

Grant Vortex

Utility and System Condensing Oil Boiler Range

Installation and Servicing Instructions





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IMPORTANT NOTE FOR INSTALLERS

These instructions are intended to guide installers on the installation, commissioning and servicing of the Grant Vortex oil boiler. After installing the boiler, leave these instructions with the user.

SPECIAL TEXT FORMATS

The following special text formats are used in these instructions for the purposes listed below:



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



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



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

PRODUCT CODES AND SERIAL NUMBERS COVERED

The serial numbers used on Grant oil boilers consist of a fifteen digit numerical code with the final three digits being the product identifier.

For example:

100000200218**556**

These instructions cover the following product codes and serial numbers:

Product code	Serial number identifier
VORTUT15-21	556
VORTUT15-26	557
VORTUT26-36	558
VORTUT36-46	555
VORTUT46-58	059
VORTUT58-70	060
VORTUTS15-26	563
VORTUTS26-36	564
VORTUTS36-46	562

SERVICING

The boiler should be serviced at least every twelve months and the details entered in the boiler passport which comes supplied with the boiler.

FUEL TYPE

All Grant Vortex boilers are suitable for use with Class C2 Kerosene. This boiler is not suitable for gas oil. To use Bio-Kerosene (B30K), refer to the information below:

OPERATION ON BIO-FUEL

All Grant Vortex condensing boilers manufactured since May 2011 are suitable for operation on both standard Kerosene (Class C2 to EN 590) and also bio-kerosene - up to a 30% blend (B30K).

All burner settings and nozzle sizes (as detailed in Section 2.2 of these instructions) 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 the boiler.
- Have the 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 Ireland.
- 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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1 INTRODUCTION

1.1 HOW A CONDENSING BOILER OPERATES

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 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 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 Grant Vortex 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 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. Refer to Section 7.

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

All the models in the current Grant Vortex range of boilers are designed to comply with the maximum NOx emissions* under the Energy-related Products Directive (ErP).

* From the 26th September 2018, the maximum NOx emissions for all new oil fired boilers (up to and including 400kW for both new build and replacement boiler installations) is 120mg/kWh.

1.3 FLUE OPTIONS

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

1.3.1 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 (Grant product code: 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.



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 guarantee on the boiler.

1.3.2 FOR BALANCED FLUE APPLICATIONS

The following flue kits are available from Grant Ireland. Refer to Section 9.4.

Yellow system

Standard low level concentric balanced flue - components available:

- 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 (for 15/21, 15/26 models 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 stainless steel 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.

1.4 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 3/8" to 1/4" BSP male adaptor supplied with the boiler.

If required, an additional flexible fuel line (630 mm) and 3/8" to 1/4" BSP male adaptor are available to purchase from Grant Ireland, for two-pipe oil supply systems (Grant product code: 20022601).

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 110°C ± 3°C.

The control panel is fitted with a burner ON/OFF switch, boiler thermostat control knob and the manual reset button for the overheat thermostat.

Figure 1-1 shows the components in the Vortex Utility boilers and the position of the control panel.

Figure 1-2 shows the details of the control panel.

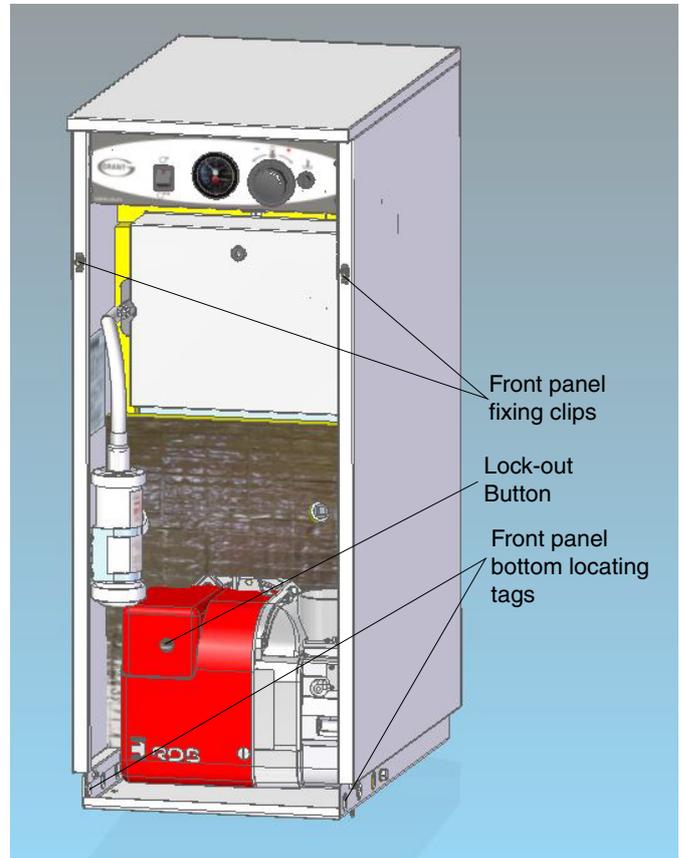


Figure 1-1: Boiler components

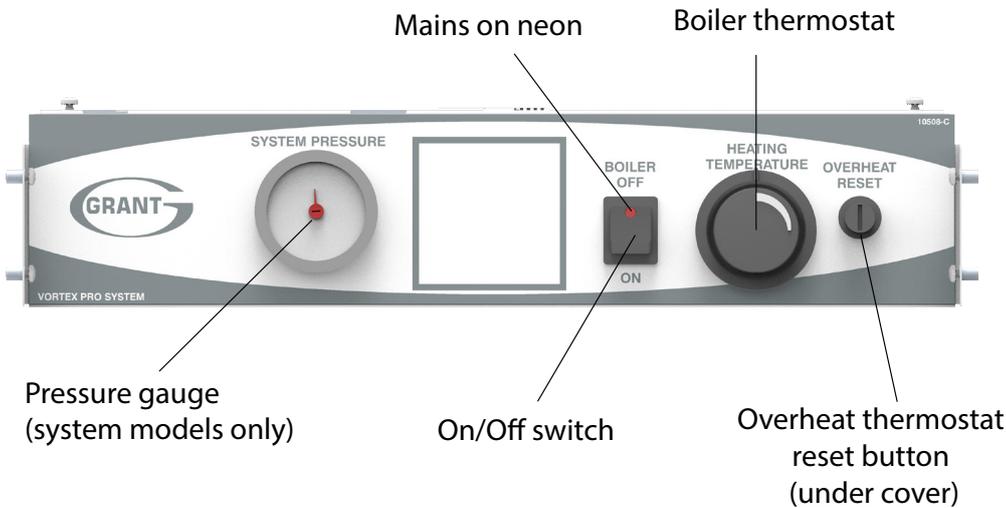


Figure 1-2: Vortex boiler control panel

2 TECHNICAL DATA

2.1 BOILER TECHNICAL DATA

Table 2-1: Boiler technical data

	Units	Utility						Utility System		
		15/21	15/26	26/36	36/46	46/58	58/70	15/26	26/36	36/46
Water content	litre	16.5	19	21	21	50	50	19	21	21
	gal	3.6	4.2	4.7	4.7	11	11	4.2	4.7	4.7
Weight (dry)	kg	70	112	134	134	295	299	126.5	142	142
	lb	154	246	295	295	649	658	278	312	312
Maximum heat output (Kerosene)	kW	21	26	36	46	58	70	26	36	46
	Btu/h	71,700	88,700	122,800	157,000	197,900	238,800	88,700	122,800	157,000
Minimum flow rate ($\Delta T=10^{\circ}\text{C}$)	l/h	1,800	2,200	3,000	4,000	5,200	6,000	2,200	3,000	4,000
Minimum flow rate ($\Delta T=20^{\circ}\text{C}$)	l/h	900	1,100	1,500	2,000	2,600	3,000	1,100	1,500	2,000
Condensate connection		22 mm (only connect plastic pipe)								
Flue diameter (conventional)	mm	100 mm			125*			100		
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	$^{\circ}\text{C}$	50 to 75								
Limit (safety) thermostat shut off temperature	$^{\circ}\text{C}$	110 \pm 3								
Maximum hearth temperature	$^{\circ}\text{C}$	Less than 50								
Electricity supply		~230 1ph 50Hz 5A fused								
Burner motor power	Watts	90			150			90	90	
Absorbed motor power	kW	0.15								
Starting current	Amps	4.2			6.4			2.6	4.2	
Running current	Amps	0.85			1.2			0.85	0.85	
Oil connection	"	1/4" BSP male (on end of flexible fuel hose)								
Conventional flue draught	mbar	Minimum: 0.087 - Maximum: 0.37								
	in wg	Minimum: 0.035 - Maximum: 0.15								
Maximum operating pressure - sealed/open system	bar	2.0								
Maximum operating pressure - pressure relief valve	bar	2.5								
Boiler type		ON/OFF								

* 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

	Utility System 15/26, 26/36 and 36/46
Heating system pressure (cold)	Maximum 1.0 bar Minimum 0.5 bar
Lift 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)
Maximum heating system volume (including boiler)*	106 litres (15/26) 128 litres (26/36) 170 litres (36/46)**
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

** Approximately

2.3 BURNER SETTINGS

Table 2-2: Burner settings

Boiler models (burner type)	Heat output		Nozzle	Oil pressure (bar)	Smoke No.	Burner head type	Burner head/ air disc setting	Distance † (mm)		Fuel flow rate (kg/h)	Flue gas temp. (°C)	CO ₂ (%) ‡	Flue gas VFR ‡ (m ³ /hr)
	(kW)	(Btu/h)						A	D				
	Utility 15/21 (Riello RDB2.2 BX E15/21)	15.0						51,200	0.45/80°EH				
	18.0	61,400	0.55/60°ES	7.0	0 - 1	BX 500	Disc: C	-	11.5	1.58	70 - 75	12.5	20.0
	21.0 *	71,700	0.60/60°ES	8.0	0 - 1	BX 500	Disc: C	-	13	1.84	75 - 80	12.5	23.0
Utility 15/26 § Utility System 15/26 § (Riello RDB2.2 BX V15/26)	15.0	15,200	0.45/80°EH	8.0	0 - 1	BX 500	Disc: B	-	11.5	1.25	60 - 65	12.5	16.0
	21.0 *	71,700	0.60/60°ES	10.0	0 - 1	BX 500	Disc: C	-	13	1.75	65 - 70	12.5	23.0
	26.0	88,700	0.75/60°ES	8.5	0 - 1	BX 500	N/A	-	15	2.16	75 - 80	12.5	28.5
Utility 26/36 Utility System 26/36 (Riello RDB2.2 BX V26/36)	26.0	88,700	0.75/60°ES	8.0	0 - 1	BX 700	N/A	-	15	2.16	65 - 70	12.5	28.5
	31.0 *	105,800	0.85/60°ES	9.0	0 - 1	BX 700	N/A	-	16	2.58	70 - 75	12.5	34.5
	36.0	122,800	1.00/60°ES	9.0	0 - 1	BX 700	N/A	-	17.5	2.99	75 - 80	12.5	39.5
Utility 36/46 Utility System 36/46 (Riello RDB2.2 BX V36/46)	36.0	122,800	1.00/60°ES	9.0	0 - 1	BX 700	N/A	-	17.5	3.09	75 - 80	12.5	39.5
	41.0 *	140,000	1.10/60°ES	10.0	0 - 1	BX 700	N/A	-	17.5	3.52	80 - 85	12.5	45.5
	46.0	157,000	1.25/60°S	8.0	0 - 1	BX 700	N/A	-	20	3.95	85 - 90	12.5	51.0
Utility 46/58 (Riello RDB3.2 VORT 58)	46.0	157,000	1.25/80°S	8.0	0 - 1	GIB	Head: 0	-	-	3.92	75 - 80	12.5	51.0
	52.0 *	177,400	1.35/80°S	9.5	0 - 1	GIB	Head: 0	-	-	4.43	75 - 80	12.5	58.5
	58.0	197,900	1.65/80°S	8.0	0 - 1	GIB	Head: 0	-	-	4.94	75 - 80	12.5	66.0
Utility 58/70 (Riello RDB3.2 VORT 70)	58.0	197,900	1.65/80°S	8.0	0 - 1	GIB	Head: 0	-	-	4.97	75 - 80	12.5	66.0
	64.0 *	218,368	1.65/80°S	9.5	0 - 1	GIB	Head: 0	-	-	5.49	75 - 80	12.5	72.5
	70.0	238,800	1.75/80°S	9.5	0 - 1	GIB	Head: 4	7-8	-	6.00	75 - 80	12.5	78.5

Notes:

† Refer to Section 10.4 (Burner Settings: RDB2.2 BX burners)

‡ Flue gas VFR: Flue gas volumetric flow rate

§ Recirculation tube fitted to Utility 15/26 and Utility System 15/26. Refer to Figure 10-3 (item 2).

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

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

3. Gas Oil is NOT suitable for use with Grant Vortex boiler range

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

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

* Factory settings: 15/21 - 21kW, 15/26 - 21kW, 26/36 - 31kW, 36/46 - 41kW, 46/58 - 52kW, 58/70 - 64kW.

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

8. When setting the 15/21 to 15.0 or the 15/26 to 15kW, the air adjuster disc requires repositioning. Refer to Section 10.4 (air adjuster disc).

When setting the 15/26 to 26kW, the air adjuster disc is not required. Refer to Section 10.4 (air adjuster disc).

When setting the 58/70 to 70kW, the combustion head must be changed. Refer to Section 11.4 (Cleaning the burner)

9. The installer must amend the boiler data label if the output is changed.

10. The boiler should be run for 10 to 15 minutes for accurate Flue Gas Analysis test results.

2.4 FLUE GAS ANALYSIS

To allow the boiler to be commissioned and serviced, the boiler is supplied with a combustion test point on the front cleaning door.

When this test point is used please note the following:

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

2.5 WATER CONNECTIONS

Table 2-3: Water connections

Boiler model	Flow connection			Return connection		
	Size	Fitting	Loose / Fitted	Size	Fitting	Loose / Fitted
Utility 15/21	22 mm pipe	Compression	In fittings bag	22 mm pipe	Compression	Fitted
Utility 15/26	22 mm pipe	Compression	In fittings bag	22 mm pipe	Compression	Fitted
Utility 26/36	22 mm pipe	Compression	In fittings bag	22 mm pipe	Compression	Fitted
Utility 36/46	28 mm pipe	Compression	In fittings bag	28 mm pipe		
Utility 46/58	1 ¼" BSP(F)	G.B. Female	fitted	1 ¼" BSP(F)	None	-
Utility 58/70	1 ¼" BSP(F)	G.B. Female	fitted	1 ¼" BSP(F)	None	-
Utility System 15/26	22 mm pipe	Compression	Fitted	22 mm pipe	Compression	Fitted
Utility System 26/36	22 mm pipe	Compression	Fitted	28 mm pipe	Compression	Fitted
Utility System 36/46	28 mm pipe	Compression	fitted			

2.6 BOILER DIMENSIONS

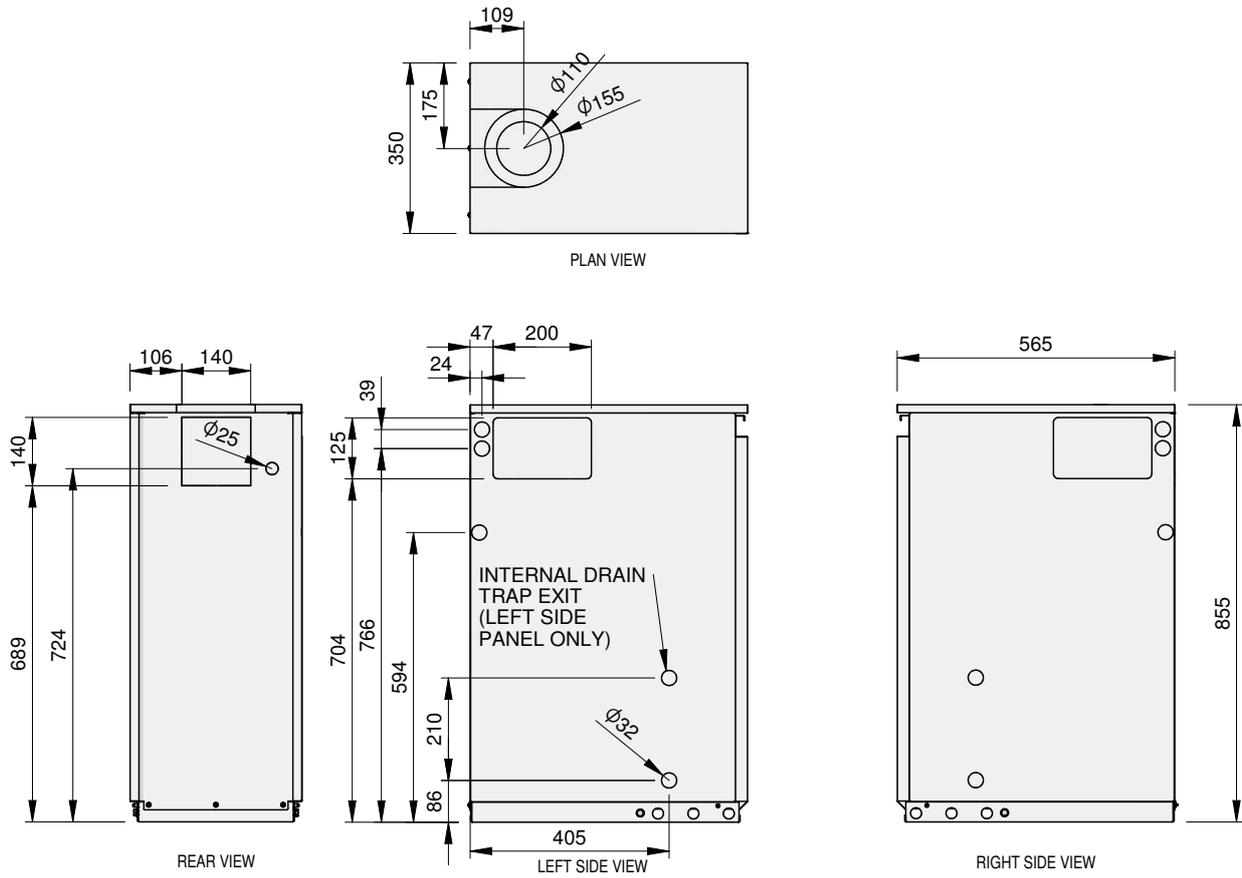


Figure 2-4: Vortex Utility 15/21 dimensions

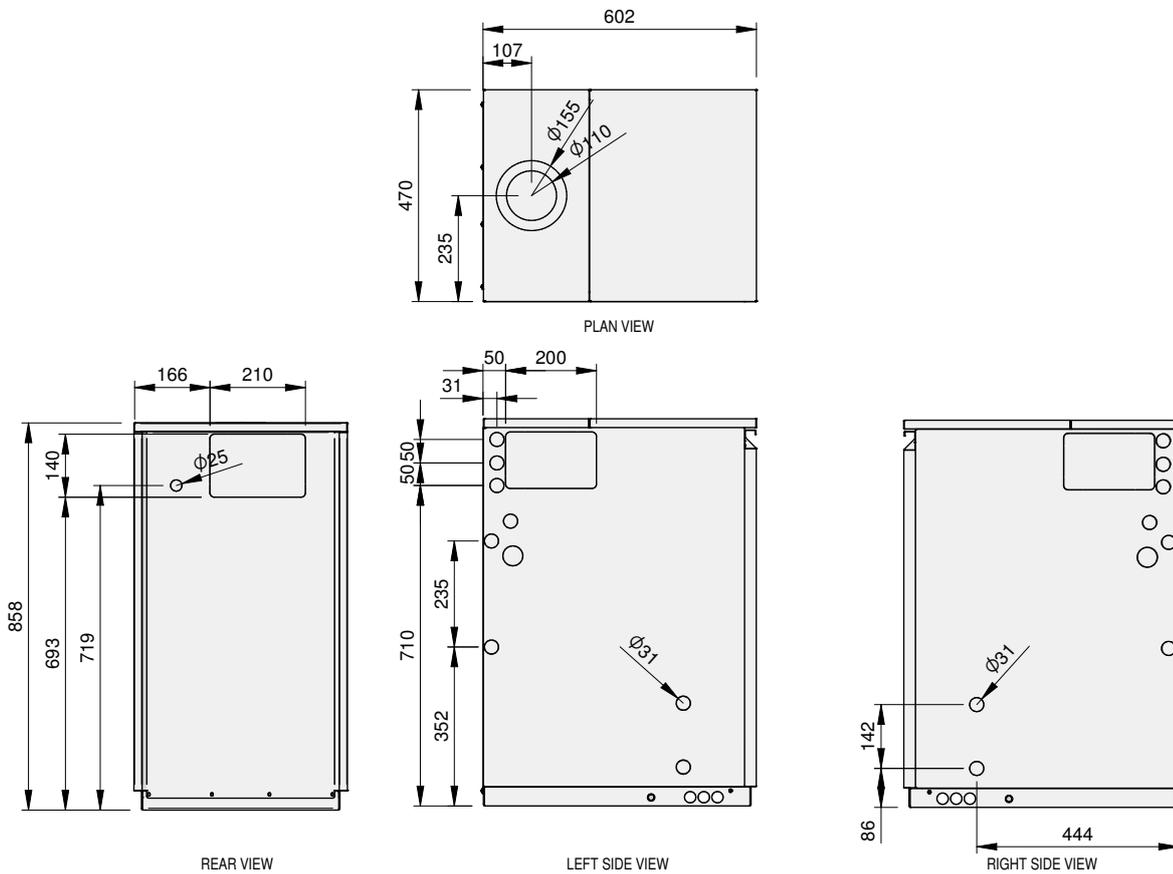


Figure 2-5: Vortex Utility 15/26 and Utility System 15/26 dimensions

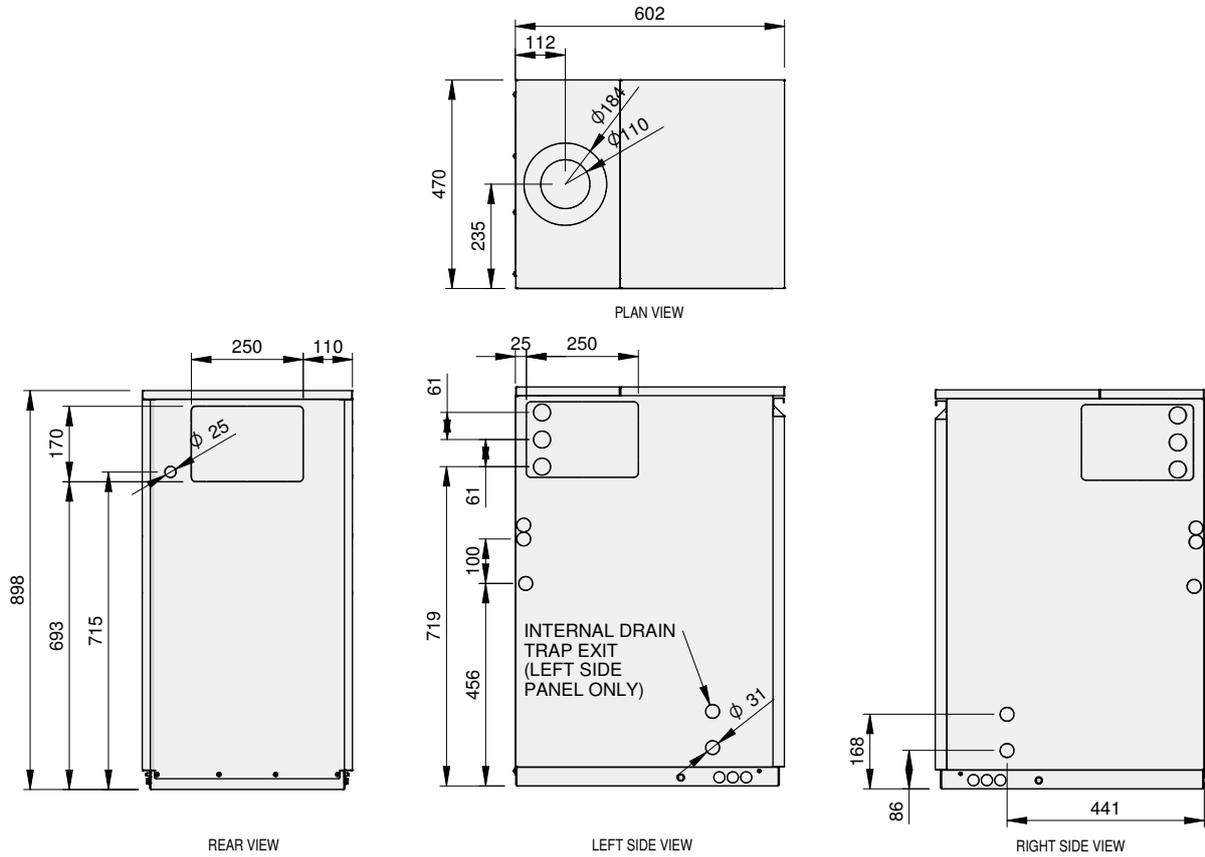


Figure 2-6: Vortex Utility 26/36, 36/46 and Utility System 26/36, 36/46 dimensions

