

Boiler Manual

Incorporating: **User Instructions**
 Installation Instructions
 Service Instructions
 Guarantee Terms & Conditions

High Efficiency Condensing Boilers

For use with Kerosene only

Models covered by this manual:

B-Series

Boilerhouse *B70HE* *B90HE* *B120HE*

U-Series

Utility *U70HE* *U90HE* *U120HE* *U150HE*
Utility Pumped *UP70HE* *UP90HE* *UP120HE* *UP150HE*
Utility System *US70HE* *US90HE* *US120HE*
Utility Combi *UC70HEE* *UC90HEE* *UC120HEE*

K-Series

Kabin Pak *K70HE* *K90HE* *K120HE* *K150HE*
Kabin Pak Pumped *KP70HE* *KP90HE* *KP120HE* *KP150HE*
Kabin Pak System *KS70HE* *KS90HE* *KS120HE*
Kabin Pak Combi *KC70HEE* *KC90HEE* *KC120HEE*

Utility Combi and Kabin Pak Combi models Patent Pending UK Application No. GB1613466.0



LEAVE THIS MANUAL WITH THE END USER



COMMISSIONING

This appliance must be commissioned. Failure to commission the boiler will invalidate the warranty. After commissioning, ensure that the Boiler Passport is completed and returned.

SERVICING

To ensure continued reliable operation, fuel economy and to validate the guarantee, it is recommended that the boiler is serviced annually by a Warmflow or an OFTEC registered technician.

NI Customers Only

Warmflow Engineering Service division (NI) provides an excellent back-up service, operating a team of OFTEC trained engineers who can meet all the servicing, commissioning and breakdown requirements for your appliance.

Tel: 028 9262 1515
Fax: 028 9262 2827
E-mail: service@warmflow.co.uk
Web: www.warmflow.co.uk

For Parts, Service Technical & Warranty Contact

Great Britain & N. Ireland, Tel: 028 9262 1515

Republic of Ireland, Tel: 048 9262 1515

LISBURN

Lissue Industrial Estate, Moira Road,
Lisburn, Co. Antrim, N. Ireland, BT28 2RF
Tel: (028) 9262 1515
Fax: (028) 9262 0869
E-mail: sales@warmflow.co.uk
technical@warmflow.co.uk
service@warmflow.co.uk

TELFORD

Unit D1 Horton Park, Hortonwood 7,
Telford, TF1 7GX
Tel: (01952) 607 750
Fax: (01952) 603 983
E-mail: salesgb@warmflow.co.uk
technical@warmflow.co.uk
service@warmflow.co.uk

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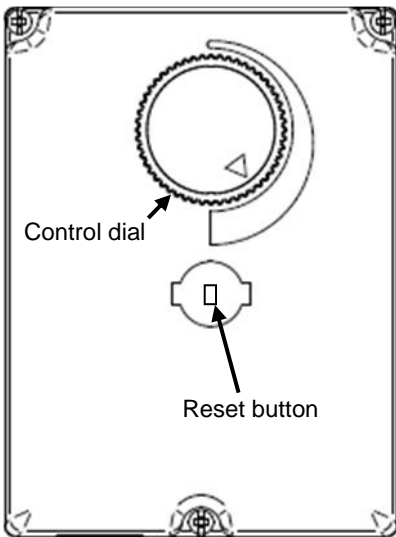
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1 USER INSTRUCTIONS

This boiler must be serviced annually. Contact Warmflow for further details.

In the event of a breakdown please contact your commissioning engineer who should contact our service department whilst at your home, to report the fault.

1.1 Dual Thermostat – Non-Combi Boilers



The radiator temperature is regulated via the boiler control thermostat. The thermostat is user adjustable from **nominally** 45°C to 75°C. Turn the control knob clockwise to increase temperature, and anticlockwise to decrease.

The thermostat has a built-in manually reset safety cut off which will 'lock out' in the event of the boiler overheating and which will need to be reset in order to restore operation. Remove the lock-out cover using a coin or screwdriver (turning anti-clockwise) and depress the red button to reset.

Do not press the reset button while the boiler is still hot as this will cause damage to the thermostat.

1.2 Burner Lockout

When the pressure jet oil fired burner stops after failing to fire the red reset button will be illuminated. This indicates that there is a fault or there is no fuel getting to the burner. The house holder should only reset the burner twice in succession. If the burner continues to lockout contact Warmflow or your service engineer.



1.3 System Pressure – System & Combi Boilers



When the boiler is connected to a sealed system the system pressure should be periodically checked. The minimum pressure, as indicated by the black needle, is 0.5 bar when the boiler is cold and 2.5 bar when the boiler is at normal operating temperature.

If the system pressure falls below the minimum (e.g. due to the removal of a radiator for decorating purposes) then the system should be topped up using the filling loop. See Section 1.4 below. Special attention must be given to corrosion inhibitor concentrations where there is a need to top up the system. See Section 1.5 below.

A pressure switch is included as standard on all Combi boiler models which prevents the operation of the boiler if the system pressure drops below 0.3 bar.

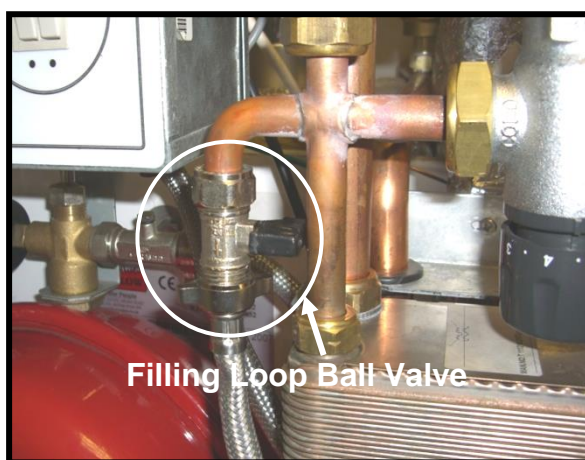
Do not allow the flexible hoses connected to the expansion vessel to become twisted, kinked or flattened. This may cause collapse of hose bore compromising the function of the expansion vessel.

1.4 Filling Loop

The system pressure is topped up using the filling loop. Open the valve to increase the systems pressure.

On System models, set the pressure to 1 bar when cold. On Combi models, increase the pressure slowly until the low pressure warning lamp **just** goes out. Refer to Section 1.6 for further guidance.

After topping up the system the valve must be fully closed and the flexible filling loop disconnected from the valve. Expect a small water loss from the pipe. Special attention must be given to corrosion inhibitor concentrations where there is a need to top up the system. See Section 1.5 below.



1.5 Corrosion Inhibitor

Special attention must be given to the concentration of corrosion inhibitors in the system water where there is a need for topping up. Concentrations must be restored to inhibitor manufacturers' recommendations and monitored going forward.

Frequent or routine topping up of the system should not be necessary and may prove harmful to the appliance. Should topping up prove necessary on a frequent or routine basis you must contact Warmflow or your installer.

1.6 Control Panel – Combi Boilers



1) Heating Temperature Control

The heating temperature control adjusts the temperature of the central heating water flowing from the boiler to the heating system. Turn the dial clockwise towards '+' to increase the temperature and anticlockwise towards '-' to reduce.

2) High Limit Reset

The high limit thermostat protects the boiler against overheating and is factory set to 110°C (not adjustable). Should this thermostat ever trip, it must be reset by pressing the small red button underneath the control panel towards the left hand side. Do NOT reset when the boiler is still hot.

3) Eco Mode On/Off Switch

Eco mode only applies to domestic hot water production. The combi boiler is supplied with eco mode set to on in order to maximise efficiency for hot water production, however it can be turned off if increased hot water production is required.

4) Hot Water On/Off Switch & 5) Heating On/Off Switch

Heating and Hot Water modes are controlled via the on/off switches unless a remote time clock has been fitted. Consult your installer. When both heating and hot water modes are selected, hot water mode will take priority. Please refer to section 4.3 for more details.

6) Mains On Lamp

If this lamp is not illuminated there may be no power coming to the appliance. Check fuses and heating controls.

7) High Limit Lamp

If this lamp is illuminated, the high limit thermostat has tripped. Press the high limit reset (2).

8) Burner Lockout Lamp

If this lamp is illuminated, the burner has locked out after failing to fire. Press the red reset button on the front of the burner. Please refer to the instructions in Section 1.2.

9) Low Pressure Lamp

If this lamp is illuminated, the system pressure has fallen below 0.3 bar. Please refer to the instructions in Sections 1.3 and 1.4. Additionally, top up the pressure until the light goes out then release pressure via the pressure relief valve until the system pressure is 1 bar when the boiler is cold.

10) Eco Mode Lamp

If this lamp is illuminated, it indicates Eco mode is available. Eco mode only applies to domestic hot water production. Eco mode can be turned on or off using the Eco mode switch (3).

1.7 Thermostatic Mixing Valve

The thermostatic mixing valve is used to adjust the temperature of the domestic hot water supply from the Combi boiler. The mixing valve knob can be rotated toward the 'Min' position to reduce hot water temperature, and toward the 'Max' position to increase hot water temperature according to User needs.

2 CONDENSING BOILER INSTALLATION REQUIREMENTS

The Warmflow condensing boiler can be fitted to most installations using standard practices and techniques. There are however a number of considerations that must be taken into account.

1. All existing systems must be properly flushed to remove any sediment/sludge in order to prevent any blockage or reduction in efficiency of the boiler.
2. The system must be fully pumped.
3. The primary difference between an ordinary boiler and a condensing boiler is the condensate drain. The drain can be plumbed from the condensate trap in any ordinary plastic pipe, e.g. plastic overflow pipe, directly into the household drain or soak away.

Any blockage in the drain could lead to an alteration in the combustion settings because of partially blocked flueways.

Where the boiler is fitted into a basement a condensate pump may be required.

4. As an indicator of the increased efficiency of a condensing boiler there may be a visible plume of 'steam' from the flue. Care needs to be exercised when positioning the appliance and selecting the type of flue to ensure that the plume does not cause a nuisance to the householder or to surrounding properties.

As the water temperature in the system rises the pluming effect will diminish. Even where pluming is not visible the boiler is still operating more efficiently than a standard boiler.

3 BEFORE FITTING A COMBI BOILER THE INSTALLER MUST CHECK:

1. What the maximum hot water demand placed on the boiler is likely to be. Not every installation is suitable for a Combi boiler. Systems requiring very high hot water flow rates may be better suited with a Warmflow unvented cylinder.

2. That the mains are capable of supplying up to 24 litre/min with a minimum dynamic pressure of 1.8 bar at the boiler. This is to ensure that the boiler can achieve its maximum output. To protect the appliance and to prevent excessive flow rates, a pressure reducing valve must be fitted to limit the maximum supply pressure to 3 bar.

3. Where the mains water pressure is supplied via a borehole pump and accumulator the pressure variation must not affect the thermostatic mixer valve. Contact Warmflow for further details.

4. The hardness of the mains water supply. Systems with hard water must be fitted with a suitable chemical scale preventer (e.g. Fernox Quantomat or Combimate).

5. That the flow from any one hot water outlet does not exceed the maximum recommended. This applies particularly to baths which are usually fitted with larger taps and larger bore supply pipes. It may be necessary to restrict the flow to these taps by reducing the bore of the supply pipework (e.g. 15mm) or by fitting a restrictor into the pipework.

6. That any outlet, when opened, does not starve all the other outlets of hot water. If more than one outlet is open at the same time then the total flow from all the outlets should not exceed the maximum flow rate of the boiler.

7. That any showers being supplied with hot water by the boiler are compatible with this type of appliance.

It should be noted that the boiler has been factory fitted with an 18 litre/min flow restrictor.

The manufacturer's guarantees are void if the appliance is not installed and commissioned in accordance with the recommendations made herein.

4 GENERAL INFORMATION

4.1 Introduction

Note: All our domestic appliances have been independently tested and accredited as exceeding the minimum SEDBUK efficiency levels required for their type, in compliance with the Building Regulations Approved Document L1A, L1B for England and Wales, the Building Standards (Scotland) Regulations Section 6, Part F Northern Ireland and Part L Republic of Ireland.

Warmflow oil fired condensing boilers are designed to burn Class C2 (28 sec redwood) kerosene only and to be used on a fully pumped system, and are suitable for connection to sealed heating systems.

As standard the Combi and System boilers are fitted with a system expansion vessel, circulating pump, filling loop, pressure gauge and pressure relief valve. An optional 7-day electronic programmer kit is also available for all Utility and Kabin Pak boiler models.

The Combi can provide, at mains pressure, domestic hot water without the need for a storage cylinder.

The manufacturer's guarantees are void if the appliance is not installed and commissioned in accordance with the recommendations made herein.

4.2 General Requirements

The installation of the boiler must be in accordance with the following regulations.

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+A1: Heating systems in buildings. Design for water-based heating systems.

BS EN 12831: Heating systems in buildings. Method for calculation of the design heat load.

BS EN 14336: Heating systems in buildings. Installation and commissioning of water based heating systems.

BS 7593: Code of practice for treatment of water in domestic hot water central heating systems

Current applicable Building Regulations and IET Wiring regulations.

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

The heating system should be installed by a competent installer in accordance with the recommendations laid down by the building services compliance guide, OFTEC and sound engineering practice.

In order to comply with building regulations, the boiler passport and/or OFTEC forms CD10 for installations and CD11 for commissioning should be left with the customer. Alternatively the installation can be inspected and approved by a building control officer.

4.3 Combi General Requirements

The boiler will have a DHW priority when both domestic hot water (DHW) and central heating (CH) are selected. So if the flow switch is closed or the heat store has not been satisfied the entire output of the boiler is directed to DHW before the boiler will switch over to CH. When fully cold it can approximately 20 minutes for the heat store to be satisfied, depending on appliance output.

After a draw-off of 120L at 24L/min, with an average temperature rise of 32°C, the thermal store has a recovery time of approximately 7 minutes depending on appliance output.

Note: If HW has not been selected no hot water can be produced even if the heat store is up to temperature.

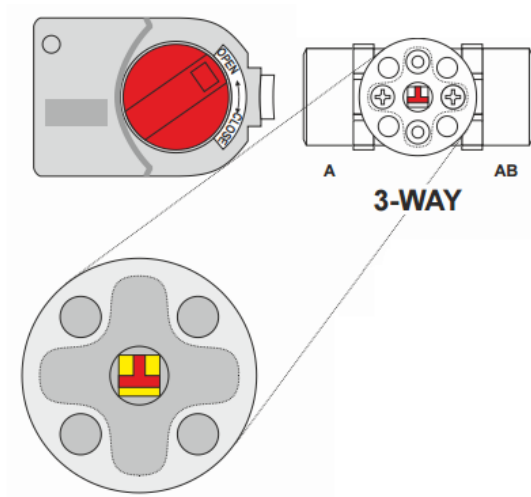
4.3.1 Pump Overrun

Where there is a build-up of excess heat in the boiler primary heat exchanger with domestic hot water mode selected, the pump overrun thermostat will operate. The excess heat will then be pumped into the heat store. Once the temperature has fallen in the boiler and the pump overrun stat is satisfied, then the circulating water pump will stop.

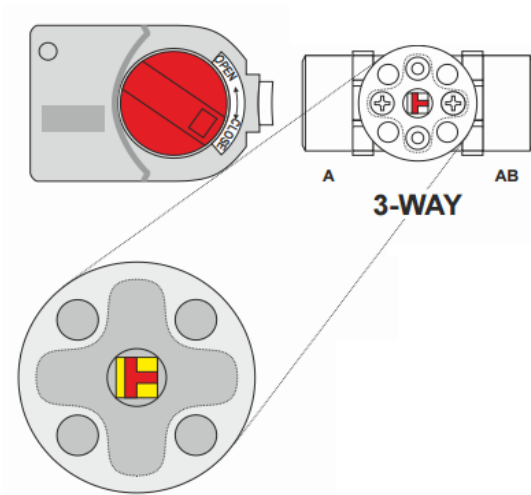
4.3.2 Diverting Valve Operation

The function of the diverting valve is to direct heated system water to either the central heating circuit or domestic hot water heat store depending on mode selection and thermostat requirements. The valve actuator is labelled with two positions 'OPEN' and 'CLOSE'.

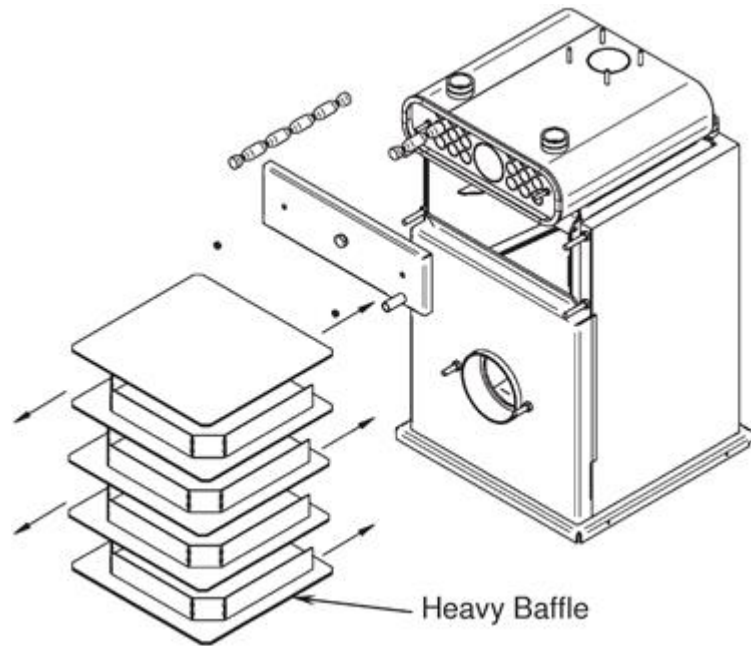
The 'OPEN' position directs heated system water to the central heating circuit, from port AB to port A:



The 'CLOSE' position directs heated system water to the boiler heat store, from port AB to port B:

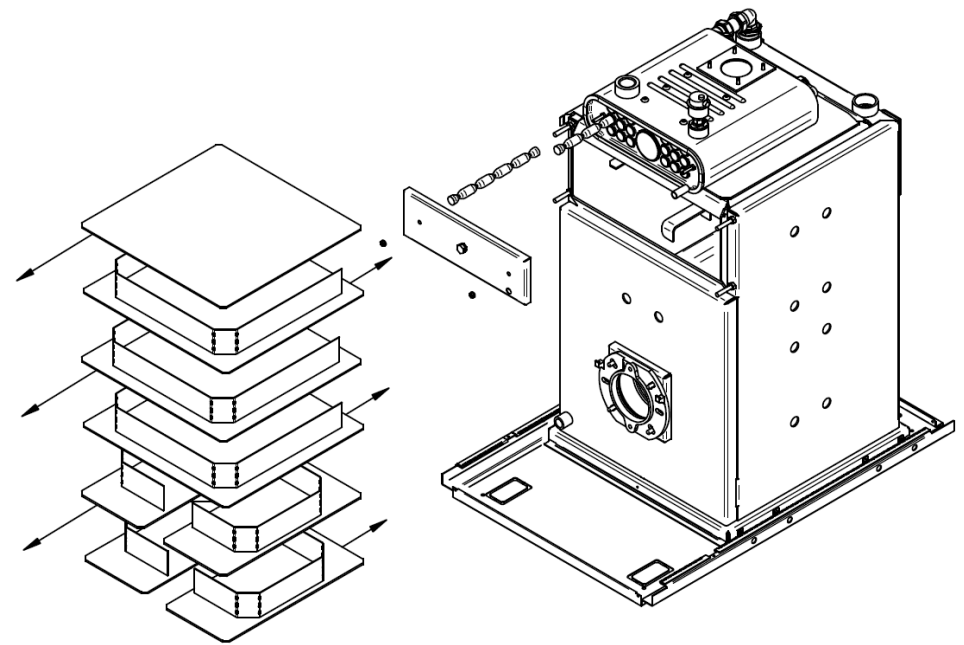


4.4 Baffle Positioning



Models up to 120 HE

The primary heat exchanger baffles consist of one heavy baffle stack (5mm thick) at the bottom, 3 lighter baffle stacks (3mm thick) in the middle and 1 baffle plate (3mm thick) at the top. Upon installation or after servicing, ensure the baffles are in the correct order and correctly stacked. To achieve maximum efficiency push the primary heat exchanger baffles in the direction of the arrows as shown. The secondary heat exchanger spring baffles must be fully inserted into the heat exchanger tubes (narrow end first).



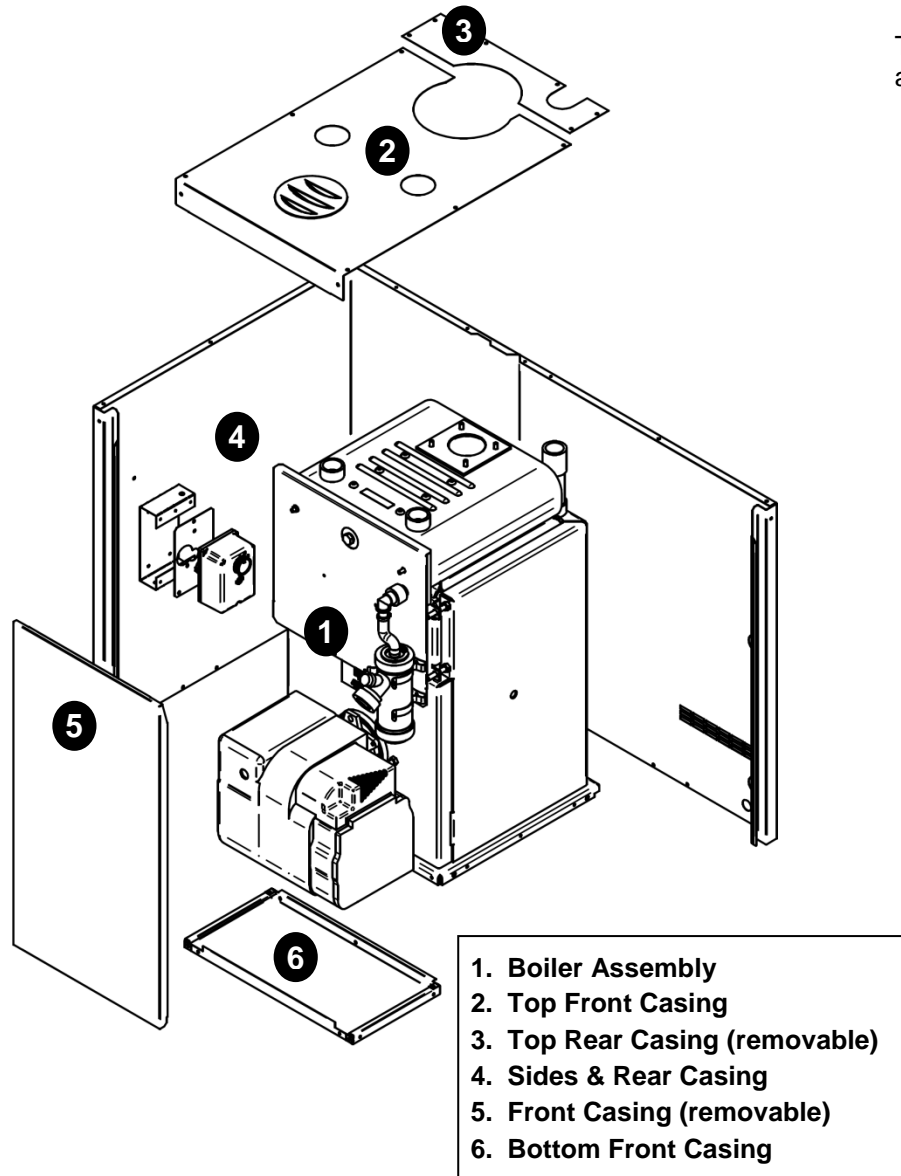
150 HE Models

The primary heat exchanger baffles consist of two half-width baffle stacks at the bottom, 3 full-width baffle stacks in the middle and 1 baffle plate at the top. Upon installation or after servicing, ensure the baffles are in the correct order and correctly stacked.

To achieve maximum efficiency, push the primary heat exchanger baffles in the direction of the arrows as shown. The secondary heat exchanger spring baffles must be fully inserted into the heat exchanger tubes (narrow end first).

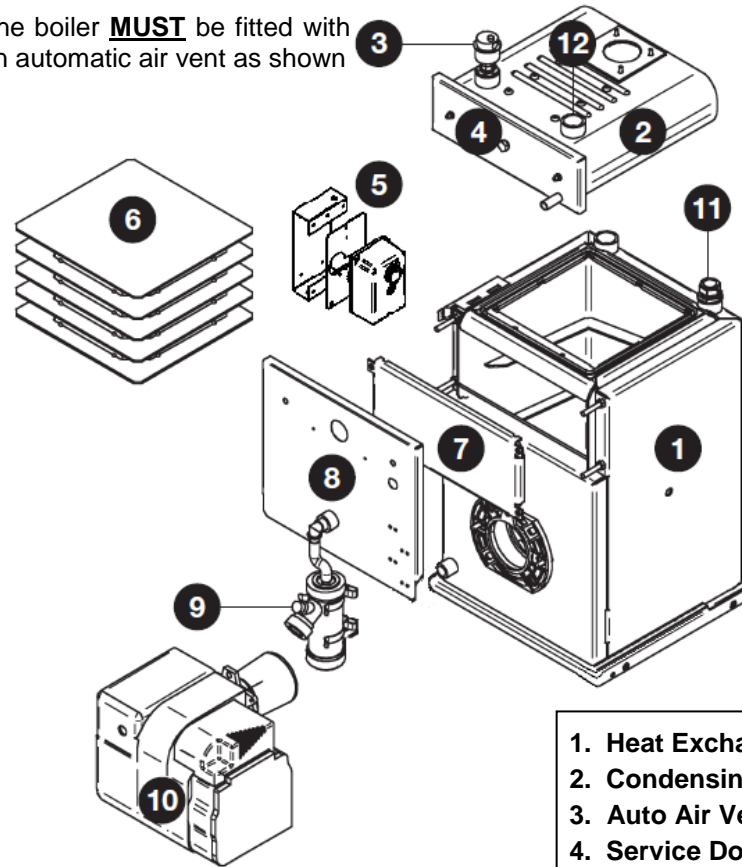
4.5 Components

4.5.1 B-Series Boilerhouse – Casing Components & Key Components



1. Boiler Assembly
2. Top Front Casing
3. Top Rear Casing (removable)
4. Sides & Rear Casing
5. Front Casing (removable)
6. Bottom Front Casing

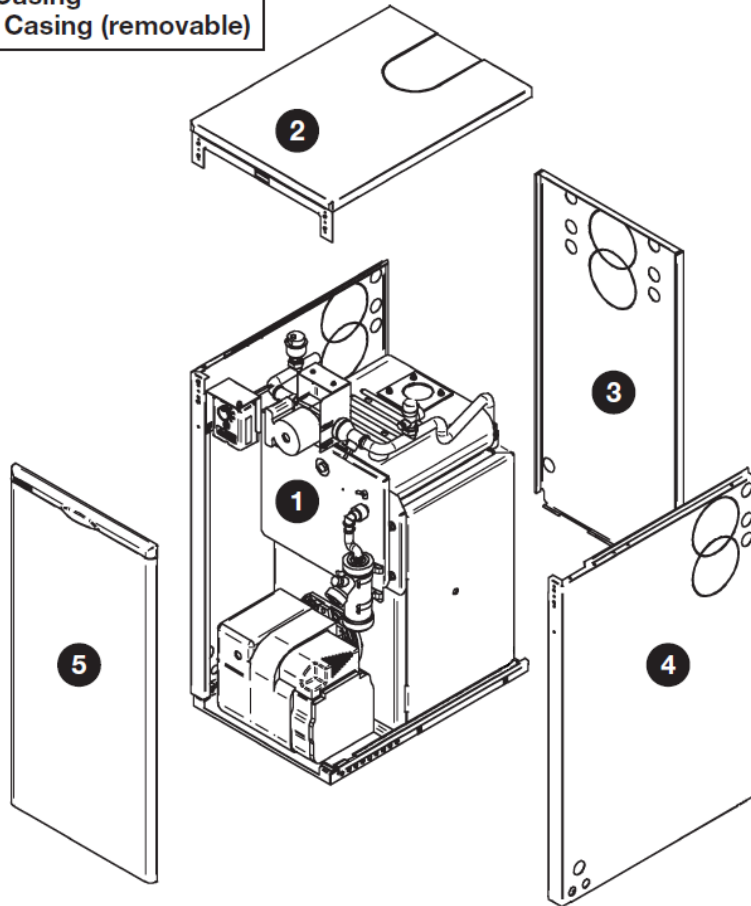
The boiler **MUST** be fitted with an automatic air vent as shown



1. Heat Exchanger
2. Condensing Unit
3. Auto Air Vent (not supplied)
4. Service Door
5. 'Dual-Safe' Thermostat
6. Heat Exchanger Baffles
7. Service Door
8. Service Door Cover
9. Condensate Trap
10. Riello RDB 2.2 Burner
11. Heating Flow Connection
12. Heating Return Connection

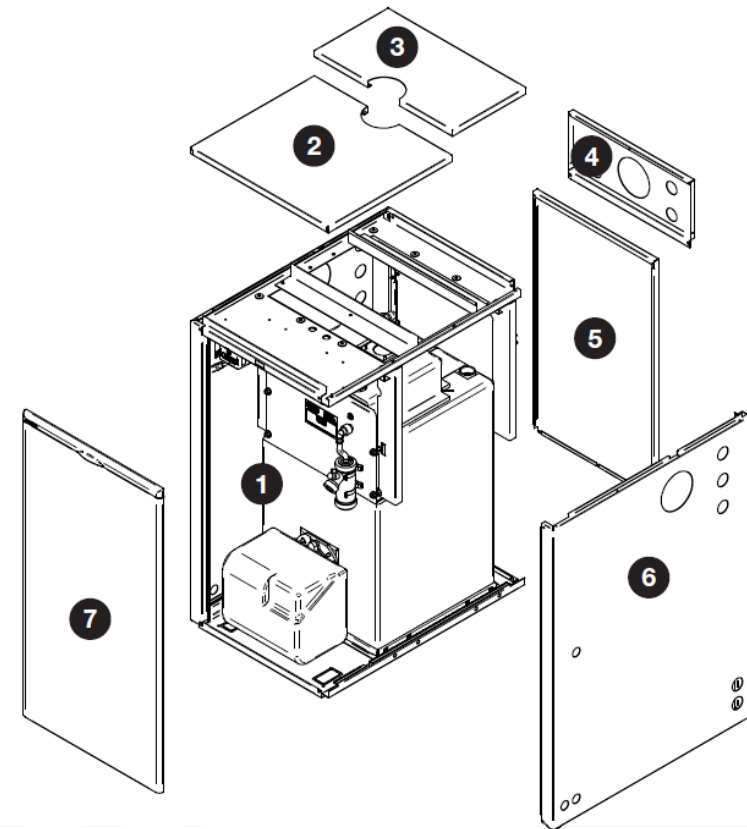
4.5.2 U-Series Utility – Casing Components

1. Boiler Assembly
2. Top Casing (removable)
3. Rear Casing
4. Side Casing
5. Front Casing (removable)



Models up to 120 HE

1. Boiler Assembly
2. Top Front Casing (removable)
3. Top Rear Casing (removable)
4. Rear Flue Casing
5. Rear Casing (removable)
6. Side Casing
7. Front Casing (removable)

