RBS120
16	Pump seal	3000439	RBS14
17	Pump	3008654	RBS101
18	'O' ring	3007162	RBS08
19	Filter - 'O' ring	3008653	RBS122
20	Connector	3003602	RBS35
21	Flexible hose	3007672	RBS36
22	Tube	3008644	RBS113
23	Pressure gauge connector	3008876	RBS138
24	Drive coupling	3000443	RBS16
25	Solenoid	3008648	RBS117
26	Motor RBS102	3002836	RBS102
27	Cover	3008649	RBS118
28	Control box assembly	3008652	RBS103
29	Solenoid lead	3008851	RBS139
30	Cover	3008879	RBS141
31	Air tube spigot	3062774	RBS143

### 13.2 Riello RDB3.2 burner

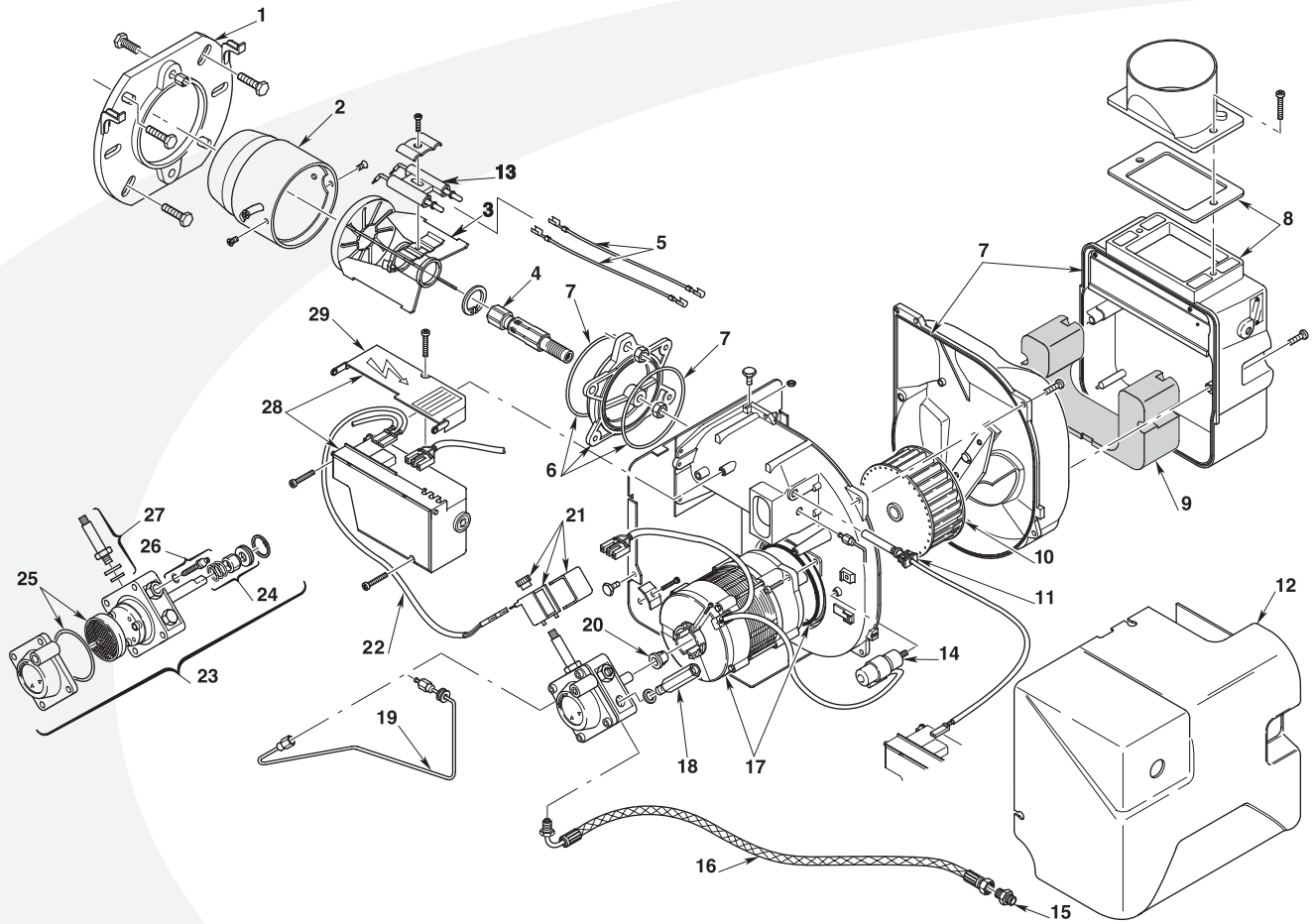


Figure 13-2: Riello RDB3.2 burner components diagram



### Riello RDB3.2 burner parts list

Key No.	Description	Riello Part No.	Grant Part No.
1	Flange	3008637	RBS153
2	Combustion head	3002572	RBS163
3	Diffuser disc assembly	3020180	RBS154
4	Nozzle holder	3002570	RBS164
5	High voltage lead	3008794	RBS129
6	Collar	3008957	RBS165
7	Seal kit	3008963	RBS156
8	Air damper assembly	3008839	RBS166
9	Insulation	3008958	RBS157
10	Fan	3005799	RBS162
11	Photocell	3008646	RBS115
12	Cover	3008962	RBS168
13	Electrode	3020121	RBS158
14	Capacitor 5 $\mu$ F	3008960	RBS167
15	Connector	3003602	RBS35
16	Flexible hose	3005720	RBS36
17	Motor	3008964	RBS159
18	Pressure gauge connector	3008876	RBS138