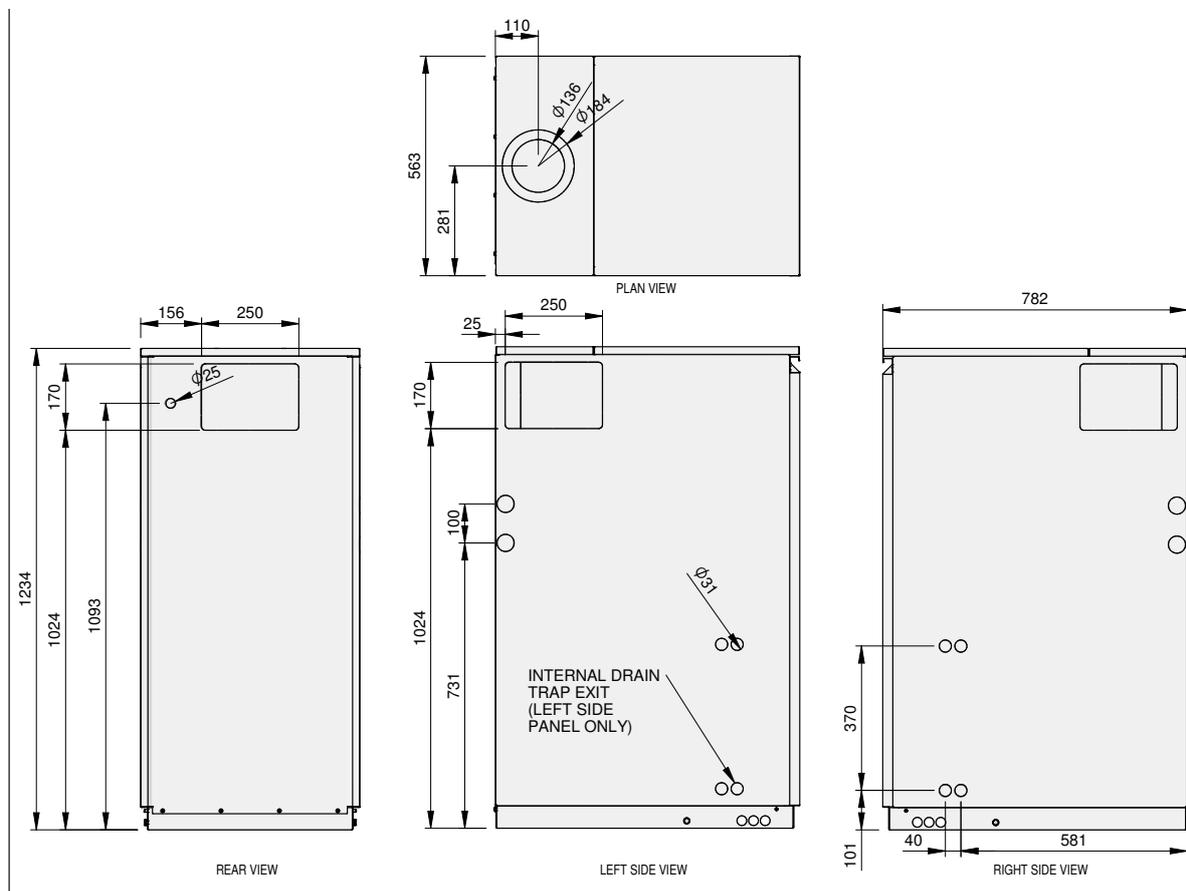


Figure 2-7: Vortex Utility 46/58, 58/70 dimensions

3 OIL STORAGE AND SUPPLY SYSTEM

3.1 FUEL SUPPLY

3.1.1 FUEL STORAGE

The tank should be positioned in accordance with the recommendations given in BS 5410-1 (Code of Practice for Oil Firing - Installations up to 45kW output capacity for space heating and hot water supply purposes). This gives details of the requirements for suitable oil tank construction, tank installation, tank bases, fire protection and secondary containment.

For installations of greater than 45kW output capacity, the tank should be installed in accordance with BS 5410-2.

Oil storage tanks should comply with the following standards:

- Plastic tanks OFT T100
- Steel tanks OFT T200



CAUTION

A galvanised tank must not be used.



NOTE

Plastic tanks should be stood on a firm non-combustible base that adequately and uniformly supports the weight of the tank over its entire base area.

The tank capacity should be selected to suit the appliance rated output. Refer to BS5410-1 for guidance.

3.1.2 FUEL PIPES

Fuel supply pipes should be either copper or steel. Galvanised pipes or fittings should not be used.

Plastic oil supply pipe conforming to BS EN 14125 can be used for underground pipe runs, but must not be used above ground.

All soft copper pipe connections should preferably be made using flared fittings. If compression fittings are to be used, a suitable pipe insert must be fitted into the pipe end.

Soft soldered connections must NOT be used on oil supply pipework.

Fuel supply pipework should be of a suitable diameter, depending on the type of oil supply system being used. Refer to information given in sections 3.1.3, 3.1.4 or 3.1.5.

Run pipes as level as possible to prevent air being trapped. Take the most direct route possible from tank to burner whilst locating the pipe where it will be protected from damage.

Pipes should be supported to prevent sagging and sleeved where they pass through a wall.

A metal body fuel filter of no better than 70 µm (micron) must be fitted in the oil supply pipe close to the tank. This should be fitted with sufficient clearance around and below it to allow easy access for maintenance.

An isolating valve should also be fitted at the tank, before the filter, to allow the oil supply to be shut off for the filter to be serviced.

A second filter (15 µm for Kerosene) must be located closer to the burner to protect the burner pump and nozzle from contamination. Refer to Figures 3-1 to 3-3.

A remote sensing fire valve must be installed in the fuel supply line in accordance with BS540-1.

A fusible wheelhead type combined isolating/fire valve MUST NOT be used in place of a remote sensing fire valve.

The fire valve must be located outside; just before the oil line enters the building, with the fire valve sensor located above the burner.

This clip is fitted on the wiring panel. This should be fixed with the

screw provided, using the small hole in the front panel of the boiler.

The fire valve should be located after the second (15 micron) filter, i.e. between the filter and the point at which the oil line enters the building. Refer to Figures 3-1 to 3-3.

The fire valve must have an operating temperature of between 90 and 95°C to avoid unnecessary nuisance shut-offs to the oil supply.

A flexible fuel hose and ¼" isolating valve are supplied loose with the boiler, to make the final connection to the burner.

If a two-pipe system or deaerator is to be used, the following additional items will be required:

- Flexible fuel hose ^{3/8} male x ¼ female, 630 mm long (product code: 20022601)
- 3/8x ¼" BSP adaptor (product code: 3005720)

These are available to purchase from Grant Ireland.

Metal braided flexible fuel hoses should be replaced ANNUALLY when the boiler is serviced.

Long life flexible fuel hoses should be inspected annually and replaced, if necessary, or after a maximum five years service life.

3.1.3 SINGLE PIPE (GRAVITY) SYSTEM - (REFER TO FIGURE 3-1)

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

If the storage tank outlet is at least 300 mm above the level of the burner oil pump, a single pipe (gravity) system should be used.

The maximum height of the oil level above the burner oil pump when the tank is full, must not exceed four metres. If this height is exceeded, a pressure reducing valve must be fitted in the oil supply pipe between the tank and the burner oil pump.

The maximum length of pipe run from the tank to the burner is limited by the minimum head of oil (the height of the tank outlet above the burner oil pump).

3.1.4 TWO PIPE SYSTEM - (REFER TO FIGURE 3-2)

Head A (m)	Maximum pipe run (m)	
	10 mm OD pipe	12 mm OD pipe
0	35	100
0.5	30	100
1.0	25	100
1.5	20	90
2.0	15	70
3.0	8	30
3.5	6	20

If the storage tank outlet is below the level of the burner oil pump, a two pipe (sub gravity) system can be used.

The return pipe should be at the same level as the tank outlet, between 75 to 100 mm above the base of the tank. The return pipe should be a sufficient distance from the tank outlet so as to prevent any sediment disturbed by the return entering the supply pipe from the tank.

A non-return valve should be fitted in the supply pipe, along with a fire valve and filters (refer to section 3.1.2 - fuel pipes). A non-return

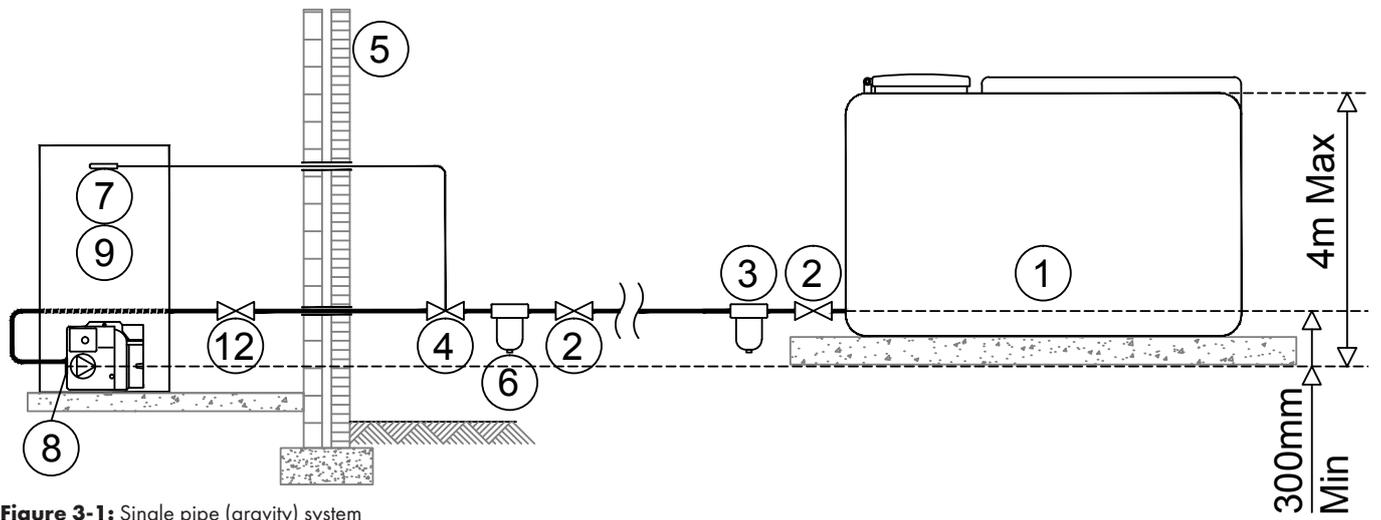


Figure 3-1: Single pipe (gravity) system

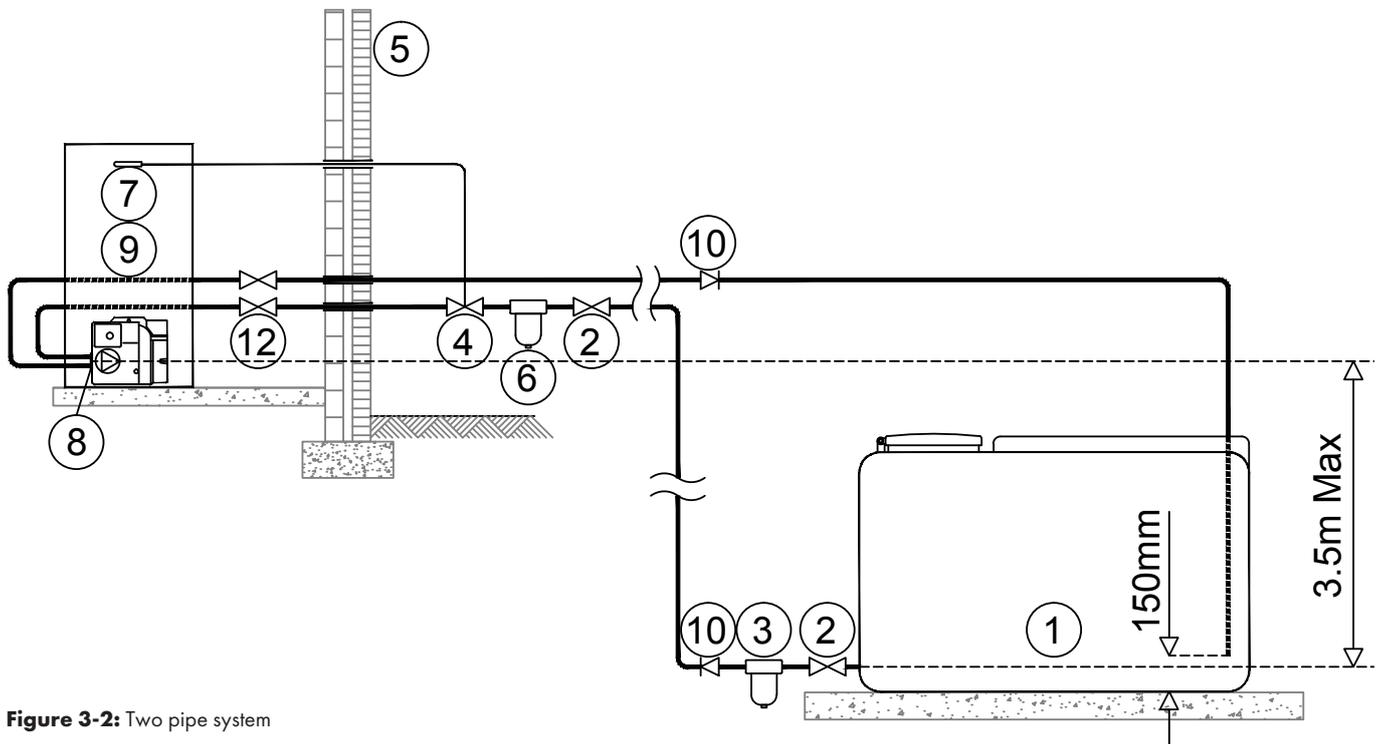


Figure 3-2: Two pipe system

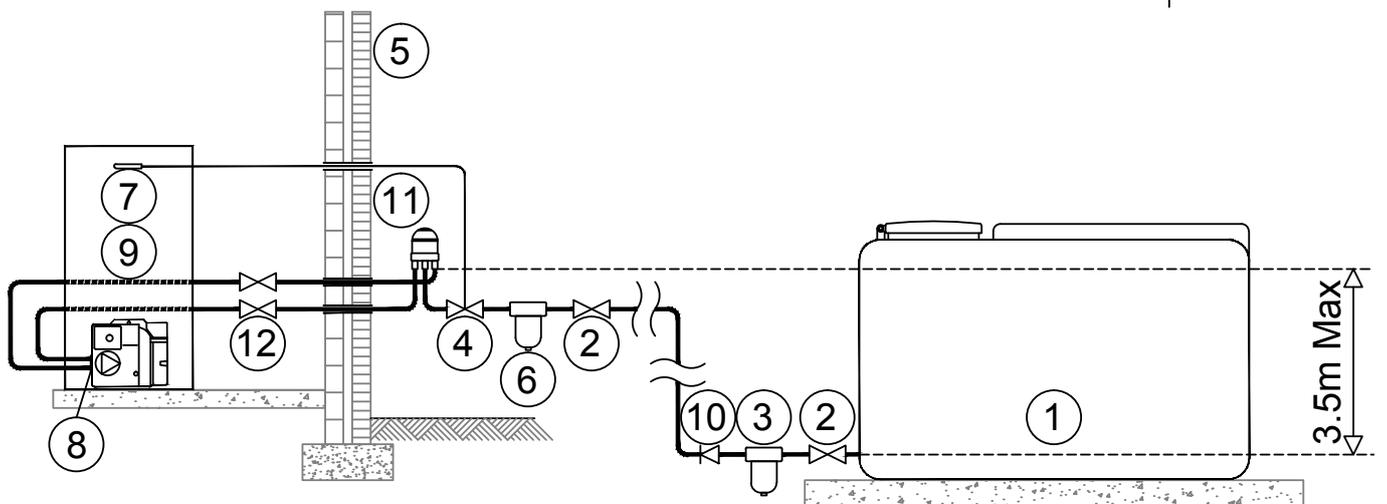


Figure 3-3: De-aeration device system

Key to oil supply diagrams

1	Oil tank	5	External wall	9	Burner
2	Isolating valve	6	Oil filter (15µm max. filtration size)	10	Non-return valve
3	Oil strainer	7	Fire valve sensor	11	De-aerator*
4	Fire valve to BS5410	8	Oil pump	12	Appliance isolation valves

valve should also be fitted in the return pipe if the top of the tank is above the burner oil pump.

The maximum suction height (from the tank outlet to the level of the burner oil pump), must not exceed 3.5 metres.

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

For guidance on the installation of top outlet fuel tanks and suction oil supply pipe sizing, refer to OFTEC Technical Book 3: Storage and Supply, available for purchase from OFTEC.

If a two-pipe system is to be used, the following additional items will be required:

- Flexible fuel hose 3/8" male x 1/4" female, 630 mm long (product code: 20022601)
- 3/8" x 1/4" BSP adaptor (product code: 3005720)

These are available to purchase from Grant Ireland.



To prevent any fuel vapour being discharged within the building, the deaerator must be fitted outside, in accordance with BS 5410-1, unless it is specifically designed to be installed inside.

3.1.5 SINGLE PIPE (SUCTION) SYSTEM WITH DEAERATOR - (REFER TO FIGURE 3-3)

If the storage tank outlet is below the level of the burner oil pump, an alternative to the two pipe (sub gravity) system is the single pipe (suction) system using a deaerator, e.g. a 'Tiger Loop' device.

The deaerator creates a loop with the burner oil pump, with the oil being circulated through the pump out to the deaerator and back to the pump. Any air in the single pipe lift from the tank is removed from the oil, collected in the deaerator and then discharged to outside.

The de-aerator must be mounted vertically at the same level as (or above) the burner oil pump. Refer to Figure 3-3.

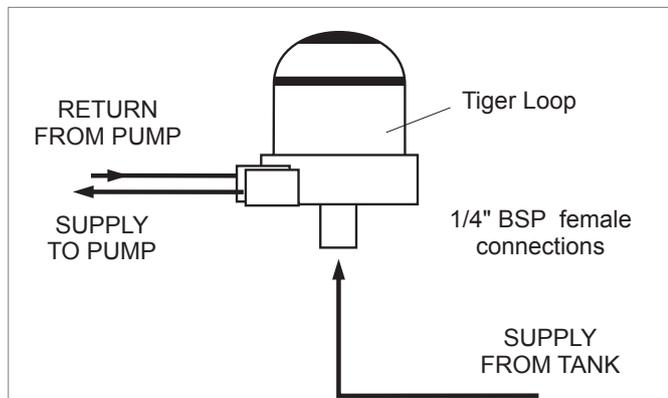


Figure 3-4: Tiger loop de-aeration device

An external deaerator must not be fitted within 500 mm of a flue terminal.

Always follow the manufacturers installation instructions supplied with the deaerator.

To use a de-aerator, the following additional items will be required:

- Flexible fuel hose 3/8" male x 1/4" female, 630 mm long (product code: 20022601)
- 3/8" x 1/4" BSP adaptor (product code: 3005720)

These are available to purchase from Grant Ireland.

3.2 BURNER OIL CONNECTION



The blanking plug supplied in the inlet (suction) port is 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.

The burner fuel pump is supplied factory set for use with a single pipe (gravity) oil supply system.

For ease of access to the burner oil pump connections, the burner should be removed from the boiler as follows:

1. Remove the red plastic burner cover.
 - Unscrew and remove the TWO fixing screws from the red burner cover and remove the cover from the burner.
2. Unscrew and remove the single burner fixing nut from the stud on the burner flange (at the top of the burner) using a 13 mm spanner. Retain the fixing nut for re-fitting the burner.
3. Carefully withdraw the burner from the boiler.

3.2.1 SINGLE PIPE (GRAVITY) CONNECTION - REFER TO FIGURE 3-5

Connect the oil supply to the burner oil pump as follows:

1. Unscrew and remove the plastic blanking plug from the suction port of the burner oil pump and discard it.
2. Fit the nut of the elbow connection on the flexible fuel hose (supplied with the boiler) into the suction port and tighten with a correct sized spanner.
3. Fit the 1/4" isolating valve (supplied with the boiler) to the end of the rigid oil supply pipe using a fitting to suit the pipe size and type (not supplied).
4. Connect the other end of the flexible fuel hose to the isolating valve using the 3/8" x 1/4" BSP adaptor (supplied with the boiler).
5. Re-fit the burner to the boiler.

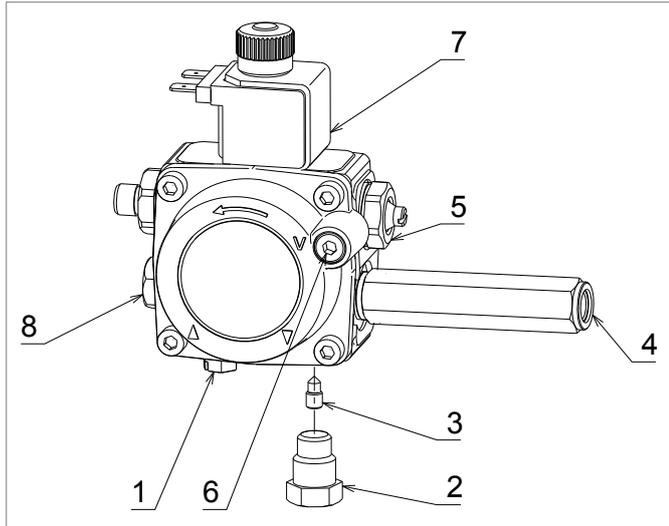
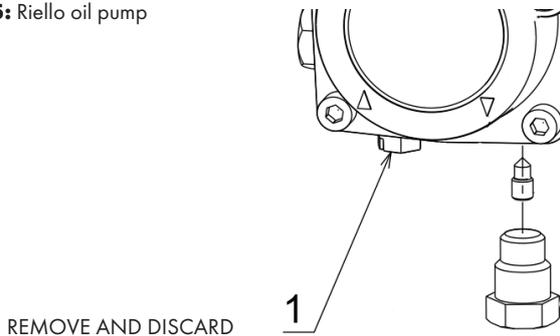


Figure 3-5: Riello oil pump



3.2.2 TWO PIPE CONNECTION

For either a two pipe (sub gravity) or a single pipe (suction) system with a deaerator, the following additional items will be required:

- Flexible fuel hose 3/8" male x 1/4" female, 630 mm long (product code: 20022601)
- 3/8" x 1/4" BSP adaptor (product code: 3005720)

These are available to purchase from Grant Ireland.

Connect the oil supply to the burner oil pump as follows:

1. Fit the flexible fuel hose (supplied with the boiler) to the suction port of the burner oil pump, as detailed in Section 3.2.1.

With either a two pipe (sub gravity) system or a single pipe (suction) system with a deaerator, the by-pass screw (supplied with the boiler) must be fitted to the burner oil pump as follows:

1. Unscrew and remove the blanking plug from the return port on the burner oil pump and discard it.
2. Fit the by-pass screw into the threaded hole (inside the return port) and fully screw it in using an Allen key.
3. Fit the nut of the elbow connection on the flexible fuel hose into the return port and tighten.
4. Fit the 1/4" isolating valve (not supplied) to the end of the rigid oil return pipe (to the deaerator or oil tank) using a fitting to suit the pipe size and type (not supplied).
5. Connect the other end of the flexible fuel hose (not supplied) to the isolating valve using a 3/8" x 1/4" BSP adaptor (not supplied).
6. Re-fit the burner to the boiler.

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	Auxiliary pressure test point

4 INSTALLATION

4.1 INTRODUCTION

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

4.2 BOILER LOCATION

The boiler must stand on a firm, level and non-combustible surface capable of supporting the boiler when full of water. Refer to Section 2.1 for weights.

It does not require a special hearth as the temperature of the boiler base is less than 50°C.

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

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.

Utility system models



NOTE

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

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



NOTE

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

4.3 REGULATIONS COMPLIANCE

Installation of a Grant Vortex boiler must be in accordance with the following recommendations:

- National Building Regulations 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.
- National Building Regulations and any local Byelaws.
- Model Byelaws and the Water Supply 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 (and any relevant amendments):

- BS 5410-1 (Code of practice for oil firing. Installations up to 45 kW output capacity for space heating and hot water supply purposes)
- BS EN 12828 (Heating systems in buildings. Design for water-based heating systems)
- BS EN 12831-1 (Energy performance of buildings. Method for calculation of the design heat load)
- BS EN 14336 (Heating systems in buildings. Installation and commissioning of water based heating systems)
- BSEN 422 (Code of Practice for treatment of water in domestic

hot water central heating systems)

- BS 7671 (Requirements for Electrical installations, IET Wiring Regulations)
- BS 7291 (Thermoplastics pipe and fitting systems for hot and cold water for domestic purposes and heating installations in buildings. General requirements)
- BS 7074-1 (Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems. Code of practice for domestic heating and hot water supply)
- BS 2869 (Fuel oils for agricultural, domestic and industrial engines and boilers. Specification)

4.4 HEATING SYSTEM DESIGN CONSIDERATIONS



WARNING

Before starting any work on the boiler or fuel supply, please read the Health and Safety information given in Section 15.