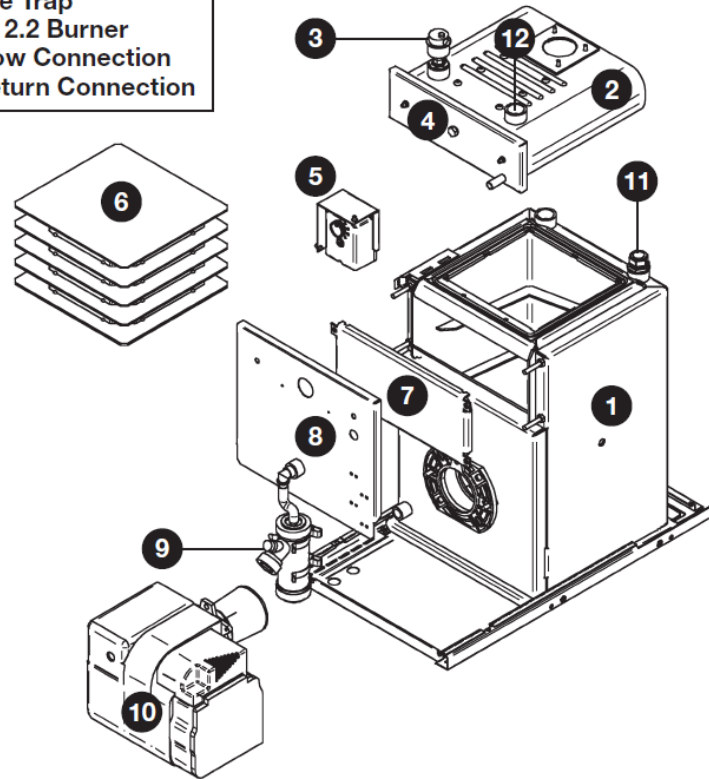


150 HE Models

4.5.3 U-Series Utility – Pre-Wired (UHE)

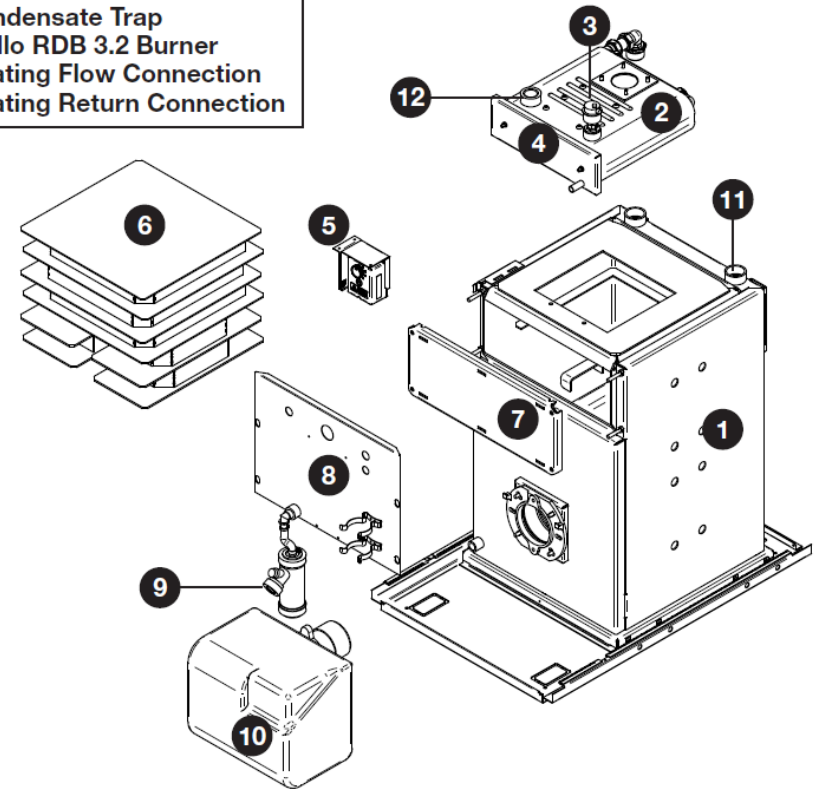
Key Components

1. Heat Exchanger
2. Condensing Unit
3. Auto Air Vent
4. Service Door
5. 'Dual-Safe' Thermostat
6. Heat Exchanger Baffles
7. Service Door
8. Service Door Cover
9. Condensate Trap
10. Riello RDB 2.2 Burner
11. Heating Flow Connection
12. Heating Return Connection



Models up to 120 HE

1. Heat Exchanger
2. Condensing Unit
3. Auto Air Vent
4. Service Door
5. 'Dual-Safe' Thermostat
6. Heat Exchanger Baffles
7. Service Door
8. Service Door Cover
9. Condensate Trap
10. Riello RDB 3.2 Burner
11. Heating Flow Connection
12. Heating Return Connection

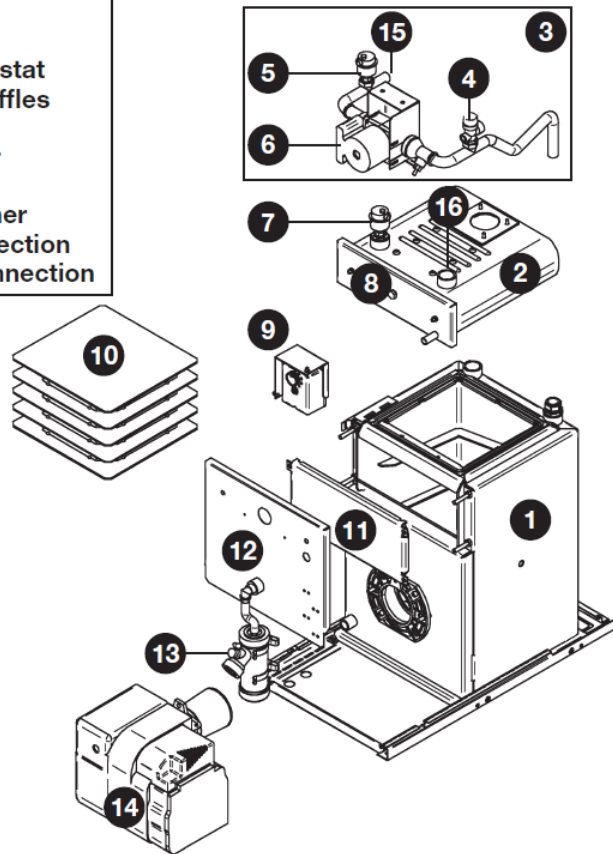


150 HE Models

4.5.4 U-Series Utility – Pumped (UPHE)

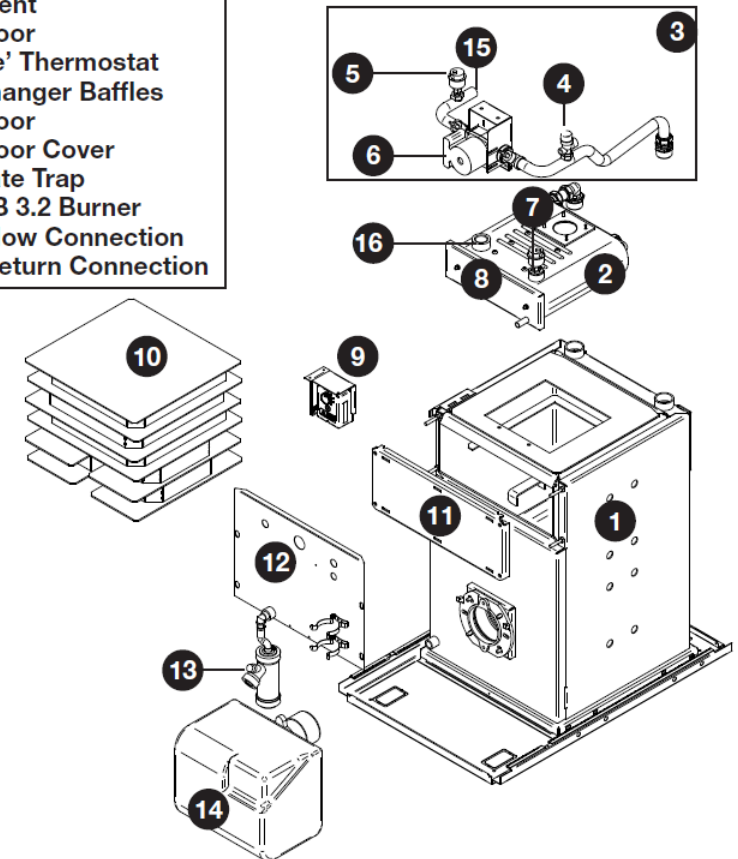
Key Components

1. Heat Exchanger
2. Condensing Unit
3. Pipework Assembly
4. Pressure Relief Valve
5. Auto Air Vent
6. Circulating Pump
7. Auto Air Vent
8. Service Door
9. 'Dual-Safe' Thermostat
10. Heat Exchanger Baffles
11. Service Door
12. Service Door Cover
13. Condensate Trap
14. Riello RDB 2.2 Burner
15. Heating Flow Connection
16. Heating Return Connection



Models up to 120 HE

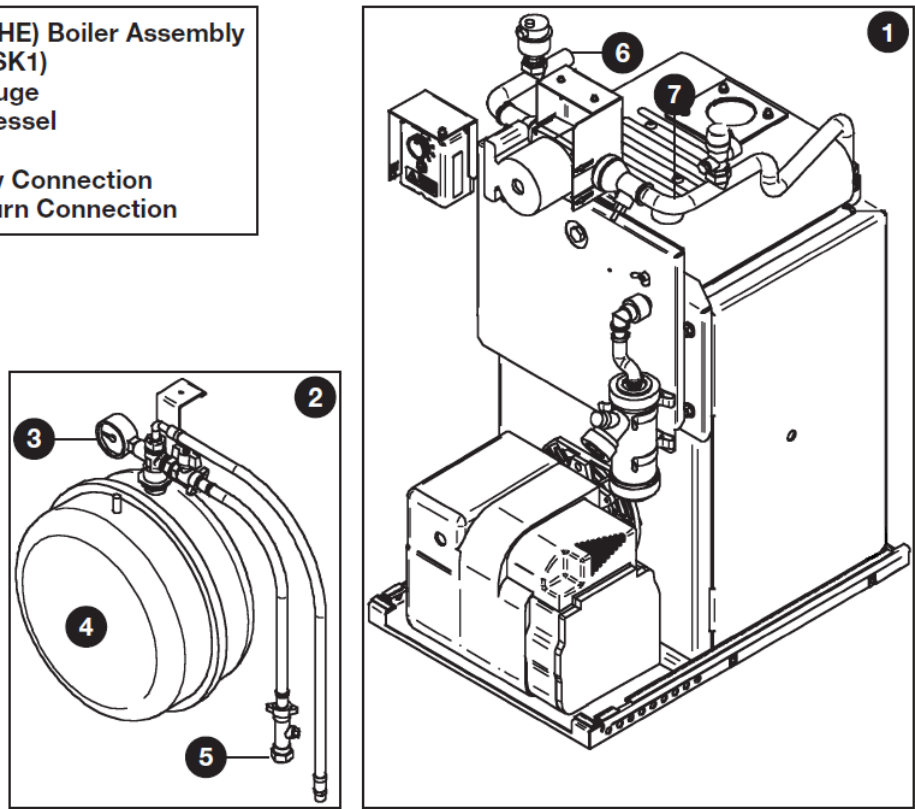
1. Heat Exchanger
2. Condensing Unit
3. Pipework Assembly
4. Pressure Relief Valve
5. Auto Air Vent
6. Circulating Pump
7. Auto Air Vent
8. Service Door
9. 'Dual-Safe' Thermostat
10. Heat Exchanger Baffles
11. Service Door
12. Service Door Cover
13. Condensate Trap
14. Riello RDB 3.2 Burner
15. Heating Flow Connection
16. Heating Return Connection



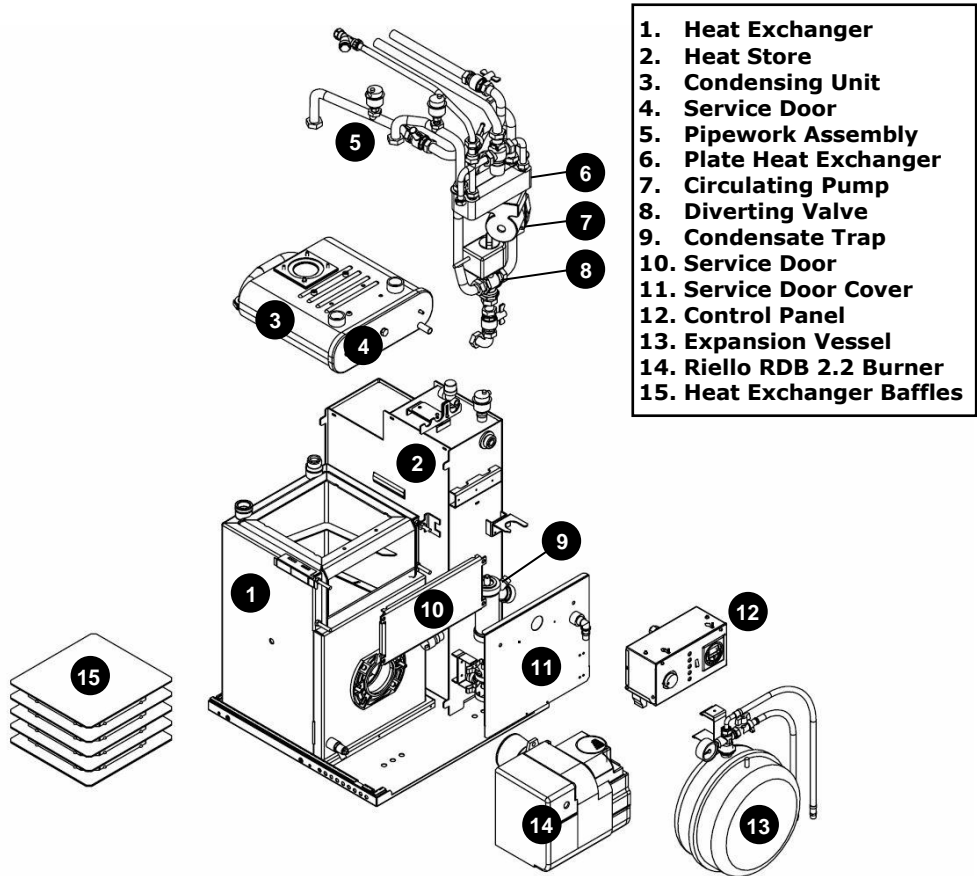
150 HE Models

4.5.5 U-Series Utility – System (USHE) - Key Components

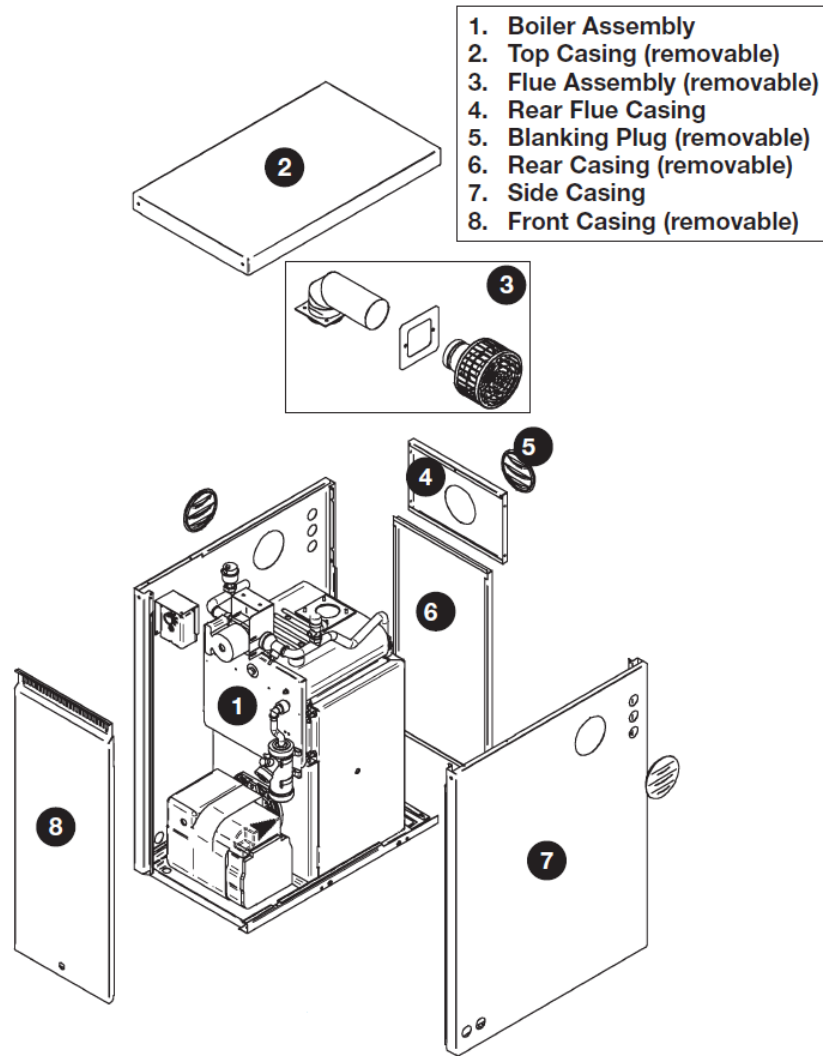
- 1. Pumped (UPHE) Boiler Assembly
- 2. System Kit (SK1)
- 3. Pressure Gauge
- 4. Expansion Vessel
- 5. Filling Loop
- 6. Heating Flow Connection
- 7. Heating Return Connection



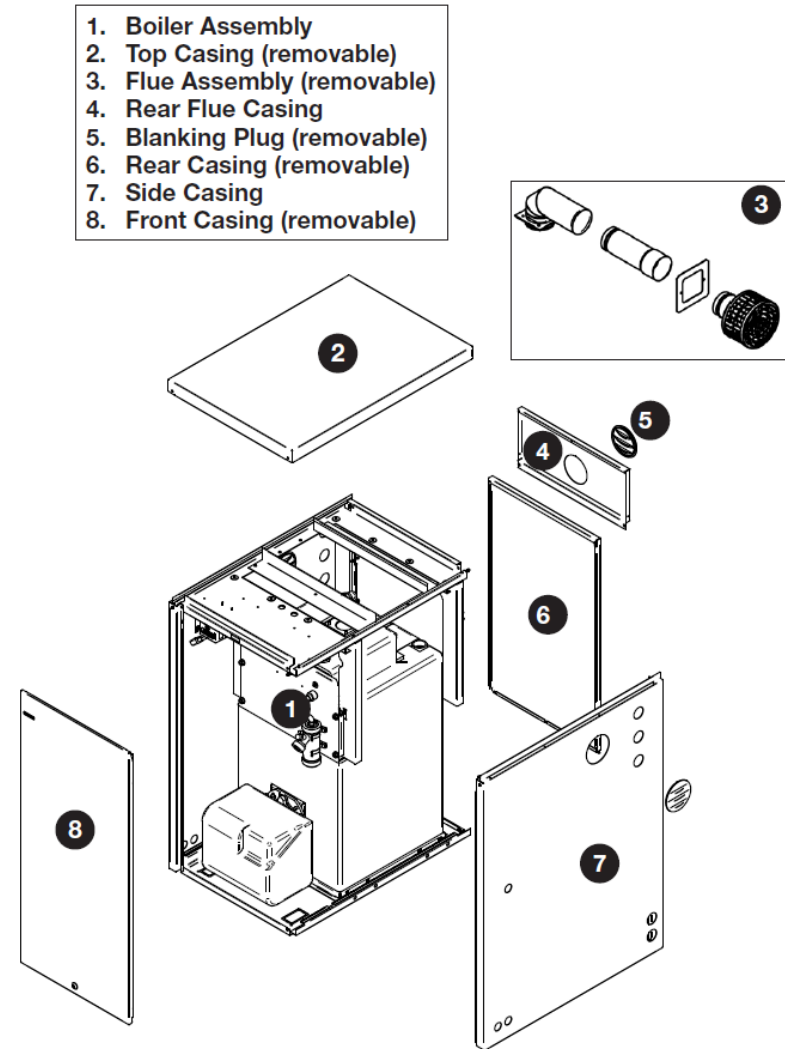
4.5.6 U-Series Utility – Combi (UCHEE) - Key Components



4.5.7 K-Series Kabin Pak – Casing Components



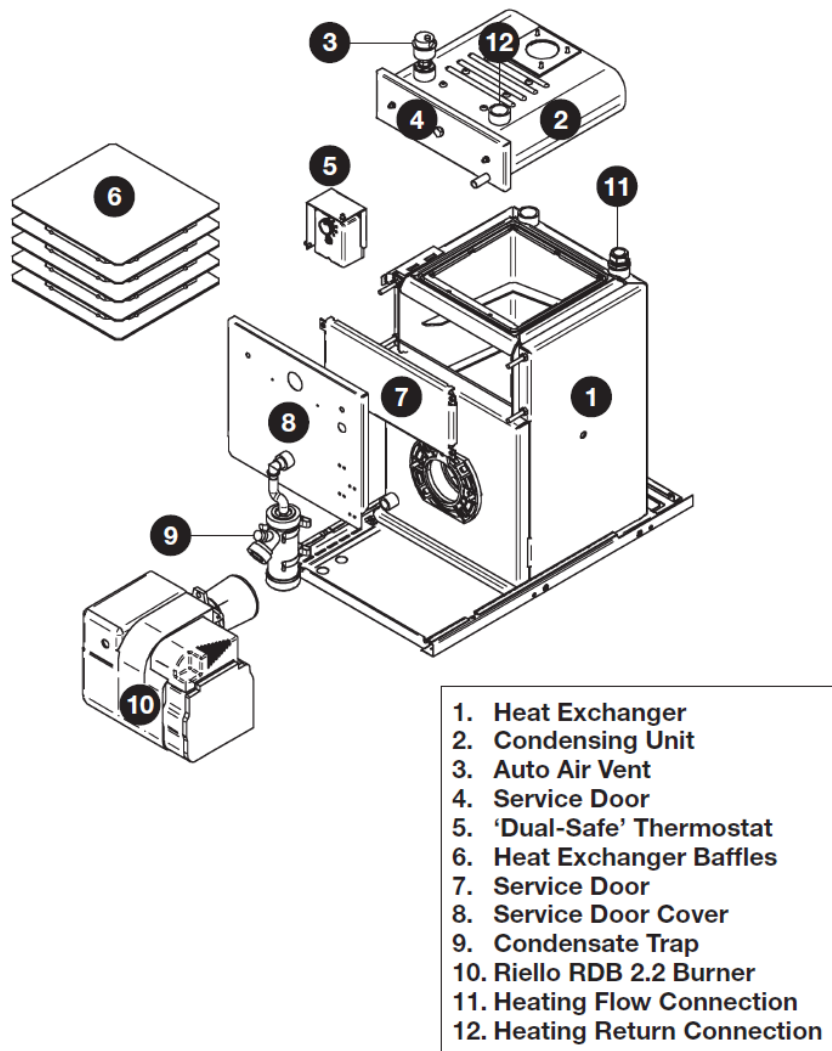
Models up to 120 HE



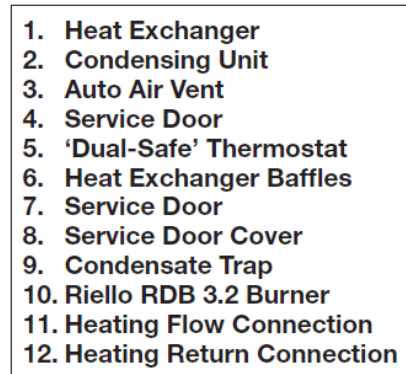
150 HE Models

4.5.8 K-Series Kabin Pak - Pre-Wired (KHE)

Key Components



Models up to 120 HE

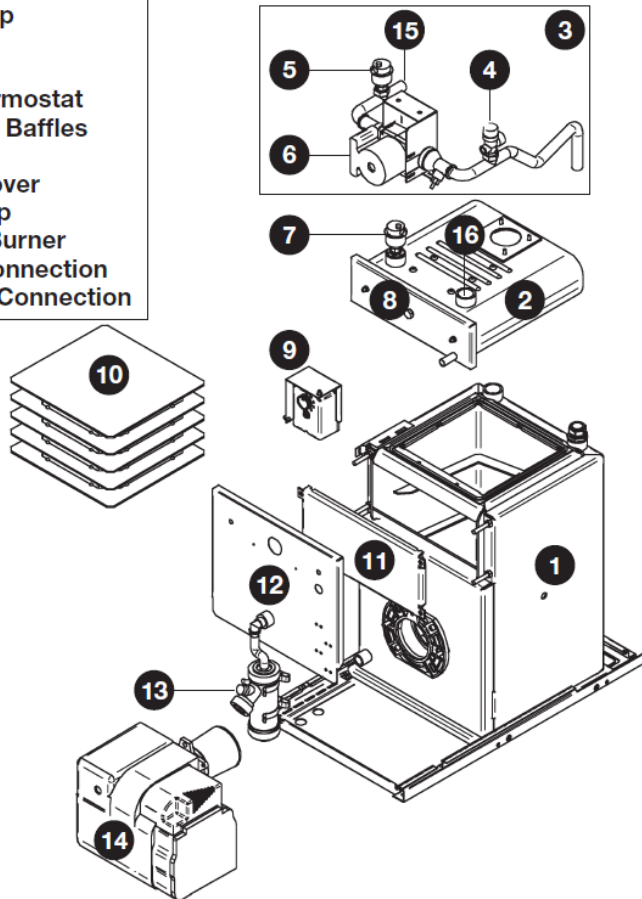


150 HE Models

4.5.9 K-Series Kabin Pak - Pumped (KPHE)

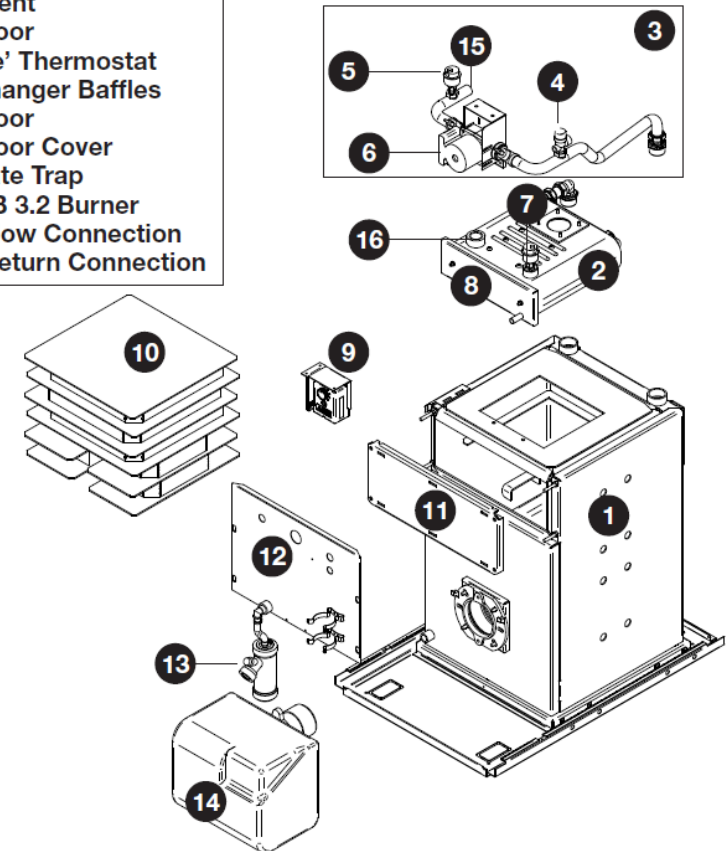
Key Components

1. Heat Exchanger
2. Condensing Unit
3. Pipework Assembly
4. Pressure Relief Valve
5. Auto Air Vent
6. Circulating Pump
7. Auto Air Vent
8. Service Door
9. 'Dual-Safe' Thermostat
10. Heat Exchanger Baffles
11. Service Door
12. Service Door Cover
13. Condensate Trap
14. Riello RDB 2.2 Burner
15. Heating Flow Connection
16. Heating Return Connection



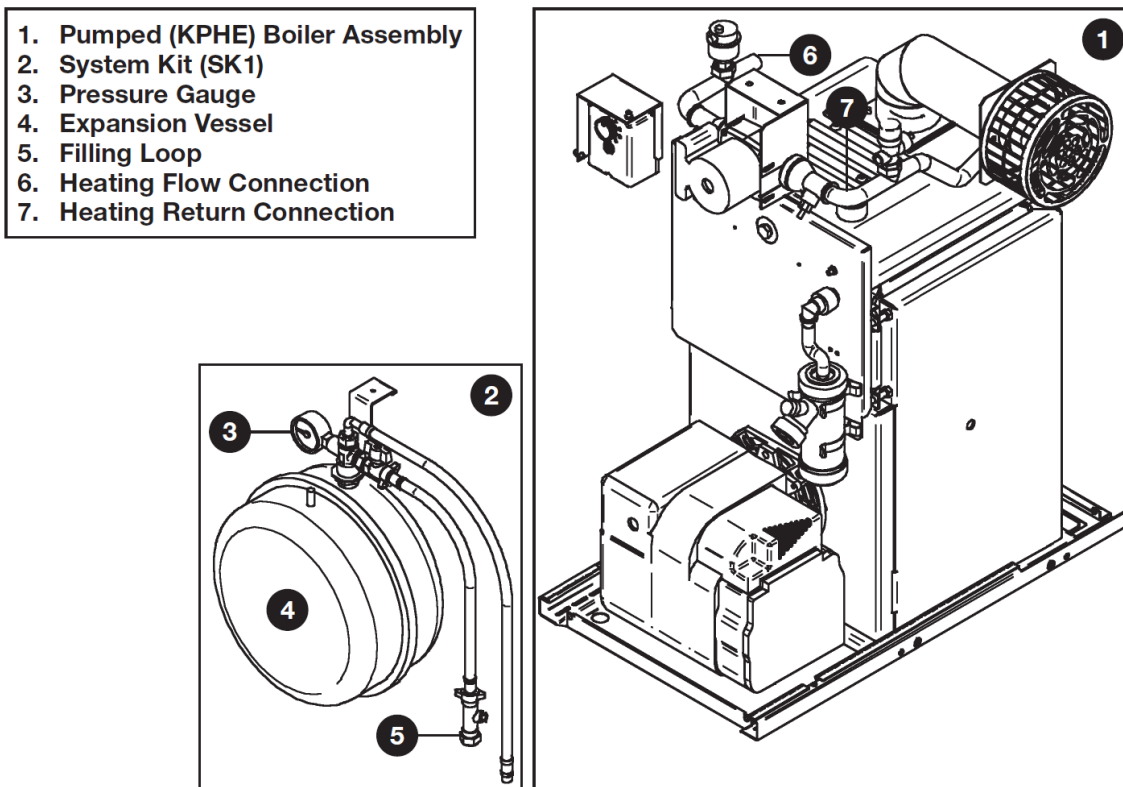
Models up to 120 HE

1. Heat Exchanger
2. Condensing Unit
3. Pipework Assembly
4. Pressure Relief Valve
5. Auto Air Vent
6. Circulating Pump
7. Auto Air Vent
8. Service Door
9. 'Dual-Safe' Thermostat
10. Heat Exchanger Baffles
11. Service Door
12. Service Door Cover
13. Condensate Trap
14. Riello RDB 3.2 Burner
15. Heating Flow Connection
16. Heating Return Connection

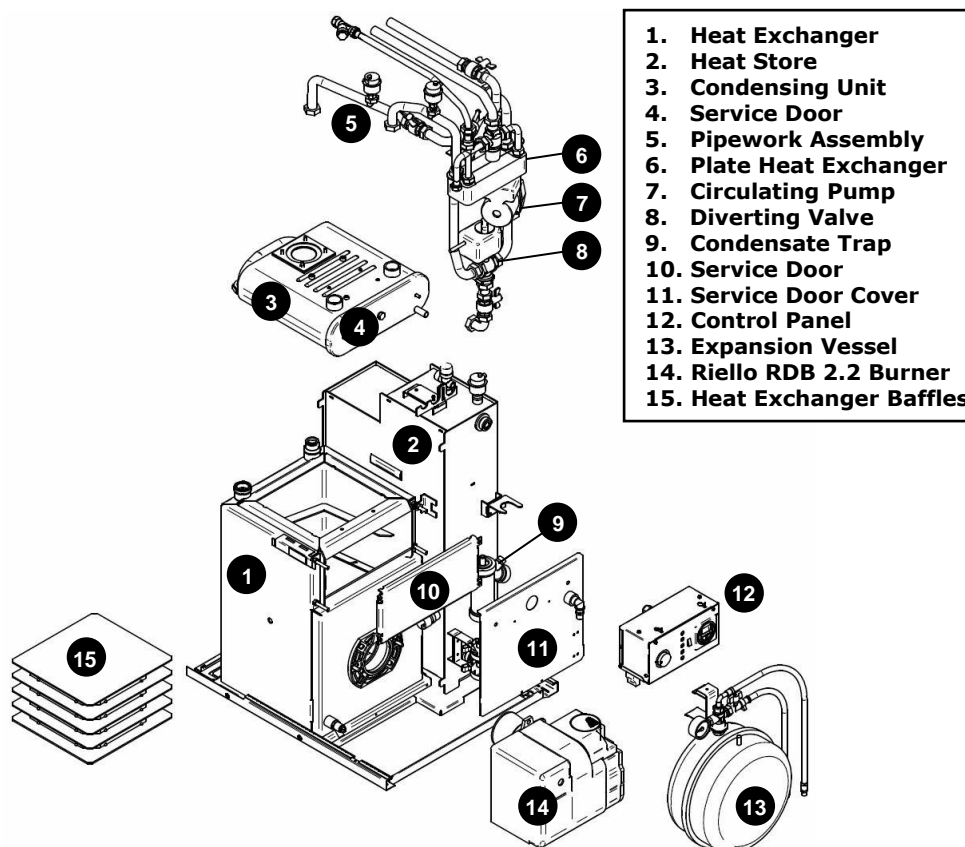


150 HE Models

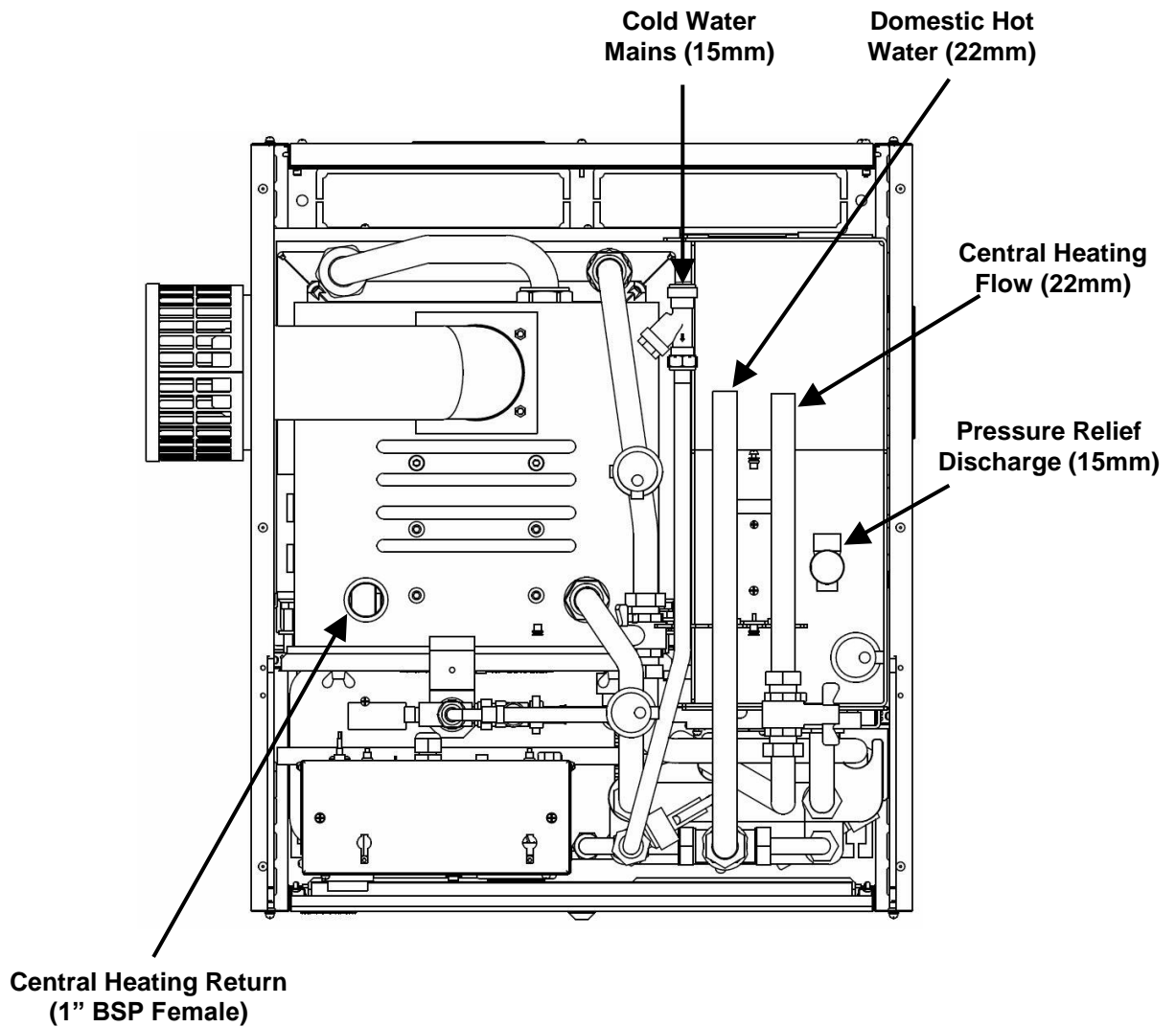
4.5.10 K-Series Kabin Pak – System (KSHE) - Key Components