19	Tube	3008961	RBS160
20	Drive coupling	3000443	RBS16
21	Solenoid	3008648	RBS117
22	Solenoid lead	3008851	RBS139
23	Pump	3008654	RBS101
24	Pump seal	3000439	RBS14
25	Filter - 'O' ring	3008653	RBS122
26	Regulator	3008651	RBS120
27	Needle valve	3007582	RBS109
28	Control box assembly	3008652	RBS103
29	Cover	3008649	RBS118

### 13.3 Boiler parts list

Description	Part No.
Cleaning door nut and washer set	EFBS14
Double pole switch	EFBS19
Baffle set (complete) - 15/21	VBS93
Baffle set (complete) - 15/26	VBS01
Baffle set (complete) - 26/36 and 36/46	VBS36
Baffle set (complete) - 46/58	VBS76
Baffle set (complete) - 58/70	VBS77
Turbulator baffle - single (all models)	VBS05
Sealed system - Expansion vessel 10 litre - 15/21	MPCBS27
Sealed system - Expansion vessel 12 litre - 15/26	MPSS01
Sealed system - Expansion vessel 16 litre - 26/36 and 36/46	MPSS07
Sealed system - Water pressure gauge	MPSS02
Sealed system pressure relief valve	MPSS03
Sealed system - Expansion vessel flexible hose	MPSS04
Cleaning door rope seal - 15/21 and 15/26	VBS15
Cleaning door rope seal - 26/36 and 36/46	VBS16
Cleaning door rope seal - 46/58 and 58/70	VBS111
Overheat thermostat	TPBS33
Boiler thermostat	TPBS34
Circulating pump - 6 m head	MPCBS23
Circulating pump - 7 m head	VBS54