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

RADIATORS:

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

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

UNDERFLOOR:

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

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

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

OPEN VENTED SYSTEMS:



NOTE

Do not connect plastic pipe directly to the boiler.

Open vented systems must be correctly designed and installed. The open safety vent pipe must be positioned to prevent 'pumping over' (i.e. the discharge of water from the open safety vent pipe into the feed and expansion cistern under the pressure created by the circulator). For detailed information on the correct design of open vented heating systems, and the correct location of the open safety

vent pipe, refer to the CIBSE Domestic Heating Design Guide and OFTEC Technical Book 4 (Installation).

4.5 PIPEWORK MATERIALS

The Grant Vortex boiler is compatible with both copper, aluminium and plastic pipe. Where plastic pipe or aluminium piping is used it must be of the oxygen barrier type and be the correct class (to BS 7291-1) for the application concerned.

On either sealed or open-vented systems; where plastic pipe is used a minimum of ONE metre of copper pipe (or as per pipe manufacturers instructions) MUST be connected between both the boiler flow and return connections and the plastic pipe.



When plastic pipe is used, the system MUST incorporate a low level pressure switch to shut off power to the boiler if the system pressure drops below 0.2 bar. A suitable low pressure switch is available to purchase from Grant Ireland (product code: ZPRESSURESWITCH).

Grant Ireland does not accept any responsibility for any damage, however caused, to plastic piping or fittings.

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 7291-1.

UNDERFLOOR PIPEWORK

Plastic pipe may be used on underfloor floor 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.

4.6 CONNECTIONS

4.6.1 FLOW AND RETURN CONNECTIONS

Refer to Section 5.

4.6.2 CONDENSATE CONNECTION

Grant Vortex 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.

Refer to Section 6 for details of the condensate disposal pipework.

4.7 PREPARATION FOR INSTALLATION

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 pack
3. Lift off the case top panel(s) and remove the water connecting fittings.

4.8 BEFORE INSTALLATION

To avoid the danger of dirt and foreign matter entering the boiler the complete heating system should be thoroughly flushed out – both 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 to be installed on an older system.

For optimum performance after installation, the boiler and the associated heating system must be flushed in accordance with the guidelines given in BSEN 422 (Treatment of water in domestic hot water central heating systems). This must involve the use of a proprietary cleaner.

After cleaning, it is vitally important that all traces of the cleaner are thoroughly flushed from the system.

For long term protection against corrosion and scale, after cleaning/flushing a suitable inhibitor should be added to the system water, such as G1000, in accordance with the manufacturers' instructions.

Failure to follow the above will invalidate the guarantee.

If the boiler is installed in a garage or out house, in order to provide further protection should there be a power failure in cold weather, a combined anti-freeze and corrosion inhibitor can be used. Follow the manufacturers' instructions supplied to achieve the level of anti-freeze protection required.

Grant Ireland strongly recommends that a Grant Mag One in-line magnetic filter/s (or equivalent*) is fitted in the heating system pipework. This should be installed and regularly serviced in accordance with the filter manufacturer's instructions.

* As measured by gauss. The MagOne magnetic filter has a gauss value of 12000.

4.9 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.



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.

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.
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.

4.10 COMPLETION

Following installation of the boiler, instruct the user in the operation of the boiler, the boiler controls, the heating controls and the safety devices.



Please ensure that the boiler passport (provided with the boiler) is completed in full, leaving the top/white copy with the user and retain the carbon copy for your own records.

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.

PIPE ENTRY/EXIT HOLES IN CASE

All Utility models except the 46/58 and 58/70 have holes to enable the pipework to exit the boiler casing.

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

5.2 WATER CONNECTIONS - SYSTEM MODELS

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

A 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.

5.3 WATER CONNECTIONS AND THERMOSTAT PHIAL POSITIONS

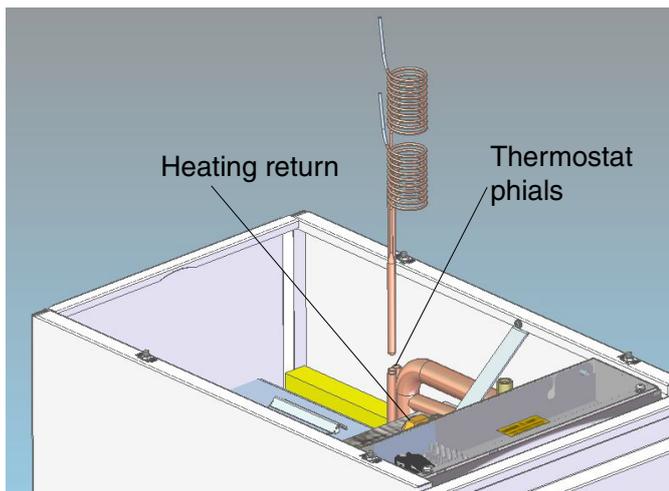


Figure 5-1: Vortex Utility 15/21

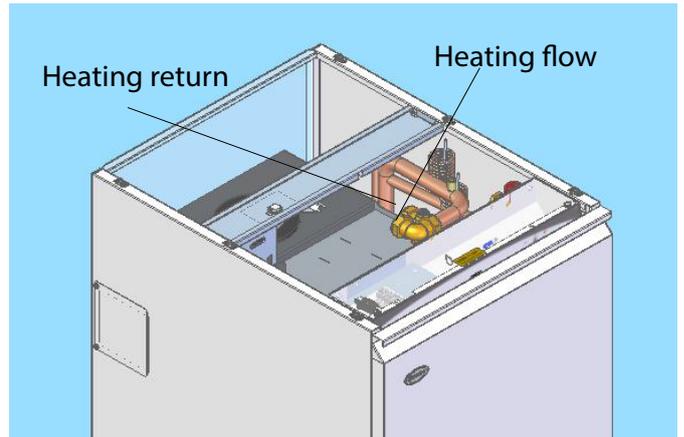


Figure 5-2: Vortex Utility 15/26

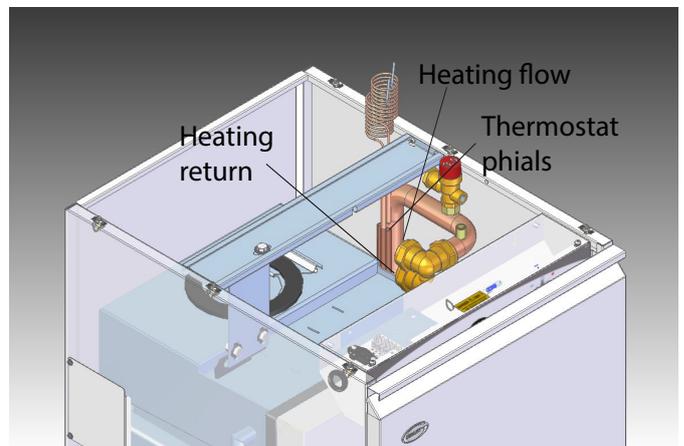


Figure 5-3: Vortex Utility 26/36 and 36/46

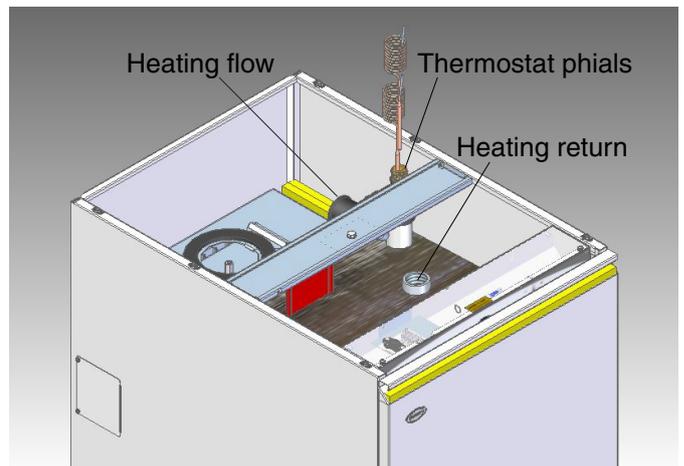


Figure 5-4: Vortex Utility 46/58 and 58/70

6 CONDENSATE DISPOSAL

6.1 GENERAL REQUIREMENTS

When in condensing mode the Grant Vortex boilers produce condensate from the water vapour in the flue gases.

This condensate is moderately acidic with a pH value of around 3.27.

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



WARNING

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.



CAUTION

Condensate disposal pipes **must 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

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

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

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(CONPUMP).

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 boilers installed in an unheated area such as a loft, basement, outhouse or garage, all condensate pipework should be as 'external'. The pipework should be insulated using suitable waterproof and weather resistant insulation.

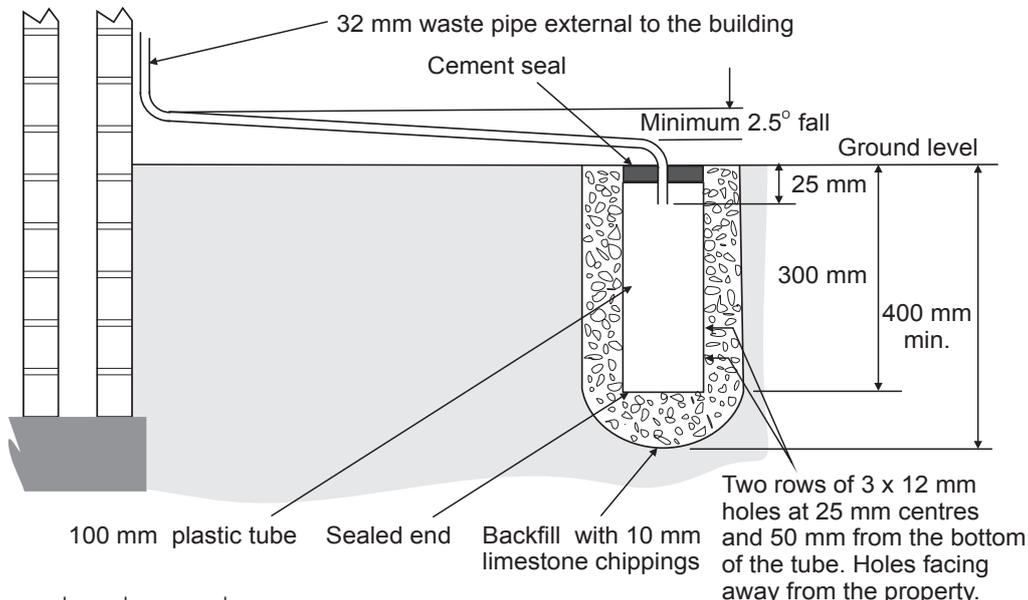


Figure 6-1: Purpose made condensate soakaway

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



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 guarantee.

6.6 CONDENSATE TRAP

Grant Vortex boilers are supplied with a condensate trap to provide the required water seal in the condensate discharge pipe from the boiler.

The condensate trap is factory fitted inside the boiler casing - mounted on the inside of the left hand 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 the procedure given in Section 6.9. This procedure must be carried out before the boiler is installed.

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

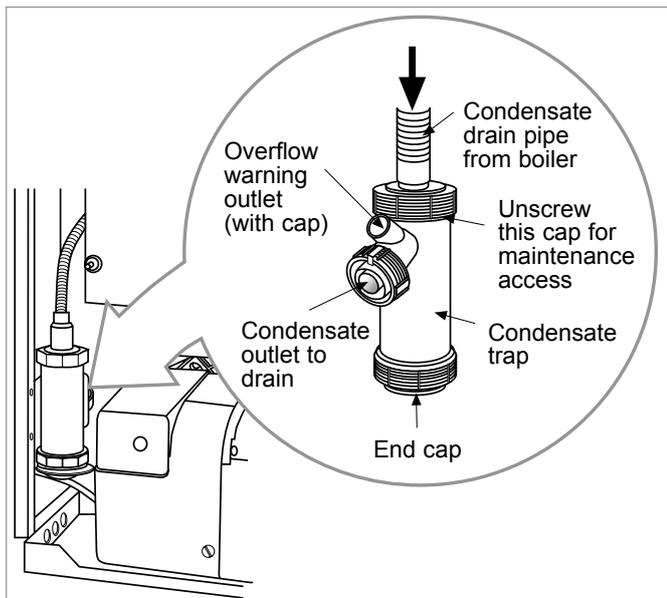


Figure 6-2: Condensate trap

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

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

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



WARNING

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

6.7 CONDENSATE DISPOSAL PIPEWORK

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

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

This discharge pipe can exit through the left side of the boiler through one of two pre-cut 'knock-outs' in the lower part of the left casing panel. Push out the 'knock-out' from the required hole taking care not to distort the side panel.



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 can be unscrewed from the trap body for inspection and cleaning.

To inspect and clean the trap:

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

6.9 EXTERNAL CONDENSATE TRAP FITTING



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

NOTE

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

1. Remove both the top casing panel(s) from the boiler.
2. Unscrew and remove the screws securing the bottom of the rear panel to the base tray of the boiler casing.
3. Grip the top of the rear panel and pull it upwards. Slide it all the way up and out of the channels on the rear edge of the two casing side panels to remove it from the boiler. Refer to Figure 6-3.
4. Push out pre-cut 'knock-out' from condensate outlet hole in rear of left side casing panel.
5. Disconnect condensate discharge hose from heat exchanger and condensate trap and remove it from the boiler.

Replace with condensate trap hose (Grant product codes:
ZCONHOSE1521 (INT-15-21KW)

ZCONHOSE2646 (INT15-26,26-36/36-46KW)

ZCONHOSE4670 (INT-46-58KW/58-70KW).

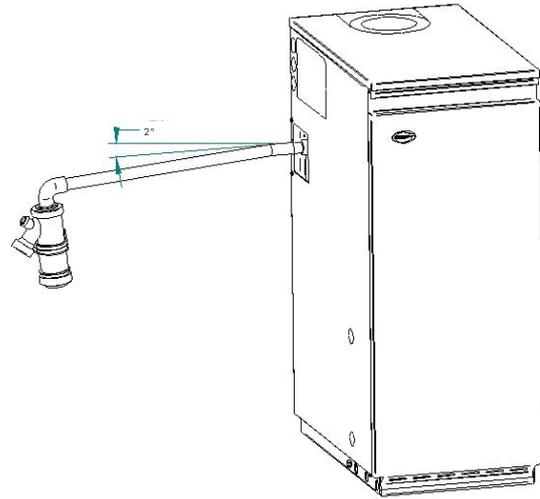
6. Pass the straight connector end of the hose through the new hole in the left hand casing panel. Push the straight connector firmly onto the condensate outlet connection of the condensing heat exchanger as far as possible.
7. Refit the rear casing panel. Ensure that both edges of the rear panel are correctly located into the channels in the rear edge of both side casing panels. Then carefully slide the rear panel fully down until the top edges is level with the top edges of the side panels.
8. Secure the bottom of the rear panel to the base tray with the screws previously removed.
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.



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

NOTE

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



NOTE

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

Figure 6-3: Gaining access to the condensate outlet

7 SEALED SYSTEMS

7.1 SEALED SYSTEM REQUIREMENTS

All Grant Vortex models are suitable for use with sealed systems complying with the requirements of BS EN 12828, BS EN 12831 and BS EN 14336.

The system must be provided with the following items:

- Diaphragm expansion vessel complying with BS EN 13831
- Pressure gauge
- Pressure relief (safety) valve
- Approved method for filling the system

7.1.1 EXPANSION VESSEL

The expansion vessel should be fitted in the return pipework as shown in Figure 7-2. To reduce the operating temperature of the expansion vessel, 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 15 mm diameter. If the expansion vessel is connected via a flexible hose, care must be taken to ensure that the hose is not twisted or kinked.



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

7.1.2 PRESSURE GAUGE

The pressure gauge must have an operating range of 0 to 4 bar. It must be located in an accessible place next to the filling loop for the system.

7.1.3 SAFETY VALVE

The safety valve 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 damage to property.

7.1.4 FILLING LOOP

Provision should be made to replace water lost from the system. This can be done manually (where allowed by the local water

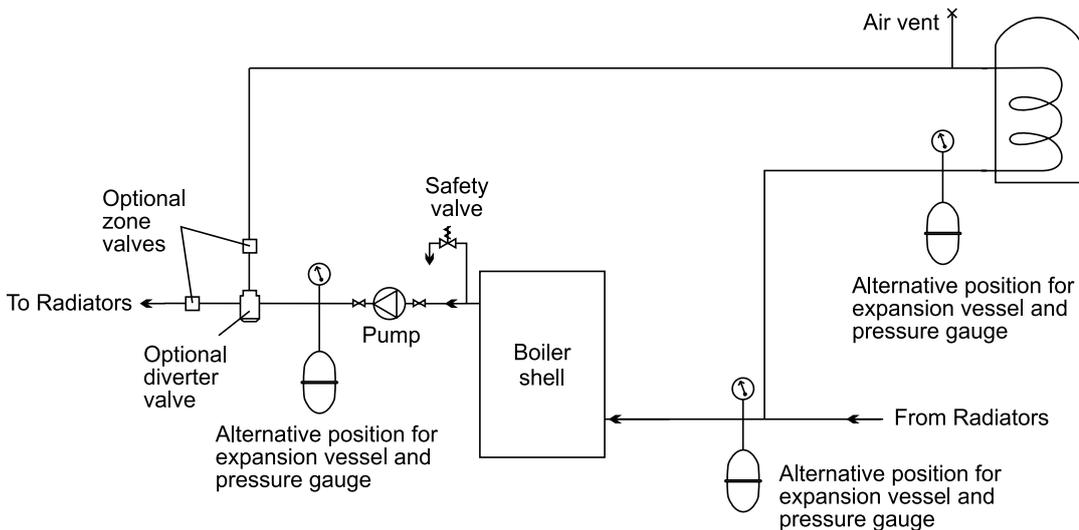


Figure 7-1: Sealed system

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

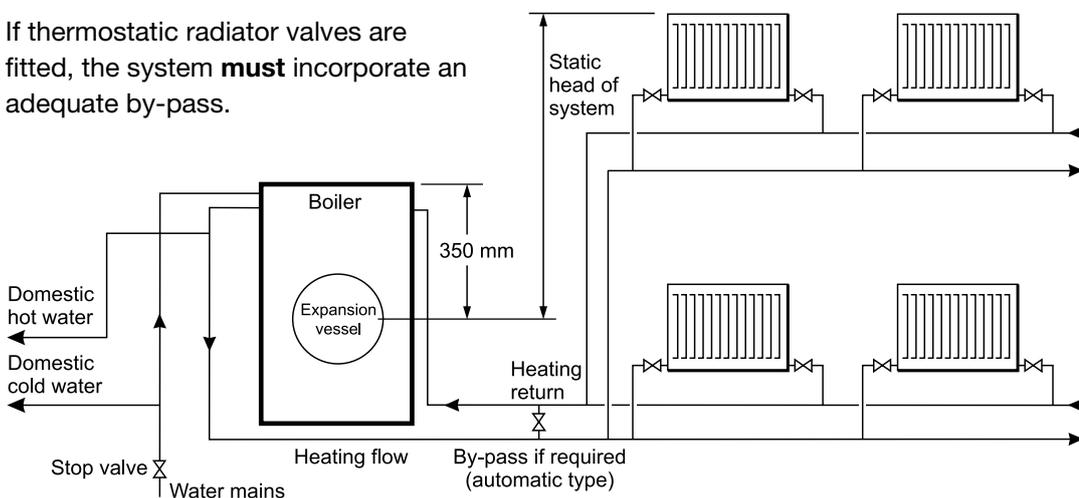


Figure 7-2: Sealed system boilers

undertaking) using an approved filling loop arrangement incorporating a double check valve assembly.

The filling loop must be isolated and disconnected after filling the system.



NOTE

Automatic fill valves should not be used

7.1.5 HEATING SYSTEM

The maximum 'setpoint' temperature for the central heating water is 75°C. Refer to Section 1.1.

An automatic air vent should be fitted in the flow and return pipes of the highest point of the system.

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

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.

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

7.2 FILLING THE SEALED SYSTEM

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



NOTE

Automatic fill valves should not be used and will invalidate the warranty

The procedure for filling the sealed system is as follows:

1. Check the air charge pressure in the expansion vessel BEFORE filling 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). Refer to Figure 7-2.

The charge pressure must not be less than the actual static head at the point of connection.



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, when necessary, 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.

Check that the small cap (or screw) on all automatic air vents is open at least one turn. The cap (or screw) remains in this position from now on.

2. Ensure that the flexible filling loop 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 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.
7. Continue to fill the system until the pressure gauge indicates between 0.5 and 1.0 bar. Close the fill point valve. 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.

8. Repeat steps 4 and 5 as required until system is full of water at the correct pressure and vented.
9. Water may be released from the system by manually operating the safety valve until the system design pressure is obtained.
10. Close the fill point and double check valves either side of the filling loop and disconnect the loop.
11. Check the system for water soundness, rectifying where necessary.

7.3 VENTING THE PUMP

For those heating circulating pumps fitted with a vent plug, it is important that the pump is properly vented to avoid an air lock and also prevent it running dry and damaging the bearings.

Unscrew and remove the plug from the centre of the pump motor. Using a suitable screwdriver, rotate the pump spindle about one turn. Replace the plug in the motor. Do not over tighten.



NOTE

Some heating circulating pumps are not fitted with a vent plug so it is not possible to vent these pumps in the manner described above. Refer to pump manufacturers own instructions for further details.

7.4 PRESSURE RELIEF (SAFETY) VALVE OPERATION

Check the operation of the pressure relief (safety) valve as follows:

1. Turning the head of the valve 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. Top-up the system pressure, as necessary.

8 ELECTRICAL

8.1 GENERAL

Grant Vortex models requires a ~230V 1ph 50Hz supply. It must be protected by a 5 Amp fuse.

Refer to Figures 8-3 to 8-6 for typical control system wiring diagrams for all models.

Refer to Figures 8-1 and 8-2 for wiring diagrams for all models.



The Vortex 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 mm² PVC as specified in BSEN 50521.5, Table 16.

All the wiring and supplementary earth bonding external to the boiler must be in accordance with the current IET 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

8.2 CONNECTING THE POWER SUPPLY

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 230 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 8-3 to 8-6 for typical control system wiring diagrams.



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.

NOTE

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)

3. If the optional plug-in electronic programmer is to be fitted, follow the fitting instructions given in Section 8.4 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.

8.3 FIT THE PROGRAMMER



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

CAUTION

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 8-3 or 8-2 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



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

NOTE

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 8-3 to 8-6 for details of typical system control wiring diagrams.
6. Replace the back of control panel and complete the electrical connection procedure from paragraph 2 of Section 8.1.
7. Refer to the User's Operating Instructions provided with the boiler for the operation and setting of the programmer.

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 8-3 to 8-6 (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 8-3 to 8-6 (as appropriate) for connection details.