4.5.11 K-Series Kabin Pak – Combi (KCHEE) - Key Components

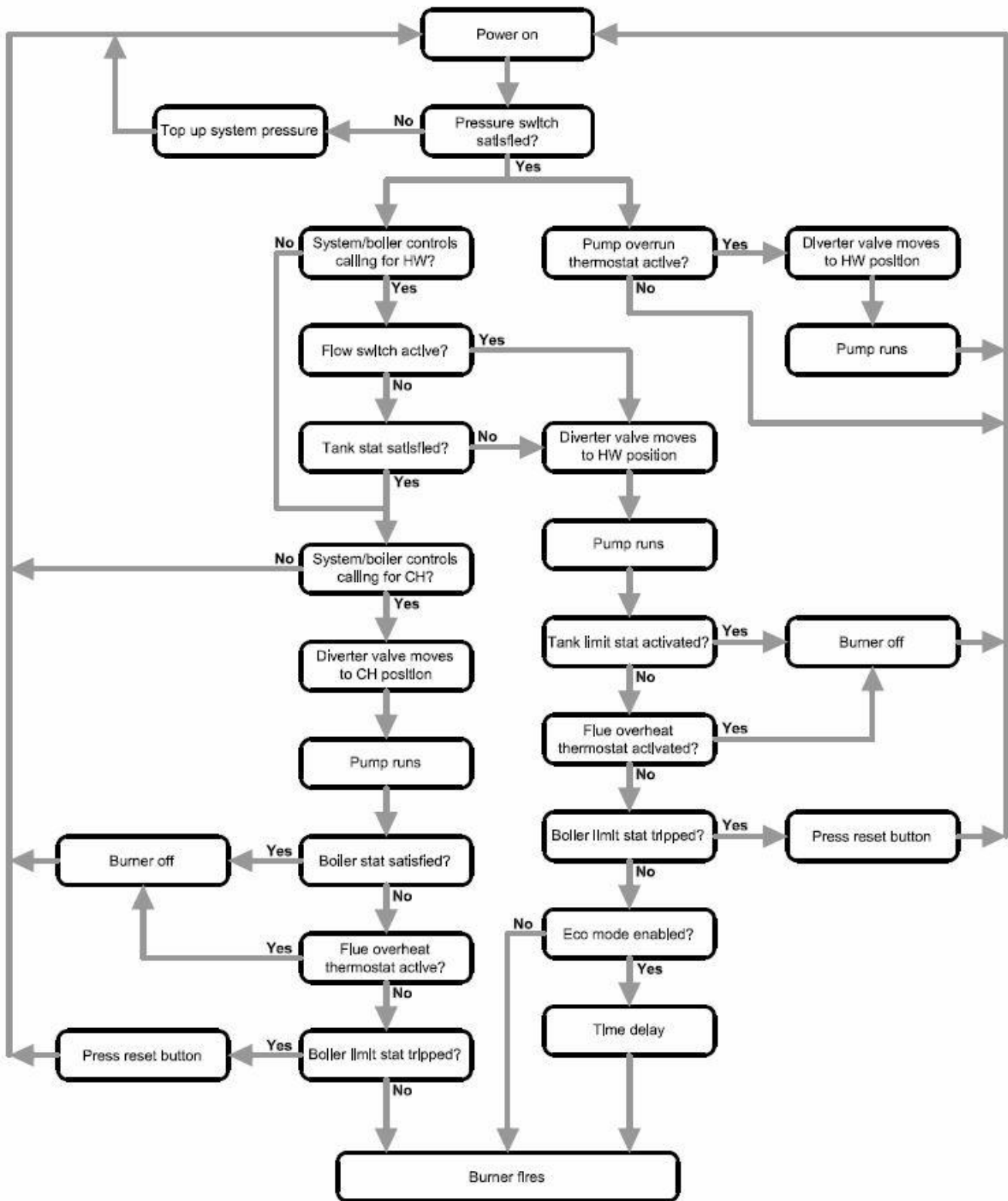


4.5.12 Combi Pipe Layout (UCHEE & KCHEE Models)



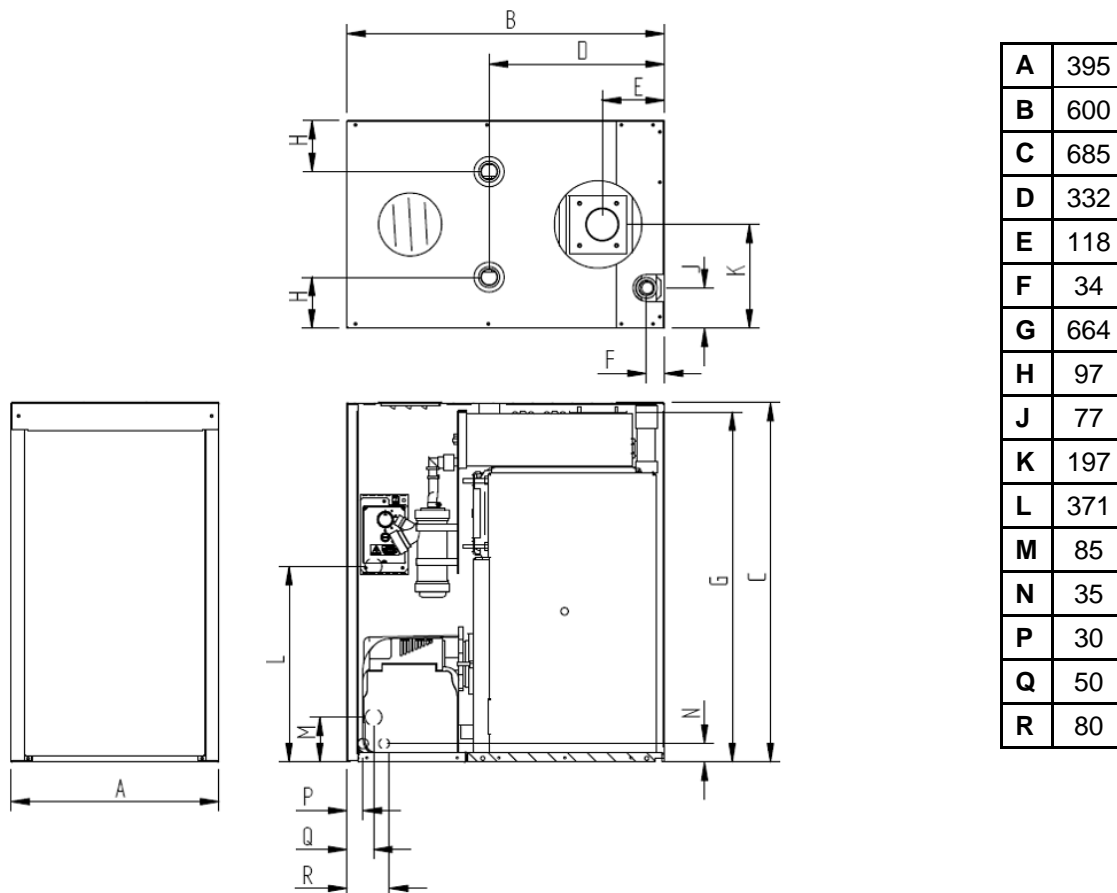
5 TECHNICAL DETAILS

5.1 Combi Sequence of Operation Flow Chart

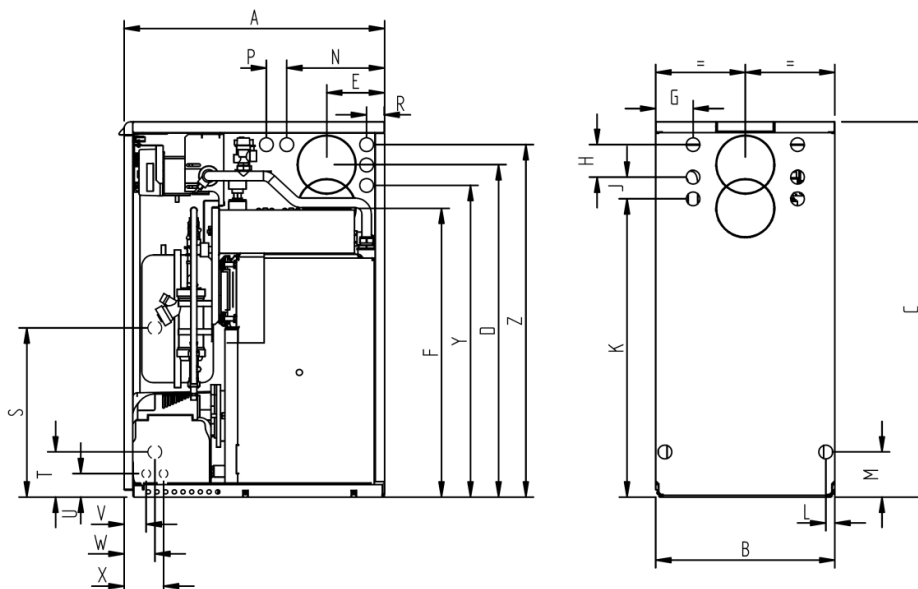


5.2 Dimensions

5.2.1 B-Series Boilerhouse (B70HE, B90HE & B120HE Models)

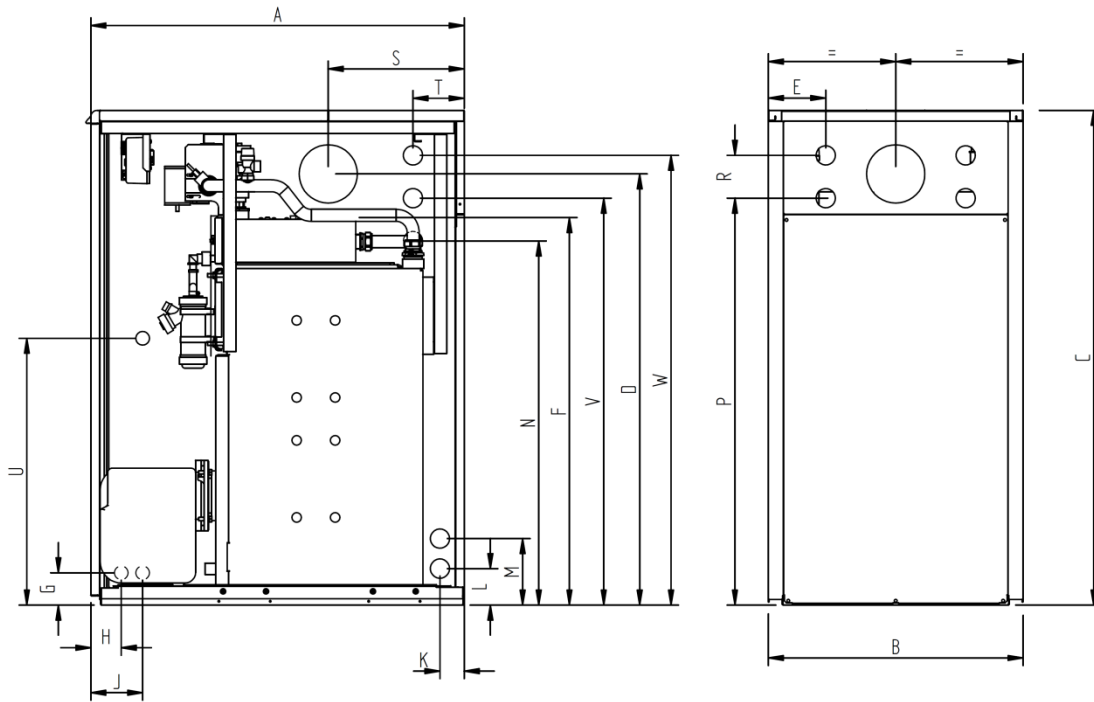


5.2.2 U-Series Utility (UHE, UPHE & USHE Models up to 120HE)



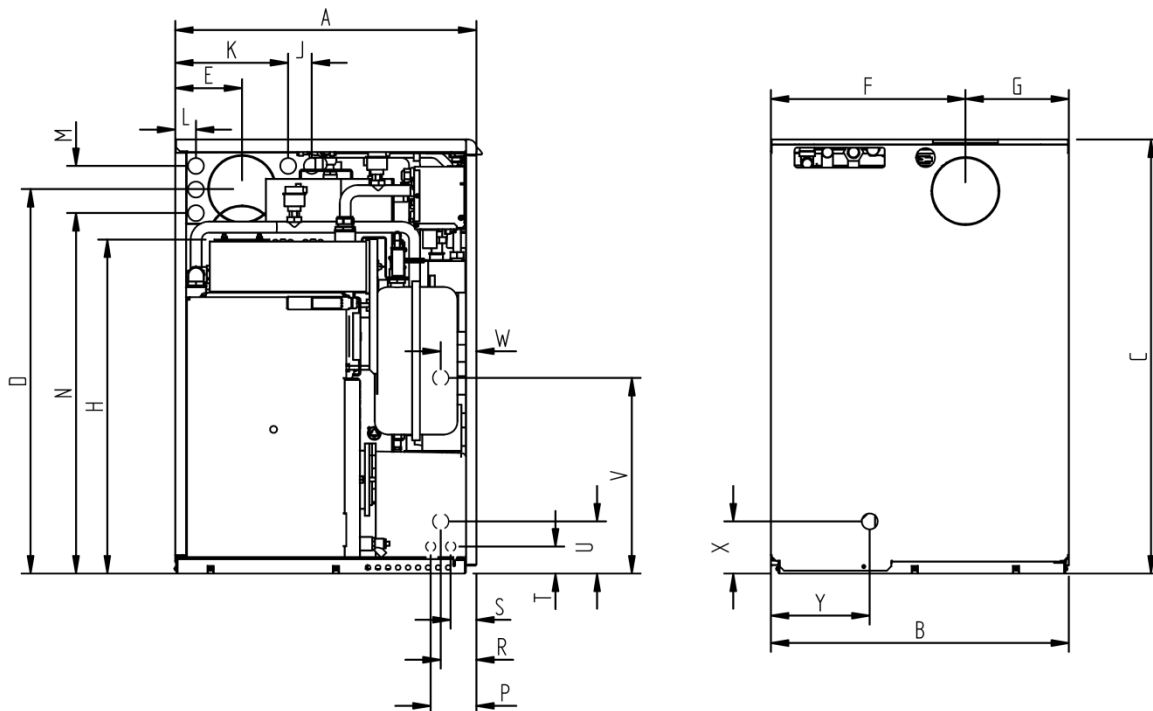
MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z
U~	600	413	865	766	134	666	86	75	50	687	21	104	226	47	41	390	104	54	51	71	91	718	812
UP~	600	413	865	766	134	666	86	75	50	687	21	104	226	47	41	390	104	54	51	71	91	718	812
US~	600	413	865	766	134	666	86	75	50	687	21	104	226	47	41	390	104	54	51	71	91	718	812

5.2.3 U-Series Utility (150HE Models)



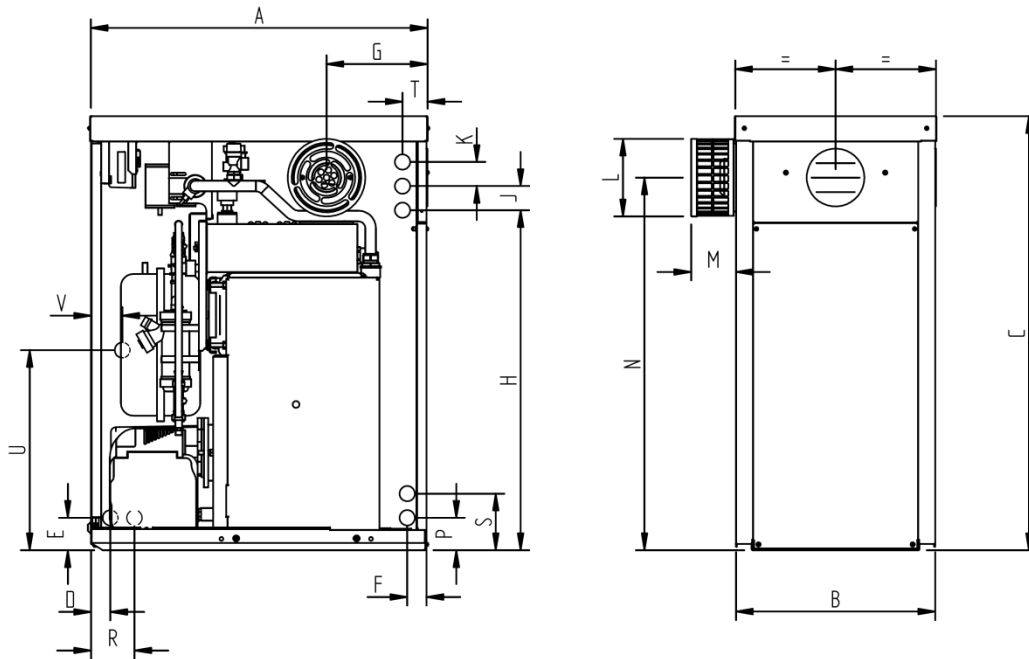
MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W
U150HE	872	595	1155	1007	134	905	75	71	121	57	85	155	850	950	100	318	120	623	950	1050
UP150HE	872	595	1155	1007	134	905	75	71	121	57	85	155	850	950	100	318	120	623	950	1050

5.2.4 U-Series Utility (UCHEE Models)



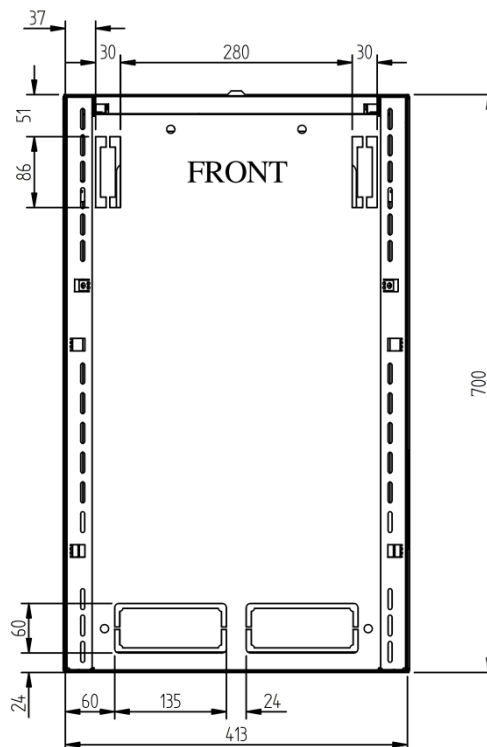
MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Y
UC~	600	595	865	766	134	388	207	666	47	226	42	94	718	91	71	51	54	104	390	71	104	197

5.2.5 K-Series Kabin Pak (KHE, KPHE & KSHE Models up to 120HE)

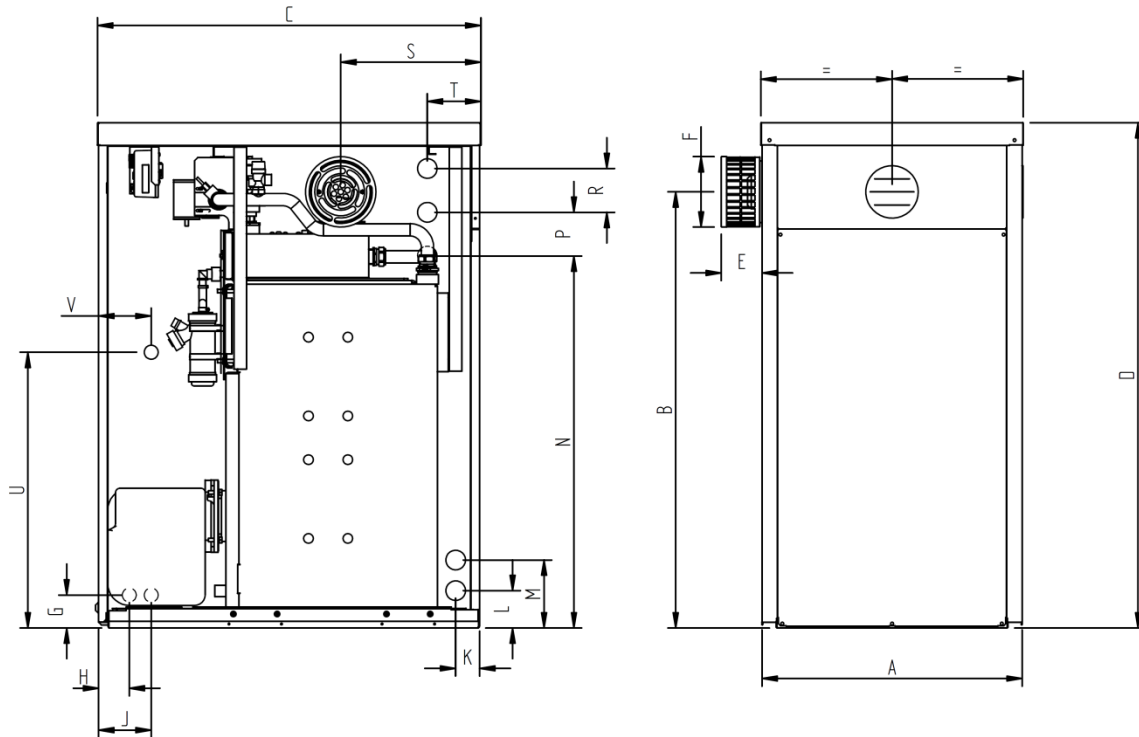


MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V
K~	700	413	900	40	67	40	210	705	50	50	161	93	773	67	90	117	52	415	65
KP~	700	413	900	40	67	40	210	705	50	50	161	93	773	67	90	117	52	415	65
KS~	700	413	900	40	67	40	210	705	50	50	161	93	773	67	90	117	52	415	65

5.2.6 K-Series Kabin Pak Base Tray (KHE, KPHE & KSHE Models up to 120HE)

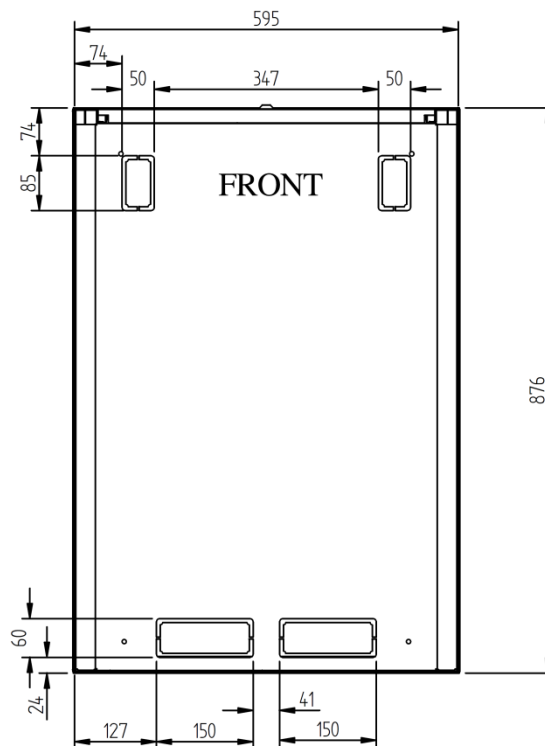


5.2.7 K-Series Kabin Pak (150HE Models)

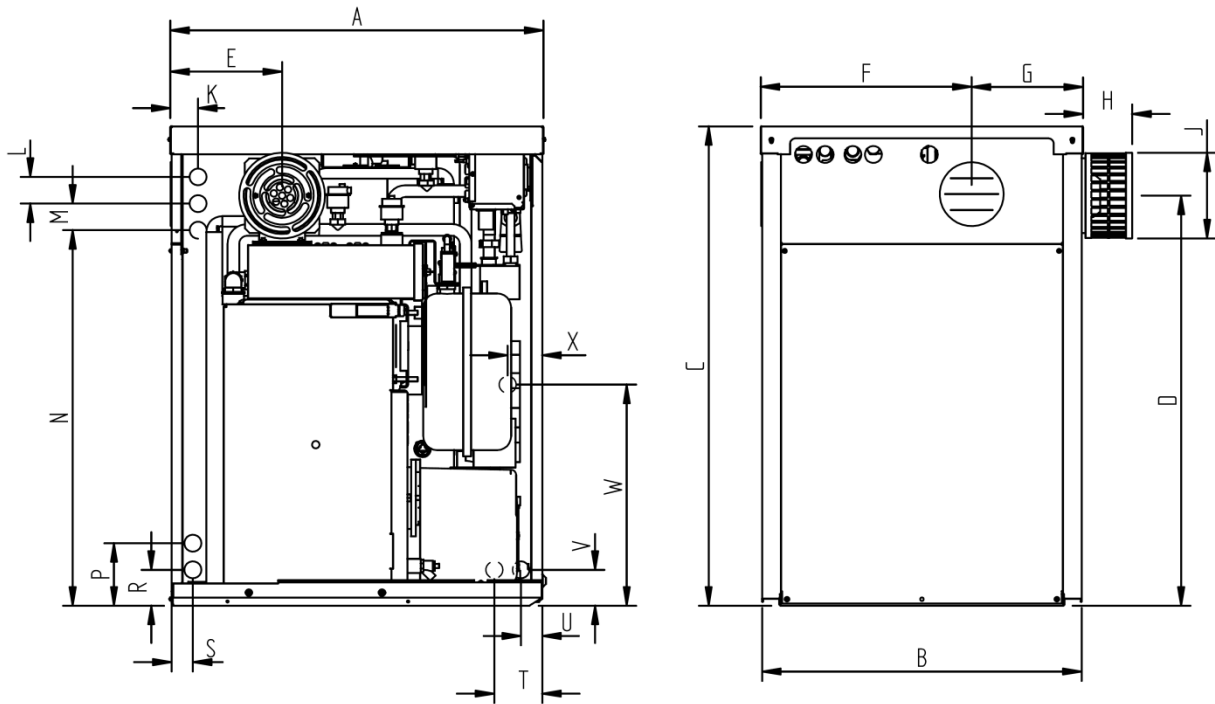


MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V
K150HE	595	997	876	1155	93	161	75	70	120	55	85	155	850	100	100	320	122	630	120
KP150HE	595	997	876	1155	93	161	75	70	120	55	85	155	850	100	100	320	122	630	120

5.2.8 K-Series Kabin Pak Base Tray (150HE Models)

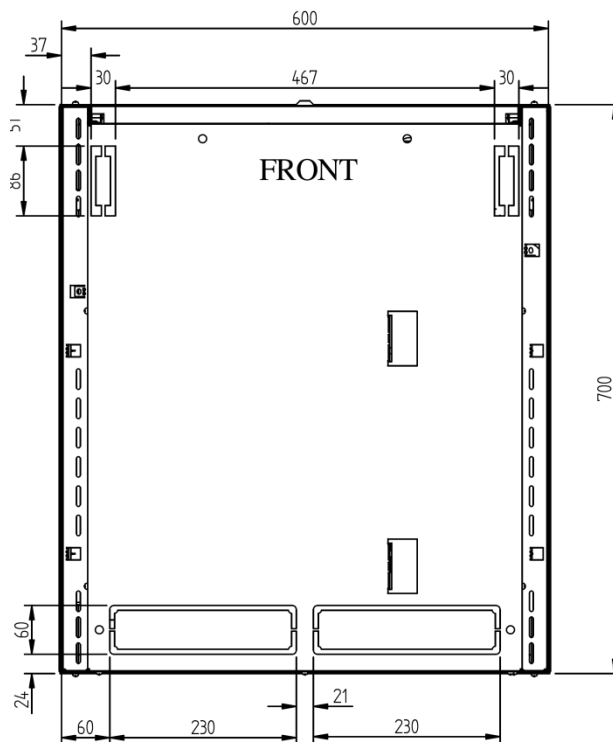


5.2.9 K-Series Kabin Pak (KCHEE Models)



MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X
KC~	700	600	900	770	210	396	209	92	161	52	50	50	705	117	67	40	90	40	67	415	65

5.2.10 K-Series Kabin Pak Base Tray (KCHEE Models)

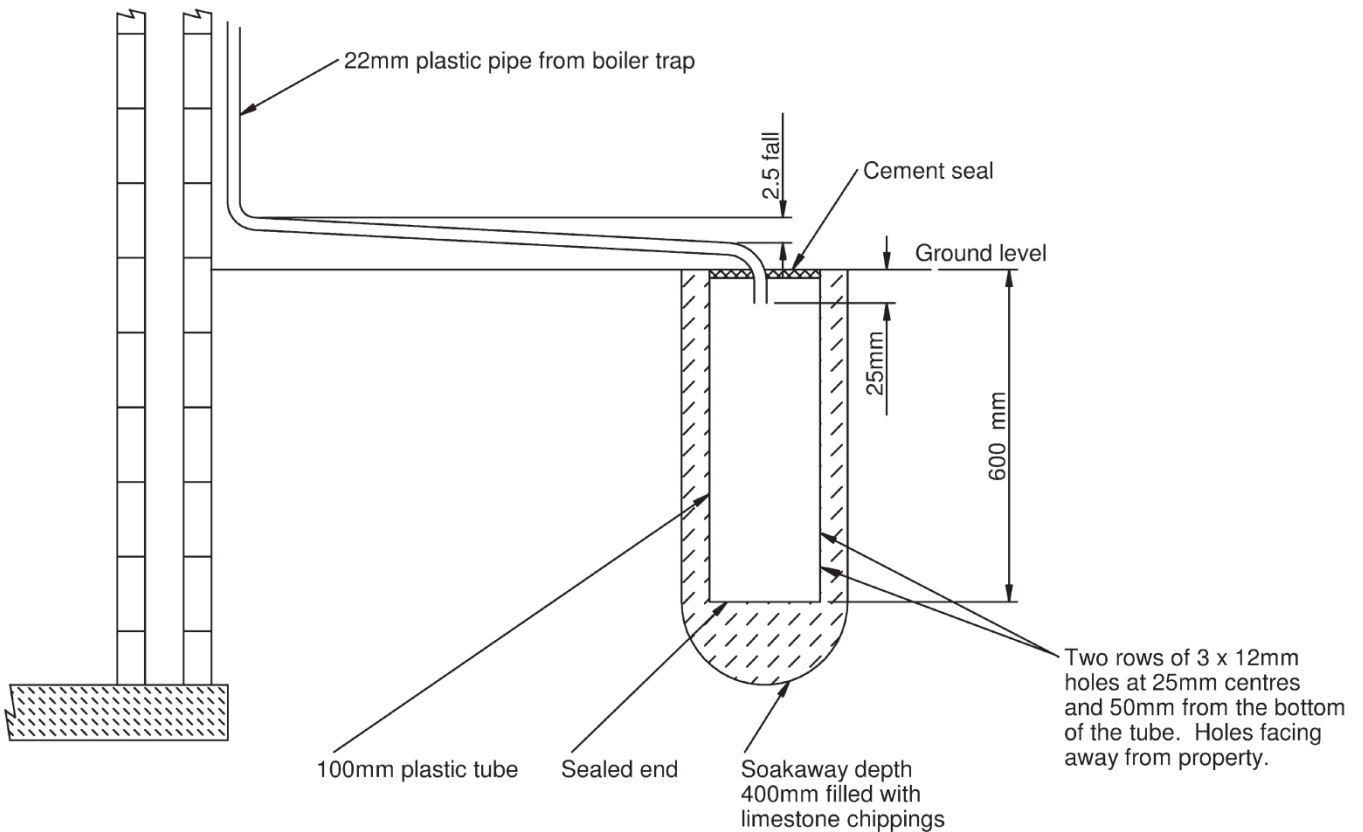
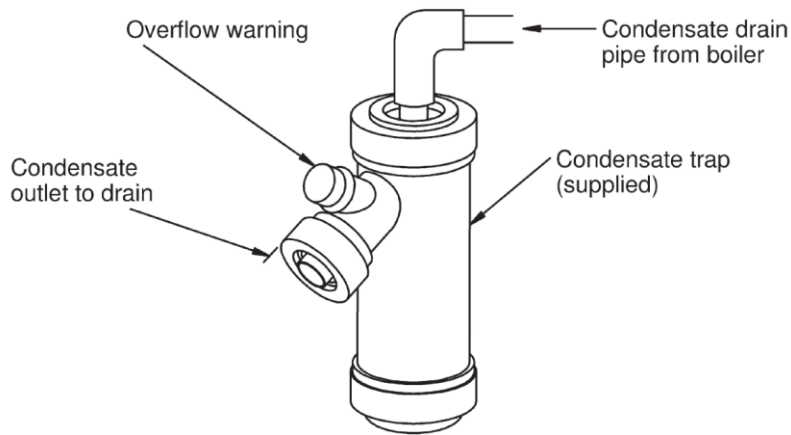


5.3 Condensate Disposal

The Warmflow high efficiency condensing boiler is supplied with a factory fitted, self-sealing condensate trap. The trap has been fitted inside the boiler casing to the right hand side.