### 13.4 Burner heads

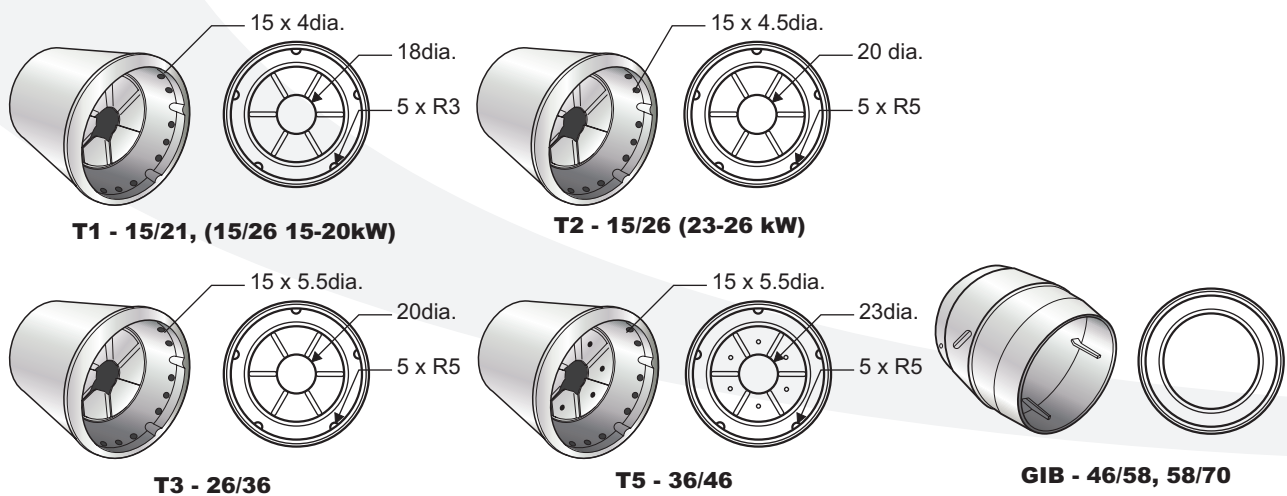


Figure 13-3: Burner heads

# 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: 1999 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 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 boiler with Grant UK within thirty days of installation. To do so visit [www.grantuk.com](http://www.grantuk.com) and follow the links to '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.

### 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 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 a 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 supply to the burner.

Ensure the problem is not being caused by the heating system or its controls. Consult the boiler handbook for guidance.

**Please 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 transferrable 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.

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.

## 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 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](http://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.



# 17 Notes

89/336/EEC  
73/23/EEC  
92/42/EEC



## Flue Terminal

The flue terminal on the outside wall must not be obstructed or damaged. In severe conditions check that the terminal does not become blocked by snow.

## Frost Protection

Your installer may have fitted a frost thermostat. If not, and you are likely to be away for a short time, leave the boiler on with the boiler thermostat set at a low setting. For longer periods 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 must 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.

If a programmer is fitted it will retain the time settings for up to 24 hours and will not have to be reset to the correct time of day when the supply is restored (the display remains for up to 1 hour, but will re-appear when the supply is restored).

## Electricity Supply

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

**WARNING**

The electricity connections to the boiler must be earthed.

## Sealed Central Heating System

If your boiler is operating on a sealed heating system, the installer will have pressurised the system and should have told you (or set it on the pressure gauge) the system pressure when cold (this is normally between 0.5 and 1.0 bar, which will increase slightly when hot). If the pressure (when cold) is below the set pressure mentioned above, you can re-pressurise the system. If this is frequently required, ask your installer or Service engineer to check the heating system for leaks and to check the expansion vessel air charge.

The boiler or system will be fitted with an automatic air vent to remove air from the system. Any air trapped in the radiators should be removed by venting the radiators using the vent screw at the top of each radiator. Only vent a radiator if the top is cool and the bottom is hot.

Excessive venting will reduce the system pressure, so only vent when necessary and check the system pressure as mentioned above.

Re-pressurise the system if necessary.

**The sealed system is fitted with a safety valve to release excess pressure from the system. If 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.**

## To re-pressurise the system by adding water:

1. Only add water to the system when it is cold and the boiler is off. Do not overfill.
2. Ensure the flexible filling loop (see Figure 3) 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).
3. Gradually open the double check valve on the front of the filling loop until water is heard to flow. When the black needle of the pressure gauge is between 0.5 and 1 bar, close the valve.
4. Vent each radiator in turn, starting with the lowest one in the system, to remove air.
5. Continue to fill the system until the pressure gauge indicates between 0.5 and 1.0 bar. Close the fill point valve.
6. Repeat steps 4 and 5 as required.
7. Close the valves either side of the filling loop and disconnect the loop.