8.5 CONTROL SYSTEM WIRING DIAGRAMS

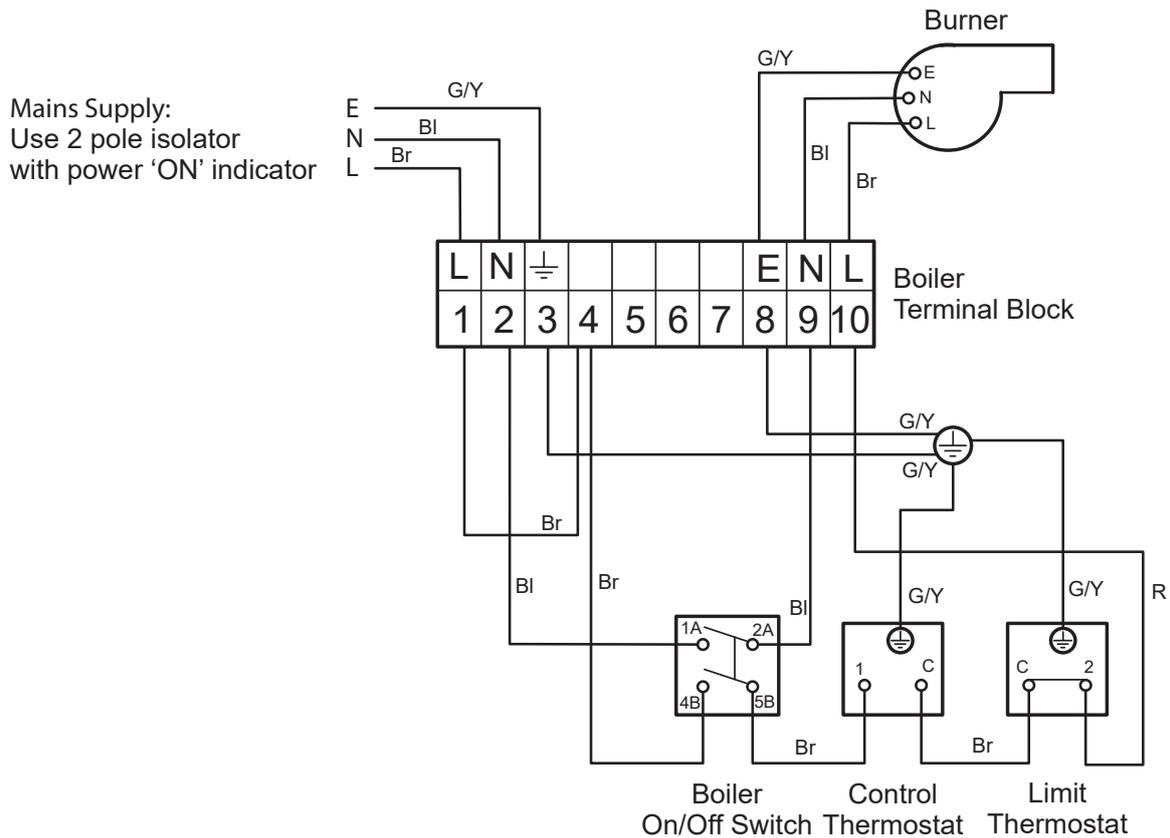
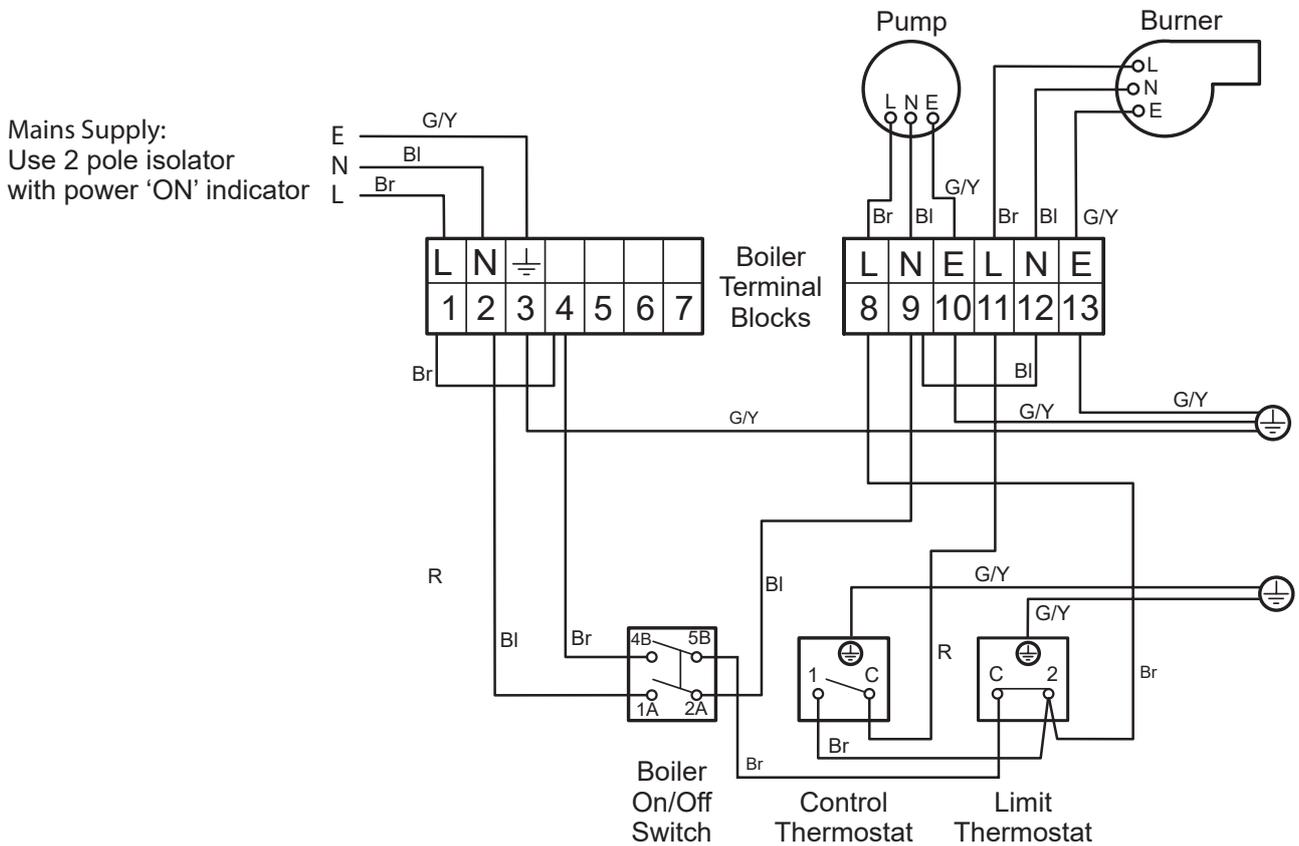


Figure 8-1: Wiring diagram - utility models



Colour code: Br - Brown, Bl - Blue, R - Red, G/Y - Green/Yellow, Y - Yellow

Figure 8-2: Wiring diagram - utility system models

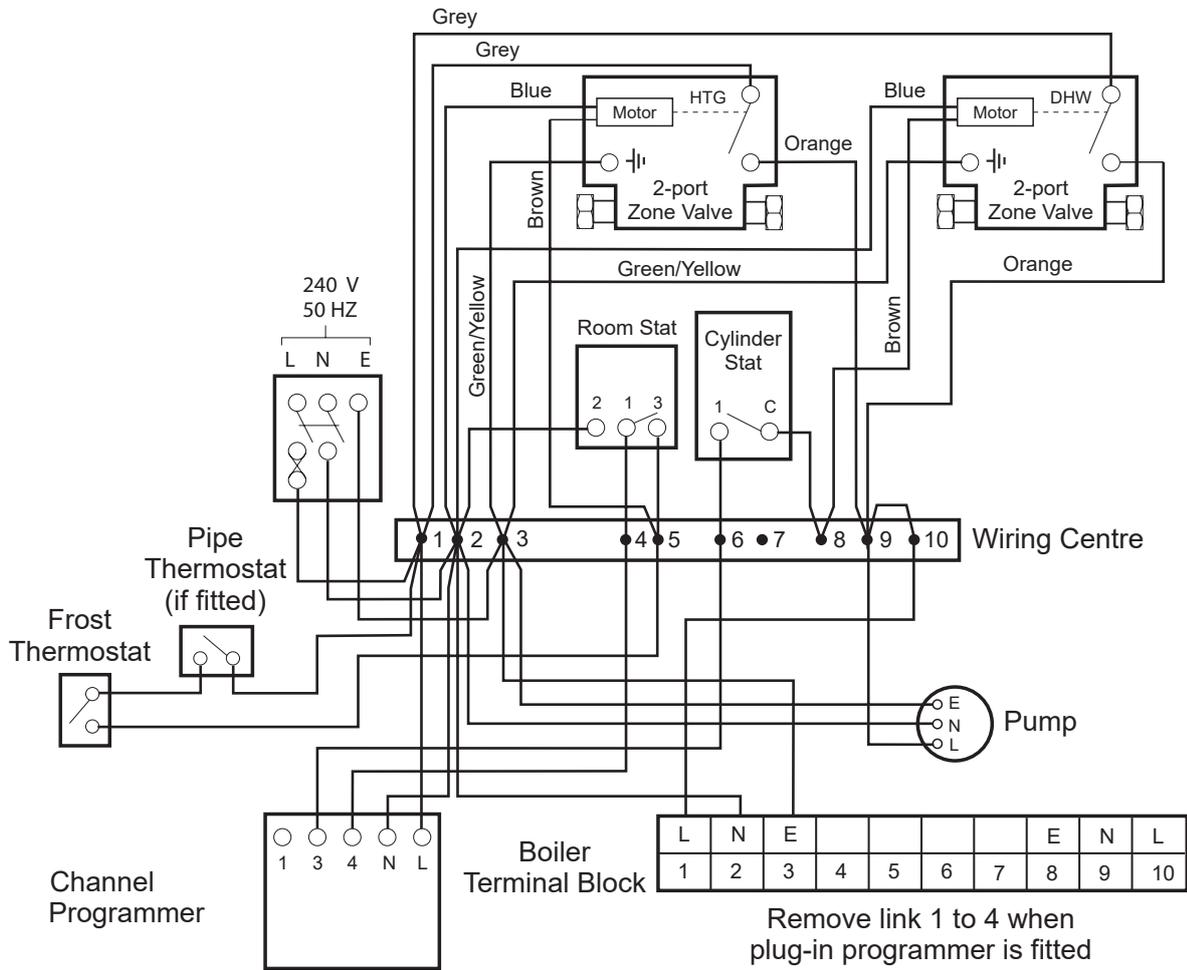


Figure 8-4: Utility models with 2 X 2-port valve control system

8.6 BOILER CONTROL PANEL WIRING DIAGRAMS

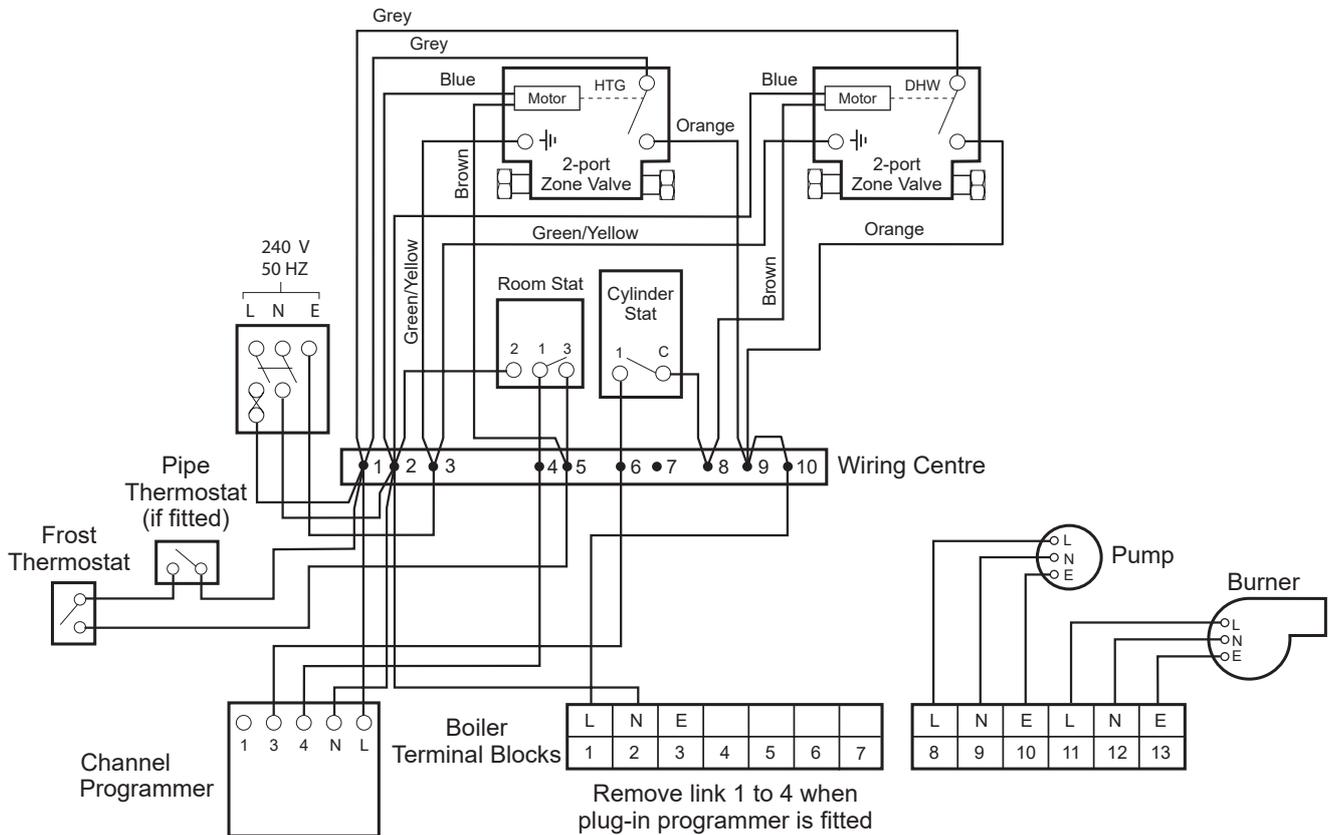
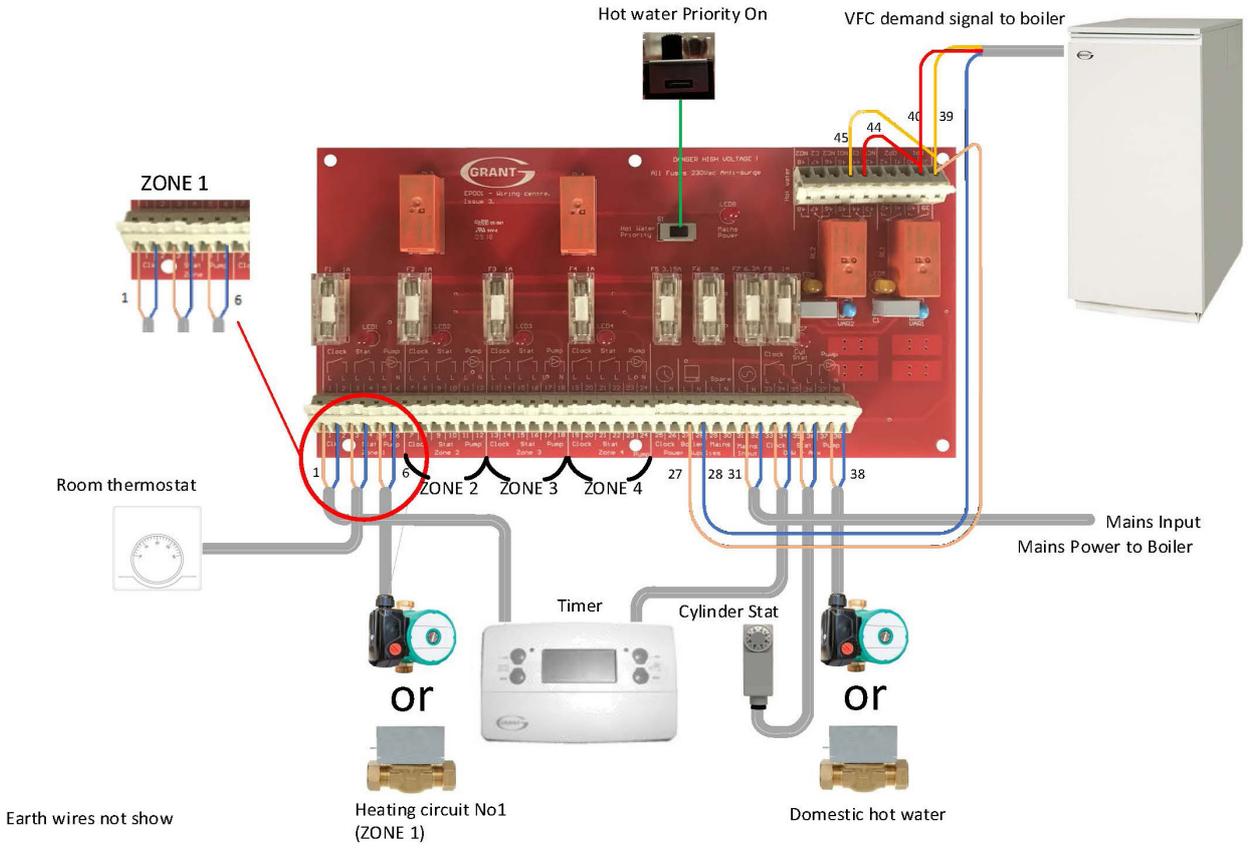


Figure 8-6: Utility System models with 2 X 2-port valve control system

8.7 SYSTEM WIRING USING GRANT WIRING CENTRE EP001



9 FLUE SYSTEM AND AIR SUPPLY SYSTEM

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.



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

NOTE

Open flue - Extract fans, where needed, should be in accordance with Section 5.4.7 in BS 5410-1.

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 5410-2.

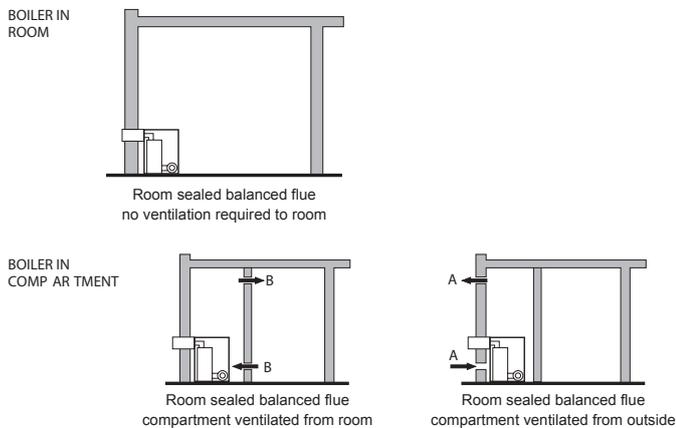


Figure 9-1: Air supply for room sealed balanced flue boilers

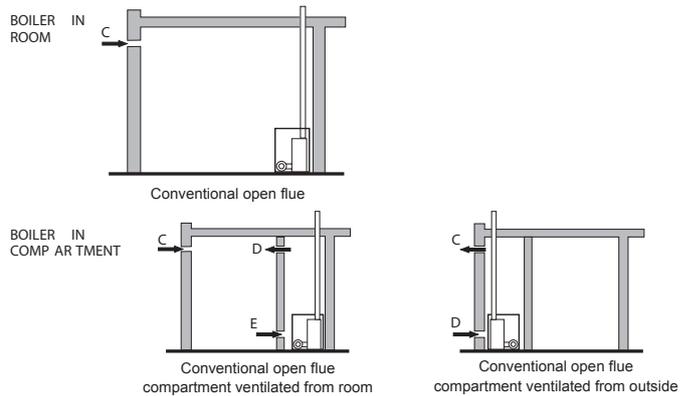


Figure 9-2: Air supply for conventional flue boilers

9.2 CONVENTIONAL FLUE SYSTEMS



NOTE

Under no circumstances can Grant Vortex boilers be installed with existing flue systems. Only flue systems and components suitable for wet flues should be used. Failure to install the correct type of flue system will invalidate the guarantee.

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 Ireland.

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 this flexible liner should not be visible from outside the chimney stack..

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.

Table 9-3: Ventilation areas

Output	15/21 kW		15/26 kW		26/36 kW		36/46 kW		46/58 kW		58/70 kW	
	cm ²	in ²										
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	1,155	180



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.



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.



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 (product code: 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 9-6. 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.

Only use flue systems suitable for oil fired condensing boilers.

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

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 Ireland. 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.

Table 9-4: Conventional flue kits

Product code	Flexi pack (Orange system)
GFKIT 6/100	100 mm diameter x 6 metre
GFKIT 6/125	125 mm diameter x 6 metre
GFKIT 8/100	100mm diameter x 8 metre
GFKIT 8/125	125mm diameter x 8 metre
GFKIT 10/100	100mm diameter x 10 metre
GFKIT 10/125	125mm diameter x 10 metre
GFKIT 11/100	100mm diameter x 11 metre
GFKIT 11/125	125mm diameter x 11 metre
GFKIT 12/100	100mm diameter x 12 metre
GFKIT 12/125	125mm diameter x 12 metre
GFKIT 14/100	100mm diameter x 14 metre
GFKIT 14/125	125mm diameter x 14 metre
GFKIT 16/100	100mm diameter x 16 metre
GFKIT 16/125	125mm diameter x 16 metre

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.

Table 9-5: Extensions

Product code	Extensions (Orange system)
WX 150/100	100 mm diameter x 150 mm
WX 150/125	125 mm diameter x 150 mm
WX 250/100	100 mm diameter x 250 mm
WX 250/125	125 mm diameter x 250 mm
WX 450/100	100 mm diameter x 450 mm
WX 450/125	125 mm diameter x 450 mm
WX 950/100	100 mm diameter x 950 mm
WX 950/125	125 mm diameter x 950 mm

Flue extensions cannot be cut.

Also available are:

- An adjustable extension (235 to 300 mm)
- 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.

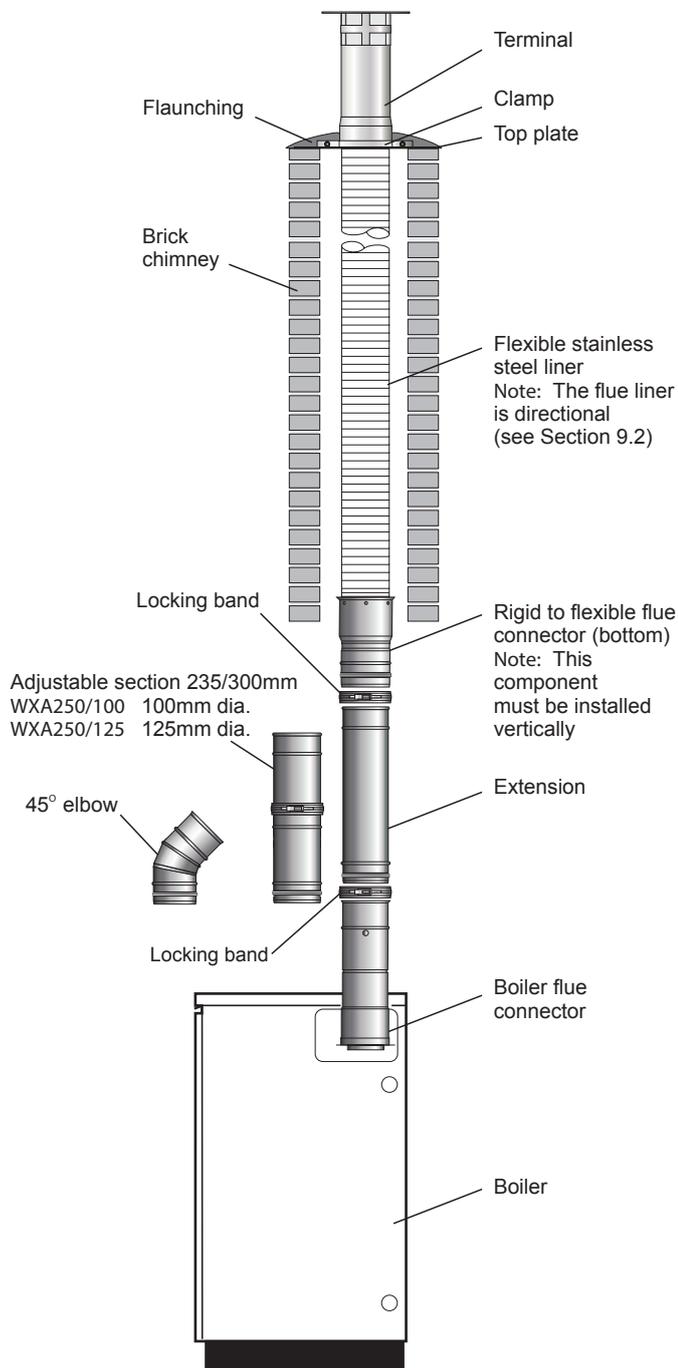


Figure 9-6: Grant Orange flue system in a typical brick chimney

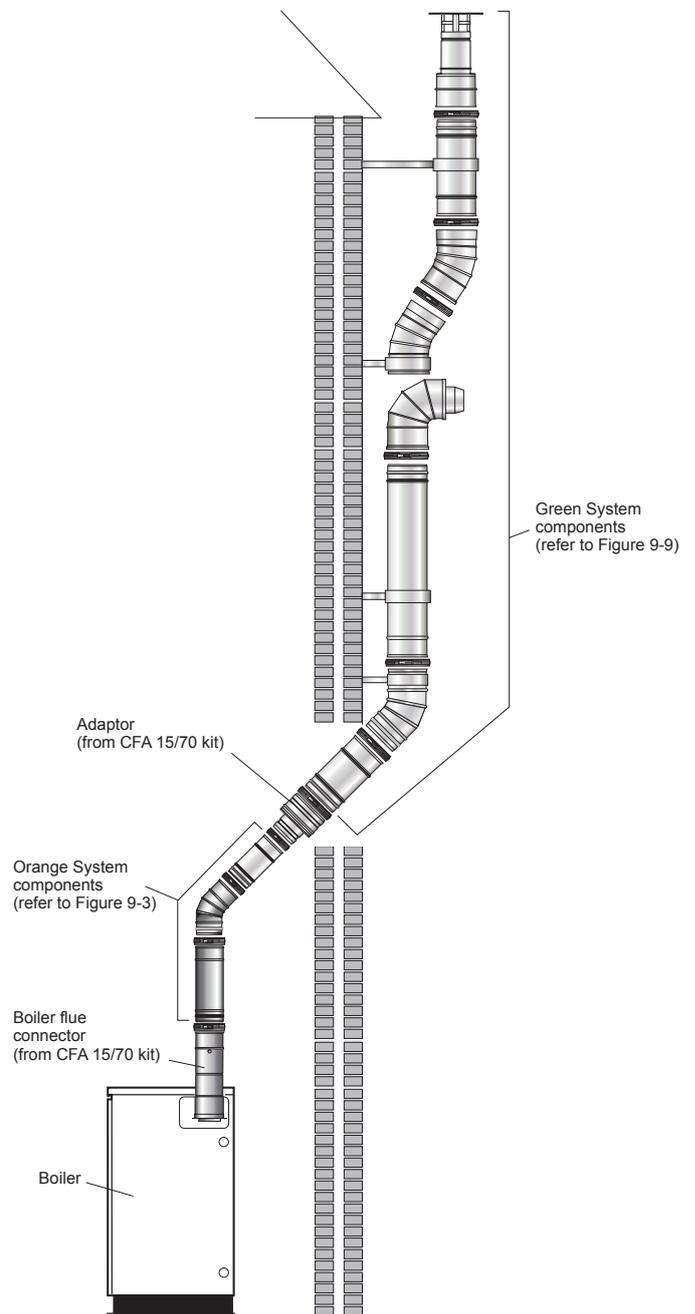


Figure 9-7: Hybrid flue system using Grant Orange and Green systems

9.3 CONNECTING A CONVENTIONAL 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 (product code: CFA15/70) must be used – refer to Section 1.3.