The condensate drainage pipe within the boiler is a flexible plastic hose which can be trimmed to length. 3/4" or 22mm pipe should be connected to the flexible hose. The pipe should not be made from steel or copper. The drainage pipe may run into an internal soil stack or waste pipe, an external gulley, hopper or soakaway as shown below.

The boiler, when fully condensing, will produce a maximum of 1.5 litres per hour of condensate. It is recommended that the drainage pipe should have a minimum fall of 1:20. This pipe must be protected from freezing either by insulating or using large diameter pipework in exposed locations.



5.4 Technical Data

5.4.1 B-Series Boilerhouse (BHE)

MODEL		B70HE			B90HE			B120HE		
Nominal Heat Output	kW	14.7	17.6	21.0	21.0	23.5	27.1	27.1	29.0	32.7
	Btu/hr	50,000	60,000	71,650	71,560	80,000	92,380	92,380	99,050	111,600
Nominal Heat Input	kW	15.3	18.4	22.0	22.0	24.4	28.0	28.0	30.0	34.0
	Btu/hr	52,150	62,600	75,000	75,000	83,175	95,550	95,550	102,400	116,000
Burner		RDB 2.2 15-21			RDB 2.2 21-26			RDB 2.2 26-33		
Head		T1SH			T2SH			T5S		
Secondary Air Damper		B			N/A			N/A		
Conventional Flue Diameter	mm	100 or 125			100 or 125			100 or 125		
	in	4 or 5			4 or 5			4 or 5		
Flue Gas Temp.	°C	86	88	90	90	93	95	95	98	110
Smoke	Bacarach	0			0			0		
Kerosene Settings										
Nozzle	make	Danfoss 60°ES			Danfoss 60°ES			Danfoss 60°ES		
	size	0.5	0.5	0.6	0.6	0.65	0.75	0.75	0.85	0.85
Oil Pump Pressure	bar	7.0	9.0	8.0	8.0	8.0	7.0	7.0	8.0	10.0
	psi	102	130	116	116	116	102	102	116	145
Max CO ₂	%	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
Approx Fuel Flow Rate	litres/h	1.65	1.98	2.35	2.35	2.65	2.98	2.98	3.40	3.81
	Gals/h	0.36	0.44	0.52	0.52	0.58	0.65	0.65	0.75	0.84
Flow Connection		1" BSP Female			1" BSP Female			1" BSP Female		
Return Connection		1" BSP Female			1" BSP Female			1" BSP Female		
Water Content	litres	22			22			22		
	gals	4.8			4.8			4.8		
Boiler Weight Wet	kg	112			112			112		
SEDBUK Efficiency 2009		90.7%			90.7%			90.8%		
Factory Settings		Highlighted in bold								

5.4.2 U-Series Utility – Pre-Wired (UHE)

MODEL		U70HE			U90HE			U120HE			U150HE		
Nominal	kW	14.7	17.6	21.0	21.0	23.5	27.1	27.1	29.0	32.7	33	38.5	44
Heat Output	Btu/hr	50,000	60,000	71,650	71,560	80,000	92,380	92,380	99,050	111,600	112,629	131,362	150,128
Nominal	kW	15.3	18.4	22.0	22.0	24.4	28.0	28.0	30.0	34.0	33	40	46.8
Heat Input	Btu/hr	52,150	62,600	75,000	75,000	83,175	95,550	95,550	102,400	116,000	112,629	136,139	159,681
Burner		RDB 2.2 15-21			RDB 2.2 21-26			RDB 2.2 26-33			RDB 3.2 33-44		
Head		T1SH			T2SH			T5S			Adjustable @ setting 5		
Secondary Air Damper		B			N/A			N/A			N/A		
Conventional	mm	100 or 125			100 or 125			100 or 125			100 or 125		
Flue Diameter	in	4 or 5			4 or 5			4 or 5			4 or 5		
Flue Gas Temp.	°C	86	88	90	90	93	95	95	98	110	75	90	105
Smoke	Bacarach	0			0			0			0		
Kerosene Settings													
Nozzle	make	Danfoss 60°ES			Danfoss 60°ES			Danfoss 60°ES			Danfoss 80°H		
	size	0.5	0.5	0.6	0.6	0.65	0.75	0.75	0.85	0.85	0.85	1.00	1.25
Oil Pump	bar	7.0	9.0	8.0	8.0	8.0	7.0	7.0	8.0	10.0	10.0	9.5	9.5
Pressure	psi	102	130	116	116	116	102	102	116	145	145	138	138
Max CO ₂	%	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
Approx Fuel	litres/h	1.65	1.98	2.35	2.35	2.65	2.98	2.98	3.40	3.81	3.81	4.48	5.25
Flow Rate	Gals/h	0.36	0.44	0.52	0.52	0.58	0.65	0.65	0.75	0.84	0.84	0.99	1.16
Flow Connection		28mm Compression			28mm Compression			28mm Compression			1¼" BSP Female		
Return Connection		1" BSP Female			1" BSP Female			1" BSP Female			1¼" BSP Female		
Water	litres	22			22			22			45		
Content	gals	4.8			4.8			4.8			9.9		
Boiler Weight Wet	kg	123			123			123			230		
SEDBUK Efficiency 2009		90.7%			90.8%			90.7%			90.3%		
Factory Settings		Highlighted in bold											

5.4.3 U-Series Utility – Pumped (UPHE)

MODEL		UP70HE			UP90HE			UP120HE			UP150HE		
Nominal	kW	14.7	17.6	21.0	21.0	23.5	27.1	27.1	29.0	32.7	33	38.5	44
Heat Output	Btu/hr	50,000	60,000	71,650	71,560	80,000	92,380	92,380	99,050	111,600	112,629	131,362	150,128
Nominal	kW	15.3	18.4	22.0	22.0	24.4	28.0	28.0	30.0	34.0	33	40	46.8
Heat Input	Btu/hr	52,150	62,600	75,000	75,000	83,175	95,550	95,550	102,400	116,000	112,629	136,139	159,681
Burner		RDB 2.2 15-21			RDB 2.2 21-26			RDB 2.2 26-33			RDB 3.2 33-44		
Head		T1SH			T2SH			T5S			Adjustable @ setting 5		
Secondary Air Damper		B			N/A			N/A			N/A		
Conventional	mm	100 or 125			100 or 125			100 or 125			100 or 125		
Flue Diameter	in	4 or 5			4 or 5			4 or 5			4 or 5		
Flue Gas Temp.	°C	86	88	90	90	93	95	95	98	110	75	90	105
Smoke	Bacarach	0			0			0			0		
Kerosene Settings													
Nozzle	make	Danfoss 60°ES			Danfoss 60°ES			Danfoss 60°ES			Danfoss 80°H		
	size	0.5	0.5	0.6	0.6	0.65	0.75	0.75	0.85	0.85	0.85	1.00	1.25
Oil Pump	bar	7.0	9.0	8.0	8.0	8.0	7.0	7.0	8.0	10.0	10.0	9.5	9.5
Pressure	psi	102	130	116	116	116	102	102	116	145	145	138	138
Max CO ₂	%	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
Approx Fuel	litres/h	1.65	1.98	2.35	2.35	2.65	2.98	2.98	3.40	3.81	3.81	4.48	5.25
Flow Rate	Gals/h	0.36	0.44	0.52	0.52	0.58	0.65	0.65	0.75	0.84	0.84	0.99	1.16
Flow Connection		22mm Copper			22mm Copper			28mm Compression			28mm Copper		
Return Connection		1" BSP Female			1" BSP Female			1" BSP Female			1¼" BSP Female		
Water	litres	22			22			22			45		
Content	gals	4.8			4.8			4.8			9.9		
Boiler Weight	Wet kg	127			127			127			242		
SEDBUK Efficiency 2009		90.7%			90.8%			90.7%			90.3%		
Factory Settings		Highlighted in bold											

U-Series Utility – System (USHE)

MODEL		US70HE			US90HE			US120HE		
Nominal	kW	14.7	17.6	21.0	21.0	23.5	27.1	27.1	29.0	32.7
Heat Output	Btu/hr	50,000	60,000	71,650	71,560	80,000	92,380	92,380	99,050	111,600
Nominal	kW	15.3	18.4	22.0	22.0	24.4	28.0	28.0	30.0	34.0
Heat Input	Btu/hr	52,150	62,600	75,000	75,000	83,175	95,550	95,550	102,400	116,000
Burner		RDB 2.2 15-21			RDB 2.2 21-26			RDB 2.2 26-33		
Head		T1SH			T2SH			T5S		
Secondary Air Damper		B			N/A			N/A		
Conventional	mm	100 or 125			100 or 125			100 or 125		
Flue Diameter	in	4 or 5			4 or 5			4 or 5		
Flue Gas Temp.	°C	86	88	90	90	93	95	95	98	110
Smoke	Bacarach	0			0			0		
Kerosene Settings										
Nozzle	make	Danfoss 60°ES			Danfoss 60°ES			Danfoss 60°ES		
	size	0.5	0.5	0.6	0.6	0.65	0.75	0.75	0.85	0.85
Oil Pump	bar	7.0	9.0	8.0	8.0	8.0	7.0	7.0	8.0	10.0
Pressure	psi	102	130	116	116	116	102	102	116	145
Max CO ₂	%	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
Approx Fuel	litres/h	1.65	1.98	2.35	2.35	2.65	2.98	2.98	3.40	3.81
Flow Rate	Gals/h	0.36	0.44	0.52	0.52	0.58	0.65	0.65	0.75	0.84
Flow Connection		22mm Copper			22mm Copper			28mm Compression		
Return Connection		1" BSP Female			1" BSP Female			1" BSP Female		
Water	litres	22			22			22		
Content	gals	4.8			4.8			4.8		
Boiler Weight Wet	kg	133			133			133		
SEDBUK Efficiency 2009		90.7%			90.8%			90.7%		
Factory Settings		Highlighted in bold								

U-Series Utility – Combi (UCHEE)

MODEL		UC70HEE			UC90HEE			UC120HEE		
Nominal Heat Output	kW Btu/hr	14.7 50,000	17.6 60,000	21.0 71,650	21.0 71,560	23.5 80,000	27.1 92,380	27.1 92,380	29.0 99,050	32.7 111,600
Nominal Heat Input	kW Btu/hr	15.3 52,150	18.4 62,600	22.0 75,000	22.0 75,000	24.4 83,175	28.0 95,550	28.0 95,550	30.0 102,400	34.0 116,000
Burner		RDB 2.2 15-21			RDB 2.2 21-26			RDB 2.2 26-33		
Head		T1SH			T2SH			T5S		
Secondary Air Damper		B			N/A			N/A		
Conventional Flue Diameter	mm in	100 or 125 4 or 5			100 or 125 4 or 5			100 or 125 4 or 5		
Flue Gas Temp.	°C	86	88	90	90	93	95	95	98	110
Smoke	Bacarach	0			0			0		
Kerosene Settings										
Nozzle	make	Danfoss 60°ES			Danfoss 60°ES			Danfoss 60°ES		
	size	0.5	0.5	0.6	0.6	0.65	0.75	0.75	0.85	0.85
Oil Pump Pressure	bar	7.0	9.0	8.0	8.0	8.0	7.0	7.0	8.0	10.0
	psi	102	130	116	116	116	102	102	116	145
Max CO ₂	%	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
Approx Fuel Flow Rate	litres/h	1.65	1.98	2.35	2.35	2.65	2.98	2.98	3.40	3.81
	Gals/h	0.36	0.44	0.52	0.52	0.58	0.65	0.65	0.75	0.84
Water Content	litres	74			74			74		
	gals	16.3			16.3			16.3		
Boiler Weight Wet	kg	238			238			238		
Domestic Hot Water (DHW) Production										
Minimum Inlet Dynamic Pressure for Maximum DHW Flow Rate	bar	1.8			1.8			1.8		
	psi	26			26			26		
Maximum Achievable DHW Flow Rate		Unrestricted			Unrestricted			Unrestricted		
Maximum Recommended DHW Flow Rate	litres/m	18			18			18		
	gal/m	4.0			4.0			4.0		
Factory Set DHW Flow Rate	litres/m	18			18			18		
	gal/m	4.0			4.0			4.0		
Minimum DHW Flow Rate	litres/m	2.5			2.5			2.5		
	gal/m	0.55			0.55			0.55		
DHW Temperature Rise (at Maximum Output)		32°C @ 18 litres/min for 120 litre draw-off			32°C @ 24 litres/min for 120 litre draw-off			32°C @ 24 litres/min for 120 litre draw-off		
Pressure Relief	bar	2.5			2.5			2.5		
	psi	0.55			0.55			0.55		
Cold Water Mains Inlet Connection		Minimum 15mm < 3.0Bar			Minimum 15mm < 3.0Bar			Minimum 15mm < 3.0Bar		
DHW Outlet Connection		22mm Copper			22mm Copper			22mm Copper		
Flow Connection		22mm Copper			22mm Copper			22mm Coper		
Return Connection		1" BSP Female			1" BSP Female			1" BSP Female		
SEDBUK Efficiency 2009		89.1%			89.1%			89.1%		
Factory Settings		Highlighted in bold								

5.4.4 K-Series Kabin Pak – Pre-Wired (KHE)

MODEL		K70HE			K90HE			K120HE			K150HE		
Nominal	kW	14.7	17.6	21.0	21.0	23.5	27.1	27.1	29.0	32.7	33	38.5	44
Heat Output	Btu/hr	50,000	60,000	71,650	71,560	80,000	92,380	92,380	99,050	111,600	112,629	131,362	150,128
Nominal	kW	15.3	18.4	22.0	22.0	24.4	28.0	28.0	30.0	34.0	33	40	46.8
Heat Input	Btu/hr	52,150	62,600	75,000	75,000	83,175	95,550	95,550	102,400	116,000	112,629	136,139	159,681
Burner		RDB 2.2 15-21			RDB 2.2 21-26			RDB 2.2 26-33			RDB 3.2 33-44		
Head		T1SH			T2SH			T5S			Adjustable @ setting 5		
Secondary Air Damper		B			N/A			N/A			N/A		
Conventional	mm	100 or 125			100 or 125			100 or 125			100 or 125		
Flue Diameter	in	4 or 5			4 or 5			4 or 5			4 or 5		
Flue Gas Temp.	°C	86	88	90	90	93	95	95	98	110	75	90	105
Smoke	Bacarach	0			0			0			0		
Kerosene Settings													
Nozzle	make	Danfoss 60°ES			Danfoss 60°ES			Danfoss 60°ES			Danfoss 80°H		
	size	0.5	0.5	0.6	0.6	0.65	0.75	0.75	0.85	0.85	0.85	1.00	1.25
Oil Pump	bar	7.0	9.0	8.0	8.0	8.0	7.0	7.0	8.0	10.0	10.0	9.5	9.5
Pressure	psi	102	130	116	116	116	102	102	116	145	145	138	138
Max CO ₂	%	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
Approx Fuel	litres/h	1.65	1.98	2.35	2.35	2.65	2.98	2.98	3.40	3.81	3.81	4.48	5.25
Flow Rate	Gals/h	0.36	0.44	0.52	0.52	0.58	0.65	0.65	0.75	0.84	0.84	0.99	1.16
Flow Connection		28mm Compression			28mm Compression			28mm Compression			1¼" BSP Female		
Return Connection		1" BSP Female			1" BSP Female			1" BSP Female			1¼" BSP Female		
Water	litres	22			22			22			45		
Content	gals	4.8			4.8			4.8			9.9		
Boiler Weight Wet	kg	128			128			128			232		
SEDBUK Efficiency 2009		90.7%			90.8%			90.7%			90.3%		
Factory Settings		Highlighted in bold											

5.4.5 K-Series Kabin Pak – Pumped (KPHE)

MODEL		KP70HE			KP90HE			KP120HE			KP150HE		
Nominal	kW	14.7	17.6	21.0	21.0	23.5	27.1	27.1	29.0	32.7	33	38.5	44
Heat Output	Btu/hr	50,000	60,000	71,650	71,560	80,000	92,380	92,380	99,050	111,600	112,629	131,362	150,128
Nominal	kW	15.3	18.4	22.0	22.0	24.4	28.0	28.0	30.0	34.0	33	40	46.8
Heat Input	Btu/hr	52,150	62,600	75,000	75,000	83,175	95,550	95,550	102,400	116,000	112,629	136,139	159,681
Burner		RDB 2.2 15-21			RDB 2.2 21-26			RDB 2.2 26-33			RDB 3.2 33-44		
Head		T1SH			T2SH			T5S			Adjustable @ setting 5		
Secondary Air Damper		B			N/A			N/A			N/A		
Conventional	mm	100 or 125			100 or 125			100 or 125			100 or 125		
Flue Diameter	in	4 or 5			4 or 5			4 or 5			4 or 5		
Flue Gas Temp.	°C	86	88	90	90	93	95	95	98	110	75	90	105
Smoke	Bacarach	0			0			0			0		
Kerosene Settings													
Nozzle	make	Danfoss 60°ES			Danfoss 60°ES			Danfoss 60°ES			Danfoss 80°H		
	size	0.5	0.5	0.6	0.6	0.65	0.75	0.75	0.85	0.85	0.85	1.00	1.25
Oil Pump	bar	7.0	9.0	8.0	8.0	8.0	7.0	7.0	8.0	10.0	10.0	9.5	9.5
Pressure	psi	102	130	116	116	116	102	102	116	145	145	138	138
Max CO ₂	%	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
Approx Fuel	litres/h	1.65	1.98	2.35	2.35	2.65	2.98	2.98	3.40	3.81	3.81	4.48	5.25
Flow Rate	Gals/h	0.36	0.44	0.52	0.52	0.58	0.65	0.65	0.75	0.84	0.84	0.99	1.16
Flow Connection		22mm Copper			22mm Copper			22mm Copper			28mm Copper		
Return Connection		1" BSP Female			1" BSP Female			1" BSP Female			1¼" BSP Female		
Water	litres	22			22			22			45		
Content	gals	4.8			4.8			4.8			9.9		
Boiler Weight Wet	kg	132			132			132			244		
SEDBUK Efficiency 2009		90.7%			90.8%			90.7%			90.3%		
Factory Settings		Highlighted in bold											

K-Series Kabin Pak – System (KSHE)

MODEL		KS70HE			KS90HE			KS120HE		
Nominal	kW	14.7	17.6	21.0	21.0	23.5	27.1	27.1	29.0	32.7
Heat Output	Btu/hr	50,000	60,000	71,650	71,560	80,000	92,380	92,380	99,050	111,600
Nominal	kW	15.3	18.4	22.0	22.0	24.4	28.0	28.0	30.0	34.0
Heat Input	Btu/hr	52,150	62,600	75,000	75,000	83,175	95,550	95,550	102,400	116,000
Burner		RDB 2.2 15-21			RDB 2.2 21-26			RDB 2.2 26-33		
Head		T1SH			T2SH			T5S		
Secondary Air Damper		B			N/A			N/A		
Conventional	mm	100 or 125			100 or 125			100 or 125		
Flue Diameter	in	4 or 5			4 or 5			4 or 5		
Flue Gas Temp.	°C	86	88	90	90	93	95	95	98	110
Smoke	Bacarach	0			0			0		
Kerosene Settings										
Nozzle	make	Danfoss 60°ES			Danfoss 60°ES			Danfoss 60°ES		
	size	0.5	0.5	0.6	0.6	0.65	0.75	0.75	0.85	0.85
Oil Pump	bar	7.0	9.0	8.0	8.0	8.0	7.0	7.0	8.0	10.0
Pressure	psi	102	130	116	116	116	102	102	116	145
Max CO ₂	%	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
Approx Fuel	litres/h	1.65	1.98	2.35	2.35	2.65	2.98	2.98	3.40	3.81
Flow Rate	Gals/h	0.36	0.44	0.52	0.52	0.58	0.65	0.65	0.75	0.84
Flow Connection		22mm Copper			22mm Copper			22mm Copper		
Return Connection		1" BSP Female			1" BSP Female			1" BSP Female		
Water	litres	22			22			22		
Content	gals	4.8			4.8			4.8		
Boiler Weight Wet	kg	138			138			138		
SEDBUK Efficiency 2009		90.7%			90.8%			90.7%		
Factory Settings		Highlighted in bold								

5.4.6 K-Series Kabin Pak – Combi (KCHEE)

MODEL		KC70HEE			KC90HEE			KC120HEE		
Nominal Heat Output	kW Btu/hr	14.7 50,000	17.6 60,000	21.0 71,650	21.0 71,560	23.5 80,000	27.1 92,380	27.1 92,380	29.0 99,050	32.7 111,600
Nominal Heat Input	kW Btu/hr	15.3 52,150	18.4 62,600	22.0 75,000	22.0 75,000	24.4 83,175	28.0 95,550	28.0 95,550	30.0 102,400	34.0 116,000
Burner		RDB 2.2 15-21			RDB 2.2 21-26			RDB 2.2 26-33		
Head		T1SH			T2SH			T5S		
Secondary Air Damper		B			N/A			N/A		
Conventional Flue Diameter	mm in	100 or 125 4 or 5			100 or 125 4 or 5			100 or 125 4 or 5		
Flue Gas Temp.	°C	86	88	90	90	93	95	95	98	110
Smoke	Bacarach	0			0			0		
Kerosene Settings										
Nozzle	make	Danfoss 60°ES			Danfoss 60°ES			Danfoss 60°ES		
	size	0.5	0.5	0.6	0.6	0.65	0.75	0.75	0.85	0.85
Oil Pump Pressure	bar	7.0	9.0	8.0	8.0	8.0	7.0	7.0	8.0	10.0
	psi	102	130	116	116	116	102	102	116	145
Max CO ₂	%	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
Approx Fuel Flow Rate	litres/h	1.65	1.98	2.35	2.35	2.65	2.98	2.98	3.40	3.81
	Gals/h	0.36	0.44	0.52	0.52	0.58	0.65	0.65	0.75	0.84
Water Content	litres	74			74			74		
	gals	16.3			16.3			16.3		
Boiler Weight Wet	kg	240			240			240		
Domestic Hot Water (DHW) Production										
Minimum Inlet Dynamic Pressure for Maximum DHW Flow Rate	bar	1.8			1.8			1.8		
	psi	26			26			26		
Maximum Achievable DHW Flow Rate		Unrestricted			Unrestricted			Unrestricted		
Maximum Recommended DHW Flow Rate	litres/m	18			18			18		
	gal/m	4.0			4.0			4.0		
Factory Set DHW Flow Rate	litres/m	18			18			18		
	gal/m	4.0			4.0			4.0		
Minimum DHW Flow Rate	litres/m	2.5			2.5			2.5		
	gal/m	0.55			0.55			0.55		
DHW Temperature Rise (at Maximum Output)		32°C @ 18 litres/min for 120 litre draw-off			32°C @ 24 litres/min for 120 litre draw-off			32°C @ 24 litres/min for 120 litre draw-off		
Pressure Relief	bar	2.5			2.5			2.5		
	psi	0.55			0.55			0.55		
Cold Water Mains Inlet Connection		Minimum 15mm < 3.0 Bar			Minimum 15mm < 3.0 Bar			Minimum 15mm < 3.0 Bar		
DHW Outlet Connection		22mm Copper			22mm Copper			22mm Copper		
Flow Connection		22mm Copper			22mm Copper			22mm Copper		
Return Connection		1" BSP Female			1" BSP Female			1" BSP Female		
SEDBUK Efficiency 2009		89.1%			89.1%			89.1%		
Factory Settings		Highlighted in bold								

5.4.7 Fiche Data

Data according to EU Regulation 811/2013, supplementing Directive 2010/30/EU

Model Type	Boilerhouse			Utility				Utility Pumped				Utility System			Kabin Pak			Kabin Pak Pumped				Kabin Pak System			
Supplier Name	Warmflow																								
Supplier Model Identifier	B70HE	B90HE	B120HE	U70HE	U90HE	U120HE	U150HE	UP70HE	UP90HE	UP120HE	UP150HE	US70HE	US90HE	US120HE	K70HE	K90HE	K120HE	K150HE	KP70HE	KP90HE	KP120HE	KP150HE	KS70HE	KS90HE	KS120HE
Seasonal Space Heating Efficiency Class	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Rated Heat Output, P_{rated} (kW)	18	24	30	18	24	30	39	18	24	30	39	18	24	30	18	24	30	39	18	24	30	39	18	24	30
Seasonal Space Heating Efficiency, η_s (%)	91	90	90	91	90	90	91	91	90	90	91	91	90	90	91	90	90	91	91	90	90	91	91	90	90
Annual Energy Consumption, Q_{HE} (GJ)	57	77	95	57	77	95	123	57	77	95	123	57	77	95	57	77	95	125	57	77	95	125	57	77	95
Indoor Sound Power Level, L_{WA} (dB)	N/A	N/A	N/A	54	54	55	56	54	54	55	56	54	54	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Specific Precautions	Refer to Manual																								

Model Type	Utility Combi			Kabin Pak Combi		
Supplier Name	Warmflow					
Supplier Model Identifier	UC70HEE	UC90HEE	UC120HEE	KC70HEE	KC90HEE	KC120HEE
Declared Load Profile	XL	XL	XL	XL	XL	XL
Seasonal Space Heating Efficiency Class	A	A	A	A	A	A
Water Heating Energy Efficiency Class	A	A	A	A	A	A
Rated Heat Output, P_{rated} (kW)	18	24	30	18	24	30
Annual Energy Consumption, Q_{HE} (GJ)	57	77	95	57	77	95
Seasonal Space Heating Efficiency, η_s (%)	91	90	90	91	90	90
Indoor Sound Power Level, L_{WA} (dB)	54	54	55	N/A	N/A	N/A
Specific Precautions	Refer to Manual					

5.4.8 Technical Parameters

Data according to EU Regulation 811/2013, supplementing Directive 2010/30/EU

Model(s)		B70HE, U70HE, UP70HE, US70HE, K70HE, KP70HE, KS70HE	UC70HEE, KC70HEE	B90HE, U90HE, UP90HE, US90HE, K90HE, KP90HE, KS90HE	UC90HEE, KC90HEE	B120HE, U120HE, UP120HE, US120HE, K120HE, KP120HE, KS120HE	UC120HEE, KC120HEE	U150HE, UP150HE, K150HE, KP150HE	
Condensing boiler		Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Low-temperature boiler		No	No	No	No	No	No	No	
B11 boiler		No	No	No	No	No	No	No	
Cogeneration space heater		No	No	No	No	No	No	No	
Combination space heater		No	Yes	No	Yes	No	Yes	No	
Item	Symbol	Value	Value	Value	Value	Value	Value	Value	Unit
Rated heat output	P_{rated}	18	18	24	24	30	30	39	kW
Useful heat output									
At rated heat output and high-temperature regime	P_4	17.9	17.9	24.1	24.1	29.9	29.9	38.5	kW
At 30% of rated heat output and low-temperature regime	P_1	5.6	5.6	7.5	7.5	9.3	9.3	12.1	kW
Seasonal Space Heating Efficiency	η_s	91	91	90	90	90	90	91	%
Useful efficiency									
At rated heat output and high-temperature regime	η_4	92.3	92.3	91.9	91.9	91.5	91.5	91.2	%
At 30% of rated heat output and low-temperature regime	η_1	97.0	97.0	95.9	95.9	95.2	95.2	95.6	%
Auxiliary electrical consumption									
At full load	e_{lmax}	0.2	0.2	0.2	0.2	0.1	0.1	0.2	kW
At part load	e_{lmin}	0.0	0.0	0.0	0.0	0.0	0.0	0.1	kW
In standby mode	P_{SB}	0.000	0.000	0.000	0.000	0.000	0.000	0.000	kW
Other items									
Standby heat loss	P_{stby}	0.1	0.1	0.1	0.1	0.1	0.1	0.1	kW
Ignition burner power consumption	P_{ign}	N/A	N/A	N/A	N/A	N/A	N/A	N/A	kW
Annual energy consumption	Q_{HE}	57	57	77	77	95	95	123	GJ
Sound power level indoors	L_{WA}	54	54	54	54	55	55	56	dB
Emission of nitrogen oxides	NO_x	182	182	154	154	159	159	124	mg/kWh
Space Heating Energy Efficiency Class		A	A	A	A	A	A	A	

Combination heaters									
Declared load profile		N/A	XL	N/A	XL	N/A	XL	N/A	
Daily electricity consumption	Q_{elec}	N/A	0.290	N/A	0.228	N/A	0.176	N/A	kWh
Annual electricity consumption	AEC	N/A	64	N/A	50	N/A	39	N/A	kWh
Water heating energy efficiency	η_{wh}	N/A	82	N/A	82	N/A	81	N/A	%
Daily fuel consumption	Q_{fuel}	N/A	23.558	N/A	23.730	N/A	24.155	N/A	kWh
Annual fuel consumption	AFC	N/A	4947	N/A	4976	N/A	5048	N/A	GJ
Water Heating Energy Efficiency Class		N/A	A	N/A	A	N/A	A	N/A	
Contact details	Warmflow Engineering Ltd., Lissue Industrial Estate, Moira Road, Lisburn, Northern Ireland, BT28 2RF								

6 ELECTRICITY SUPPLY & WIRING DETAILS

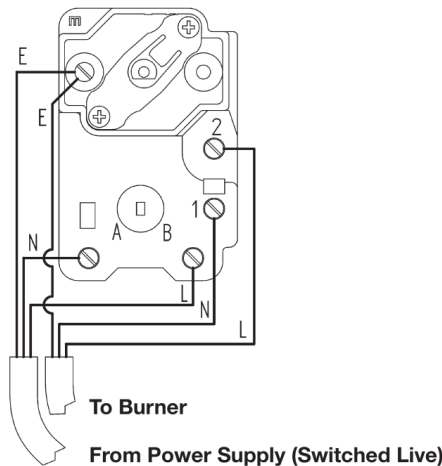
Note: All wiring activities described in the following sections should only be undertaken by trained persons having an appropriate level of competency/qualification.

220 – 240V. 1PH, 50Hz

The boiler/burner and other external electrical equipment should be wired with heat resistant cable via a fused double pole isolating switch which should be fitted with a 5 amp fuse.

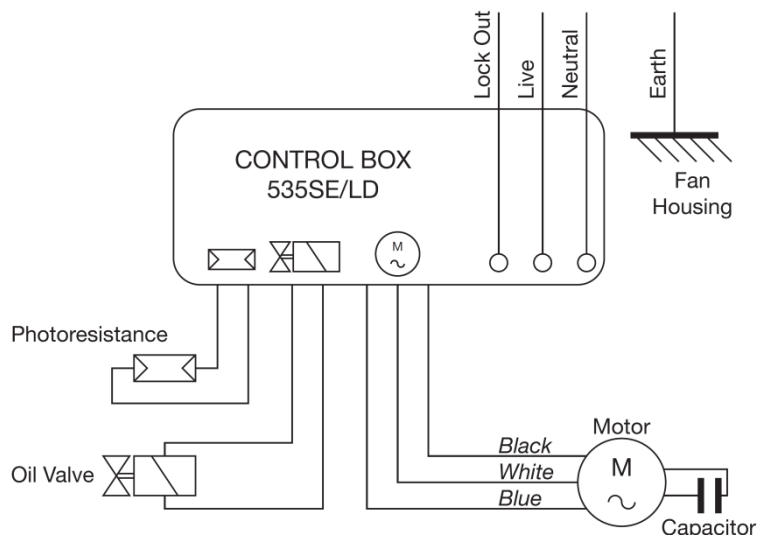
The appliance must be effectively earthed and all external wiring should comply with current IEE Regulations.