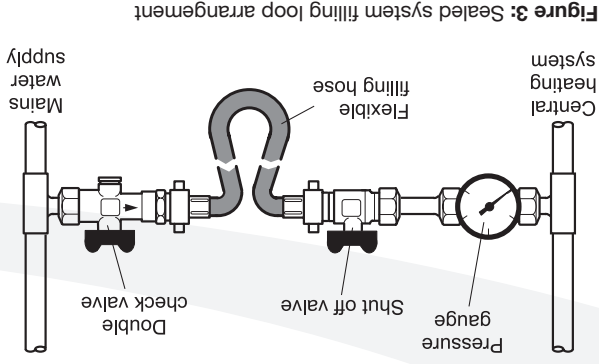


Figure 3: Sealed system filling loop arrangement



now operate during the 'on' periods set on the programmer.

### If your Boiler Fails to Light

Make the following checks:

1. Check that the boiler On/Off switch is ON (Kitchen/Utility models only).
2. Check that the programmer (if fitted) is working and is in an 'on' period.

3. Check that all thermostats are set to the desired setting and are calling for heat.

4. Check if the burner 'Lock-out' reset button (on the burner) is lit. If it is, press it 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 that the fuel supply valve is open.

5. Check that the fire valve in the oil supply line has not tripped.

6. Ensure that a fuse has not blown or that the electricity supply has not failed.

7. Check to see if the safety thermostat has operated (see Section Overheat Thermostat).

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.

### Turning Off your Boiler

#### Kitchen/Utility models

**For short periods** - Set the On/Off to OFF.

To restart, 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 electricity supplies turned off at the mains.

#### Boiler House models

**For short periods** - Switch off the electricity supply to the boiler.

To restart, switch on the electricity supply to the boiler.

**For long periods** - Switch off the electricity supply to the boiler. If required the fuel supply valve may be closed and the water and electricity supplies turned off at the mains.

To restart, refer to the full lighting

instructions given in the Section Lighting your Boiler.

### About your Fuel

Grant VORTEX Pro boilers only operate on Class C2 Kerosene to BS 2869:1998. You should always quote this type of fuel 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.

### General Notes and Care of your System

#### Boiler thermostat



This control allows the temperature of the water leaving the boiler to heat the radiators and domestic hot water to be adjusted.

**If you have a cylinder thermostat on your hot water cylinder, this will control the temperature of your domestic hot water. The boiler thermostat setting must be equal to or above the cylinder thermostat setting to enable the cylinder thermostat to control the domestic hot water system.**

#### Burner 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.

Figure 1 shows the position of the Lock-out Reset button on the burner

Make the following checks:

1. Check that the boiler On/Off switch is ON.
2. Check that the programmer (if fitted) is working and is in an 'on' period.

3. Check that all thermostats are set to the desired setting and are calling for heat.

4. Check if the burner 'Lock-out' reset button (on the burner) is lit. If it is, press it 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 that the fuel supply valve is open.

5. Check that the fire valve in the oil supply line has not tripped.

6. Ensure that a fuse has not blown or that the electricity supply has not failed.

7. Check to see if the safety thermostat has operated (see Section Overheat Thermostat).

If the burner still fails to light after carrying out these checks then a fault exists or the fuel supply is low. If you have sufficient fuel, switch off the electricity supply to the boiler and contact 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. 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 marked reset (see Figures 1 and 2), press the button then replace the cap.

If this condition continually repeats, contact your Service engineer.

### Programmer (if fitted)

Refer to the instructions supplied with the Programmer.

### Ventilation

Always ensure that the boiler has adequate ventilation. Any ventilation openings provided by the installer must not be obstructed.

Periodically check that they are clear.

Do not attempt to 'box in' the boiler or build a compartment around it before consulting your installer.

Do not place any combustible material around or on the boiler or flue pipe.

# User Instructions

## Introduction

This User Guide is intended to assist the User in the operation of the Grant VORTEX Pro 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.