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 9-8.
5. Fit the flue adaptor (from the adaptor kit) into the boiler connector.

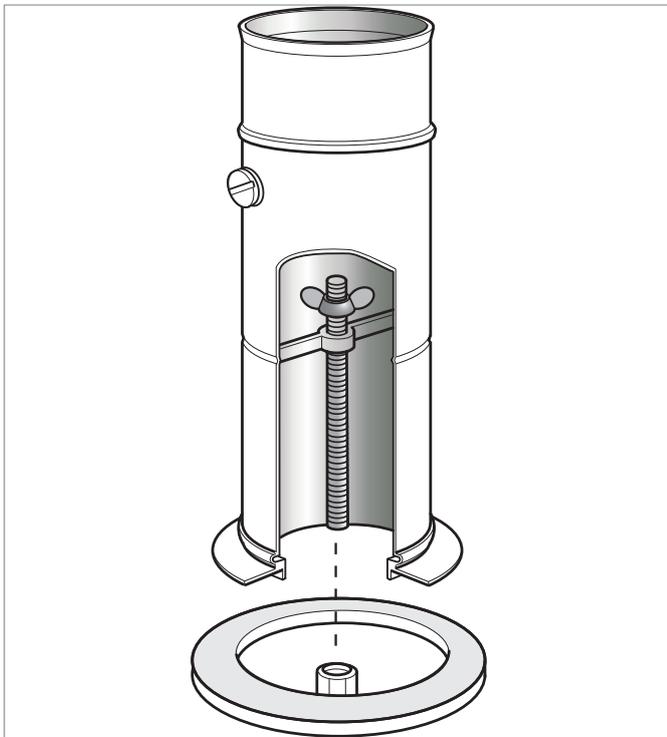


Figure 9-8: Boiler flue connector



NOTE

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

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

9.4 BALANCED FLUE SYSTEMS

Apart from a conventional flue, several balanced flue options are available for use with the Grant Vortex 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 9-9: 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 Grant 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.

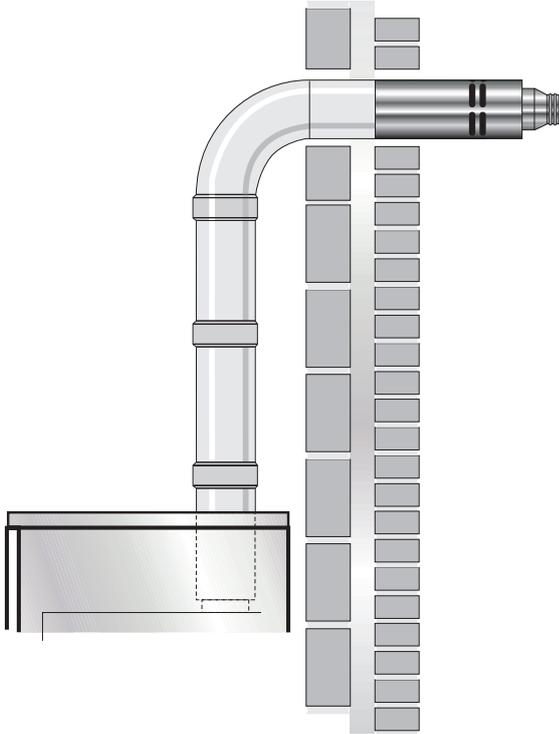


Figure 9-10: High level balanced flue

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.

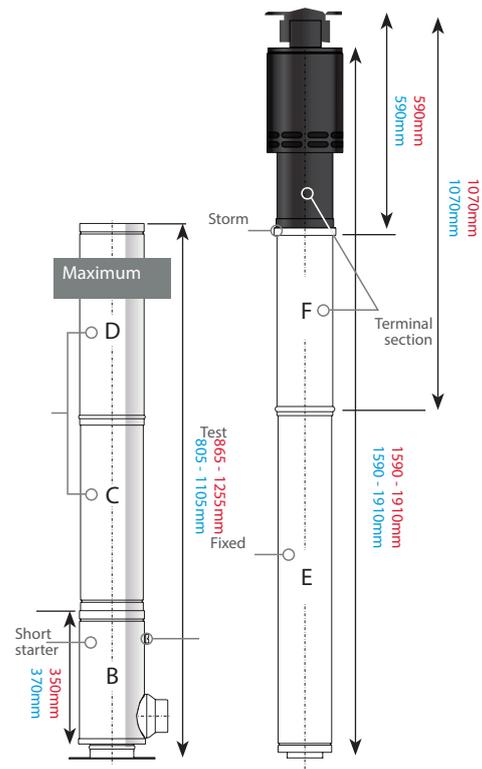


Table 9-11: White system components - product codes

Item	15/21 and 15/26 models	26/36, 36/46, 46/58 and 58/70 models
1.2 metre high level adjustable flue kit c/w 90° elbow and terminal	HLK015090	HLK0290200
Adjustable vertical 3 metre flue kit c/w terminal and storm collar	VTK055090	VTK0690200
225 mm extension	EXTK31225/90	EXTK32225/200
450 mm extension	EXTK09450/90	EXTK10450/200
950 mm extension	EXTK11950/90	EXTK12950/200
275 to 450 mm adjustable extension	EXTK13ADJ/90	EXTK14ADJ/200
45° elbow	ELBK2145/90	ELBK2245/200
Pitched roof flashing - aluminium (VTK055090 and VTK0690200)	VTMF200	
Pitched roof flashing - lead	VTK25P90 (includes collar)	VTK26P240 (no collar) VTK26P200/X (includes collar)
Flat roof flashing - aluminium	VTK27F90	VTK28F200
Wall bracket	BRK2990	BRK30200

FLEXIBLE VERTICAL BALANCED FLUE (RED SYSTEM)

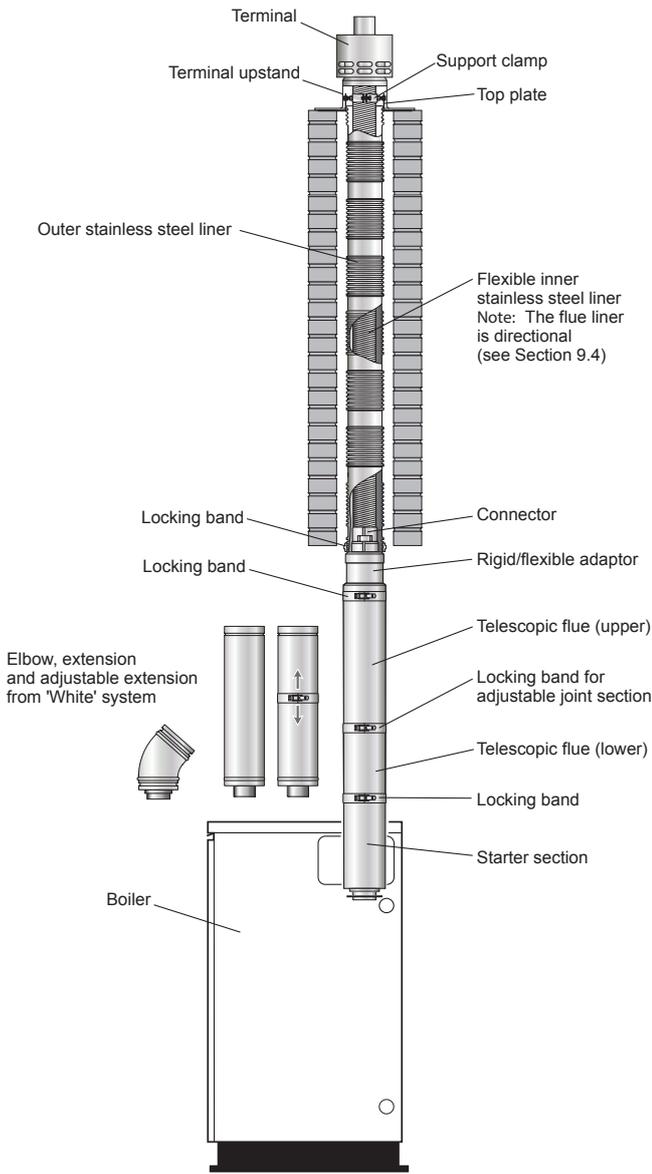


Figure 9-12: Red system balanced flue

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 9-12.

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.



One metre of straight flue length should be deducted for every elbow used. If the flexible liner has to pass around an offset in the chimney, two metres of straight flue length should be deducted to compensate for this, i.e. equivalent to two 45° elbows.

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.



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 (product code: ELBK2145/90 models up to 26 kW output or ELBK2245/200 for models 26 to 70 kW output).

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

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 9-13.

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 9-13.

The minimum dimensions for locating the terminal from building features (windows, doors, etc.) are shown in Figure 9-15.

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 Ireland.

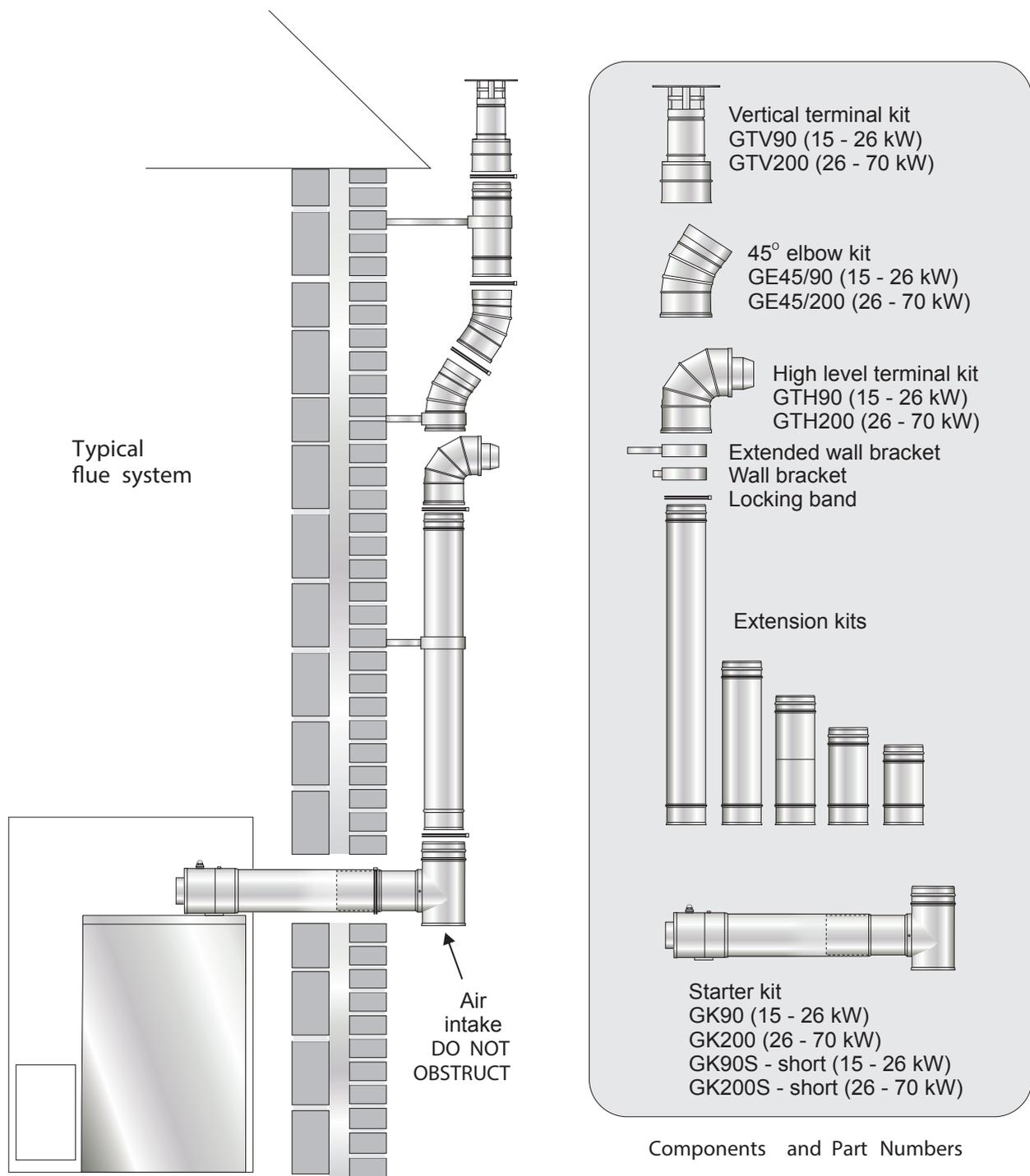


Figure 9-13: External balanced flue (green system)

Table 9-14: Green system components - product codes

Item	15/21 and 15/26 models	26/36, 36/46, 46/58 and 58/70 models
Standard starter kit (stainless steel)	GK90	GK200
Short starter kit (stainless steel)	GK90S	GK200S
150 mm extension	GX150/90	GX150/200
250 mm extension	GX250/90	GX250/200
450 mm extension	GX450/90	GX450/200
950 mm extension	GX950/90	GX950/200
195 - 270 mm adjustable extension	GXA250/90	GXA250/200
45° elbow	GE45/90	GE45/200
Straight terminal	GTL90	GTL200
High level 90° terminal	GTH90	GTH200
Vertical terminal	GTV90	GTV200
Wall bracket - standard	GWB90	GWB200
Wall bracket - extended	GEB90	GEB200

9.5 PREPARE THE WALL

9.5.1 LOW LEVEL BALANCED FLUE

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 9-15.

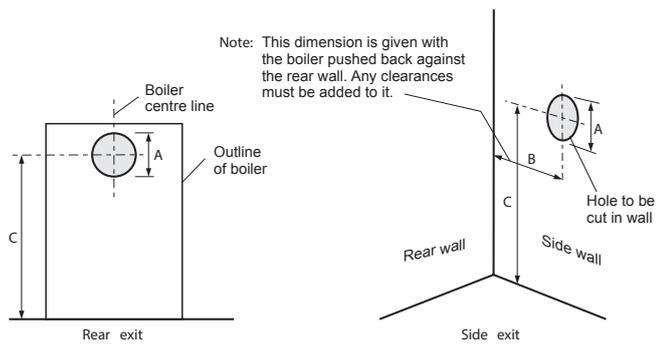


Figure 9-15: Flue hole dimensions and position for low level system

9.5.2 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 9-17.

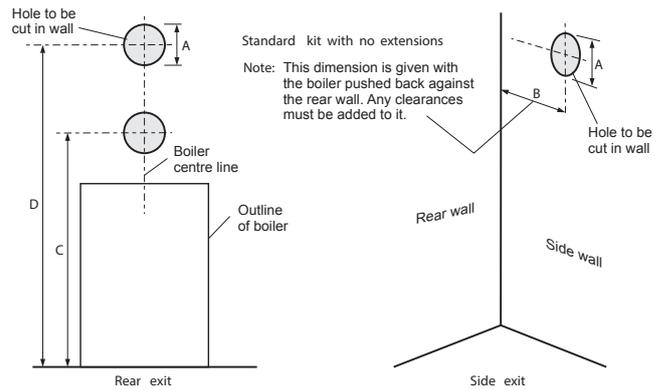


Figure 9-17: Flue hole dimensions and position for high level system

Table 9-16: Low level balanced flue hole cutting dimensions

Model	Dimension (mm)		
	A (dia.)	B	C
15/21, 15/26	127	120	768
26/36	162	120	780
36/46	162	120	780
46/58, 58/70	162	1120	1,102



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

Table 9-18: High level balanced flue hole cutting dimensions

Model	Dimension (mm)			
	A (dia.)	B	C	D
15/21, 15/26	175	120	1,215*	1,715 - 2,115
26/36	200	120	1,280*	1,700 - 2,020
36/46	200	120	1,280*	1,700 - 2,020
46/58, 58/70	200	120	1,595*	2,015 - 2,335

* Dimension C for starter section and elbow/terminal only



Dimension A given in Figure 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.

9.6 FLUE CLEARANCES

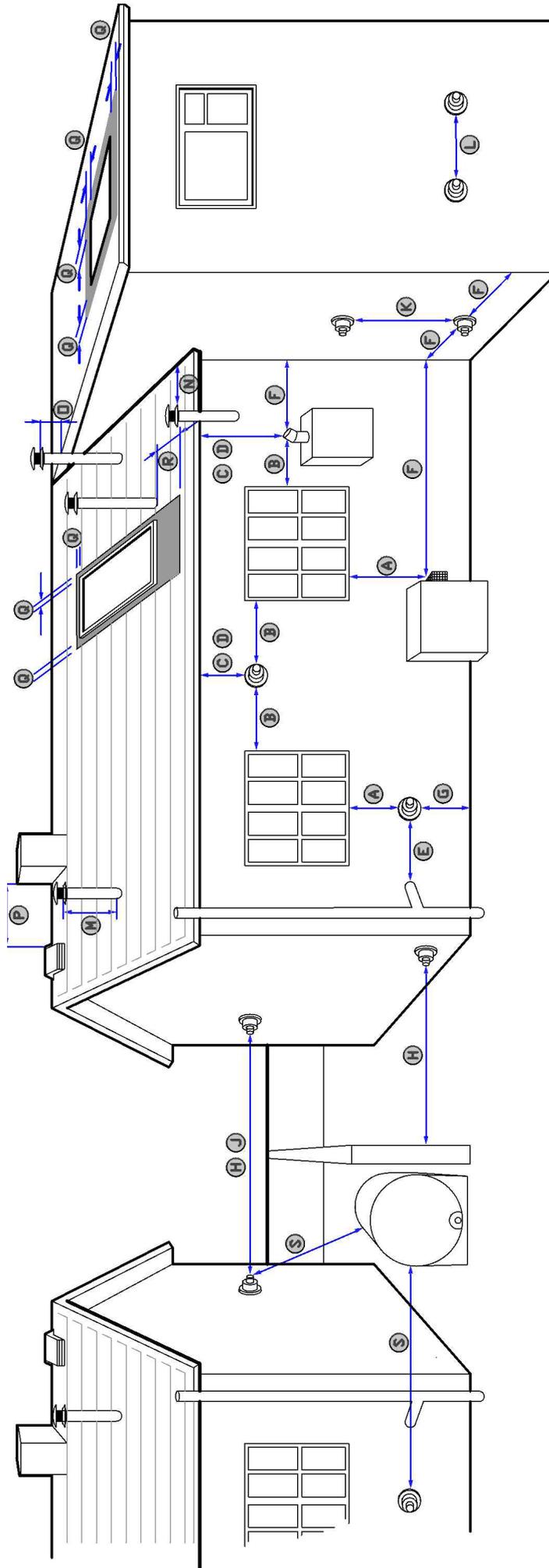


Figure 9-19: Flue clearances

Table 9-20: Flue clearances

Ref	Location of outlet	Minimum distance (mm)	
		Pressure jet	Condensing
A	Directly below an opening, air brick opening, opening window, etc.	600	1,000 **
B	Horizontally to an opening, air brick opening, opening window, etc.	600	1,000 **
C	Below a gutter, eaves or balcony with protection	75 *	1,000 **
D	Below a gutter, eaves or balcony without protection	600	1,000 **
E	From vertical sanitary pipework	300	
F	From an internal or external corner	300	
G	Above ground or balcony level	300	
H	From a surface or boundary facing the terminal	600	2,500 **
J	From a terminal facing the terminal	1,200	
K	Vertically from a terminal on the same wall	1,500	
L	Horizontally from a terminal on the same wall	750	
M	Above the highest point of an intersection with the roof	600	
N	From a vertical structure to the side of the terminal	750	
O	Above a vertical structure less than 750 mm from the side of the terminal	600	
P	From a ridge terminal to a vertical structure on the roof	1,500	
Q	Above or to the side of any opening on a flat or sloping roof	300	
R	Below any opening on a sloping roof	1,000	
S	From oil storage tank (Class 1)	1,800 ***	

* A heat shield at least 750 mm wide must be fitted to provide protection of combustible material.

** Clearances required by BS 5410-1:2014 to alleviate the effect of plume nuisance. If a risk assessment shows that there will be no impact from pluming, then the 'pressure jet' figure could apply - seek confirmation from Local Authority Building Control.

*** Seek guidance from OFTEC Book 3 (Oil Storage and Supply).

NOTES

- Appliances burning class D fuel have additional restrictions. Refer to BS 5410-1:2014.
- Vertical structure in N, O and P includes tank or lift rooms, parapets, dormers, etc.
- Terminating positions A to L are only permitted for appliances that have been approved for low level flue discharge when tested in accordance with BS EN 303-1, OFS A100 or OFS A101.
- Terminating positions should be at least 1.8 metres from an oil storage tank (Class 1) unless a wall with at least 30 minutes fire resistance and extending 300 mm higher and wider than the tank is provided between the tank and the terminating position.
- Where a flue is terminated less than 600 mm away from a projection above it and the projection consists of plastics or has a combustible or painted surface, then a heat shield of at least 750 mm wide should be fitted to protect these surfaces.
- If the lowest part of the terminal is less than 2 metres above the ground, balcony, flat roof or other place to which any person has access, the terminal should be protected by a guard.
- Notwithstanding the dimensions given above, a terminal should not be sited closer than 300 mm to combustible material. In the case of a thatched roof, double this separation distance should be provided. It is also advisable to treat the thatch with a fire retardant material and close wire in the immediate vicinity of the flue.
- A flue or chimney should not pass through the roof within the shaded area delineated by dimensions Q and R.
- Where protection is provided for plastics components, such as guttering, this should be to the standard specified by the manufacturer of the plastics components.
- Terminals must not be sited under car ports.
- Terminals at low levels (terminals under 2.1 metres) have more restrictive recommendations and should not be positioned near public footways, frequently used access routes, car parking spaces less than 2.5 metres from the terminal or patio's (hard surface area).

Further guidance can be obtained from BS 5410-1:2014, OFTEC Book 4 (Installation) and Approved Document J.

Grant Ireland flue products are fully compliant with the CE (Communauté Européenne/European Community) standards having undergone rigorous product testing.

10 COMMISSIONING

To ensure safe and efficient operation, it is essential that a Grant Vortex boiler is commissioned as detailed in the following procedure.