6.1 Dual-Safe Thermostat (Non-Combi Boilers)



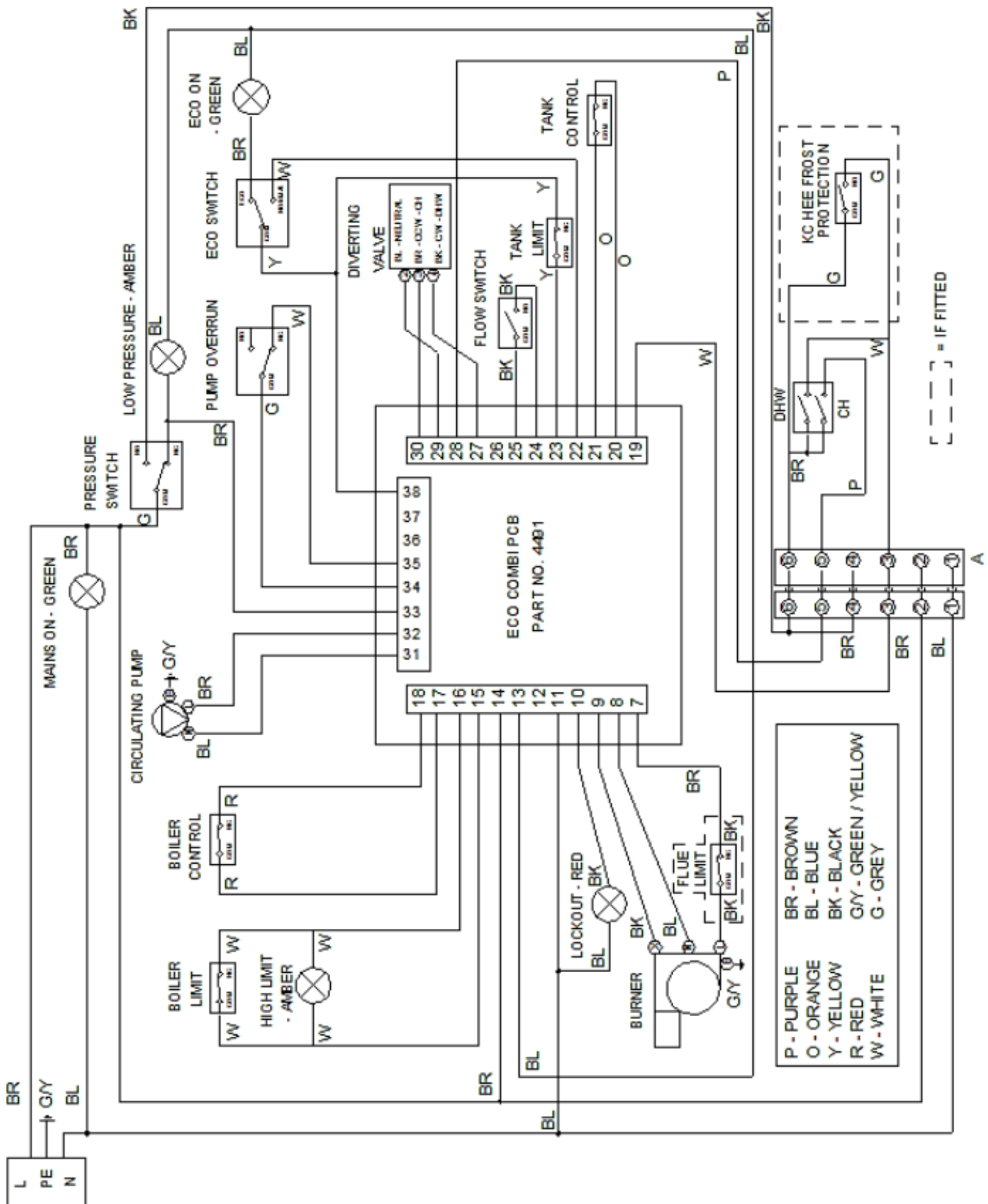
Warning: Do not fit any other wires or loop wires to this stat as this will bypass the thermostats.

6.2 RDB Burner Control Box



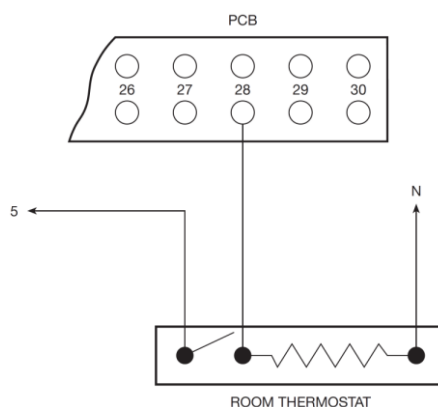
6.3 Combi Wiring Details

6.3.1 Wiring Diagram



The 3 pin mains plug must be supplied with a permanent live to allow the pump overrun stat and relay to operate.

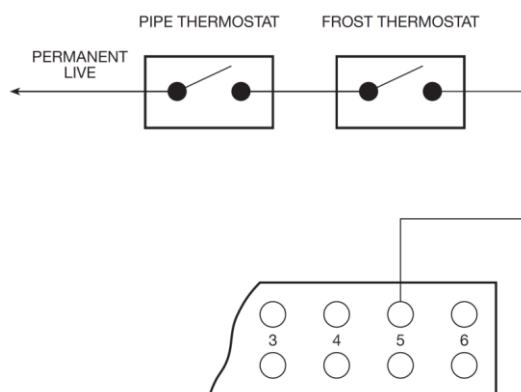
6.3.2 Fitting a Room Thermostat to a Combi



Remove the purple wire from no 5 and no 28 on the PCB and wire the thermostat as shown. The room thermostat should be located where it is not subjected to extraneous heat gains, direct sunlight or draughts.

6.3.3 Building Frost Protection

1. Combi Boiler Models



In order to provide frost protection for the fabric of the building a frost thermostat should be fitted in the coldest room in the house and calling for appropriate zone valves to open and the boiler to call for heat irrespective of time clock operation. To prevent over heating of the property a pipe thermostat should be fitted on the return pipe close to the boiler.

To protect the fabric of the boiler only, the Kabin Pak Combi boiler is factory fitted with a frost thermostat as standard.

2. All Other Boiler models

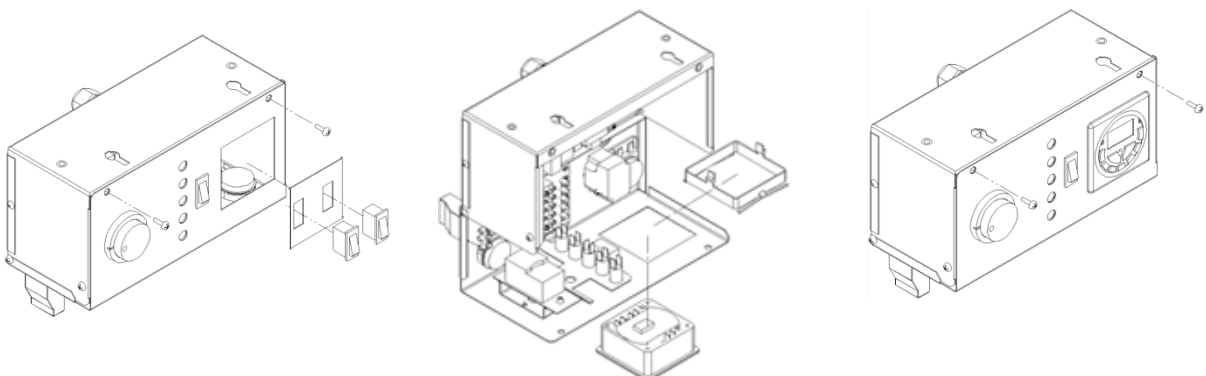
For all other boiler models building frost protection measures should be based upon a thermostat fitted in the coldest room in the house and a pipe thermostat fitted on the return pipe close to the boiler, These thermostats should call for heat and open appropriate zone valves, irrespective of time clock operation. Consult with your installer as installations will vary.

6.3.4 Combi Pump Overrun Thermostat

The condensing Combi boilers have been fitted with a pump overrun thermostat. In order for the thermostat to work effectively the boiler **must** be supplied with a permanent live via the 3 pin mains plug. Failure to do this will result in nuisance trip outs.

6.4 Installation of a Warmflow Combi Optional Programmer (PC1)

1. Disconnect the electrical supply.
2. Drop down control box front (2 screws).
3. Disconnect the 6 pin plug from the CH/HW on/off switches.
4. With a sharp knife cut out the outline of the panel knockout through the fascia label from the front of the panel.
5. With a hacksaw blade or snips remove the knockout piece ensuring that all metal tags or burrs have been removed from the hole.
6. Feed the programmer and harness through the hole from the front of the panel.
7. Secure in position by attaching the securing bracket to the rear of the programmer.
8. Plug the wiring harness into the 6 way socket.
9. Activate battery back up on the programmer by removing the plastic strip.
10. Close the control panel cover and reconnect the electrical supply.
11. Using the operating instructions located towards to back of this manual or supplied with the programmer, set the switching times.



6.5 Remote Timers for Combis

6.5.1 Installation of a remote two channel programmer

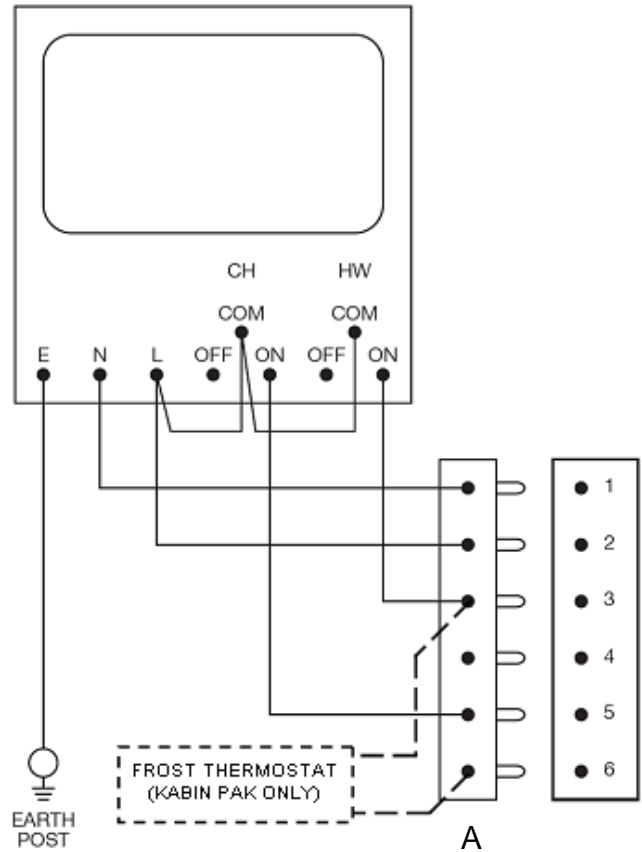
Permanent Live Supply

The boiler **must** be supplied with a permanent live mains supply via a fused isolator connected to the boiler 3 pin mains plug into the control panel.

Failure to connect a permanent live to the boiler will prevent the programmer, boiler mains lamp and pump overrun thermostat from operating. It will also disable the built-in boiler frost protection of a Kabin Pak Combi.

Connecting the Programmer

Inside the boiler control panel, remove the purple, white and brown wires connecting the CH and HW switches to the 6 pin connector of the terminal block.



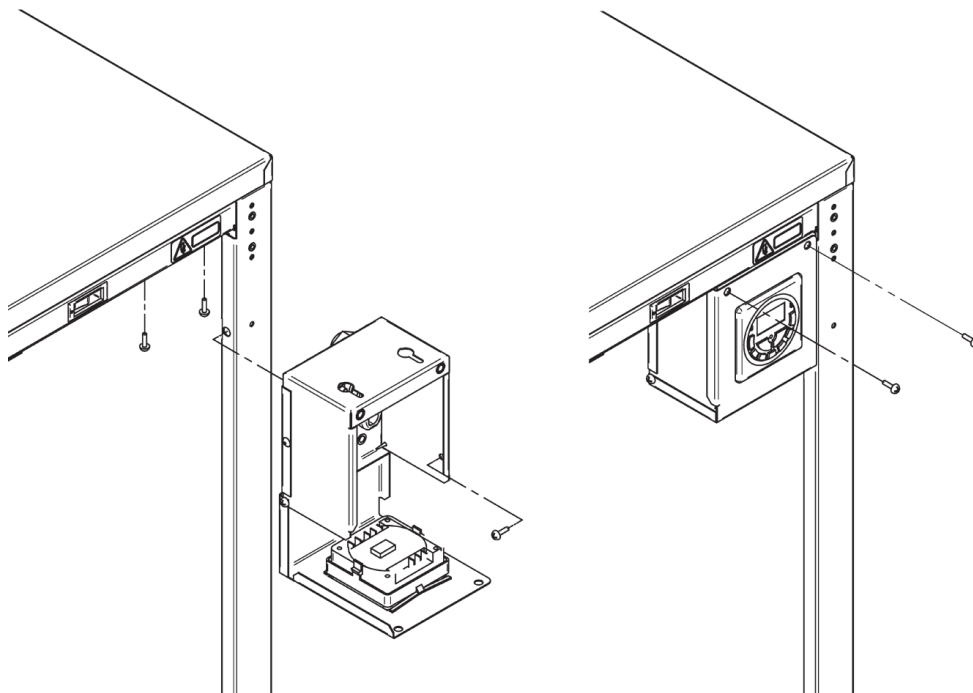
Connect the programmer to the 6 pin connector via a 5 core cable as shown ensuring the earth is connected to one of the earth posts inside the control panel. On Kabin Pak models, ensure the frost thermostat connections to pins 3 and 6 are left in place.

Connecting the programmer in this manner will bypass the CH and HW on/off switches on the boiler control panel. The boiler and programmer will both be powered from the boiler 3 pin mains plug, so only one mains connection is required.

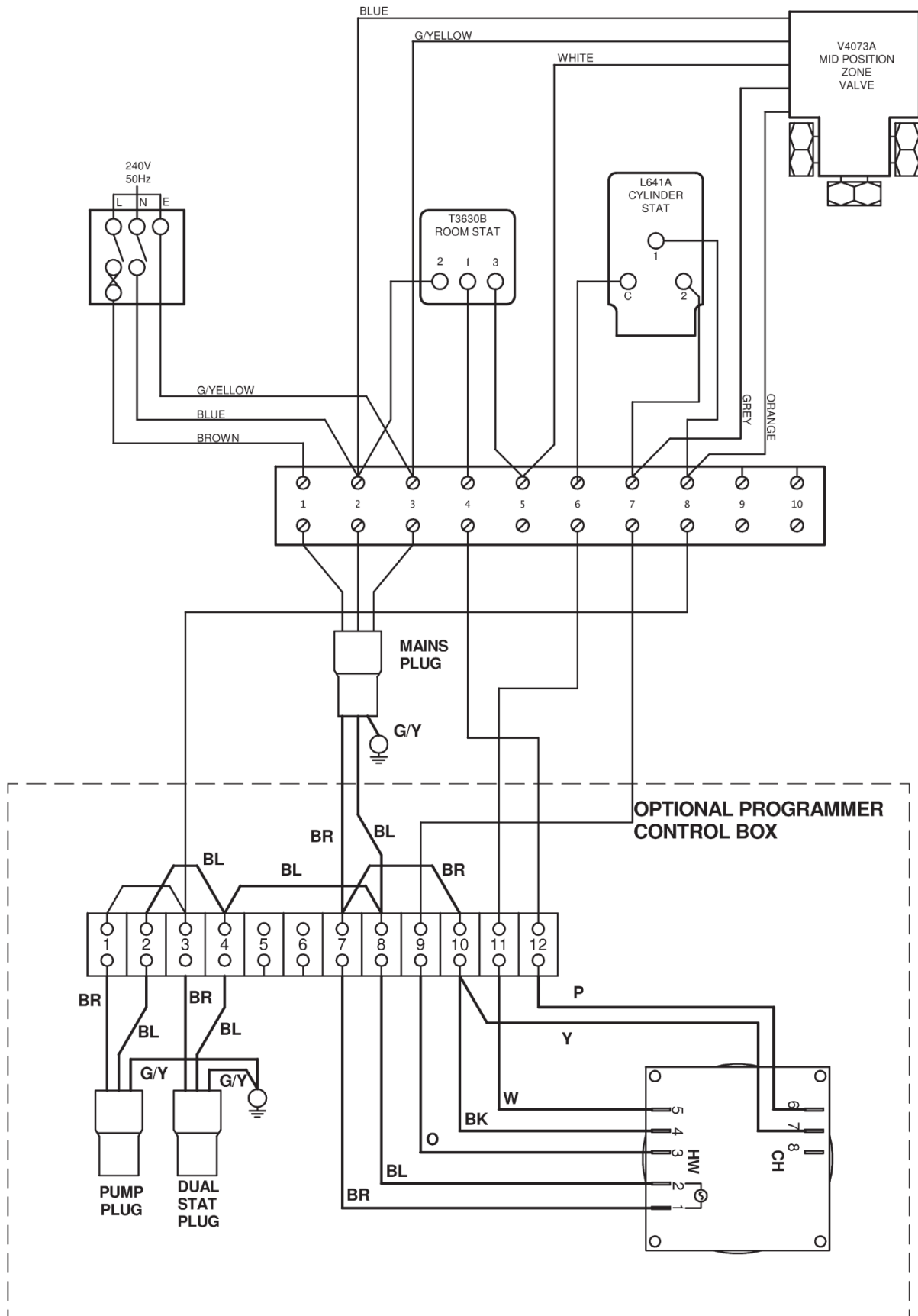
The neutral connection to the 3-pin plug on the control panel must be the sole mains neutral connection to the appliance.

6.6.3 Programmer Installation

1. Disconnect electrical supply.
2. Drop down control box front (2 screws).
3. Secure control box to the horizontal casing bracket (2 screws) and right hand side (1 screw).
4. Connect the thermostat, circulating pump and the mains supply to the leads on the rear of the control box.
5. Two examples of system wiring are shown in the following sections.
6. If fitting the programmer to a Utility model without an integral circulating pump, disconnect the circulating pump plug from terminals 1 and 2 of the programmer terminal block and from the earth post. Remove the circulating pump plug then wire the external circulating pump into terminals 1 and 2 of the programmer terminal block and the earth post, feeding the wire in through the circulating pump plug cable clamp.
7. Activate battery backup on programmer by removing the plastic strip.
8. Close the control panel cover (2 screws) and reconnect the electrical supply.
9. Using the operating instructions located towards the back of this manual or supplied with the programmer, set the switching times.

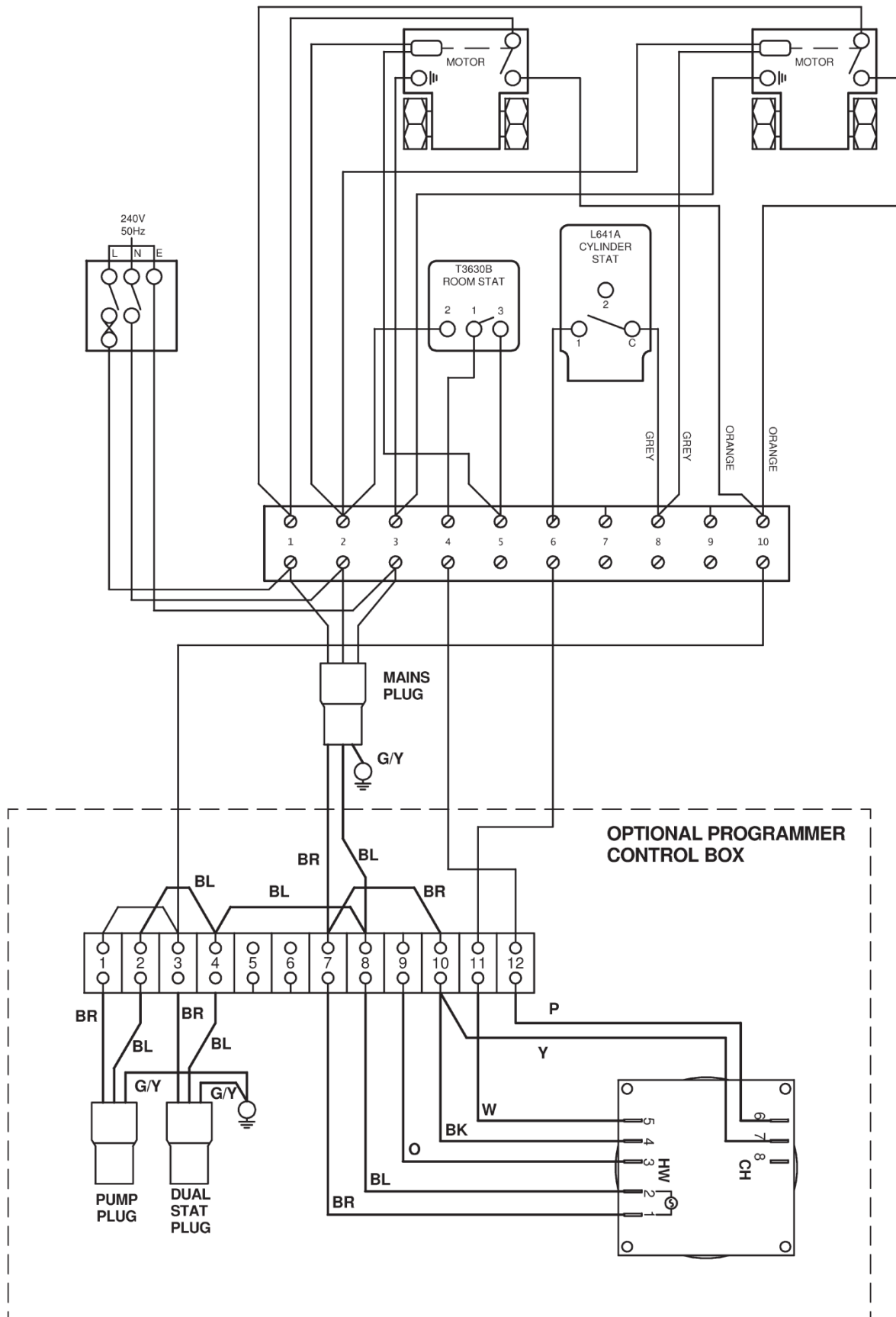


6.6.4 Honeywell 'Y' Plan – Independent CH & DHW (Fully Pumped Only)



Note: Before fitting programmer, remove loop between 3 and 12 on the terminal block.

6.6.5 Honeywell 'S' Plan – Independent CH & DHW (Fully Pumped Only)



Note: Before fitting programmer, remove loop between 3 and 12 on the terminal block.

7 OIL SUPPLY

1. Oil Tank

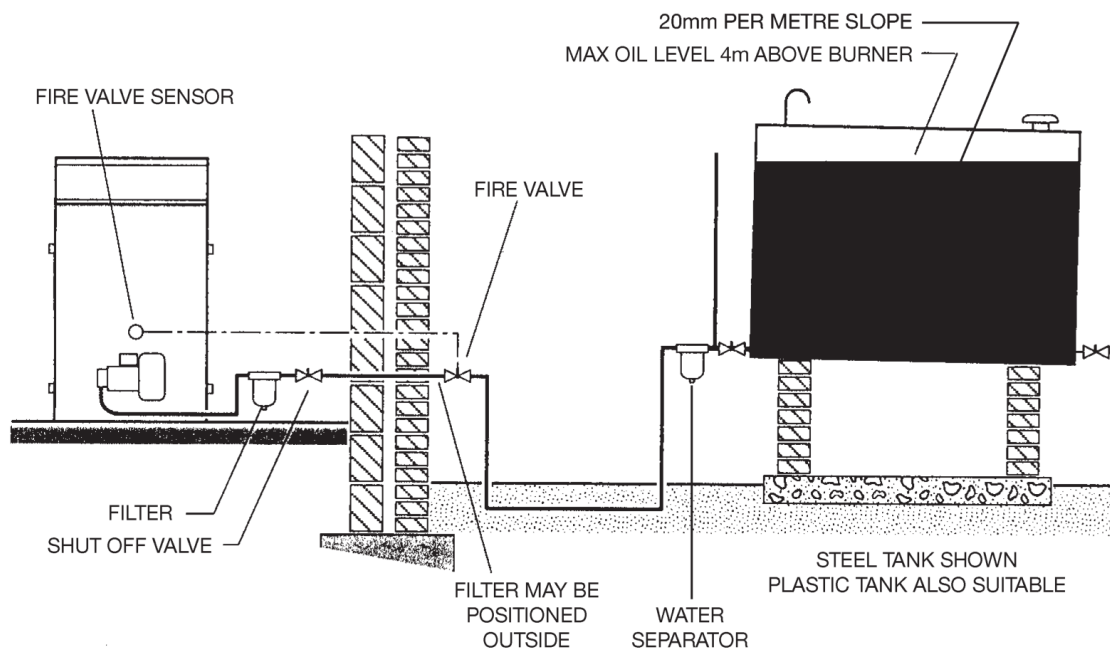
Steel tanks constructed to BS799: PART 5 should be painted on the outside only and mounted on piers to prevent corrosion. Plastic oil tanks are also available and can be suitable for installation at ground level. However, oil should never be stored in translucent plastic containers.

The tank outlet should be at a height to provide sufficient clearance to allow for proper maintenance of any isolation valve, oil filter or water separator fitted.

2. The pipe from the oil tank to the burner should be run in copper, steel or aluminium. Galvanised pipe and fittings should not be used. The pipework should terminate close to the boiler and be fitted with an isolating valve and filter. A remote sensing fire valve must be fitted to the oil line preferably before the oil line enters the building (BS5410: PART 1).

Depending on the position of the tank a two pipe system may be required. One and two pipe oil systems are shown below. As an alternative to a two pipe system, a Tigerloop or other approved de-aerator may be used.

7.1 One Pipe Gravity System

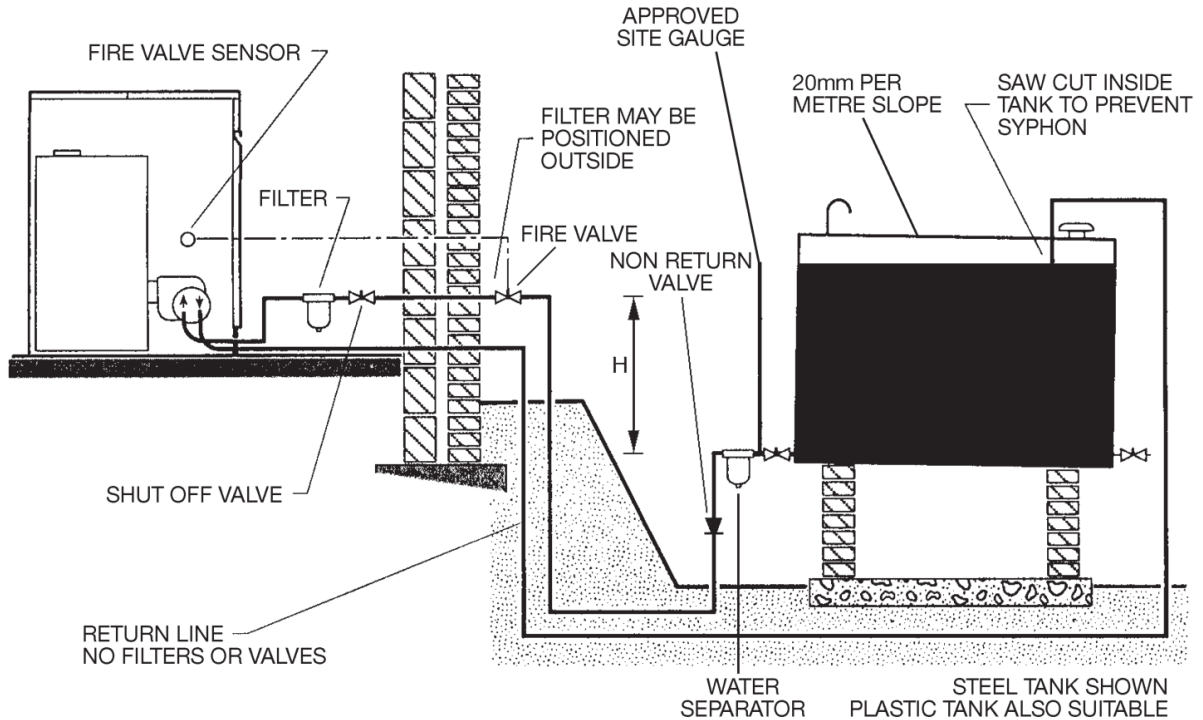


Total Maximum Pipe Length (m)

Head H(m)	0.5	1.0	1.5	2.0
ID 8mm	10	20	40	60
ID 10mm	20	40	80	100

Note: Plastic oil level gauges may shrink when exposed to kerosene thus allowing the ingress of water. Pump failures due to water contamination are not covered under warranty.

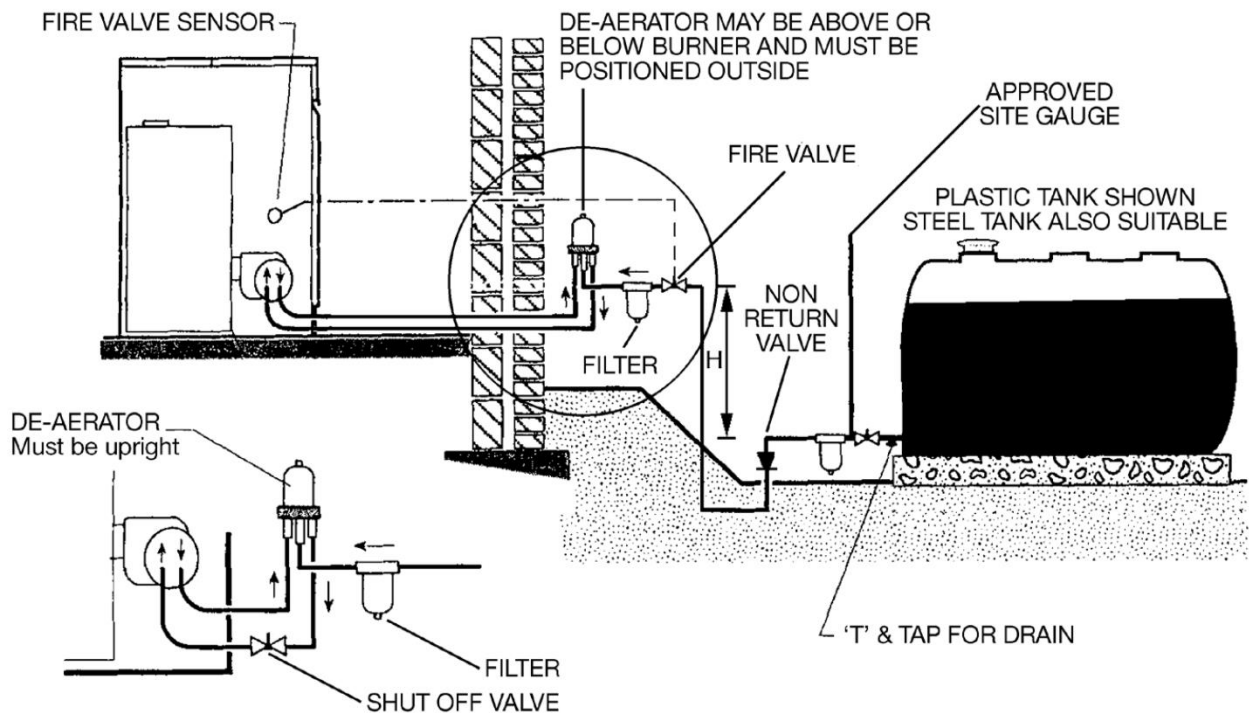
7.2 Two Pipe System



Total Maximum Pipe Length (m)

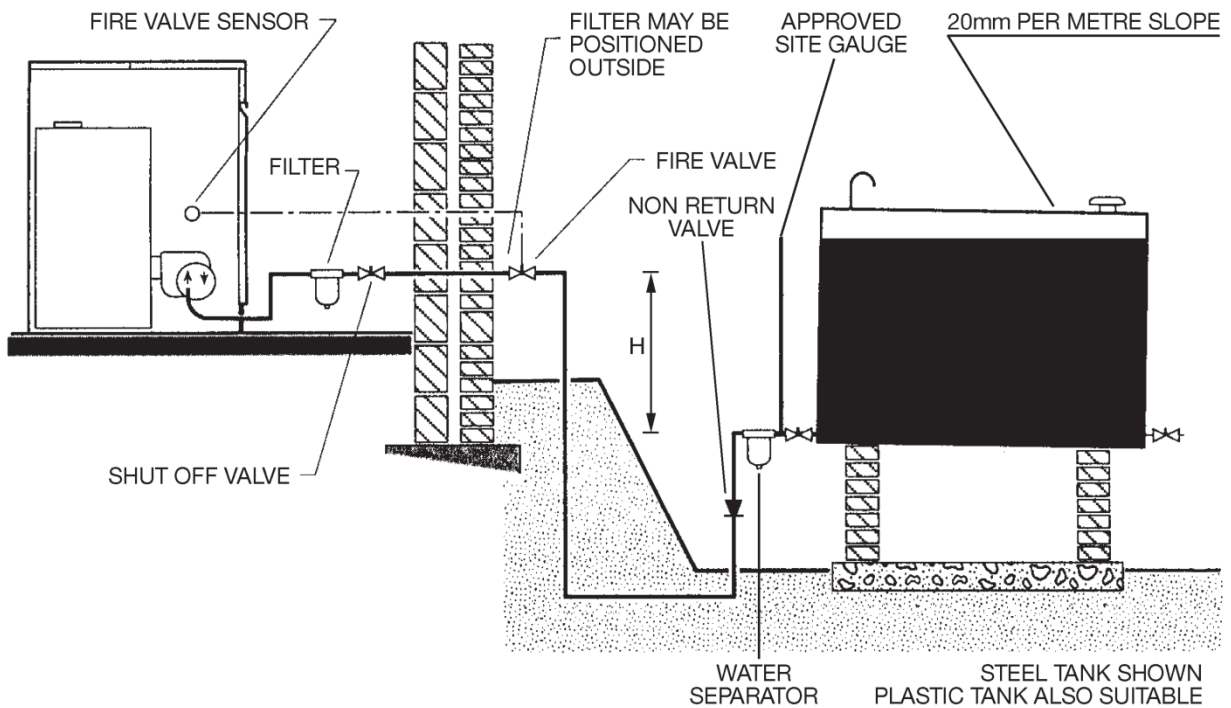
Head H(m)	0.0	0.5	1.0	1.5	2.0	3.0	3.5
ID 8mm	35	30	25	20	15	8	6
ID 10mm	100	100	100	90	70	30	20

7.3 De-aerator System



For maximum pipe length and lift contact de-aerator manufacturer.