1. Ensure that there is sufficient fuel, of the

The lighting procedure is:

### Lighting your Boiler

To gain access to the controls, pull the front panel forward at the top to disengage the fixing clips then lift it up and off the boiler as shown in Figure 1.

### Boiler Controls (Kitchen/Utility models)

If your boiler has a programmer fitted, it will provide hot water and central heating during the periods set on the programmer. If your boiler is switched on, but does not necessarily indicate the burner is firing.

### About your boiler

The boiler is fully automatic once switched on, providing central heating (and also heating your domestic hot water if you have a hot water cylinder fitted). Kitchen/Utility boilers have a 'mains on' neon, see Figure 1, which lights when the boiler is switched on, but does not necessarily indicate the burner is firing.

2. Switch on the electricity supply to the boiler.

Boiler House models will start as soon as the electricity supply to the boiler is switched on.

3. Set the On/Off switch to ON and, if fitted, the programmer (CH or HW) to ON (Kitchen/Utility models only).

4. The boiler will now light automatically.

5. If you have a programmer fitted in the control panel, refer to the instructions supplied with the programmer and set the

programmer. Set the HW and CH functions to TIMED. The boiler will

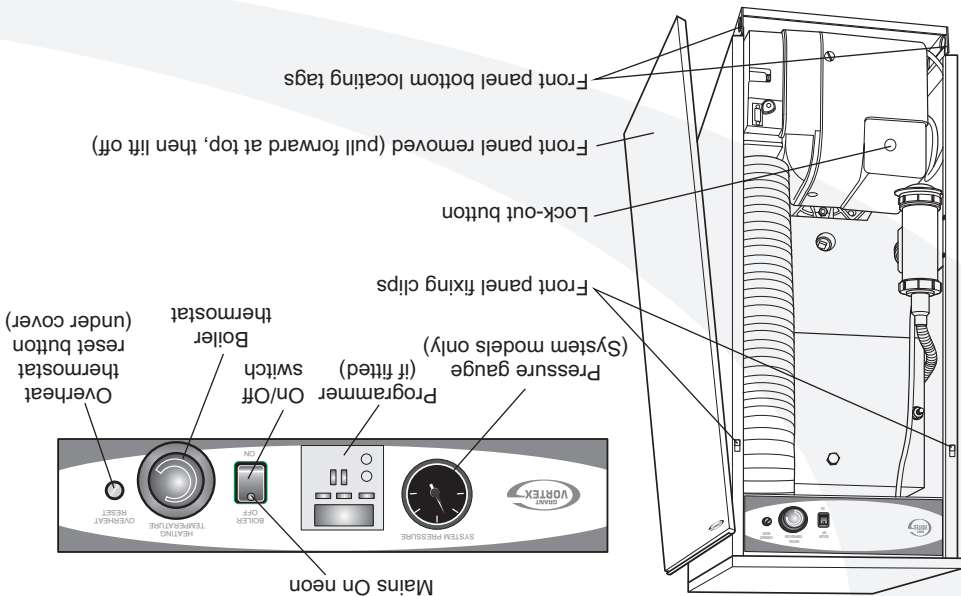


Figure 1: Boiler controls (Kitchen/Utility model shown)

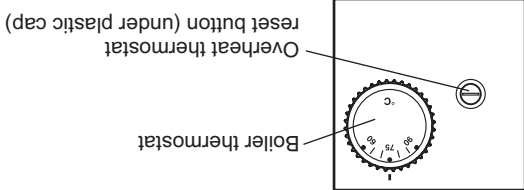


Figure 2: Boiler House dual thermostat (on top of boiler)

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**For use with Kerosene\* only.****Service Log**

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:**

- a) Use a bio-kerosene (B30K) compatible flexible oil line in place of the oil line supplied with this boiler.
  - b) 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.
- c) Check the suitability of the flue system with Grant UK.
  - d) 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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This manual is accurate at the date of printing but will be superseded and should be disregarded if specifications and/or appearances are changed in the interests of continued product improvement.

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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.

# Grant Vortex Pro

Kitchen/Utility, System and Boiler House Floor Standing Condensing  
Oil Boiler Range

## User Instructions