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

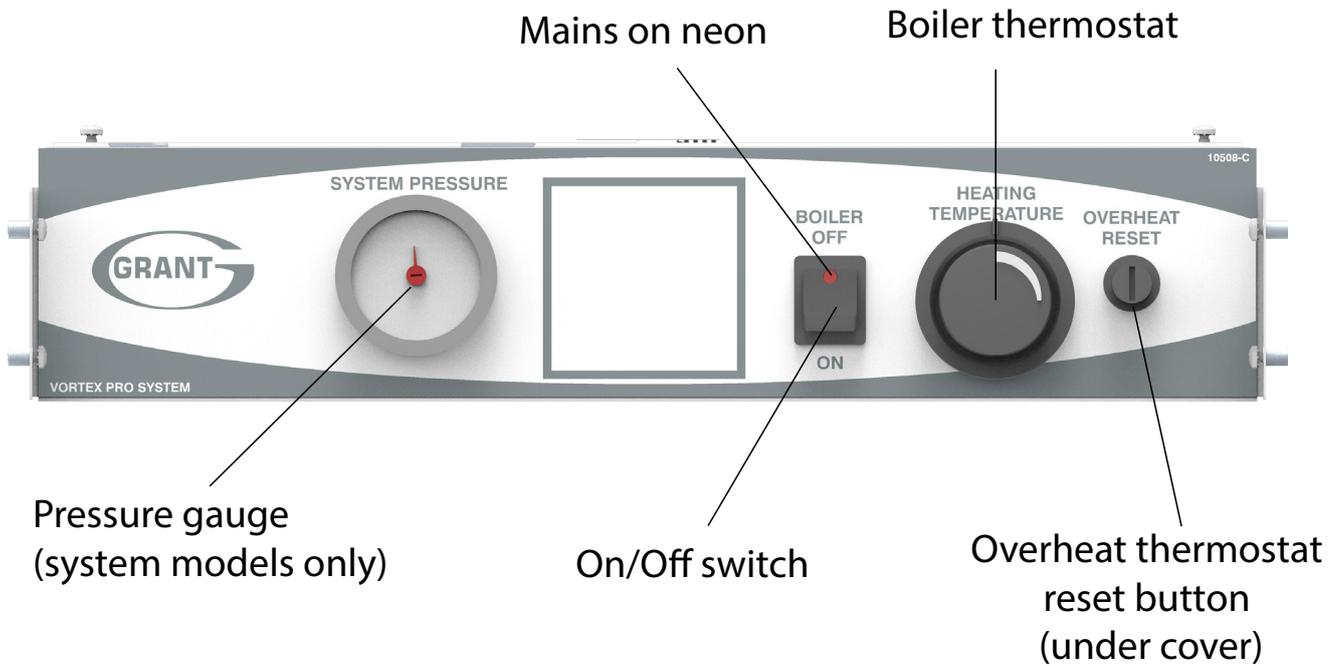


Figure 10-1: Vortex boiler control panel

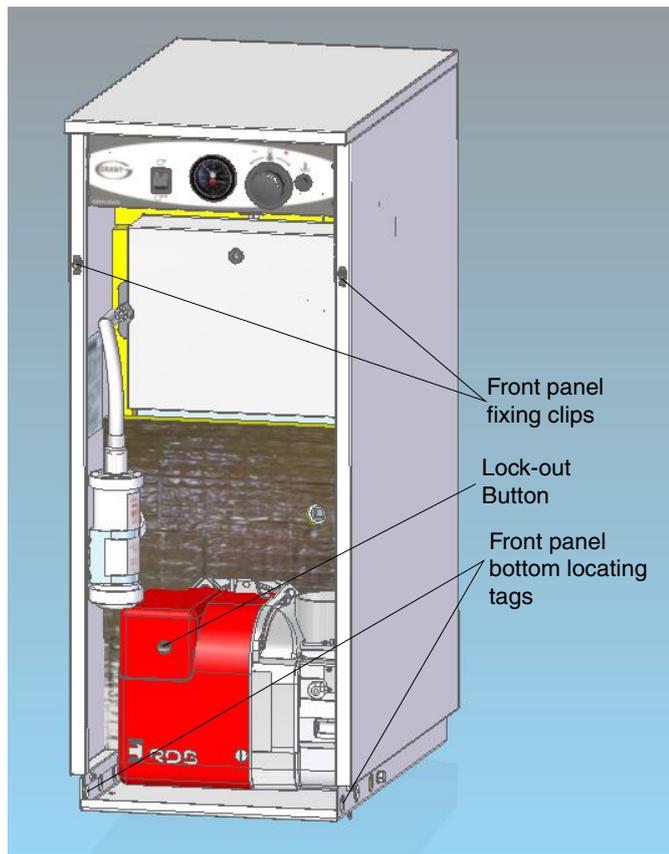


Figure 10-2: Position of boiler components - Vortex boiler

The controls are shown in Figure 10-1.

10.1 BEFORE SWITCHING ON

1. Ensure the boiler is isolated from the electrical supply and the boiler On/Off switch is set to OFF.
2. Check that the high limit thermostat bulb and boiler thermostat bulb are correctly located in their respective pockets. Refer to Figures 5-1 to 5-4. Check condition of both thermostat capillaries. Ensure they are not damaged, broken, kinked or crushed.
3. Remove the nuts and washers securing the front cleaning door. Withdraw the door – take care as it is heavy.
4. Check that the turbulators are in position and that the ends are vertical. Refer to Figure 11-6.
5. Check that the baffles are in position. Refer to Figures 11-1, 11-2, 11-3, 11-4 or 11-5 as required.
6. Re-fit cleaning door and check it is fitted correctly and that a good seal is made.
7. Unscrew the burner fixing nut (located at the top of the mounting flange) and remove the burner from the boiler.
8. Check/adjust the burner settings as described in Section 10.2 or 10.3.
9. Re-fit the burner to the boiler and tighten the fixing nut. **Do not over-tighten!**
10. Check that the sealed system has been vented and pressurised and there are no leaks.
11. Ensure that the condensing heat exchanger has been vented via the manual air vent (on heating return connection). Refer to Section 5.3
12. Ensure that the air vent on the heating flow pipe (system version only) is open. Refer to Section 5.3.
13. Check that all fuel line valves are open.
14. Remove the plastic burner cover if it was not previously removed.
15. Connect a combined vent manifold and pressure gauge to the pressure gauge connection port on the oil pump. See Figure 3-5. Open the vent screw on the vent manifold to vent the oil supply whilst the pump is running.
16. Check that all system controls are calling for heat and turn the boiler thermostat to maximum.

10.2 BURNER SETTINGS: RDB2.2 BX BURNERS

FOR 15/21, 15/26, 26/36 AND 36/46 MODELS

With the burner removed from the boiler:

1. On the 15/26 models - first remove the recirculation tube from the burner head. Unscrew and remove the single fixing screw and slide the recirculation tube off the head.
2. Remove the burner head. Refer to Figure 10-3. Loosen the three fixing screws (1) and remove head (2) from burner.

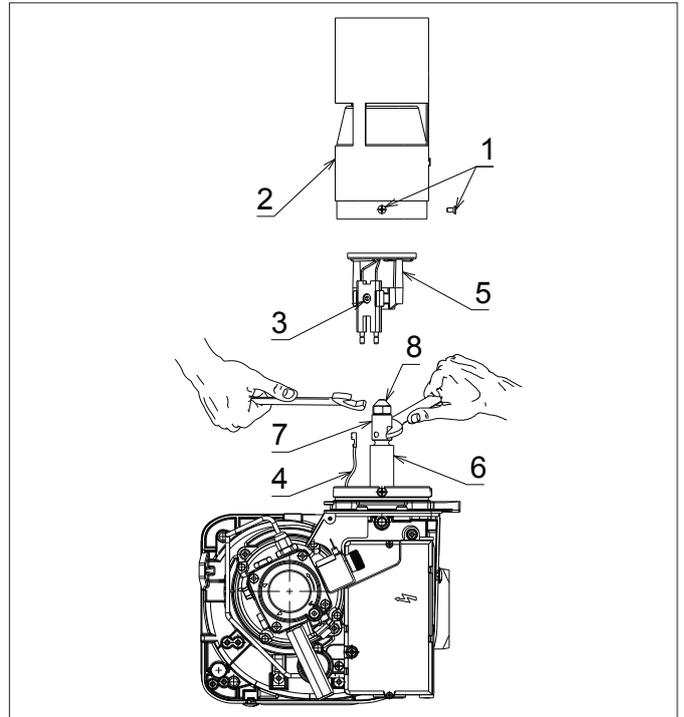


Figure 10-3: Burner head, recirculation tube (if fitted) diffuser and nozzle holder

3. Check the nozzle is correct for the required boiler output. Refer to Table 2-2 for the correct nozzle size and type for the required boiler output.
4. If the nozzle needs to be replaced - remove the diffuser/electrode assembly. Refer to Figure 10-4.
 - Using a 4 mm Allen key, loosen the diffuser fixing screw (3) on the electrode assembly.
 - Lift diffuser/electrode assembly (5) up and off the nozzle holder.
 - Disconnect both ignition leads (4) from the electrodes.
5. Use a 16 mm spanner to remove/re-fit the nozzle, whilst holding the nozzle holder using a 19 mm spanner.



CAUTION

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



NOTE

Ensure that the nozzle is securely tightened so that it does not leak but DO NOT OVER TIGHTEN!

6. Re-fit the diffuser/electrode assembly. Refer to Figure 10-3.
 - Reconnect ignition leads (4) to electrodes.
 - Re-fit the diffuser/electrode assembly (5) onto the nozzle holder lining up the fixing screw with the recess in the nozzle holder.
 - Ensure diffuser assembly is fitted down hard onto the shoulder on the nozzle holder.
 - Tighten the fixing screw (3) to secure the diffuser/electrode assembly in place on the nozzle holder.



Do not overtighten the fixing screw as this may damage the electrode insulator.

NOTE

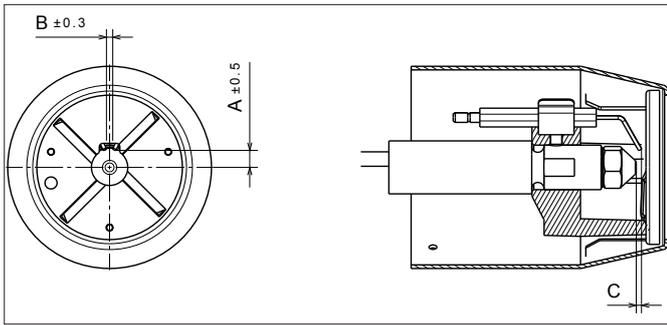


Figure 10-4: Ignition electrode settings

Model	A	B	C
Utility 15/21, 15/26 Utility System 15/26	7	2.5	2.5 - 3
Utility 26/36, 36/46 Utility System 26/36, 36/46	4.5	3	2 - 2.5

7. Check/adjust electrode setting. Refer to Figure 10-4.
8. Re-fit the burner head. Refer to Figure 10-3.
 - Locate the head fixing screws (5) in the countersunk slots in the burner collar.
 - Check that the small oil drip hole (on the head) is pointing downwards.
 - Tighten the two screws (1) to secure the head (2) in position on the burner.
9. Adjust the diffuser position. Refer to Figure 10-5.



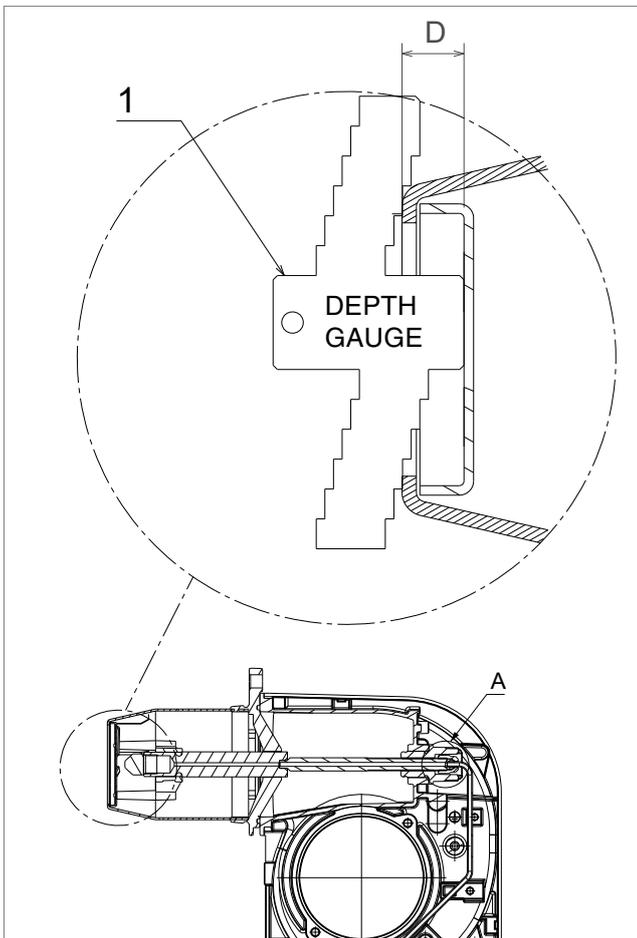
The distance between the end of the burner head and the front face of the diffuser (D) MUST be correctly set for the burner to operate correctly.

NOTE

- Refer to Table 2-2 for the required distance (head setting) for the boiler output required.
- Check the distance D using the gauge plate supplied with the boiler.
- To use the gauge plate: Position the gauge on the burner head as shown in Figure 10-5.
- Locate the gauge with the correct steps (i.e. the two marked with the required distance D) resting on the edge of the burner head.
- Check the gauge plate is at 90° to the end of the burner head and is positioned at the full diameter of the head.
- If the distance D is correct, the tongue of the gauge should just make contact with the diffuser, with BOTH steps still in contact with the edge of the burner head.
- If the steps are not in contact with the edge of the burner head, when the tongue of the gauge is touching the diffuser, the diffuser must be 'opened' (see below).
- If the tongue does not reach the diffuser, when the steps are in contact with the edge of the burner head, the diffuser must be 'closed' (see below).

To adjust the diffuser position:

- If necessary, adjust distance D using the black adjustment knob located around the oil supply pipe on the front of the burner. Refer to Figure 10-5. Re-check distance D using the gauge plate, as described above.
- For easier access to the adjustment knob, pull the photocell out from the burner housing.
- To increase distance D (to open the diffuser): rotate the knob clockwise - indicated as '+' on the knob.
- To decrease distance D (to close the diffuser): rotate the knob anti-clockwise - indicated as '-' on the knob.



NOTE

One full rotation of the adjustment knob is approximately 1 mm of diffuser movement.



NOTE

It is essential that the final position of the diffuser is checked, using the gauge plate provided with the boiler and the diffuser adjusted as necessary to achieve the required distance D.

10. For Vortex 15/21 and 15/26 models only:
Check the burner air adjuster disc is correctly set. Refer to Section 10.4.
11. On the 15/26 models - refit the recirculation tube to the burner head and secure using the single fixing screw.

10.3 BURNER SETTINGS: RDB3.2 BURNERS

FOR 46/58 AND 58/70 MODELS

With the burner removed from the boiler:

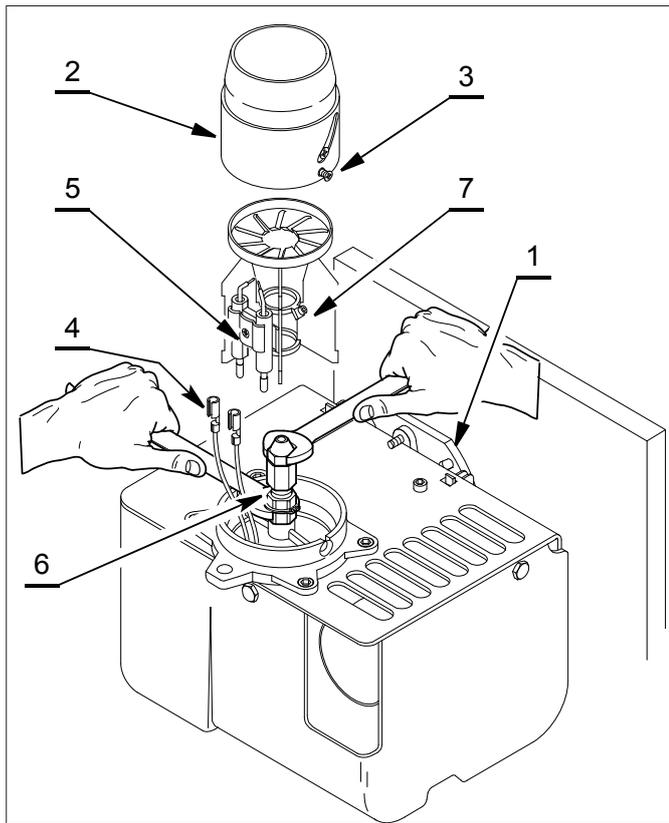


Figure 10-6: Riello RDB 3.2 burner head, diffuser and nozzle holder

1. Remove the burner head. Refer to Figure 10-6. Loosen both fixing screws (3) and remove head from burner (2).
2. Check the nozzle is correct for the required boiler output. Refer to Table 2-2 for the correct nozzle size and type for the required boiler output.
3. If the nozzle needs to be replaced - Remove the diffuser/electrode assembly. Refer to Figure 10-6.
 - Loosen the diffuser clamp screw (7) and remove the diffuser/electrode assembly from the nozzle holder (6). Refer to Figure 10-6
 - Disconnect both ignition leads (4) from the electrodes.
4. Use a 16mm spanner to remove/re-fit the nozzle, whilst holding the nozzle holder using a 17mm spanner.



CAUTION

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



NOTE

Ensure that the nozzle is securely tightened so that it does not leak but DO NOT OVER TIGHTEN!

5. Reconnect ignition leads to electrodes.
6. Re-fit the diffuser/electrode assembly to the nozzle holder.
7. Check/adjust the diffuser position to give the correct gap (A) between the nozzle and diffuser. Refer to Figure 10-7.

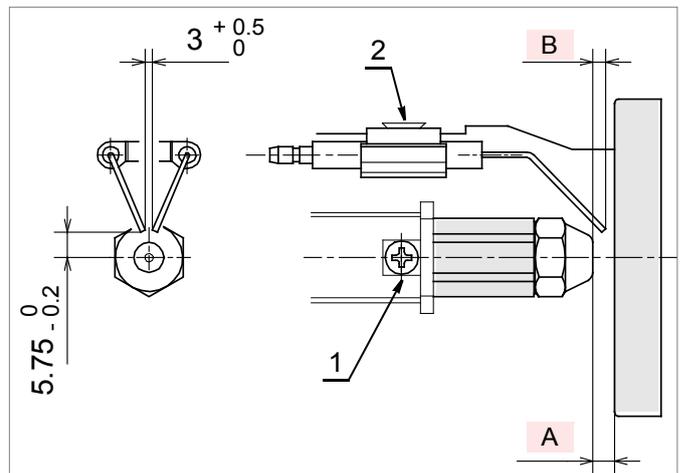


Figure 10-7: Ignition electrode settings

Model	A	B
Utility 46/58 and 58/70	7.5	4

- To adjust the diffuser position:
 - Loosen the diffuser clamp screw.
 - Slide diffuser along the nozzle holder to give the correct gap (A).
 - Tighten the diffuser clamp screw.
8. Check/adjust the electrode assembly to give the correct gap (B) between the nozzle and electrodes. Refer to Figure 10-7.
 - To adjust the electrode position:
 - Loosen the electrode clamp screw.
 - Slide the electrode assembly to give the correct gap (B).
 - Tighten the electrode clamp screw.
 9. Re-fit the burner head. Refer to Figure 10-6.
 - Locate the head fixing screws in the countersunk slots in the burner collar.
 - Tighten the two screws (3) to secure the head (2) in position on the burner.
 10. Check the combustion head setting.
 - The correct head setting depends on the required output of the boiler. Refer to Table 2-2
 - This should be set to '0' in all cases except when the 58/70 is set to maximum (70kw) output.
 - In this case the head is set to '4' (i.e. on the 4th line). Refer to Figure 10-8.
 11. To adjust the head setting (if required):
 - Loosen the two screws in the curved slots in outer ring of the head (NOT the two head fixing screws). Refer to Figure 10-8.
 - Rotate the end of the burner head until either '0' or the 4th line, as required.
 - Tighten the two screws to fix the head in the required position.

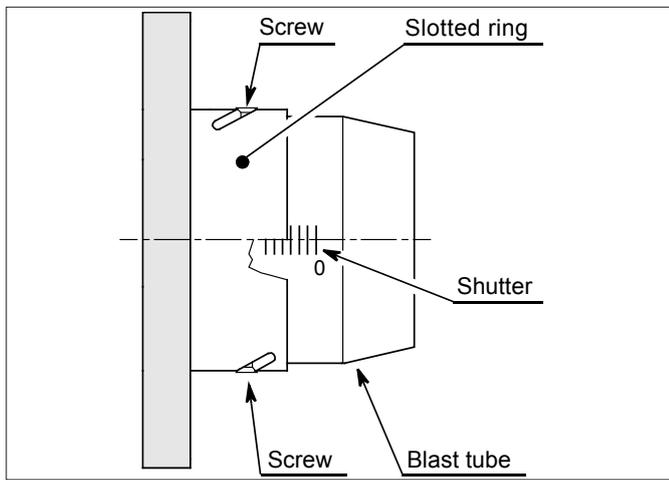


Figure 10-8: Riello RDB 3.2 combustion head adjustment

10.4 AIR ADJUSTER DISC: 15/21 AND 15/26 MODELS ONLY



If the 15/26 model is to be set to 26kW, the air adjuster disc is not required. It should be removed from the burner and discarded.

NOTE

The Riello RDB 2.2 BX burner fitted to these boilers incorporates a secondary air adjustment.

This is an air adjuster disc located on the fan housing (inside the air inlet housing).

It is essential, for correct operation of the burner, that this internal air adjuster disc is correctly set. Refer to Figure 10-9.

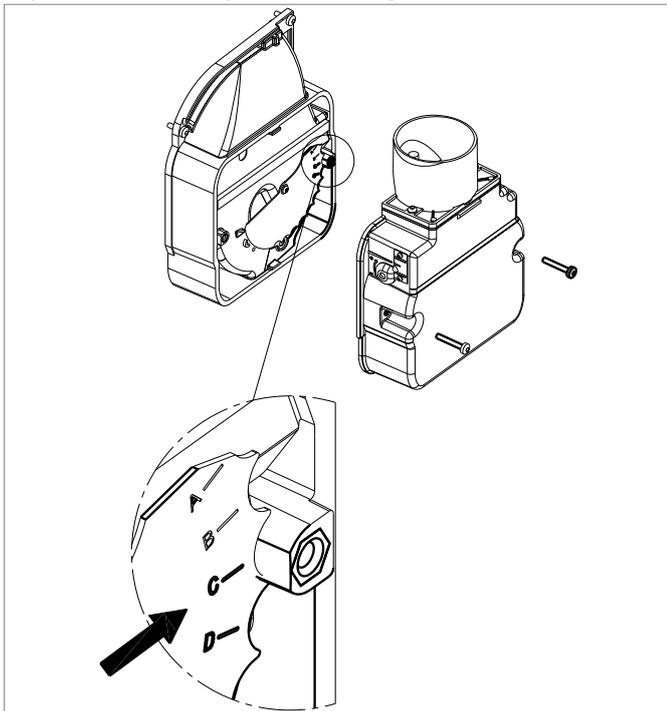


Figure 10-9: Air adjuster disc

To access the air adjuster disc:

1. Ensure the boiler is isolated from the electrical supply.
2. Remove the burner fixing nut (located at the top of the mounting flange) and withdraw the burner from the boiler.
3. Undo the two screws and remove the air inlet cover from the side of the burner.
4. The air adjuster disc is mounted on the fan housing. Refer to Figure 10-9.
5. Check that this disc is correctly set for the factory set output of the boiler, i.e. with the correct cut-out marked located against the moulded boss on the fan housing. Refer to Table 2-2 page

8 for correct disc settings. If the disc is not correctly set it **MUST** be re-positioned. Refer to step 7 below.

6. If the burner is to be set to a different output than the factory setting, the air adjuster disc **MUST** be set to the required setting for that output. Refer to Table 2-2 for correct disc settings.
7. The air adjuster disc is re-positioned as follows:
 - Remove the screw from the centre of the air adjuster disc.
 - Re-position the disc so that the correct cut-out is located against the moulded boss on the fan housing.
 - Replace the screw in the centre of the air shutter disc and tighten.
8. If the 15/26 model is to be set to 26kW, the air adjuster disc is not required. It should be removed from the burner and discarded.
9. Re-fit the air inlet cover to the side of the burner and secure in place using the two screws.

10.5 SWITCHING ON

1. Switch on the electricity supply to the boiler.
2. Set the boiler On/Off switch to ON. A neon on the switch lights when it is in the ON position. 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.
The burner should then fire. Open the vent screw on the vent manifold to vent the supply while the oil pump is running. Close vent screw once vented.
3. 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 on the burner lights, wait about 45 seconds and 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. Refer to Section 2.3 (burner settings).
5. Adjust the pressure if necessary - refer to Section 11.9 (burner components).



It is important that the oil pressure is correctly set.

NOTE

6. Operate the boiler until it reaches normal operating temperature. Check oil supply/return pipe for leaks, rectifying where necessary.
7. Check the operation of the boiler thermostat. Ensure that by turning it anticlockwise it switches the burner off.
8. 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.
9. Ensure that there are no oil leaks, replace the burner cover.
10. On balanced flue installations - Ensure the flexible air inlet tube is correctly connected to both the burner air inlet and the flue system.

10.6 RUNNING THE BOILER

1. Relight the boiler and allow it to run for at least 20 minutes.
2. Check the smoke number, if it is 0-1 then it is satisfactory.
3. Using a calibrated electronic flue gas analyser, set to the correct fuel, check the CO₂% in the flue gases.
4. Set the CO₂%, as indicated on the flue gas analyser, to the required value as given in Section 2.3 for the boiler concerned.
5. Adjust the burner air damper, using the hexagonal key supplied, to achieve the required CO₂%. Refer to Section 11-9.
6. To increase the CO₂%:
 - Turn the screw anti-clockwise. This will close down the burner air damper and decrease the combustion air entering the burner.To decrease the CO₂%:
 - Turn the screw clockwise. This will open up the burner air damper and increase the combustion air entering the burner.
7. When the CO₂% is set to the correct level, re-check the smoke number if the burner air damper has been moved. Under no circumstances must the smoke number be above 1.