7.4 One Pipe Lift System



Total Maximum Pipe Length (m)

Head H(m)	0.0	0.5	1.0	1.5	2.0	3.0	3.5
ID 8mm	35	30	25	20	15	8	6
ID 10mm	100	100	100	90	70	30	20

Note: The pump vacuum should not exceed a maximum of 0.4 bar. Above this, gas is released from the oil thus leading to burner lockout.

7.5 Instructions for the use of Bio Fuel

To ensure consistency, the fuel supplier must be able to demonstrate compliance with a recognised Quality Control and management system to ensure high standards are maintained within the storage, blending and delivery processes. The installation oil storage tank and its ancillaries must also be prepared BEFORE liquid Bio fuel is introduced. Checks and preparation should include;

1. For new installations, make sure that all materials and seals in the oil storage and supply line to the burner are compatible with Bio fuels. For all installations, there must be a good quality bio compatible oil filter at the tank and then a secondary filter for protecting the burner from contamination. The filtration must be to the specification detailed in the technical manual supplied with the burner
2. If an existing oil storage tank is to be used then in addition to the materials checks as detailed above, it will be essential that the tank is first inspected for condition and checked for water or other contamination. Warmflow strongly recommend that the tank is cleaned and oil filters replaced prior to Bio fuel delivery. If this is not completed then due to the hygroscopic nature of Bio fuel, it will effectively clean the tank, absorb any water present which in turn will result in equipment failure that is not covered by the manufacturer's warranty.
3. Depending on the capacity of the oil storage tank and oil usage, fuels may remain static within the tank for some considerable time and so Warmflow recommends that the oil distributor is consulted regarding the appropriate use of additional Biocides within the fuel to prevent microbial growth from occurring within the tank.

The Department of Transport suggest when using fuels with a bio fuel content within "Stationary Equipment" that the content of tanks is turned every six months or in any event no less than every twelve months to help prevent blockages to filters. Warmflow suggests that fuel suppliers and or service companies are contacted for guidance on fuel storage. The extract detailed above referencing Section 4 – Composition, note 8 to BS2869:2010 should also be considered, and special attention should be applied to dual fuel applications where oil may be stored for long periods of time.

4. The burner must be set according to the appliance application and commissioned checking that all combustion parameters are as recommended in the appliance technical manual.
5. Warmflow recommends that the in line and burner oil pump filters are inspected and if required replaced frequently during burner use, before the burner start up following a long period of discontinued operation and even more frequently where contamination has occurred. Particular attention is needed when inspecting and checking for fuel leakages from seals, gaskets and hoses.

INSTALLER/SERVICER NOTES

1. During the burner installation, check that the gasoil and bio fuel blends are in accordance with Riello recommendations (please refer to the chapters “Technical Data” and “Guidance for the use of bio fuel blends within the burner technical manual).
2. If a Bio blend is in use the installer must seek information from the end user that their fuel supplier can evidence that the blends of fuel conform to the relevant EN standards.
3. Check that the materials used within the oil tank and ancillary equipment are suitable for bio fuels. If in doubt contact the relevant supplier or manufacturer.
4. Particular attention should be given to the oil storage tank and supply to the burner. Warmflow recommends that existing oil storage tanks are cleaned and inspected and any traces of water are removed BEFORE bio fuel is introduced (Contact the tank manufacturer or oil supplier for further advice). If these recommendations are not respected this will increase the risk of contamination and possible equipment failure.
5. Warmflow recommends a good quality bio compatible oil filter at the tank and a secondary filter are used to protect the burner pump and nozzle from contamination. The filter sizes must be in line with the technical manual supplied with the burners.
6. The burner hydraulic components and flexible oil lines must be suitable for bio fuel use (check with Riello if in doubt).
7. Regularly check visually for any signs of oil leakage from seals, gaskets and hoses.
8. It is strongly recommended that with Bio fuel use, oil filters are inspected and replaced every 4 months and more regularly where contamination is experienced.
9. During extended periods of non-operation and/or where burners are using oil as a standby fuel, it is strongly recommended that the burner is put into operation for short periods at least every three months.

8 FLUES

8.1 Flue Options, Components & Dimensions

The use of any flue system other than that supplied or recommended by the manufacturer will invalidate the warranty.

The following flue options are available from Warmflow:

FBF	Low Level Balanced Flue Kit
HBF	High Level Balanced Flue Kit
VBF	Vertical Balanced Flue Kit
HFL	Horizontal Entry Flue Liner Kit
VFL	Vertical Entry Flue Liner Kit
UPMK	Utility Plume Management Kit
KPMK	Kabin Pak Plume Management Kit

8.1.1 Conventional Flue Guidelines

The flue system should be designed in accordance with local bye-laws and the Building Regulations. Draught stabilisers are not recommended for oil fired boilers. Sharp bends or horizontal runs should be avoided and the flue should terminate 2 feet (600mm) above the ridge of the dwelling. Terminals which restrict the discharge or allow ingress of water should be avoided.

When connecting to an existing masonry chimney, a Warmflow HFL or VFL flexible flue liner suitable for use with oil fired condensing boilers and of an appropriate diameter must be used. The annular space must be filled with insulation and sealed top and bottom.

Only Warmflow flue systems designed specifically for use with oil-fired condensing boilers may be used.

8.1.2 Condensing Boiler Flue Kits

FIRE SAFETY

As with a metal flue system, where a plastic flue system is used within a building which is 'compartmentalised' as defined by the Building Regulations, care must be taken to ensure that the installation of the flue does not contravene the Regulations and create a safety risk.

In particular, where the flue passes through a 'compartment floor' or 'compartment wall' as defined by the Building Regulations it must be enclosed so as to create a 'protected shaft' as defined by the Regulations. Consult your local Building Control department for detailed guidance.

The use of a plastic flue system is no different from that of a metal flue system. If in doubt, consult your local Building Control department.

FIT FLUE THERMOSTAT

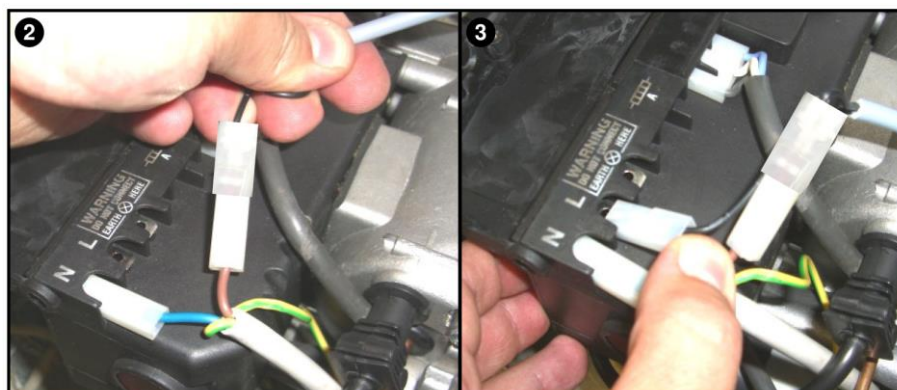
1. Remove the test point bolt from the boiler. Apply PTFE tape to the flue thermostat then screw it into the test point. Tighten **by hand only**.



CONNECT THERMOSTAT

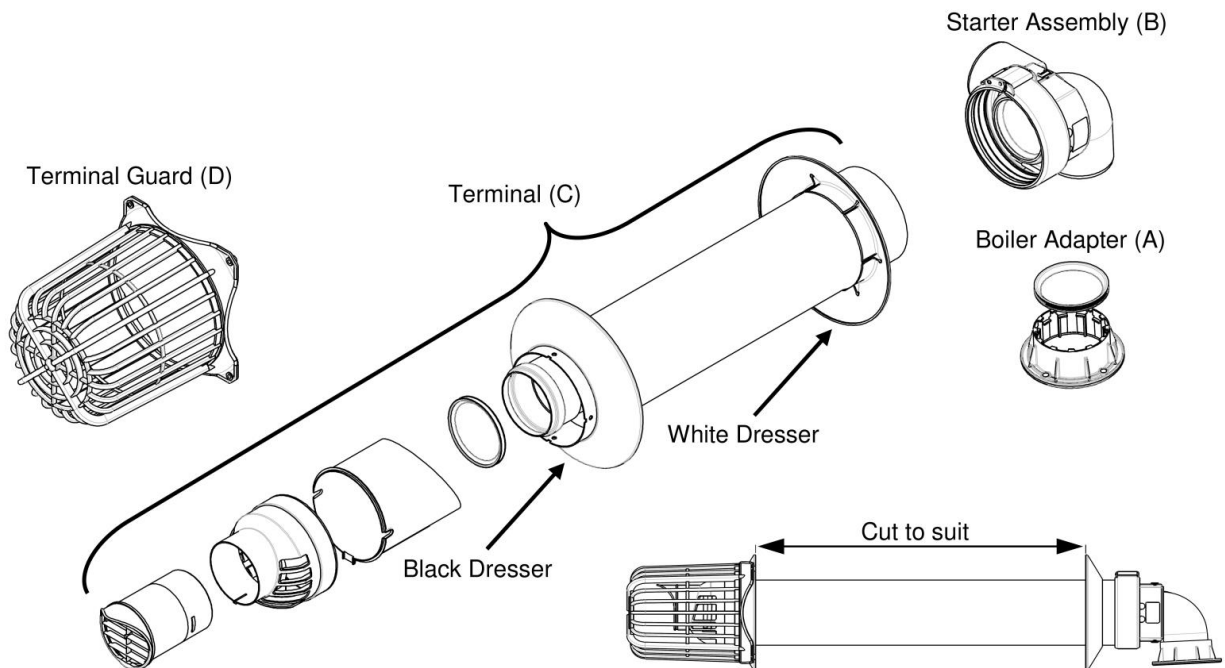
2. Remove the red burner cover. Isolate the electrical supply then open the control box cover. Disconnect the live (brown) wire of the burner power cable and connect it to the corresponding (large) connector of the flue thermostat cable.

3. Connect the other connector of the flue thermostat cable to the live terminal of the control box. Close and secure the cover.



8.1.3 HE Low Level Balanced Flue Kit (FBF)

The kit comprises:

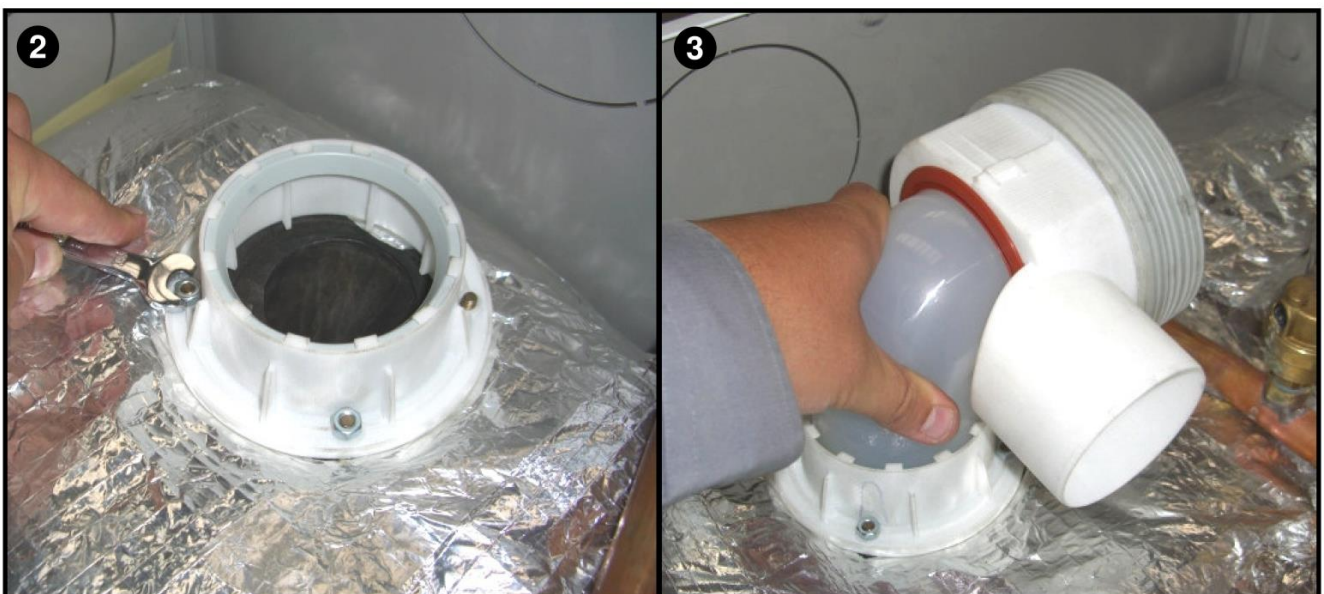


FIT FLUE THERMOSTAT

1. Fit the flue thermostat **BEFORE** fitting the flue kit.

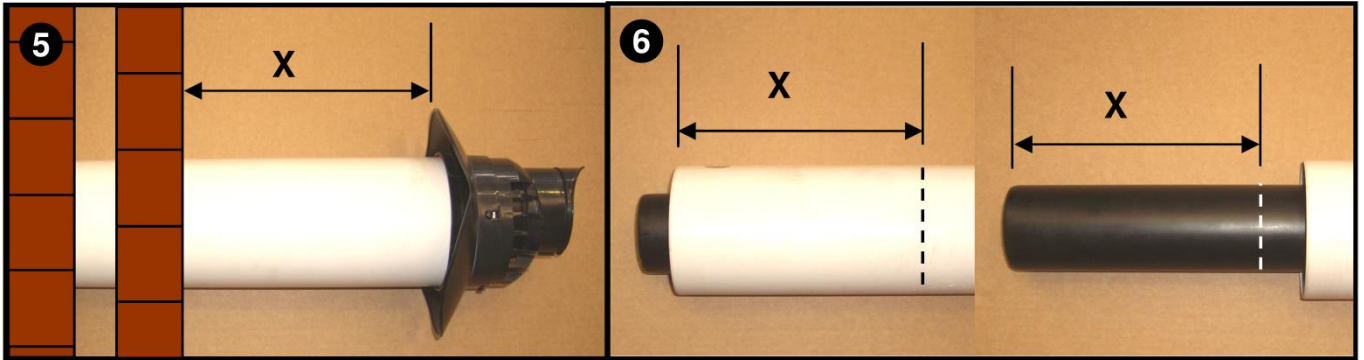
FIT STARTER PIECE

2. Remove the appropriate casing panel cut-out using snips. Fit the boiler adapter (A).
3. Lubricate the seals then insert the starter assembly (B).



MEASURE AND CUT FLUE TERMINAL

4. Cut a hole through the wall and fit a non-combustible sleeve.
5. Lubricate then fit the flue terminal (C) and measure the excess length, **X**.
6. Cut **X** mm from the outer pipe of the terminal then **X** mm from the inner pipe.

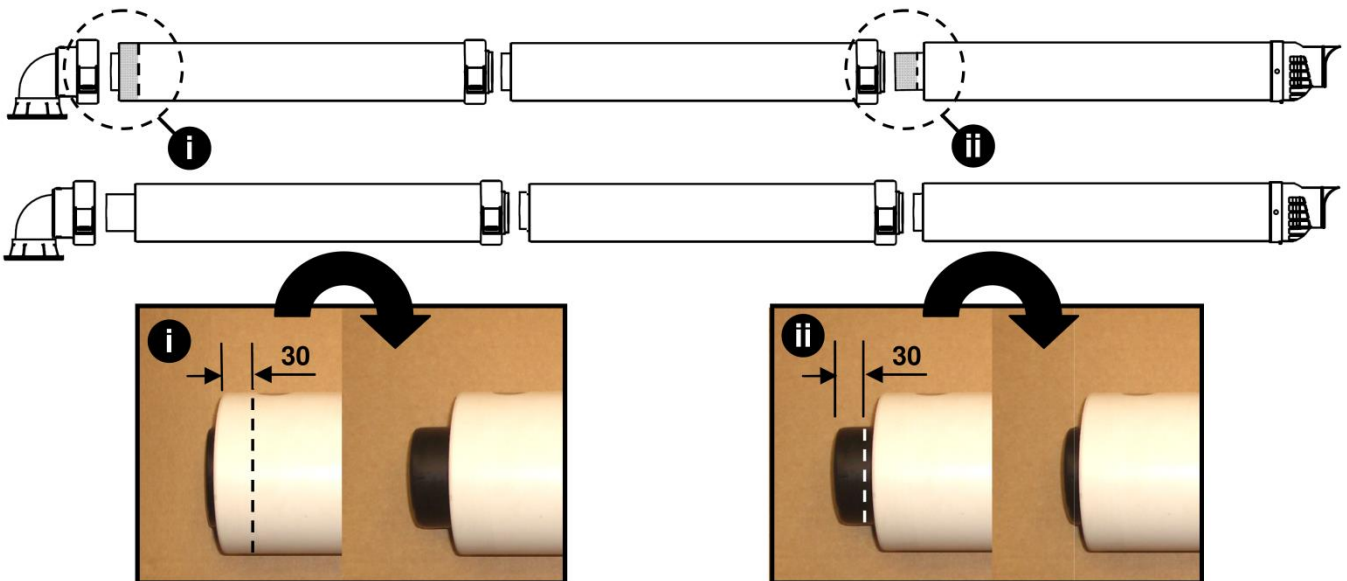


CONNECT TERMINAL AND AIR HOSE

7. Lubricate then refit the terminal then secure with the locking band.
8. Fit the air inlet spigot and gasket to the burner. Attach the flexible air hose to the burner and starter assembly and secure with the jubilee clips.

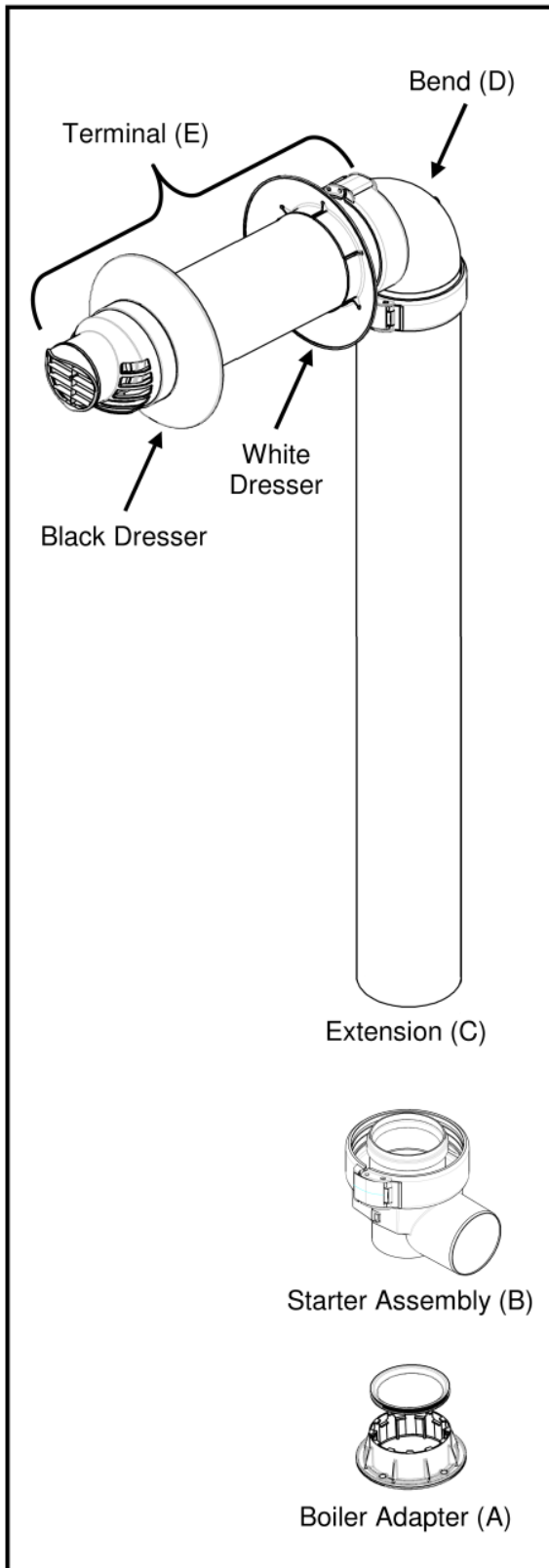
ONLY IF EXTENDING HORIZONTALLY

- i. Cut 30 mm from the outer pipe of the 1st extension only.
- ii. Cut 30 mm from the inner pipe of the flue terminal.



8.1.4 HE High Level Balanced Flue Kit (HBF)

The kit comprises:



FIT FLUE THERMOSTAT

1. Fit the flue thermostat **BEFORE** fitting the flue kit.

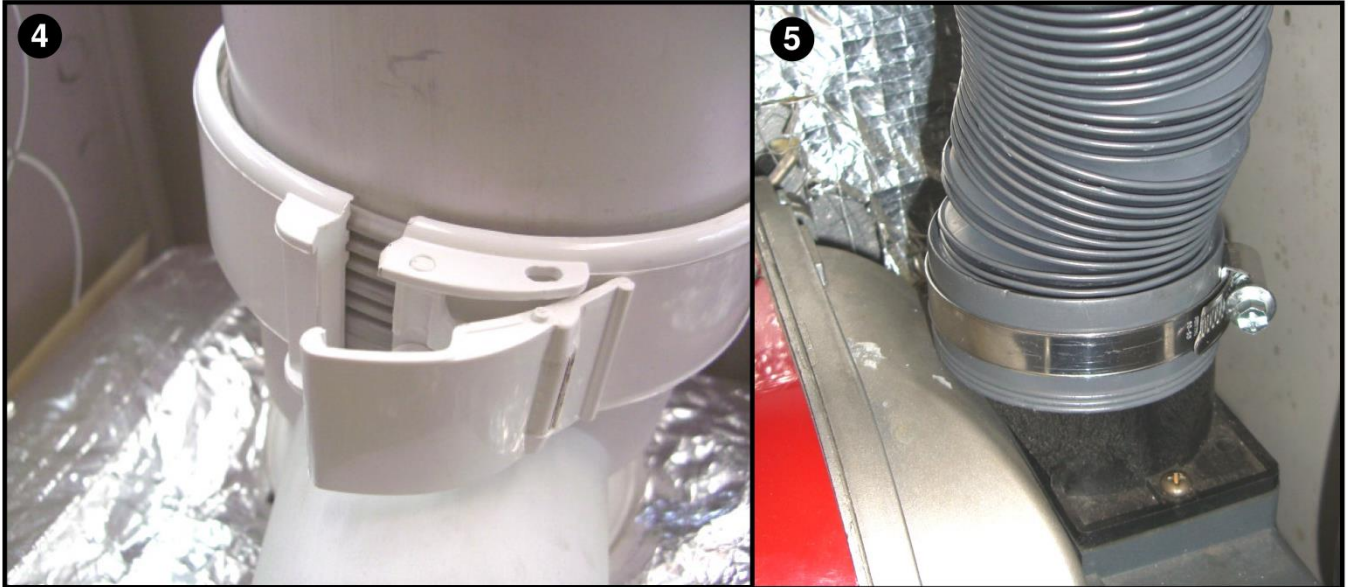
FIT STARTER PIECE

2. Remove the top panel casing cut-out using snips. Fit the boiler adapter (A).

3. Lubricate the seals, then insert the starter assembly (B).

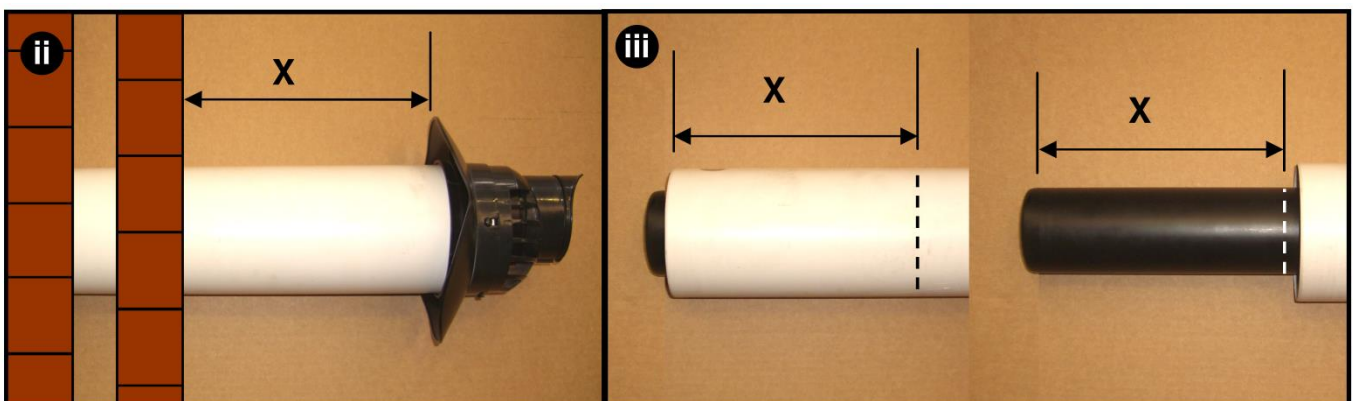


4. Lubricate and fit the extension (C) and bend (D) then secure with the locking bands.
5. Fit the air inlet spigot and gasket to the burner. Attach the flexible air hose to the burner and starter assembly and secure with the jubilee clips.



MEASURE AND CUT FLUE TERMINAL

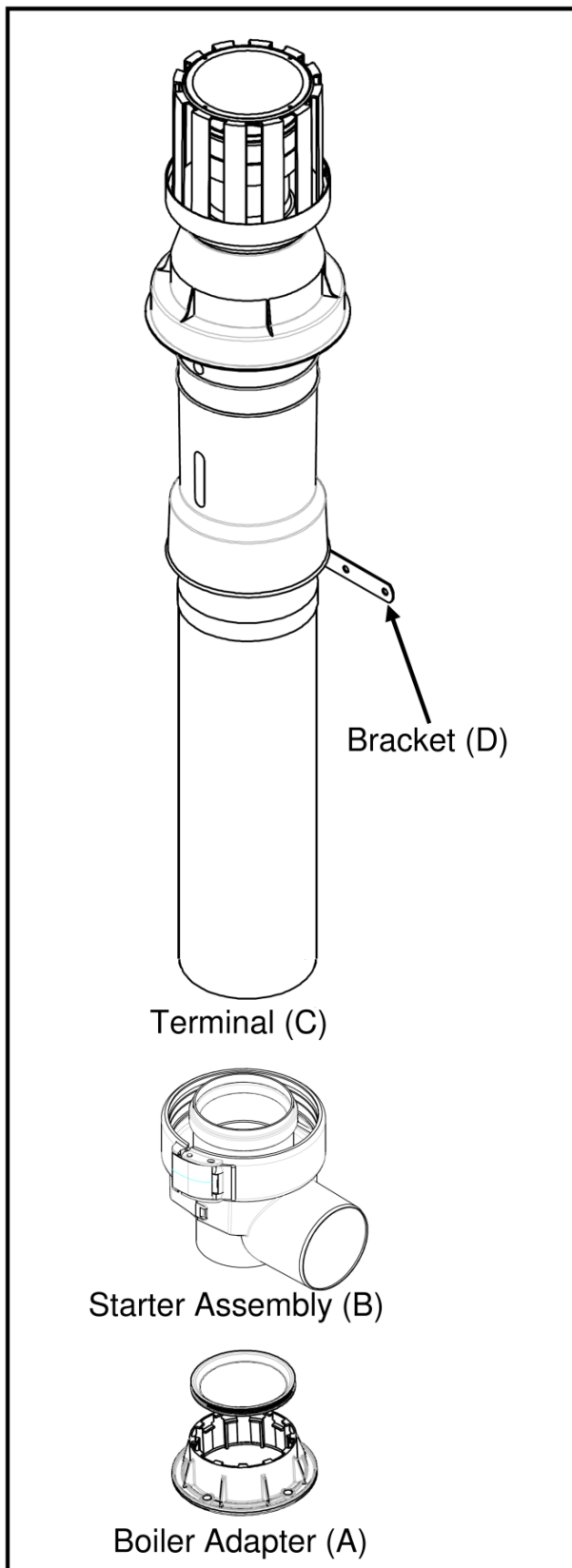
- i. Cut a hole through the wall and fit a non-combustible sleeve.
- ii. Fit the flue terminal (E) and measure the excess length, **X**.
- iii. Cut **X** mm from the outer pipe of the terminal then **X** mm from the inner pipe.



Note: A terminal guard is required if the termination location is less than 2m above external ground level.

8.1.5 HE Vertical Balanced Flue Kit (VBF)

The kit comprises:



FIT FLUE THERMOSTAT

1. Fit the flue thermostat **BEFORE** fitting the flue kit.

FIT STARTER PIECE

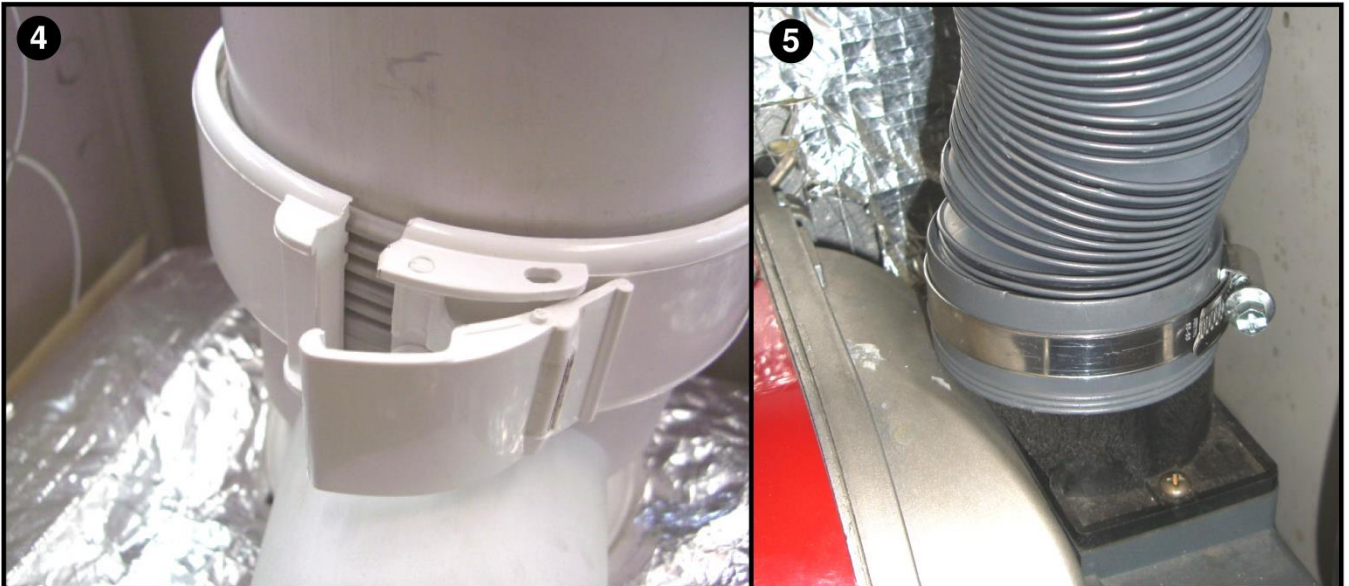
2. Remove the top panel casing cut-out using snips. Fit the boiler adapter (A).

3. Lubricate the seals, then insert the starter assembly (B).



CONNECT 1ST EXTENSION AND AIR HOSE

4. Lubricate then fit the 1st extension and secure with the locking band.
5. Fit the air inlet spigot and gasket to the burner. Attach the flexible air hose to the burner and starter assembly and secure with the jubilee clips.