WARNING

Check cleaning door seal, boiler/flue seal and burner flange seal with flue gas analyser for a minimum of 60 seconds and a distance of 100mm (from each seal) to ensure there is no leak of flue gases.



NOTE

For safe and efficient operation of the boiler it is essential that the air damper is correctly set to give the required %CO₂ in the flue gases.

10.8 COMPLETION

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



NOTE

After commissioning, complete the Boiler Passport. Return the green/ white copy to Grant Engineering (ULC). The green copy is retained by the commissioning engineer and the yellow copy is left with the user in the Boiler Passport for users record.

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

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



CAUTION

If there is any possibility of the boiler being left during freezing conditions, then the boiler and system should be drained. Alternatively, a suitable heating system 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. Both the %CO₂ and smoke test may all be carried out using this test point.

This test point is NOT suitable for measuring boiler efficiency or conventional flue draught.

When using the test point on the cleaning cover note that the flue gas temperature reading will be higher than that measured in the flue thus resulting in an inaccurate efficiency reading. To obtain an accurate flue gas temperature and efficiency, the reading can only be measured outside through the low level flue terminal (or the test point on the conventional flue starter section when used).

10.7 BALANCING THE SYSTEM

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

10.9 INFORMATION FOR THE USER

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

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

11 SERVICING

To ensure safe and efficient operation it is essential that a Grant Vortex boiler is serviced at regular intervals of no longer than 12 months.

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 boiler passport which is supplied with the boiler..

This information may be required to validate the Grant guarantee.



WARNING

Before starting any work on the boiler or fuel supply, please read the Health and Safety information given in Section 14 of these Instructions.

11.1 CHECKS BEFORE SERVICING

The following sequence of checks should be made before starting any servicing work:

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 system connections and fittings are sound. Remake any joints and check the tightness of any fittings that may be leaking.
4. Allow the boiler and system to cool down.
5. If the boiler is part of a sealed central heating system, check the system pressure, check the operation of the pressure relief valve and check the expansion vessel air charge. Refer to Section 7.
6. Refill, vent and re-pressurise the system as necessary. Refer to Section 7.
7. Check that any ventilation openings are adequate of adequate free area and are clear of obstructions. See Section 9.
8. Remove any sludge/water from the fuel tank by opening the sludge valve at the lower end of the tank (if fitted).
9. Ensure that all fuel system connections and fittings are sound. Remake any joints and check the tightness of any fittings that may be leaking.
10. With the fuel supply valve (at the oil tank) closed, clean/replace the filter element and clean the filter bowl.



WARNING

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

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

11.2 DISMANTLING PRIOR TO SERVICING

The procedure for dismantling the boiler is as follows:

1. Remove the front panel from the boiler (pull forward at the top and then lift off).
2. On system models, carefully lift up the expansion vessel and remove it from the boiler. Place it on the floor, taking care not to strain the flexible pipe.
3. Disconnect the flexible air tube from the burner.

4. Unscrew and remove the two fixing screws and remove the red cover from the burner.
5. Remove the burner fixing nut (located at the top of the mounting flange) and withdraw the burner from the boiler. If required, disconnect the flexible oil line(s), using a suitable container to prevent any oil spillage.
6. Check or replace the flexible fuel supply hose, as follows:
 - Braided flexible fuel supply hoses (as supplied with the boiler) should be replaced annually, i.e. when the boiler is serviced.
 - Long-life hoses should be inspected annually. If in doubt replace the hose(s). In any event, these hoses must be replaced every five years.



NOTE

With a two-pipe oil supply there will be two flexible hoses connected to the burner. Identify (mark if necessary) which is the inlet and return if they are to be disconnected.

11.3 CLEANING THE BOILER

The procedure for cleaning the boiler is as follows:

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



NOTE

The condensate trap and condensate outlet must be checked on every service and cleaned as necessary.

The end cap is not sealed to the trap body and can be removed for cleaning. Ensure that this cap is correctly re-fitted before re-starting the boiler.

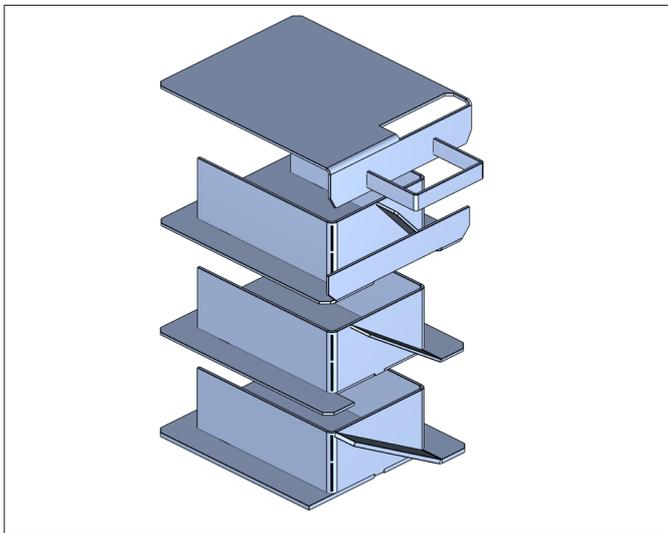


Figure 11-1: Baffles (15/21 models) Product code: BF01

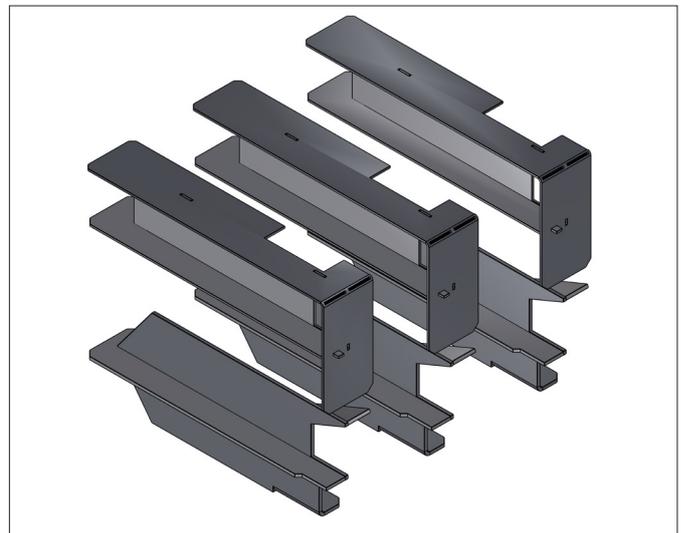


Figure 11-4: Baffles (46/58 models) Product code: BF04

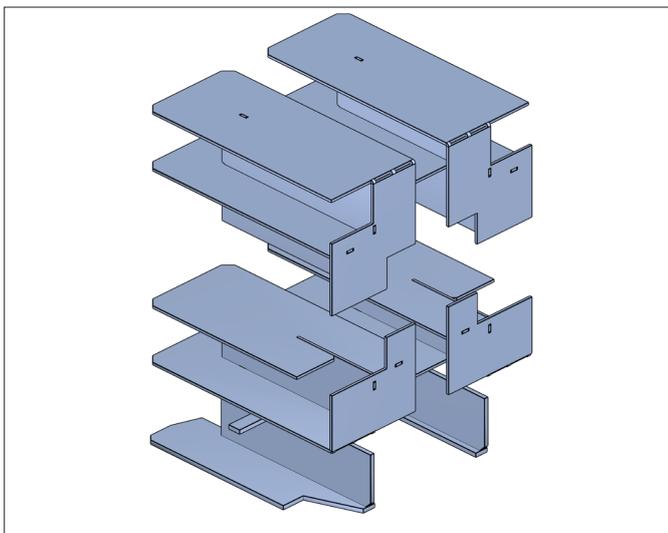


Figure 11-2: Baffles (15/26 models) Product code: BF02

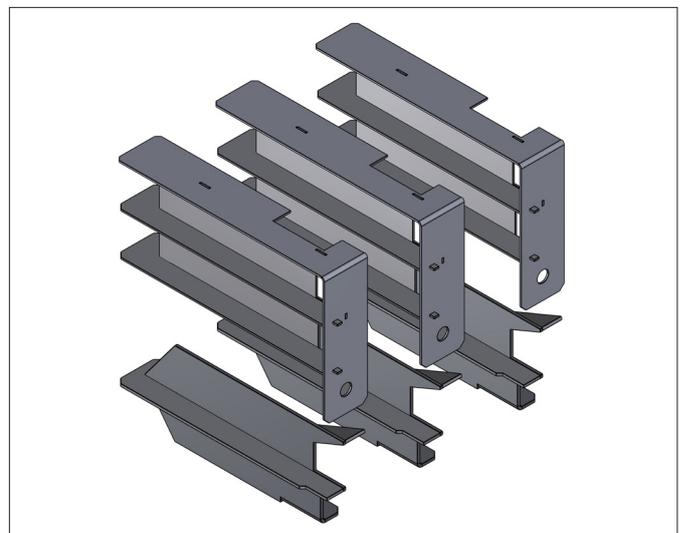


Figure 11-5: Baffles (58/70 models) Product code: BF05

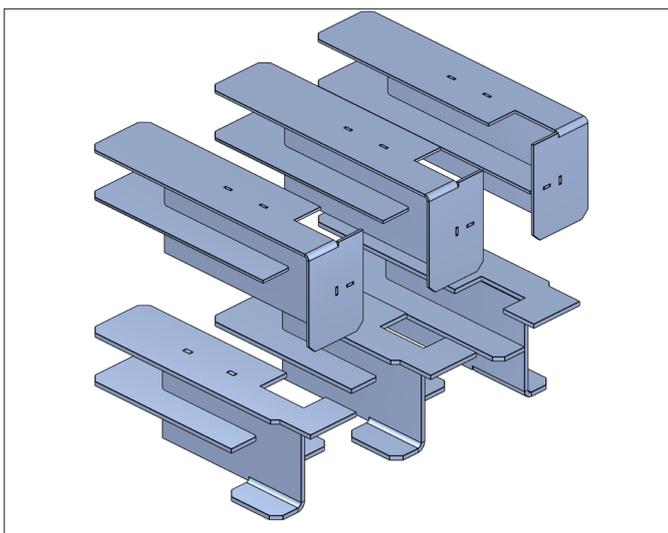


Figure 11-3: Baffles (26/36 and 36/46 models) Product code: BF03

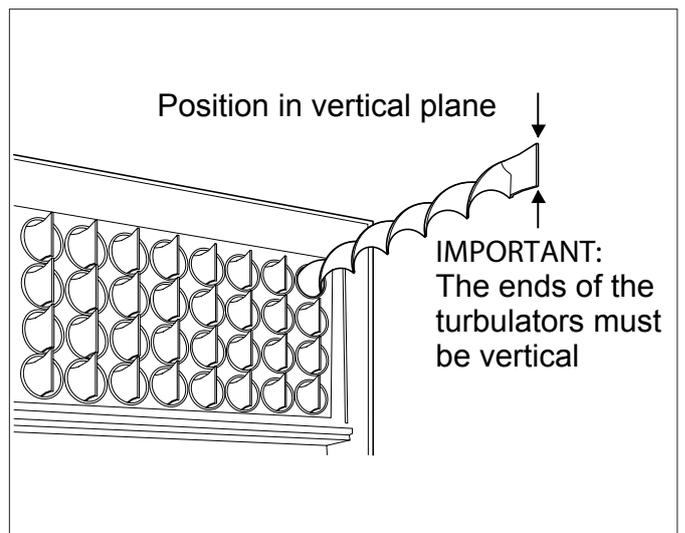


Figure 11-6: Turbulators Product codes:
 CA3261(INT-15-21KW)
 CA3360(INT15-26KW,26-36KW/36-46KW)
 CA3476 (INT-46-58KW/58-70KW).

11.4 CLEANING THE BURNER: RDB2.2 BX BURNERS ONLY

FOR 15/21, 15/26, 26/36 AND 36/46 MODELS

With the burner removed from the boiler:

Burner head, nozzle and diffuser/electrode assembly:

- On the 15/26 models - first remove the recirculation tube from the burner head. Unscrew and remove the single fixing screw and slide the recirculation tube off the head.
- Remove the burner head. Refer to Figure 10-3. Loosen the three fixing screws (1) and remove head (2) from burner.
- Clean the burner head and recirculation tube (if fitted).
- Remove diffuser/electrode assembly. Refer to Figure 10-3.
 - Using a 4 mm Allen key, loosen the diffuser fixing screw (3) from electrode assembly.
 - Lift diffuser/electrode assembly (5) up and off the nozzle holder.
 - Disconnect both ignition leads (4) from the electrodes.
- Replace the nozzle (8). The nozzle should always be replaced on an annual service. Refer to Table 2-2 for the correct nozzle size and type for the required boiler output. Do NOT attempt to clean the nozzle.

Use a 16 mm spanner to remove/re-fit the nozzle, whilst holding the nozzle holder using a 19 mm spanner.



CAUTION

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



NOTE

Ensure that the nozzle is securely tightened so that it does not leak but do not overtighten.

- Inspect the ignition electrodes - remove the diffuser fixing screw and withdraw the electrode assembly. Wipe clean and check for any cracks in the ceramic insulation. Replace if necessary.
- Re-fit the diffuser/electrode assembly. Refer to Figure 10-3.
 - Reconnect ignition leads (4) to electrodes.
 - Re-fit the diffuser/electrode assembly (5) onto the nozzle holder lining up the fixing screw with the recess in the nozzle holder.
 - Ensure diffuser assembly is fitted down hard onto the shoulder on the nozzle holder.
 - Tighten the fixing screw (3) to secure the diffuser/electrode assembly in place on the nozzle holder.



NOTE

Do not overtighten the fixing screw as this may damage the electrode insulator.

- Check/adjust the electrode settings. Refer to Figure 10-4. Always check the electrode settings after replacing the nozzle.
- Re-fit the burner head. Refer to Figure 10-3.
 - Locate the head fixing screws (5) in the countersunk slots in the burner collar.
 - Check that the small oil drip hole (on the head) is pointing downwards.
 - Tighten the two screws (1) to secure the head (2) in position on the burner.
- Adjust the diffuser position. Refer to Figure 10-5.



NOTE

The distance between the end of the burner head and the front face of the diffuser (D) MUST be correctly set for the burner to operate correctly.

- Refer to Table 2-2 for the required distance (head setting) for the boiler output required.
- Check the distance D using the gauge plate supplied with the boiler.
- To use the gauge plate: Position the gauge on the burner head as shown in Figure 10-5.
- Locate the gauge with the correct steps (i.e. the two marked with the required distance D) resting on the edge of the burner head.
- Check the gauge plate is at 90° to the end of the burner head and is positioned at the full diameter of the head.
- If the distance D is correct, the tongue of the gauge should just make contact with the diffuser, with BOTH steps still in contact with the edge of the burner head.
- If the steps are not in contact with the edge of the burner head, when the tongue of the gauge is touching the diffuser, the diffuser must be 'opened' (see below).
- If the tongue does not reach the diffuser, when the steps are in contact with the edge of the burner head, the diffuser must be 'closed' (see below).

To adjust the diffuser position:

- If necessary, adjust distance D using the black adjustment knob located around the oil supply pipe on the front of the burner. Refer to Figure 10-5. Re-check distance D using the gauge plate, as described above.
- For easier access to the adjustment knob, pull the photocell out from the burner housing.
- To increase distance D (to open the diffuser): rotate the knob clockwise - indicated as '+' on the knob.
- To decrease distance D (to close the diffuser): rotate the knob anti-clockwise - indicated as '-' on the knob.



NOTE

One full rotation of the adjustment knob is approximately 1 mm of diffuser movement.



NOTE

It is essential that the final position of the diffuser is checked, using the gauge plate provided with the boiler and the diffuser adjusted as necessary to achieve the required distance D.

- On the 15/26 models - re-fit the recirculation tube to the burner head and secure using the single fixing screw.
- Continue cleaning the other burner components as detailed in Section 11.6.

11.5 CLEANING THE BURNER: RDB3.2 BURNERS ONLY

FOR 46/58 AND 58/70 MODELS

With the burner removed from the boiler:

- Remove the burner head. Refer to Figure 10-6. Loosen the three fixing screws and remove head from burner.
- Clean the burner head.
- Remove diffuser/electrode assembly. Refer to Figure 10-6.
 - Loosen the diffuser clamp screw.

- Remove the diffuser/electrode assembly from the nozzle holder. Refer to Figure 10-6.
 - Disconnect both ignition leads from the electrodes.
4. Replace the nozzle (6). The nozzle should always be replaced on an annual service. Refer to Table 2-2 for the correct nozzle size and type for the required boiler output. Do NOT attempt to clean the nozzle.

Use a 16 mm spanner to remove/re-fit the nozzle, whilst holding the nozzle holder using a 19 mm spanner



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



Ensure that the nozzle is securely tightened so that it does not leak but DO NOT OVER TIGHTEN!

5. Inspect the ignition electrodes - loosen the electrode clamp screw and withdraw the electrode assembly. Wipe clean and check for any cracks in the ceramic insulation. Replace if necessary.
6. Reconnect ignition leads to electrodes.
7. Re-fit the diffuser/electrode assembly to the nozzle holder.
8. Check/adjust the diffuser position to give the correct gap (A) between the nozzle and diffuser. Refer to Figure 10-5.
- To adjust the diffuser position:
- Loosen the diffuser clamp screw.
 - Slide diffuser along the nozzle holder to give the correct gap (A).
 - Tighten the diffuser clamp screw.
9. Check/adjust the electrode assembly to give the correct gap (B) between the nozzle and electrodes. Refer to Figure 10.7
- To adjust the electrode position:
- Loosen the electrode clamp screw.
 - Slide the electrode assembly to give the correct gap (B).
 - Tighten the electrode clamp screw.
10. Re-fit the burner head. Refer to Figure 10.6.
- Locate the head fixing screws in the countersunk slots in the burner collar.
 - Tighten the two screws (3) to secure the head (2) in position on the burner.
11. Check the combustion head setting.
- The correct head setting depends on the required output of the boiler. Refer to Table 2-2.
 - This should be set to '0' in all cases except when the 58/70 is set to maximum (70kw) output.
 - In this case the head is set to '4' (i.e. on the 4th line). Refer to Figure 10.8.
12. To adjust the head setting:
- Loosen the two screws in the curved slots in outer ring of the head (NOT the two head fixing screws). Refer to Figure 10.8.
 - Rotate the end of the burner head until either '0' or the 4th line, as required.
 - Tighten the two screws to fix the head in the required position.
13. Continue cleaning the other burner components as detailed in Section 11.6.

11.6 CLEANING THE BURNER: ALL MODELS

Photocell

The photocell is a push-fit in the front of burner body. Refer to Sections 11.9.1 and 11.9.2.

1. Holding the body of the photocell and NOT the cable, carefully pull the photocell out of the burner.
2. Clean the sensor end of the photocell.
3. Replace photocell back in the burner and check that it is fully pushed in.

Burner air inlet cover

This is located on the right hand side of the burner. Refer to Figure 11-5.

1. Unscrew and remove the two screws and remove the air inlet cover from the burner.
2. Check inside and remove any debris, leaves, hair, fluff, etc. from the air inlet cover and air damper.
3. Check the condition of the rubber seal around the air inlet cover. Replace if damaged or missing.

Burner fan housing

This is located over the fan impeller. Refer to Section 11.9.

With the burner air inlet cover already removed:

1. Unscrew and remove the four screws and remove the fan housing from the burner.
2. Check and clean the fan impeller and remove any debris, leaves, hair, fluff etc.
3. Check/clean the fan housing is clean.
4. Check the rubber seal around the fan housing. Replace if damaged or missing.
5. Re-fit the fan housing to the burner and secure with the four screws.
6. Check the air adjuster disc (15/21 and 15/26 models only). Refer to Section 10.9 for details.
7. Re-fit the air inlet cover to the burner and secure with the two screws.

Oil pump filter

This is located under the end cover on the oil pump. Refer to Section 11.9.

1. Unscrew and remove the four cap screws securing the pump end cover.
2. Remove the filter and wash in kerosene.
3. Check the O-ring seal around the end cover. Replace if damaged.
4. Replace the filter and end cover.
5. Re-fit the four cap screws, tightening evenly, to secure the end cap.

11.7 AIR ADJUSTER DISC: 15/21 AND 15/26 MODELS ONLY

Refer to Section 10.5.

11.8 RECOMMISSIONING



To ensure safe and efficient operation of the boiler it is important that re-commissioning is carried out, especially combustion checks (%CO₂ level, flue gas temperature and smoke number) after the boiler has been serviced. Refer to the Commissioning instructions in Section 10.

12 FAULT FINDING

12.1 BOILER FAULT FINDING

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

Figure 12-1: Boiler fault finding

Fault	Remedies
Boiler will not start:	
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. Check that the fire valve has not operated to shut off the oil supply.
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.
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.
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:	
1. 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.
2. 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.
3. 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.
4. Water temperature low.	Undersized 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.
5. Boiler operating on overheat thermostat.	Faulty boiler thermostat. No circulation, check circulating pump. Check for air lock.
6. 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.
7. Oil odours.	Check all fuel line connections, remake as necessary.
8. Combustion fumes smell.	Check boiler cleaning cover and seal are correctly fitted. Check burner is correctly fitted onto correct flange. Check flue is correctly sealed into flue outlet of boiler. Check the condensate pipe and trap are operating correctly.



Check cleaning door seal, boiler/flue seal and burner flange seal with flue gas analyser for a minimum of 60 seconds and a distance of 100mm (from each seal) to ensure there is no leak of flues gases.

13 SPARE PARTS

13.1 BOILER PARTS LIST

Table 13-1: Boiler parts list

Description	Grant IRL product code
Double pole switch	ZSWDPN
Baffle set (complete) - 15/21	BF01
Baffle set (complete) - 15/26	BF02
Baffle set (complete) - 26/36 and 36/46	BF03
Baffle set (complete) - 46/58	BF04
Baffle set (complete) - 58/70	BF05
Turbulator baffle - 360 mm (single)	CA3261 (INT-15-21RW) CA3360 (INT15-26,26,36/3646KW) CA3476 (INT-46-58KW/58KW/58-70KW)).
Cleaning door rope seal - 15/21 and 15/26	Z20FGR
Cleaning door rope seal - 26/36 and 36/46	Z20FGR
Cleaning door rope seal - 46/58 and 58/70	Z20FGR
Limit thermostat (110°C)	ZINDHSTAT
Control thermostat (50 - 75°C)	ZINDCSTAT
Wilo SE circulating pump (6 m head) - 15/26, 26/36 models Pre 20.04.2015	ZCPUMPW*
Wilo HE circulating pump (7 m head) - all models Post 20.04.2015	ZCPUMPWM

* Standard efficiency pumps should only be installed when a high efficiency pump is not compatible

13.2 SEALED SYSTEM PARTS LIST

Table 13-2: Sealed system parts list

Description	Grant IRL product code
Expansion vessel (10 litre) - 15/26 Pre 12/08/2008	ZEXPV10L541
Expansion vessel (12 litre) - 15/26 Post 12/08/2008	ZEXPV12L
Expansion vessel (12 litre) - 26/36	ZEXPV12L531
Expansion vessel (16 litre) - 36/46	ZEXPV126L
Water pressure gauge c/w t-piece	Z014GAUGE
Pressure relief valve (2.5 bar)	Z1/2SRV
Expansion vessel flexible hose	ZHEV450

13.3 RIELLO RDB 2.2 BX BURNERS (15/21, 15/26, 26/36 AND 36/46 MODELS)

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

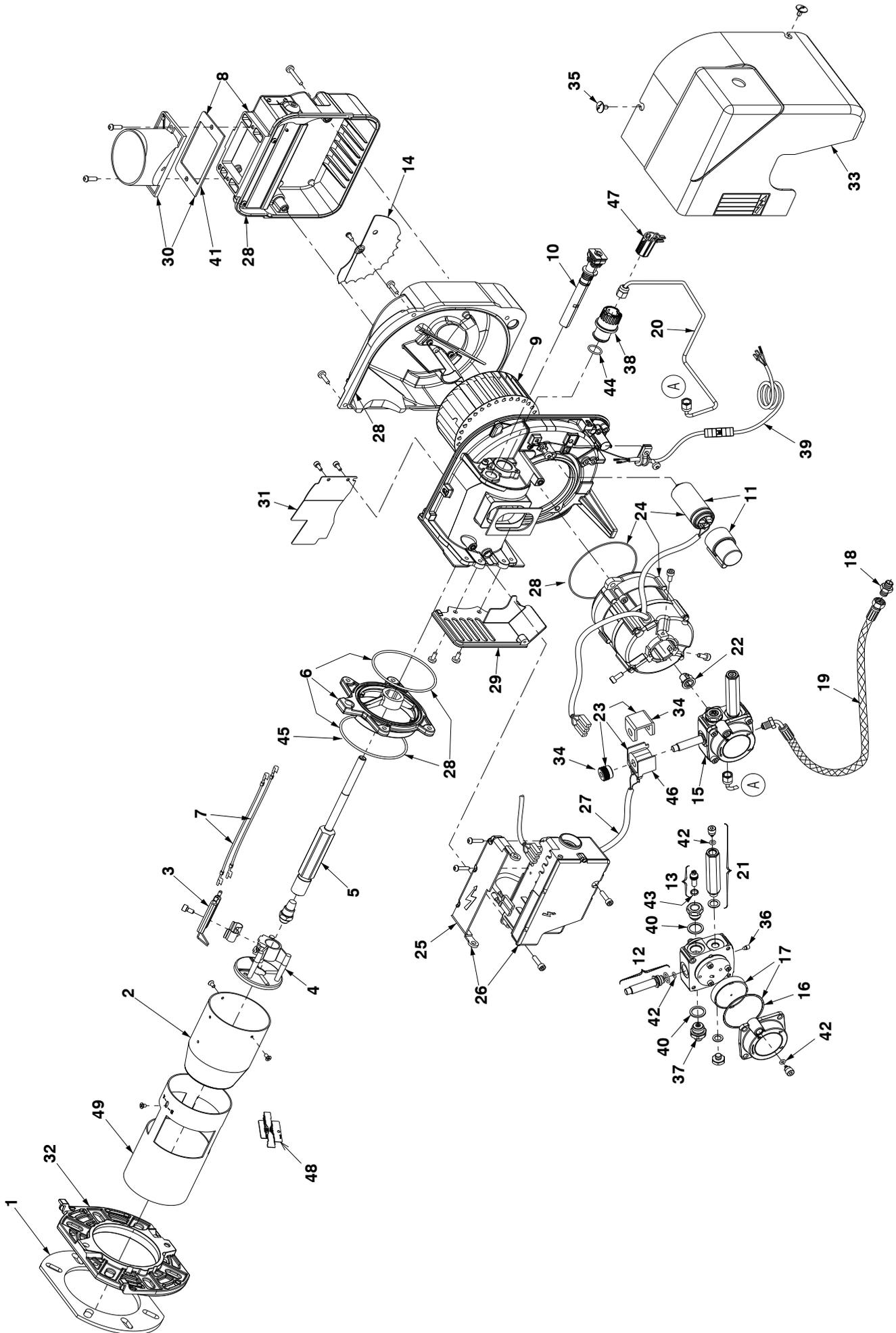


Figure 13-3: Riello RDB 2.2 BX burner exploded diagram - 15/21, 15/26, 26/36 and 36/46kW models

Figure 13-4: Riello RDB 2.2 BX burner parts list - 15/21, 15/26, 26/36 and 36/46kW models

Key No.	15/21	15/26	26/36	36/46	Description	Riello product code
1	•	•	•	•	Flange gasket	3005787
2	•	•	•	•	Combustion head (burner serial No. ≤ 02098013XXX)	20076038
	•	•	•	•	Combustion head (burner serial No. ≥ 02108013XXX)	20147320
3	•	•			Electrode	20018545
			•	•	Electrode	20018693
4	•	•			Diffuser disc	20139837
			•	•	Diffuser disc	20133586
5	•	•	•	•	Nozzle holder	20133588
			•	•	Collar (burner serial No. ≤ 02098013XXX)	20133590
6	•	•	•	•	Collar (burner serial No. ≥ 02108013XXX)	20141540
	•	•	•	•	High voltage lead	20019415
8	•	•	•	•	Air damper assembly	20089768
				•	Air damper assembly	3008839
9	•	•	•	•	Fan	3005788
10	•	•	•	•	Flame sensor	20132526
11	•	•	•	•	Capacitor	20071576
12	•	•	•	•	Needle valve	3007871
13	•	•	•	•	Regulator	3008651
14	•	•			Air damper	20094349
15	•	•	•	•	Pump	20030953
16	•	•	•	•	O-ring	3007175
17	•	•	•	•	O-ring and filter	3020436
18	•	•	•	•	Connector	3003602
19	•	•	•	•	Hose	3005720
20	•	•	•	•	Tube	20018549
21	•	•	•	•	Extension	3008876
22	•	•	•	•	Coupling	3000443
23	•	•	•	•	Coil	3008648
24	•	•	•	•	Motor and capacitor	20071577
25	•	•	•	•	Protection	3008649
26	•	•	•	•	Control box	3008652

Continued on next page

Figure 13-4: Riello RDB 2.2 BX burner parts list - 15/21, 15/26, 26/36 and 36/46kW models (continued)

Key No.	15/21	15/26	26/36	36/46	Description	Riello product code
27	•	•	•	•	Connection	3008851
28	•	•	•	•	Seals kit	20040600
29	•	•	•	•	Front shield	3020306
30	•	•	•	•	Air intake	3020281
31	•	•	•	•	Bulkhead	20081612
32	•	•	•	•	Front piece	3006384
33	•	•	•	•	Cover	3008879
34	•	•	•	•	Shell and knob	3007566
35	•	•	•	•	Screw	20119098
36	•	•	•	•	Bypass screw	20029299
37	•	•	•	•	Connector	3020076
38	•	•	•	•	Knob	30134372
39	•	•	•	•	Connection	20140287
40	•	•	•	•	Seal	3007087
41	•	•	•	•	Seal	3020086
42	•	•	•	•	O-ring	3007177
43	•	•	•	•	O-ring seal	3007028
44	•	•	•	•	O-ring	3007167
45	•	•	•	•	O-ring	3007178
46	•	•	•	•	Coil	3007565
47	•	•	•	•	Index	20147023
48	•	•	•	•	Gauge	20148209
49	•	•	•	•	Recirculation tube	20133598

13.4 RIELLO RDB 3.2 BURNERS (46/58 AND 58/70 MODELS)

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

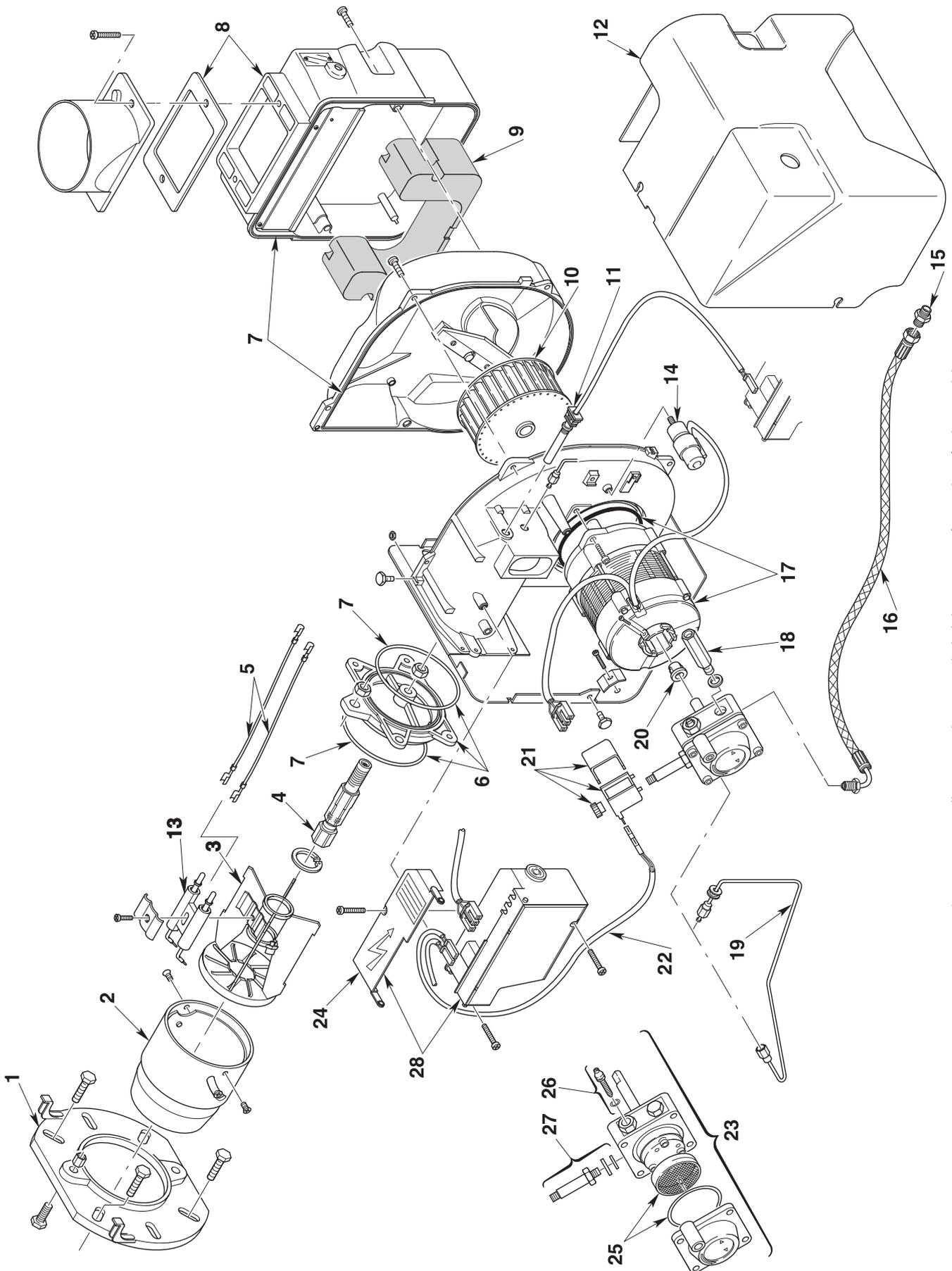


Figure 13-5: Riello RDB 3.2 burner exploded diagram - 46/58 and 58/70kW models

Figure 13-6: Riello RDB 3.2 burner parts list - 46/58 and 58/70kW models

Key No.	Description	Riello product code
1	Mounting flange	3008637
2	Combustion head	3002572
3	Diffuser disc	3020180
4	Nozzle holder	3002570
5	High voltage lead	3008794
6	Burner head mounting collar	3008957
7	Seal kit	3008963
8	Air damper assembly	3008839
9	Insulation	3008958
10	Fan impeller	3005799
11	Photocell	3008646
12	Burner cover	3008962
13	Electrode assembly	3020121
14	Capacitor 5 µF	20081251
15	x ¼ BSP adaptor	3003602
16	Flexible oil line	20032005 (replaces 3007621)
17	Motor	20084086
18	Pressure gauge connector	3008876
19	Supply tube	3008961
20	Drive coupling	3000443
21	Solenoid coil	3008648
22	Solenoid lead	3008851
23	Oil pump	20030953
24	Control box protection	3008649
25	Pump filter (including o-ring)	3020436
26	Pump pressure regulator	20032135
27	Solenoid valve	3007871
28	Control box - 535SE/1D	3008652

14 DECLARATION OF CONFORMITY

EC DECLARATION OF CONFORMITY

In accordance with BS EN ISO/IEC 17050-1:2004

We: Grant Engineering (IRL) ULC

Of: Crinkle,
Birr,
Co.Offaly
R42 D788

Telephone: (057) 912 0089

Fax: (057) 912 1060

Email: info@grantengineering.ie

Website: www.grantengineering.ie

Declare that:

Equipment: Domestic oil boilers

Model Name/Number: Grant Vortex Utility 15-21, 15-26, 26-36, 36-46, 46-58 and 58-70

Indoor

Grant Vortex Utility System 15-26, 26-36 and 36-46

Indoor

Note: All Grant system variants are supplied with glandless high efficiency integrated circulators

In accordance with the following Directives:

2006/95/EEC Conforms with the safety objectives of the Low Voltage Directive and its amending directives.

2004/108/EC Conforms with the essential protection requirements of the Electromagnetic Compatibility Directive and its amending directives.

92/42/EC Conforms with the requirements of the Boiler Efficiency Directive.

2010/30/EU Conforms with the Labeling of Energy related products to EU (no) 811/2013

2009/125/EC Conforms with the Ecodesign of Energy related products to EU (no) 813/2013

I hereby declare that the equipment named above has been tested and found to comply with the relevant sections of the above referenced specifications. The unit complies with all essential requirements of the Directives.

Responsible Person: Peter Darcy

Position: R&D Manager

Signature:



Date: August 2019

15 HEALTH AND SAFETY INFORMATION

Under the Consumer Protection Act 2007 and Section 6 of the Health & Safety at Work Act 2005, we are required to provide information on substances hazardous to health (COSHH Regulations 2002).

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:

15.1 INSULATION MATERIALS

Material Types:

Board 607, rockwool, 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. When heated for first time to 200 degrees Celsius release of binder component and binder decomposition products can occur which, in high concentrations, may irritate the eyes and 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.

15.2 SEALANT AND ADHESIVE

Material Types:

Silicone elastomer.

Description:

Sealant and adhesive.

Known Hazards:

Irritation to eyes, irritation to skin.

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.

15.3 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.

16 END OF LIFE INFORMATION

GENERAL

Grant oil boilers incorporate components manufactured from a variety of different materials. The majority of these materials can be recycled whilst the smaller remainder cannot.

Materials that cannot be recycled must be disposed of according to local regulations using appropriate waste collection and/or disposal services.

DISASSEMBLY

There is little risk to those involved in the disassembly of this product. Please refer to and follow the Health and Safety Information given in the Installation & Servicing Instructions provided with the boiler.

For guidance on the disassembly of the boiler refer to the information given in the Servicing section of the Installation & Servicing Instructions provided with the boiler.

RECYCLING

Many of the materials used in Grant oil boilers can be recycled, these are listed in the table below:

COMPONENT	MATERIAL
Outer casing panels	Mild steel (polyester powder coated)
Primary heat exchanger and baffles	Mild steel
Secondary heat exchanger	Stainless steel
Secondary heat exchanger spirals	Aluminium alloy
Pipework	Copper
Burner body/flange	Aluminium alloy
Burner oil pump	Aluminium alloy/steel
Riello oil burner cover	Plastic
Electrical wiring	Copper/plastic
Thermostats	Copper/plastic
Printed Circuit boards	Copper/plastic

DISPOSAL

All materials other than those listed above must be disposed of responsibly as general waste.

17 PRODUCT FICHE

Product fiche concerning the
 COMMISSION DELEGATED REGULATIONS
 (EU) No 811/2013 of 18 February 2013
 (EU) No 813/2013 of 2 August 2013

Vortex Utility	Symbols	Unit	Utility 15/21	Utility 15/26	Utility 26/36	Utility 36/46	Utility 46/58	Utility 58/70	Utility System 15/26	Utility System 26/36	Utility System 36/46
Condensing boiler			Yes	Yes	Yes						
Low temperature boiler			No	No	No						
B1 boiler			No	No	No						
Combination heater			No	No	No						
Rated heat output	Prated	kW	21	26	36	46	58	70	26	36	46
Useful heat output											
At rated heat output and high temperature regime	P_4	kW	21	26	36	46	58	70	26	36	46
At 30% of rated heat output and low temperature regime	P_1	kW	6.3	7.8	10.8	13.8	17.4	21	7.8	10.8	13.8
Auxiliary electricity consumption											
At full load	elmax	kW	0.158	0.130	0.150	0.148	0.189	0.182	0.130	0.150	0.148
At part load	elmin	kW	0.052	0.039	0.049	0.052	0.072	0.075	0.039	0.049	0.052
In standby mode	P_{sb}	kW	0	0	0	0	0	0	0	0	0
Useful efficiency											
Seasonal space heating energy efficiency	s	%	90.81	91.71	94.56	90.00	91.94	91.61	91.71	94.56	90.00
At rated heat output and high temperature regime	η_4	%	88.9	93.6	95.1	90.8	91.5	90.9	93.6	95.1	90.8
At 30% of rated heat output and low temperature regime	η_1	%	97.1	96.4	99.3	94.4	96.7	96.2	96.4	99.3	94.4
Other items											
Standby heat loss	P_{sby}	kW	0.23	0.264	0.293	0.301	0.309	0.306	0.264	0.293	0.301
Ignition burner power consumption	P_{ign}	kW	0	0	0	0	0	0	0	0	0
Annual energy consumption	Q_{HE}	kWh	-	-	-	-	-	-	-	-	-
Sound power level indoors	L_{WA}	dB	49.6	50.6	53.7	51.1	55.7	55.0	50.6	53.7	51.1
Emissions of nitrogen oxides	NO_x	mg/ kWh	<120	<120	<120	<120	<120	<120	<120	<120	<120
Emission class			2	2	2	2	2	2	2	2	2
Daily fuel consumption	Q_{fuel}	kWh	-	-	-	-	-	-	-	-	-
Annual fuel consumption	AFC	GJ	-	-	-	-	-	-	-	-	-

18 GUARANTEE

You are now the proud owner of a Grant Vortex condensing boiler from Grant Engineering (Ireland) ULC which has been designed to give years of reliable, trouble free operation.

Grant Engineering (Ireland) ULC guarantees the manufacture of the boiler including all electrical and mechanical components for a period of **twelve months from the date of installation⁴**, provided that the boiler has been installed in full accordance with the installation and servicing instructions issued. See main Terms and Conditions below.

In the first instance

Contact your installer or commissioning engineer to ensure that the fault does not lie with the system components or any incorrect setting of the system controls that falls outside of the manufacturer's guarantee otherwise a service charge could result. Grant Engineering (Ireland) ULC will not be liable for any charges arising from this process.

If a fault or defect occurs within the manufacturer's guarantee period

If your boiler should fail within the guarantee period, you must contact Grant Engineering (Ireland) ULC who will arrange for the repair under the terms of the guarantee, providing that the boiler has been correctly installed, commissioned, the boiler passport has been returned to Grant Engineering (Ireland) ULC within 30 days of installation and serviced by a competent person and the fault is not due to tampering, running out of oil, oil contamination, debris, system water contamination, misuse, trapped air or the failure of any external components not supplied by Grant Engineering (Ireland) ULC, e.g. fire valve, motorised valve, etc.

If a fault covered by the manufacturer's guarantee is found

The leaking boiler must be reported and returned via the supplier/merchant. Ask your installer to contact Grant Engineering (Ireland) ULC Service Department on (057) 912 0089 who will arrange for a competent service engineer to rectify the fault.

Remember - before you contact Grant Engineering (Ireland) ULC

- Ensure the boiler has been installed, commissioned and serviced by a competent person in accordance with the installation and servicing instructions.
- Ensure there is oil to supply the burner.
- Ensure the problem is not being caused by the heating system or its controls.
- The boiler passport has been returned to Grant Engineering (Ireland) ULC within 30 days of installation.

Free of charge repairs on the burner (For the first twelve months)

During the guarantee period 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 installation and servicing instructions, it was registered with Grant Engineering (Ireland) ULC within thirty days of installation⁴ and, for boilers over twelve months old, details of annual service is available³.

The following documents must be made available to Grant Engineering (Ireland) ULC on request:

- Proof of purchase
- Boiler passport

Chargeable repairs

A charge may be made (if necessary following testing of parts) if the breakdown is due to any fault(s) caused by the plumbing or heating system, e.g. contamination of parts due to system contamination, sludge, scale, debris or trapped air. Refer to 'Extent of manufacturer's guarantee'.

Extent of manufacturer's guarantee

The manufacturer's guarantee does NOT cover the following:

- If the boiler has been installed for over **one year**.
- If the boiler has not been installed, commissioned, or serviced by a competent person in accordance with the installation and servicing instructions.
- Instances where the serial number has been removed or made illegible.
- Fault(s) due to accidental damage, tampering, unauthorised adjustment, neglect, misuse or operating the boiler contrary to the manufacturer's installation and servicing instructions.
- Damage due to external causes such as bad weather conditions (flood, storms, lightning, frost, snow, or ice), fire, explosion, accident or theft.
- Fault(s) due to incorrectly sized expansion vessel(s), incorrect vessel charge pressure or inadequate expansion on the system.
- Fault(s) caused by external electrics and external components not supplied by Grant Engineering (Ireland) ULC.
- Problems caused by lack of oil or faults with the oil storage and supply system.
- Fault(s) due to contamination of the oil storage and supply system, e.g. water or debris.
- Bleeding or removing oil storage tank contamination or blockages from oil lines.
- Problems due to the flue system being incorrectly fitted or not installed to meet installation requirements.
- Boiler servicing, de-scaling or flushing.
- Cleaning out condensate traps/discharge pipes or thawing out frozen condensate pipework.
- Checking and replenishing system pressure.
- Oil supply pipelines, electrical cables and plugs, external controls not supplied by Grant Engineering (Ireland) ULC.
- Heating system components, such as radiators, pipes, fittings, pumps and valves not supplied by Grant Engineering (Ireland) ULC.
- Instances where the oil boiler has been un-installed and re-installed in another location.
- Use of spare parts not authorised by Grant Engineering (Ireland) ULC.
- Consumable items including, but not limited to, oil nozzles, oil

hoses, gaskets and seals.

IMPORTANT

The nozzle and braided oil hose supplied with the boiler are only covered for the period up to the time of the first service (twelve months). Both **must** be changed on the first service and on every annual service thereafter.

IMPORTANT

A suitable oil filter with a minimum 15µm filtration **must** be installed in the oil supply line.

Do not wait until the fuel supply runs out before you re-order. 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 oil supply is delivered and that the fuel is allowed to settle for an hour before restarting the boiler.

Terms of manufacturer's guarantee

- The Company shall mean Grant Engineering (Ireland) ULC.
- The boiler must be installed by a competent person and in full accordance with the relevant Codes of Practice, Regulations and Legislation in force at the time of installation.
- The boiler is guaranteed for **one year** from the date of installation³ and the boiler registered with the Company within thirty days of installation. Any work undertaken must be authorised by the Company and carried out by a competent service engineer.
- This guarantee will be invalid if the boiler passport has not been returned to Grant Engineering (Ireland) ULC, if the boiler does not have an annual (every twelve month) service and it will then be limited to twelve months from the date of installation⁴.
- The shell (heat exchanger) of the oil boiler is covered by a **five year parts only** guarantee from the date of installation⁴. This is subject to the following:
 - The boiler is operated correctly, in accordance with the Installation and servicing instructions.
 - Grant Engineering (Ireland) ULC **strongly recommends** that a Grant Mag-One in-line magnetic filter/s (or equivalent⁵) is fitted in the heating system pipework. This should be installed and regularly serviced in accordance with the filter manufacturer's instructions. We reserve the right to ask for proof of installation – failure to provide this may result in the guarantee becoming invalid.
 - Proof is provided that the system has been flushed or chemically cleaned where appropriate (refer to BSEN 422) and that the required quantity of a suitable corrosion inhibitor added.
 - Proof of annual servicing (including the checking of any expansion vessels and pressure relief valves) must be provided if and when requested by the Company.
- 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 installation and servicing instructions.
- The boiler is registered with the Company within thirty days of installation. Failure to do so does not affect your statutory rights¹.
- The balance of the guarantee is transferable providing the installation is serviced prior to the dwelling's new owners taking up residence. Grant Engineering (Ireland) ULC must be informed of the new owner's details.
- 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.
- This guarantee applies to Grant Engineering (Ireland) ULC boilers purchased and installed in Ireland and Northern

Ireland. Provision of in-guarantee cover elsewhere in Ireland is subject to agreement with the Company.

- 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.
- Proof of purchase and date of installation, commissioning and service documents must be provided on request.
- If a replacement boiler is supplied under the guarantee (due to a manufacturing fault) the product guarantee continues from the installation date of the original boiler and **not** from the installation date of the replacement⁴.
- The oil boiler must be connected to a mains water supply (installations utilising a private water supply are not covered by this guarantee).
- Breakdown/failure due to lime scale will not be covered by this guarantee.
- The replacement of a boiler under this guarantee does not include any consequential costs, such as the removal or replacement of worktops, kitchen units, etc.
- The boiler (excluding external modules) must not be sited in a location where it may be subjected to frost.

Hard water advice (for Combi boilers only)

If you live in a hard water area, protection against scaling must be given to the domestic hot water heat exchanger of your combination boiler.

You should fit an appropriate scale inhibitor or water softener as any breakdown caused by water scaling is not covered by the manufacturer's guarantee. Ask your installer for advice.

Foot notes

1. Your statutory rights entitle you to a one year guarantee period only.
2. We recommend that your oil boiler is serviced every twelve months (even when the guarantee has expired) to prolong the lifespan and ensure it is operating safely and efficiently.
3. The guarantee period will commence from the date of installation, unless the installation date is more than six months from the date of purchase, in which case the guarantee period will commence six months from the date of purchase.
4. As measured by gauss. The MagOne magnetic filter has a gauss measurement of 12,000.

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19 REMARKS



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