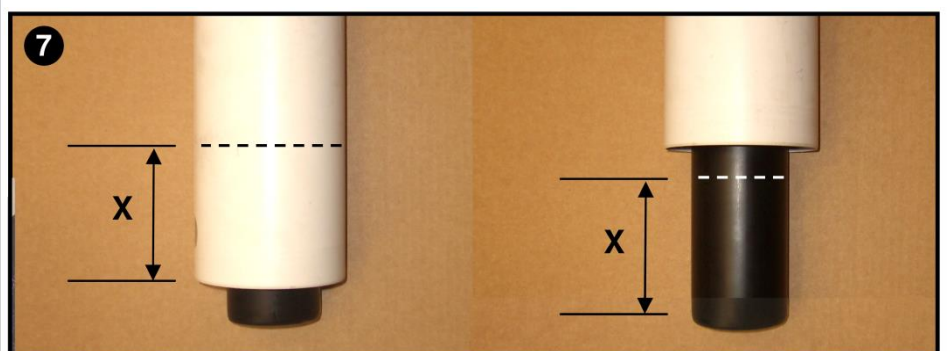


MEASURE AND CUT TERMINAL

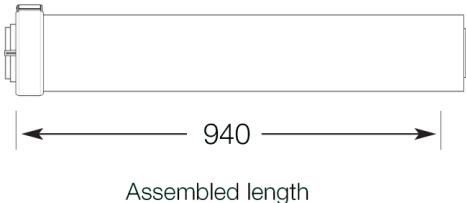
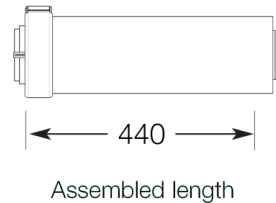
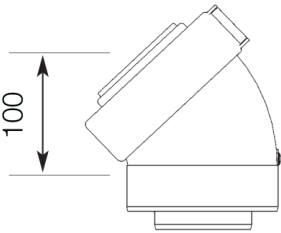
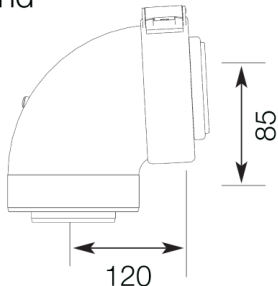
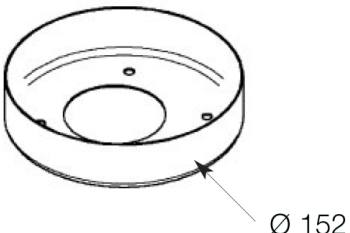
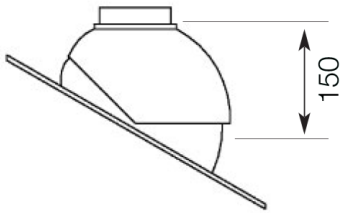
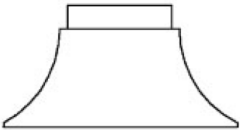
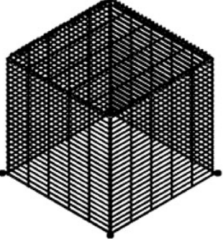


6. Fit the flashing and assemble the flue up through the roof, lubricating all seals. Measure the excess length, X, noting carefully the correct measurement locations.

7. Cut X mm from the outer pipe of the terminal (C) then X mm from the inner pipe. Refit and secure in place with the bracket (D).



8.1.6 Warmflow HE Boiler Flue Components: 80/125 Ø

<p>F3 - 1000mm extension pipe</p>  <p>Assembled length = 940</p>	<p>F4 - 500mm extension pipe</p>  <p>Assembled length = 440</p>
<p>F7 - 45° bend</p>  <p>Effective length = 0.5m</p>	<p>F8 - 87° bend</p>  <p>Effective length = 1.0m</p>
<p>F10 - conventional flue adapter</p>  <p>Ø 152</p>	<p>F11 - pitched roof flashing</p>  <p>150</p>
<p>F12 - flat roof flashing</p> 	<p>F14 - terminal guard</p> 

Note:

1. Flue fitting kit required.
2. If the terminal is less than 2 metres above ground level, a terminal guard must be fitted.
3. Extension pipes and flue adapter lengths quoted are effective lengths and not the actual length of the piece.
4. All dimensions in mm unless otherwise stated.

8.1.7 Flue Length Calculation

BOILER OUTPUT (kW)	TOTAL EQUIVALENT FLUE LENGTH (m)	
	Vertical Balanced Flue	High/Low Level Balanced Flue
15	8.0	5.0
21	8.0	5.0
26	8.0	5.0
30	6.0	3.5
33	4.0	2.5
44	4.0	2.5

Note:

- 1. All flues can utilise any combination of bends, straights, adapters and terminals.**
- 2. Ensure flue is arranged such that it falls continuously towards the boiler.**
- 3. The Low Level, High Level and Vertical Balanced Flue Systems can use any combination of flue extension pieces up to the maximum equivalent length depending upon boiler output as illustrated in the above table.**

Example Calculation:

Boiler Output: 20kW

Length of Flue (distance from boiler to terminal): 8.0m

Example 1: No bends fitted.

Length of vertical flue 8.0m

No bends 0.0m

Equivalent length 8.0m

Equivalent length within the maximum allowable.

INSTALLATION ACCEPTABLE.

Example 2: 2 x 45° bends fitted.

Length of vertical flue 8.0m

2 x 45° bends 1.0m

Equivalent length 9.0m

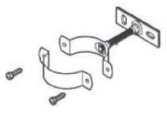


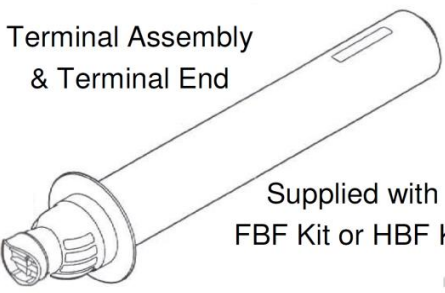
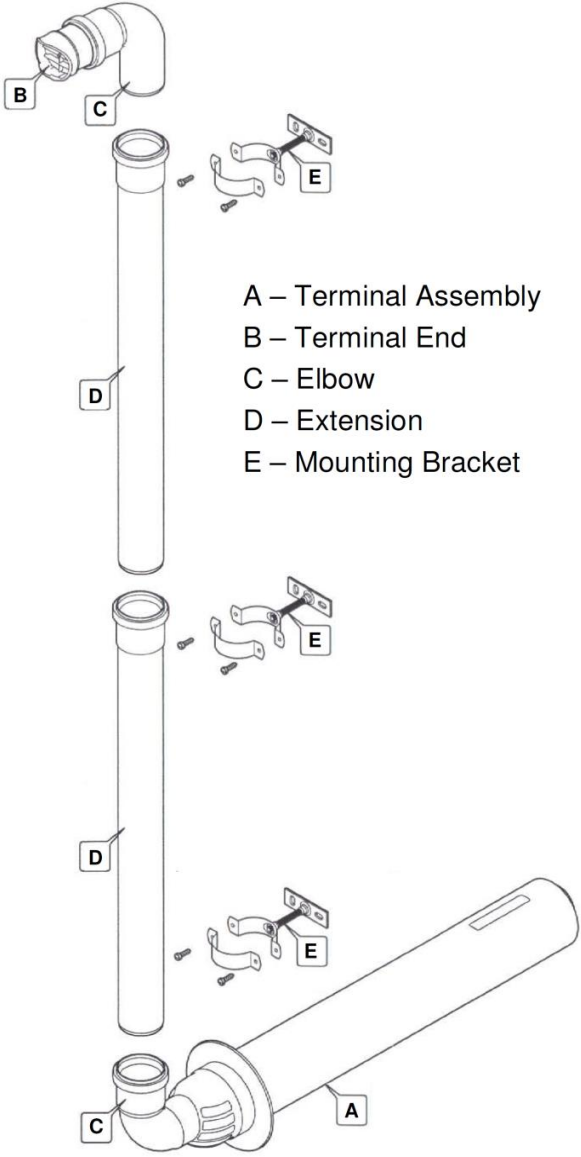
Equivalent length now exceeds the maximum allowable.

INSTALLATION NOT ACCEPTABLE.

8.1.8 Plume Management Kits

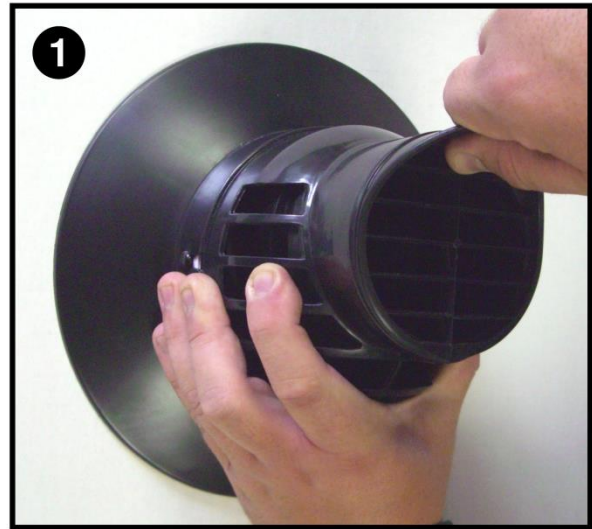
Plume Management Kits are available for our range of appliances.

8.1.9 Utility Plume Management Kit (UPMK)

<p>The kit comprises:</p>  <p>Mounting Bracket x 3</p>  <p>Elbow x 2</p>  <p>Extension x 2</p> <p>The kit does NOT include:</p>  <p>Terminal Assembly & Terminal End</p> <p>Supplied with FBF Kit or HBF Kit</p>	<p>Assembled kit</p>  <p>A – Terminal Assembly B – Terminal End C – Elbow D – Extension E – Mounting Bracket</p>
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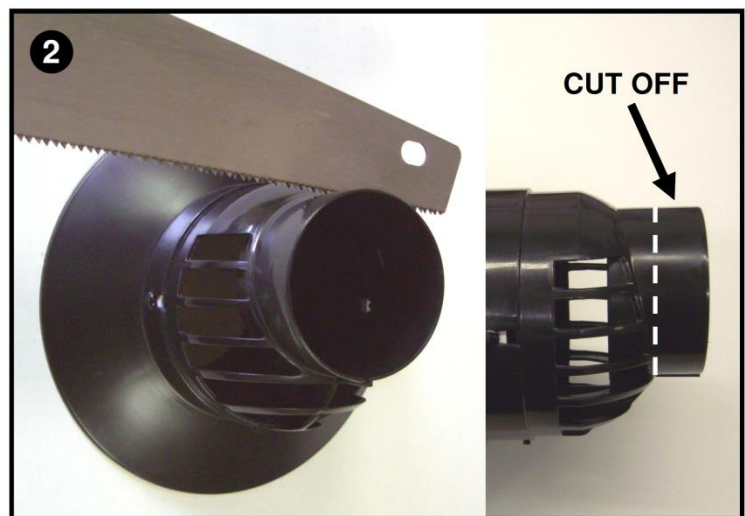
REMOVE TERMINAL END

1. Hold the Terminal Assembly (A) in place and extract the Terminal End (B) by gripping and pulling firmly.



CUT OFF EXCESS MATERIAL

2. Using a suitable saw, cut off the highlighted portion of the end of the Terminal Assembly (A) then de-burr the cut edge.



FIT DIVERTER ELBOW

3. Lubricate and insert one of the Elbows (C) into the end of the Terminal Assembly (A). Elbow (C) can be pointed at any angle up to +/- 87° from the vertical. It must not be pointed horizontally or downwards as the effect of the flue gas condensate will reduce the life of the flue seals.


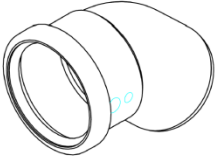
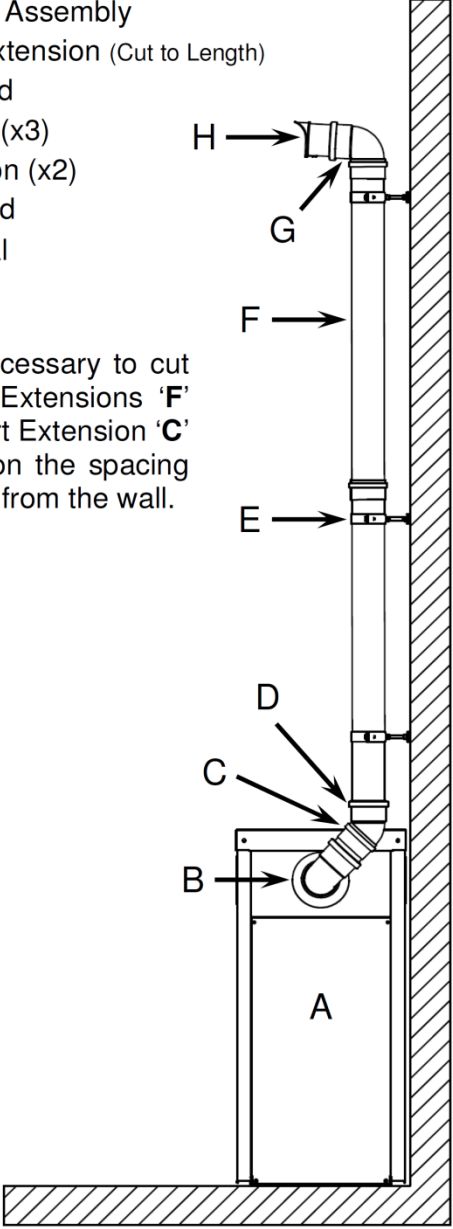
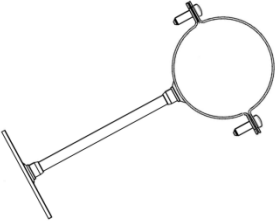
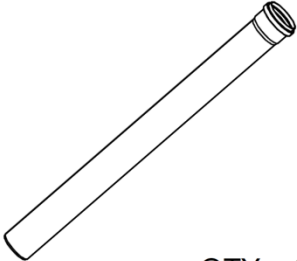
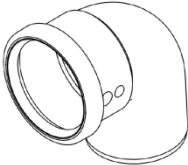
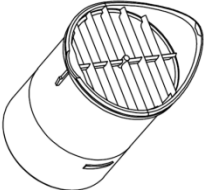
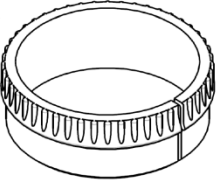



ASSEMBLE THE KIT

Assemble the remainder of the kit inserting the Terminal End (B) into the top Elbow (C) and using the Mounting Brackets (E) to secure the Extensions (D) as shown overleaf.

8.1.10 Kabin Pak Plume Management Kit (KPMK)

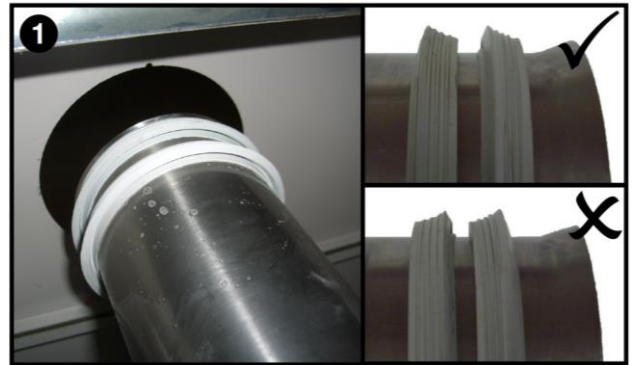
The kit comprises:

<p>Diverter Assembly 'B'</p>  <p>QTY = 1</p>	<p>45° Bend 'D'</p>  <p>QTY = 1</p>	<p>A – Kabin Pak Boiler B – Diverter Assembly C – Short Extension (Cut to Length) D – 45° Bend E – Bracket (x3) F – Extension (x2) G – 90° Bend H – Terminal</p> <p>Note: It will be necessary to cut one of the Extensions 'F' to form Short Extension 'C' depending on the spacing of the boiler from the wall.</p> 
<p>Mounting Bracket 'E'</p>  <p>QTY = 3</p>	<p>Extension 'F'</p>  <p>QTY = 3</p>	
<p>90° Bend 'G'</p>  <p>QTY = 1</p>	<p>Terminal 'H'</p>  <p>QTY = 1</p>	
<p>Split Ring-nut</p>  <p>QTY = 1 (loose)</p>	<p>Diverter Assembly Seal</p>  <p>QTY = 2 (loose)</p>	

1. FIT DIVERTER ASSEMBLY SEALS

Apply suitable lubricant to the two Diverter Assembly Seals (supplied loose) then fit to the end of the boiler flue pipe noting the correct orientation.

The seals MUST be fitted as shown with the outer surface sloping away from the end of the pipe to allow the Diverter Assembly to push over the seals.



2. FIT SPLIT RING-NUT

Fit the Split Ring-nut by pulling open the split and pushing the nut over the pipe. Ensure the threaded end is facing towards the seals.



3. FIT & SECURE DIVERTER ASSEMBLY

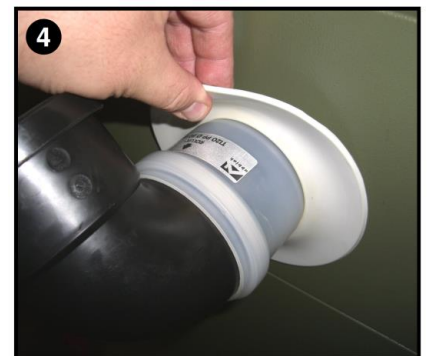
Lubricate the inside of the Diverter Assembly 'B' then push the assembly onto the end of the pipe and over the 2 seals. Use the Split Ring-nut to force the seals into the assembly ensuring that they remain flat on the pipe.

Tighten the Ring-nut into the assembly ensuring the assembly is tight onto the end of the pipe and that the seals are well compressed. The Diverter Assembly should be firmly attached to the pipe when complete.



4. ADJUST DIVERTER ASSEMBLY

Turn the 90° bend on the Diverter Assembly 'B' around to 45°, pointing towards the wall. If necessary, adjust the position of the rubber dresser on the Diverter Assembly in order to ensure a good weather seal.



5. ASSEMBLE PLUME MANAGEMENT KIT

Assemble the remainder of the Plume Management Kit as shown over the page, securing the whole assembly into place using the Mounting Brackets 'E'.

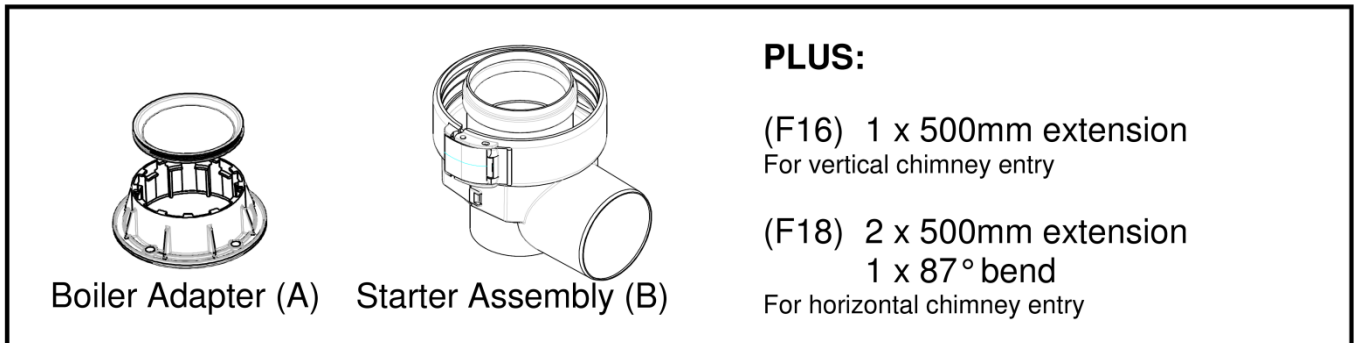
It will be necessary to cut one of the Extensions 'F' to form Short Extension 'C', depending on the spacing of the boiler from the wall.

If fitting the flue extension pipe (on a 150HE or Combi model), glue the rubber dresser of the Diverter Assembly 'B' to the boiler casing using silicone sealant in order to secure the assembly in place.

Ensure the location of the terminal complies with all local legislative requirements.

8.1.11 Flexible Flue Liner Kit (HFL & VFL)

These boiler connection kits (F16 or F18) contain:



Installation instructions

FIT FLUE THERMOSTAT

1. Fit the flue thermostat **BEFORE** fitting the flue.

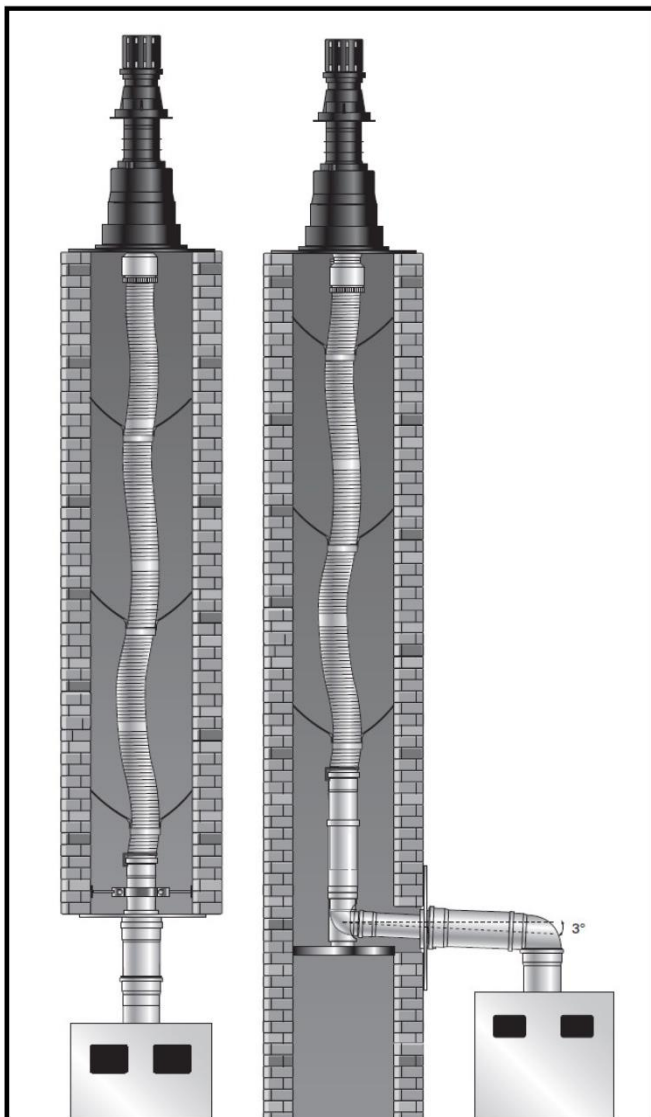
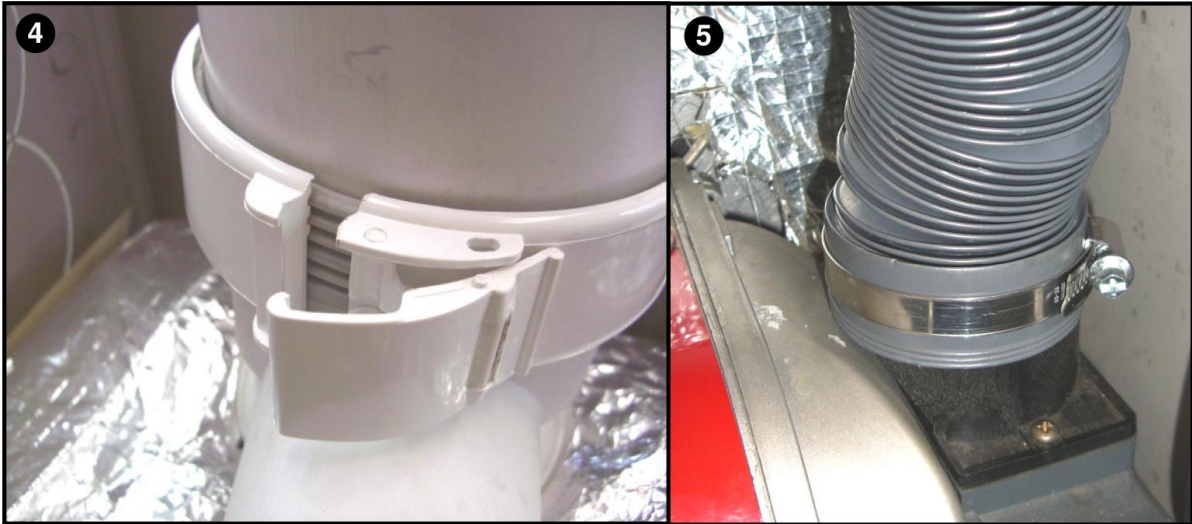
FIT STARTER PIECE

2. Remove the top casing panel cut-out using snips. Fit the boiler adapter (A).
3. Lubricate the seals then insert the starter assembly (B).



CONNECT 1ST EXTENSION AND AIR HOSE

4. Lubricate then fit the 1st extension and secure with the locking band.
5. Fit the air inlet spigot and gasket to the burner. Attach the flexible air hose to the burner and starter assembly and secure with the jubilee clips.



CONNECT TO CLOSURE PLATE

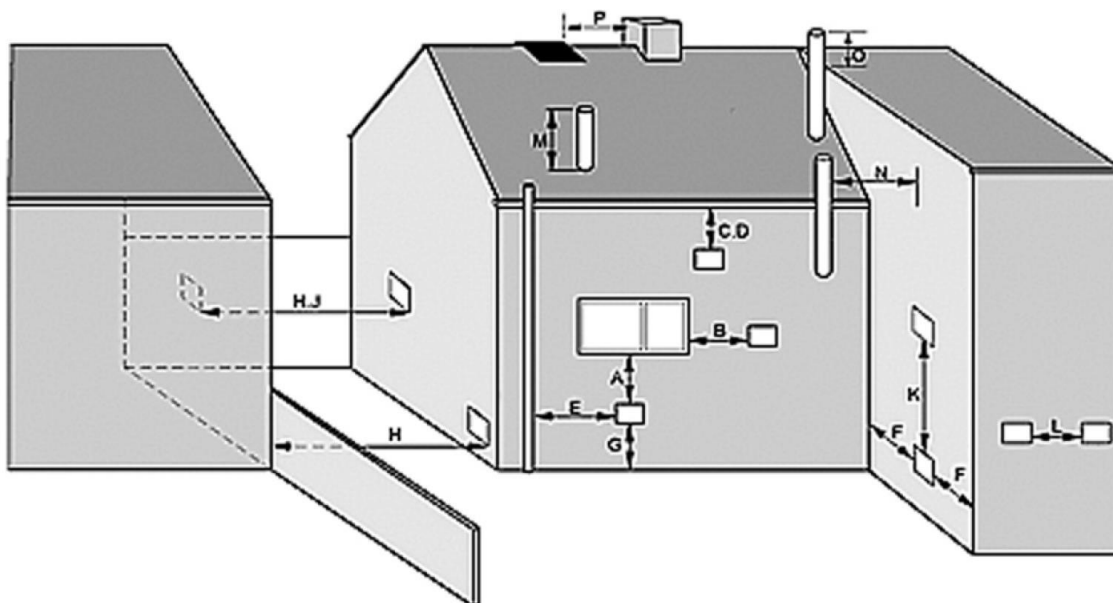
Install the chimney components and closure plate as instructed in the separate instruction leaflet.

Run the flue from the boiler to the chimney closure plate. If necessary, the extension(s) can be cut to length.

Horizontal entry kits only

Ensure that the 'horizontal' section into the closure plate is inclined back towards the boiler at a minimum of 3° to the horizontal as shown.

8.2 Flue Terminal Locations



MINIMUM DISTANCES TO TERMINALS IN MILLIMETRES AS MEASURED FROM THE TOP OF THE CHIMNEY OR THE RIM OF A LOW LEVEL DISCHARGE OPENING

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

These are minimum dimensions and are only quoted as guidelines. Installation in exposed positions is not recommended. Account must be made of the plumbing from the flue. If it is likely to be a nuisance to the householder the use of a vertical balanced flue or conventional flue should be considered.

Terminating positions must be at least 1.8 metres from an oil storage tank unless a wall with at least 30 minute fire resistance and extending 300 mm higher and wider than the tank is provided between the tank and the terminating position.

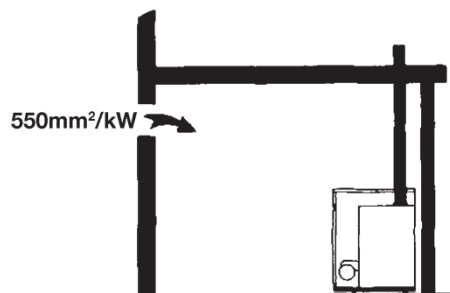
9 AIR SUPPLY FOR COMBUSTION & VENTILATION

(see BS5410)

9.1 Open Flue Boilers

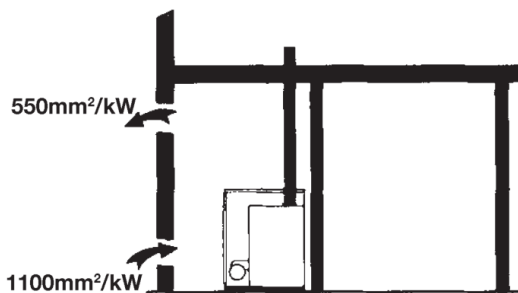
When the boiler is sited in a cellar where the only access for combustion and ventilation air is at high level then the combustion air should be ducted to low level.

Combustion Air Supply
Boiler in Room



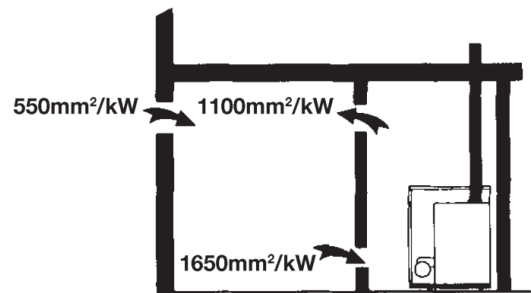
OPEN FLUE

Boiler in Compartment



OPEN FLUE

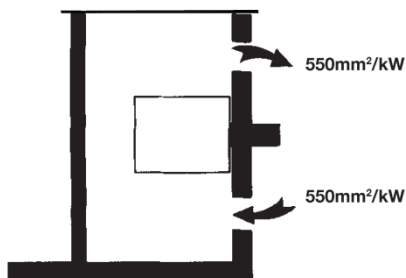
VENTILATED FROM OUTSIDE



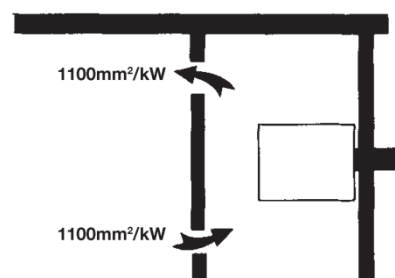
OPEN FLUE

VENTILATED FROM ROOM

9.2 Balanced Flue Boilers – Boilers in a Compartment



VENTILATED FROM OUTSIDE



VENTILATED FROM ROOM

Air Supply for Ventilation

No Combustion Air Inlet Required to Room

10 INSTALLATION REQUIREMENTS

The boiler installation must be in compliance with relevant standards and Building Regulations. See Section 4.2 of this manual.

10.1 General Requirements

10.1.1 Hearth

The boiler has a hearth temperature of between 50°C and 85°C and should be stood on a rigid, non-porous, non-combustible base, which is not softened by warmth, to comply with the Building Regulations.

10.1.2 Service Access

24" (600mm) Clearance should be provided above and in front of the boiler to allow for routine servicing. Pumped, System and Combi models may require access to the top. This is of particular relevance to appliances located beneath work surfaces. Such work surfaces should be easily removable for service access.

10.1.3 Heating System

The heating system should be installed to current HVAC codes of practice. Before installing the boiler the new or existing system must be thoroughly flushed to clear all sludge or other foreign matter such as solder, steel wool and copper filings. The system must be cleansed, neutralised and protected from corrosion in accordance with BS5449 and BS7593 using suitable cleansing agent(s) and inhibitor(s) and carried out in accordance with the cleanser / inhibitor manufacturers' instructions. The system must be dosed to the concentrations specified by the inhibitor manufacturer (refer to the Technical Data section of this manual for the volume of the boiler when calculating the total system volume). Inhibitor concentrations must be monitored and maintained on an ongoing basis. Failure of components such as, but not limited to heat exchangers, condensing units, pumps, auto air vents, pressure relief valves, and non-return valves due to corrosion products in the system will not be covered by warranty.

10.1.4 Air Vents

The plastic plugs of the auto air vent(s) factory-fitted to the boiler must be loosened when filling the system in order to bleed the air from the boiler. The plug should be tightened again once filling is complete. In addition to any factory fitted air vents it is recommended that another air vent is fitted at the highest point in the system. Where the flow pipework drops down from the boiler the installer must ensure that an automatic air vent is fitted to the top of the pipework to prevent air being trapped in the boiler.

On Boilerhouse HE models, the boiler **MUST** be fitted with an automatic air vent as shown in Section 4.5.1. If an air vent is not fitted, air will accumulate in the secondary heat exchanger and cause the boiler to malfunction. Failure to fit an air vent will invalidate ALL warranties.

10.1.5 Drain Cock

For all appliances not factory-fitted with drain cocks, one should be fitted to the boiler drain boss located to the left hand side of the burner. Drain cocks should also be fitted to the lowest points in the system to allow the system to be completely drained.

10.1.6 Frost Protection

Where there is a risk to the boiler or installation from frost then a suitable frost thermostat should be fitted. Alternatively the system could be dosed with an antifreeze agent. The Kabin Pak Combi boiler is factory fitted with a frost thermostat as standard to protect the fabric of the boiler only. For all other Kabin Pak models covered by this manual a Frost Thermostat Kit (Code FSK1) is available as an optional extra. This also protects the fabric of the boiler only. Details of frost protection for the fabric of the building can be found in section 6.3.3 of this manual.

10.1.7 Pipework

We strongly advise that all installation pipework is run in copper. However, if plastic pipe is used, it must be recommended by the pipe manufacturer for use with oil fired appliances and, in any case, the last 1000mm of pipework connected directly to the appliance must be of copper. All connections to the appliance must be made with compression fittings.

10.2 Sealed Systems

10.2.1 Expansion Vessel

Refer to Section 4.2 of this manual for standards referencing details of expansion vessel sizing.

The values given in the table below are for total system volumes which include the water content of the boiler details of which can be found in the Technical Data Section 5.4 of this manual. System and Combi models up to 120HE are supplied with a 12 litre expansion vessel charged to 1.0 bar. This can accommodate a maximum combined boiler and system volume of 110 litres. Where permitted by the type, size and configuration of heating system the expansion vessel bladder pre-charge pressure can be reduced, prior to filling the system, to 0.5 bar in order to accommodate a total system volume of 145 litres. Expansion vessel pre-charge pressures should be evaluated and adjusted periodically, normally as part of servicing.

When measuring the expansion vessel bladder pre-charge pressure, using a tyre gauge, the system should be cold and the system pressure should be relieved (by manually operating the system pressure relief valve) in order to obtain an accurate reading.

If the maximum total system volumes stated above are to be exceeded, additional expansion capacity will be required.

INITIAL CHARGE	VESSEL VOLUMES											
0.5	2.1	4.2	6.3	8.3	10.5	12.5	14.6	16.7	18.7	20.8	22.9	25.0
1.0	2.7	5.4	8.2	10.9	13.6	16.3	19.1	21.8	24.5	27.2	30.0	32.7
1.5	2.9	7.8	11.7	15.6	19.5	23.4	27.3	31.2	35.1	39.0	42.9	46.8
SYSTEM VOLUME	25	50	75	100	125	150	175	200	225	250	275	300

Do not allow the flexible hoses connected to the expansion vessel to become twisted, kinked or flattened. This may cause collapse of hose bore compromising the function of the expansion vessel.

10.2.2 System Filling

For all System and Combi boilers a filling point complete with a filling loop is supplied fitted to the expansion vessel. The filling loop **MUST** be disconnected from the mains supply after filling. A system pressure when cold of 1 bar is recommended. After filling, vent all air from the system. The plastic plugs of the auto air vent(s) factory fitted to the boiler must be loosened when filling the system in order to bleed the air from the boiler, then re-tightened when filling is complete.

10.2.3 Combi Filling

When filling a combination boiler, the appliance must be switched off, and the diverting valve red handle pressed and turned to the mid position to ensure correct filling of the system and heat store.

10.2.4 System Pressure

Water loss from the system as indicated by a reduction in pressure on the pressure gauge may be made up through the filling loop. In the first week of operation it is normal to see a drop in system pressure. After this time the system pressure must be rechecked and the system refilled. Failure to do so may lead to boiler faults.

Special attention must be given to the concentration of corrosion inhibitors in the system water where there is a need for topping up or refilling. Inhibitor concentrations must be restored to the concentrations specified by the inhibitor manufacturer.

Frequent or routine refilling and topping up of the system should not be necessary on an ongoing basis and may prove harmful to the appliance. Should topping up prove necessary on a frequent or routine basis you must contact Warmflow or your installer.

10.2.5 Pressure Relief Valve

Any pressure relief valve fitted to the boiler or system must be able to discharge externally to a drain where the discharge can be seen but cannot cause any injury or damage. No other valves should be positioned between the relief valve and discharge termination. The pressure relief valve should be manually activated periodically in order to assess valve opening, normally as part of servicing.

10.2.6 Low Pressure Switch

Where there is a catastrophic loss of water from the system the boiler thermostats may fail to operate which would result in serious damage to the appliance. To prevent this it is recommended that a low pressure cut out switch set at 0.3 bar is fitted to **the system** and wired in series with the boiler limit thermostat. Combi models are factory-fitted with a pressure switch as standard.

10.3 Combi Domestic Hot Water

10.3.1 Mains Water Pressure

To protect the appliance and to prevent excessive flow rates, a pressure reducing valve must be fitted to limit the maximum supply pressure to 3 bar.

We strongly advise that all installation pipework is run in copper. However, if plastic pipe is used, it must be recommended by the pipe manufacturer for use with oil fired appliances and, in any case, the last 1000mm of pipework connected directly to the appliance must be of copper.

Whenever a pressure reducing valve or other device containing a non-return valve is fitted to the mains water supply to the boiler, a mini expansion vessel must be fitted after the device in order to protect the appliance from the expansion due to heating of the water in the domestic hot water pipework

Note that the flow rate from individual taps is dependent on the number of outlets being operated together, as well as the length and size of pipework and the mains supply pressure.

10.3.2 Water Hardness

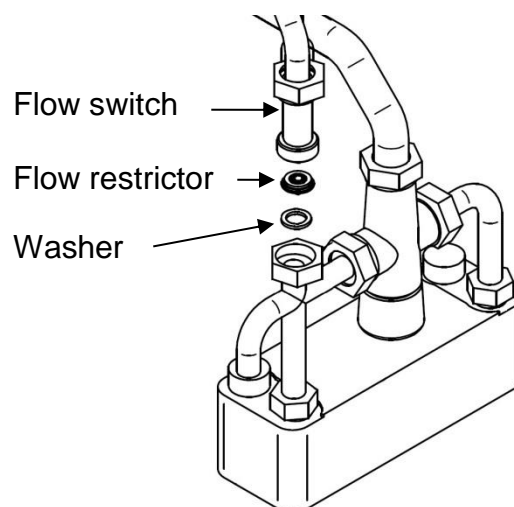
Although many of the DHW components are designed to resist lime scale formation, in areas of hard water it may still be necessary to fit an inline chemical water softener. For further information contact Warmflow and your local water company.

10.3.3 Boreholes

Where the mains water supply to the boiler is fed from a borehole via a pump and accumulator arrangement the variable pressure can cause the mixer valve to go to its fail safe settings thus preventing the outlet water temperature from achieving a suitable level. In order to minimise the pressure variations it is recommended that differential on the borehole pump pressure switch is kept as low as possible without adversely affecting the pump motor. The accumulator must be as large as possible in order to reduce the rate of pressure change and a pressure reducing valve (PRV) must be situated between the pump and accumulator and the boiler. The PRV must be set slightly below the minimum setting of the pressure switch on the pump.

10.3.4 Flow Restrictor

An 18L/min flow restrictor has been factory fitted but can be easily removed if required.



10.3.5 Pipework

All pipework including pipework within the casing should be insulated after the boiler has been installed. Pipe insulation with a minimum wall thickness of 19mm (Armaflex or equivalent) should be used wherever possible. For exterior pipework insulation, please see the latest local building regulations for details.

10.3.6 Tank thermostat

The tank thermostat adjustment is located on the back of the control panel. This may be adjusted higher or lower dependent on the installation. For maximum efficiency, it is recommended to set the thermostat to the lowest temperature which will still provide adequate hot water temperatures at all outlets. This may involve raising the mixer valve setting.

10.3.7 Balanced flue

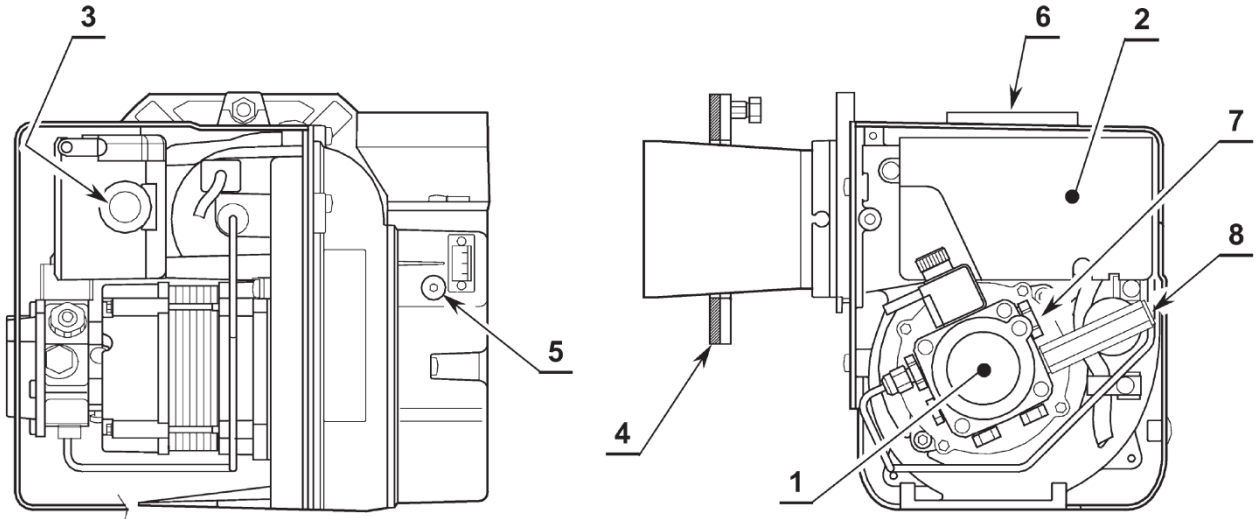
Due to the relatively high ambient temperature within the combi casing, a balanced flue should be fitted in order to draw in cooler outside air. For external Kabin Pak combi models, an air inlet adapter, AID, is available from Warmflow.

10.3.8 Plinth / Base

The boiler should be installed on a plinth or base with a thermal break such as non-combustible solid insulation. This is to minimise heat transfer to the ground and maximise the overall efficiency of the boiler.

11 BURNERS

11.1 RDB Burner

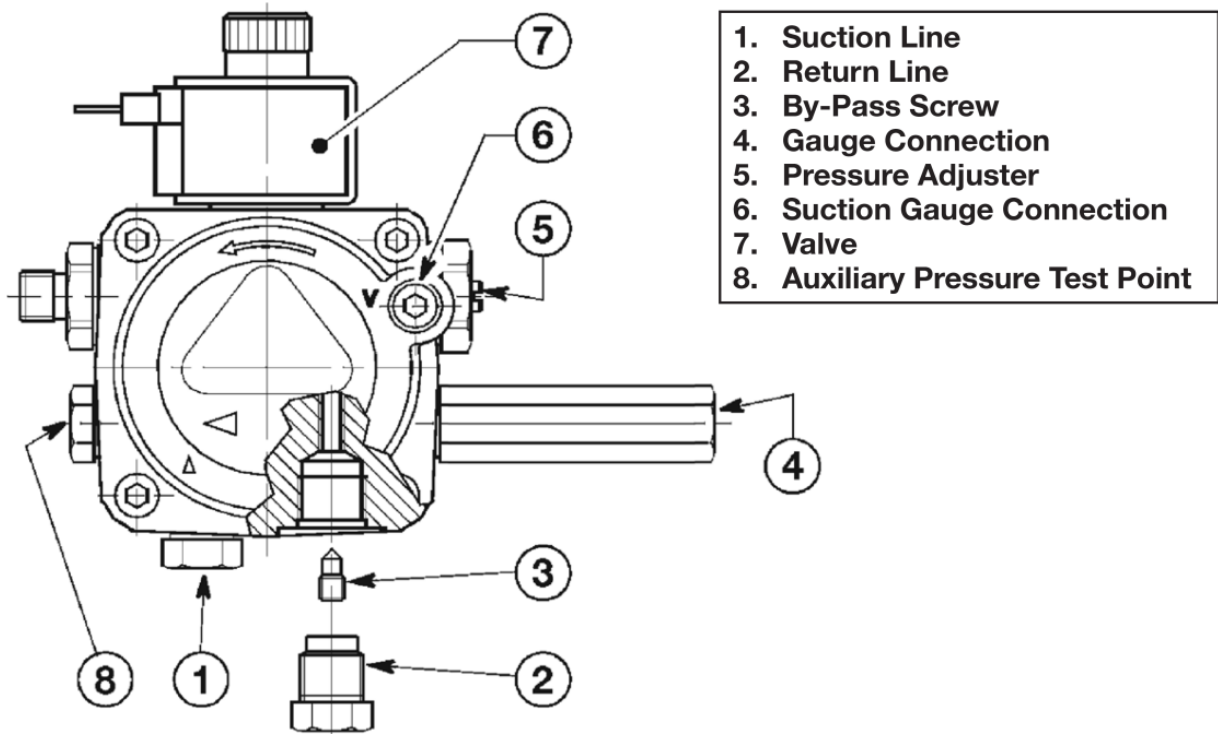


- 1. Pump
- 2. Control Box
- 3. Reset Button with Lock-Out Lamp
- 4. Flange with Insulating Gasket

- 5. Air Damper Adjustment Screw
- 6. Air Tube Connection (Supplied with BF Kit)
- 7. Pump Pressure Adjustment Screw
- 8. Pressure Gauge Port

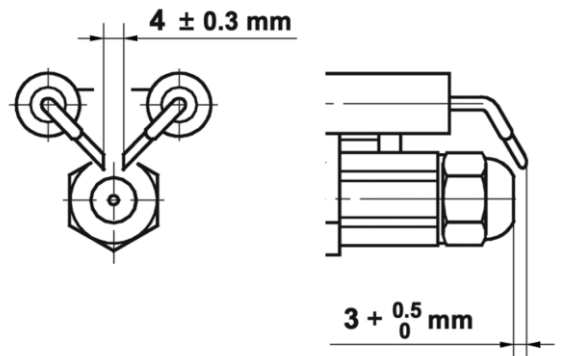
11.2 Oil Pump

The burner is supplied for use with a one pipe system. For use on a two pipe system, it is necessary to remove the return port plug and fit a small by-pass plug as shown.

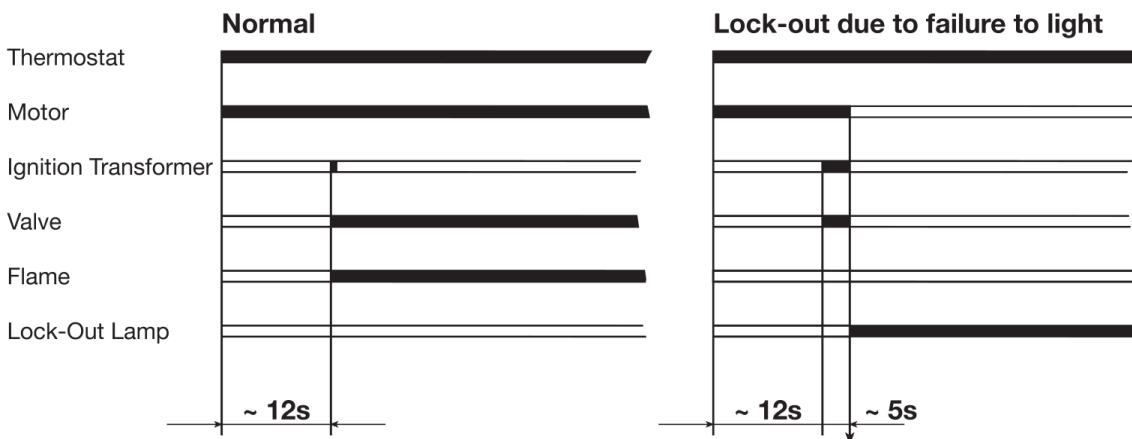


11.3 Electrode Setting

When removing or replacing the nozzle, move the electrodes forward to avoid the risk of damage. The electrodes are slacked by unscrewing the brass post that passes from the electrode holder out of the side of the burner. When work is complete, ensure the electrodes are reset as shown and secured by tightening the brass post.



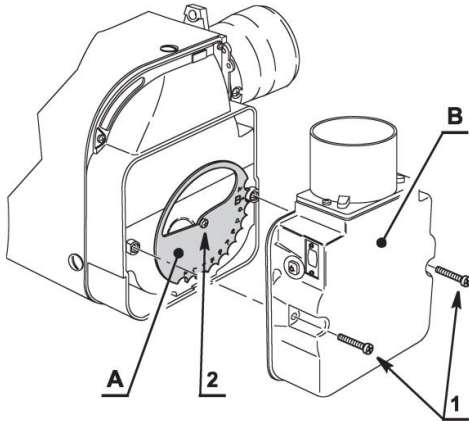
11.4 Burner Start-Up Cycle



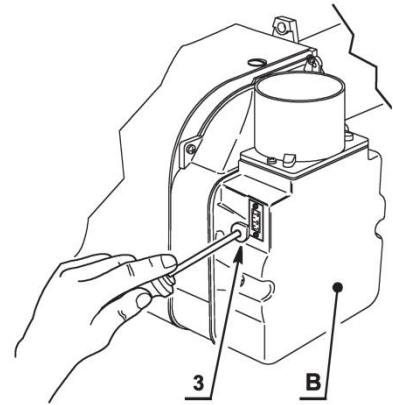
11.5 Air Damper Adjustment

The air damper is set in factory. This regulation is purely indicative. Each installation however, has its own working conditions: actual nozzle output; positive or negative pressure in the combustion chamber, the need of excess air, etc. All these conditions may require a different air damper setting.

Air Damper (A) – 15/21 Burner Only



Air Damper (B)



Air Damper (A) – The main air damper can be set in either of two positions. To set the positions of the damper, proceed as follows: Remove the secondary air damper (B) loosening the screws (1). Loosen the screw (2) and rotate the main air damper (A) to the required position. Retighten the screw (2) and put back the secondary air damper (B).

Air Damper (B) – The purpose of this damper is to perform a fine tuning of the inlet air. Tuning of this device is possible by turning the screw (3).

12 COMMISSIONING & SERVICING

12.1 Commissioning

Note: It is the responsibility of the installer to ensure that the boiler is properly commissioned by an OFTEC trained and registered technician. Failure to do so WILL invalidate ALL warranties.

Before firing ensure that all the baffles are in place, as they may have been displaced during transit; Refer to the General Information section. Switch the boiler on, ensuring all controls are calling for heat.

The oil pump pressure must be checked by fitting a pressure gauge to the pump pressure port. If necessary the pressure should be adjusted until it corresponds with the value in the Technical Data section for the required output. Using a smoke pump, check the smoke number. It should be zero.

Using a flue gas analyser, check the CO₂ content and the flue gas temperature once the boiler is hot. Testing while the boiler is still relatively cold gives inaccurate results and leads to incorrect adjustments being made.

Where a balanced flue has been fitted ensure the air duct connecting the flue and burner has been properly connected before commissioning.

Note: All product warranties will be invalidated if the appliance is not commissioned by a Warmflow or OFTEC trained and registered technician and the commissioning certificate of the OFTEC Boiler Passport completed and returned to Warmflow within 30 days from the date of installation and 90 days from the date code stamped on the appliance.

Additionally, to comply with the building regulations, the boiler passport or OFTEC form CD11 should be completed and a copy left with the householder.

12.2 Servicing

12.2.1 General Requirements

The appliance must be serviced annually by a Warmflow or OFTEC registered service technician in accordance with the recommendations laid out in OFTEC's Technical Book 2: 'Domestic & Light Commercial Servicing and Commissioning – Requirements for Oil Fired Systems – Pressure Jet Appliances'.

Additionally, when servicing, special attention **MUST** be paid to the condition of the oil nozzle, flexible oil line, fuel filter, door insulation, sealing rope, expansion vessel (inc. pre-charge) and the secondary heat exchanger door seal. If found to be defective, they **MUST** be replaced. Flexible oil lines must be replaced if out of their guarantee period. If doubt exists as to the guarantee period expiry date of the flexible oil lines, or if their integrity is uncertain, they **MUST** be replaced as part of the service.

The operation of boiler appliance safety controls and devices such as high limit thermostats, pressure relief valves and fire valves **MUST** be assessed. If found to be defective, they **MUST** be replaced.

N.B.: Where they exist, wheel-head fire valves **MUST** be replaced with a remote acting type.

The system corrosion inhibitor concentration must be checked during annual servicing (instant on-site test kits are available from inhibitor manufacturers) and additional inhibitor **MUST** be added if the system is found to be under-dosed. Refer to the inhibitor manufacturer for further guidance.

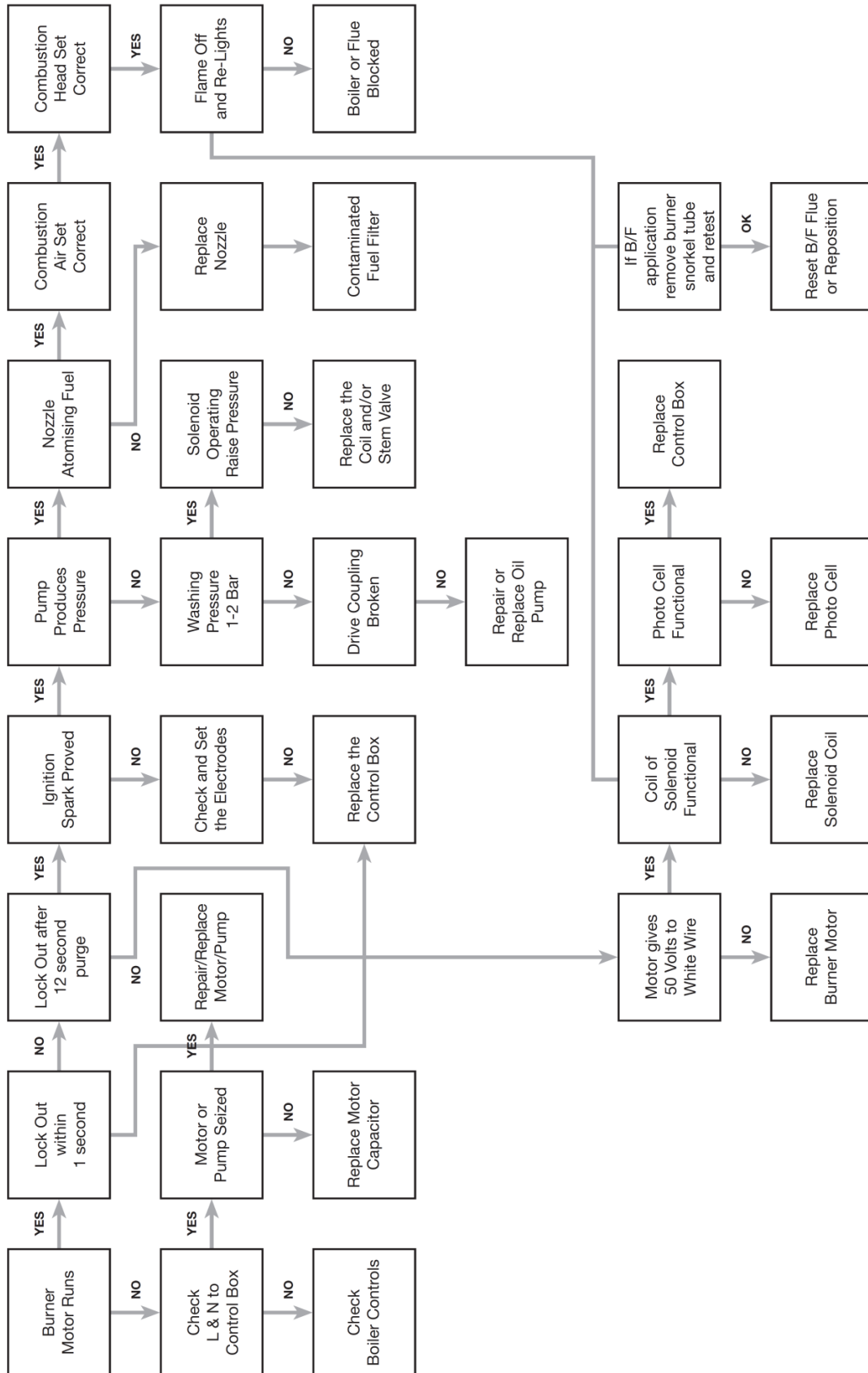
Note: All product warranties will be invalidated if the appliance is not serviced annually by a Warmflow or OFTEC trained and registered technician. Details of the servicing conducted must be recorded in the OFTEC Boiler Passport.

13 BURNER FAULT FINDING



WARNING: The burner fault finding chart is to only be used by competent and suitably qualified engineers. It may be necessary to check live terminals inside the control panel. Extreme care should be taken when doing so.

13.1 Riello RDB

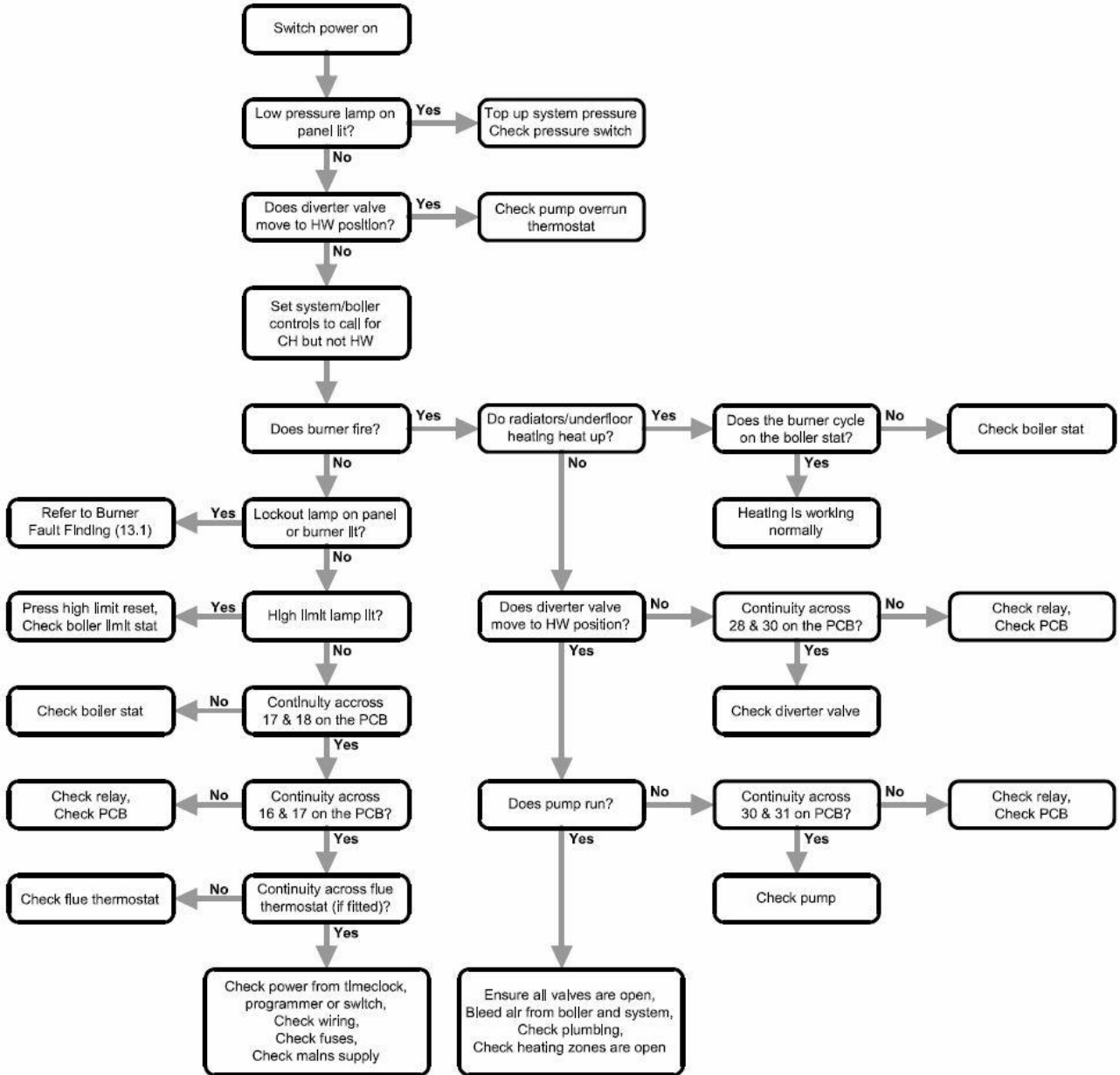


14 COMBI FAULT FINDING

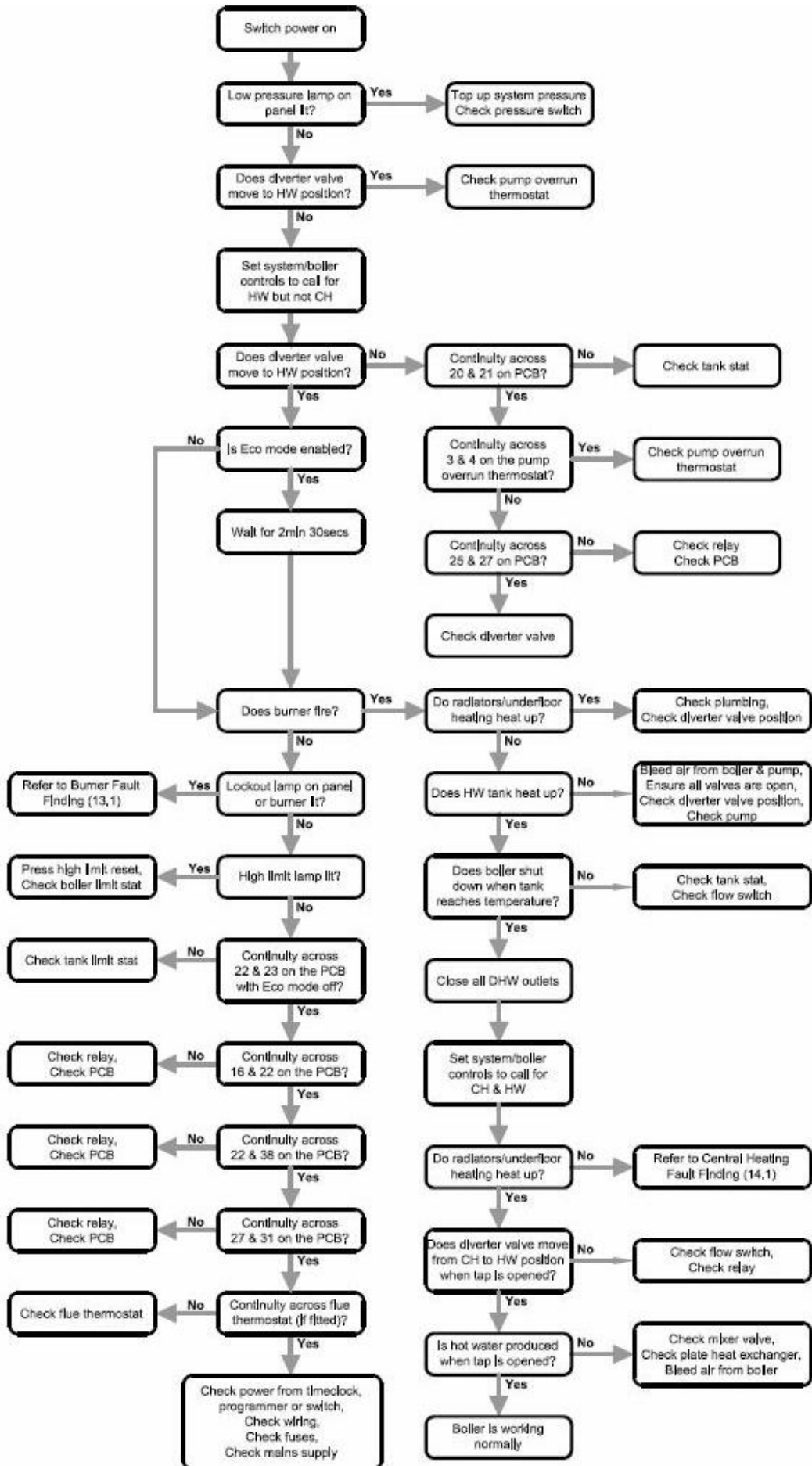


WARNING: The combi fault finding charts (Central Heating and Hot Water) are to only be used by competent and suitably qualified engineers. It may be necessary to check live terminals inside the control panel. Extreme care should be taken when doing so.

14.1 Central Heating



14.2 Domestic Hot Water



15 OPTIONAL BOILER MOUNTED DIGITAL TIMER



15.1 Operating Instructions

15.1.1 After Installation

When you first install the Cr2032 battery (by removing the clear plastic strip from the rear of the timer) you must press the 'RESET' button, the LCD display will display fully for 3 seconds. Then LCD display will change to '5:2d'. You can press DAY button to select '7d', '24H' programme mode.

This configures the timer as follows:

- 5/2d:** 5 day/2 day programme option allows different ON/OFF times on weekday and weekend.
- 7d:** 7 day programme option allows different programme setting on each day of weekday and weekend.
- 24H:** 24 hours programme option runs same programme every day.

When you finalise the setting, press the CLOCK button for normal operation.

15.1.2 Built in Programme

For convenience, the timer module has a built in programme, however, it can be easily adjusted (see section 15.1.5 to Change the Programmes).

The timer offers 3 options for both CH and HW programme period.

OFF: Off all the time.

AUTO: To run your time schedule for period one or two or three each day.

ON: Turn on all the time.

Factory Present Time Schedule

<i>Switching</i>	Mon – Fri Time Schedule		Sat – Sun Time Schedule	
	CH/CH1	HW/CH2	CH/CH1	HW/CH2
PERIOD 1 ON	06:30	06:30	07:30	07:30
PERIOD 1 OFF	08:30	08:30	10:30	10:30
PERIOD 2 ON	12:00	12:00	12:00	12:00
PERIOD 2 OFF	14:00	14:00	14:00	14:00
PERIOD 3 ON	16:30	16:30	16:30	16:30
PERIOD 3 OFF	22:30	22:30	22:30	22:30

15.1.3 To Set Current Time & Day

1. Press and hold **CLOCK** button then press **DAY** button to select current day of the week.
2. Press and hold **CLOCK** button then press **HOUR** button until the correct hour is displayed.
3. Press and hold **CLOCK** button then press **MINUTE** button until the correct minute is displayed.

15.1.4 Select Operation Mode

Press CH SELECT / HW SELECT button to select operation mode to be **OFF, AUTO, ON.**

15.1.5 To Set Programme Period

Press and hold **DAY** button and press **MIN** until the correct programme period is displayed.

Set Day Programme Period 1 On/Off

<i>Switching</i>	Mon – Fri Time Schedule		Sat – Sun Time Schedule	
	CH/CH1	HW/CH2	CH/CH1	HW/CH2
PERIOD 1 ON	06:30	06:30	07:30	07:30
PERIOD 1 OFF	22:30	22:30	22:30	22:30

Set Day Programme Period 2 On/Off

<i>Switching</i>	Mon – Fri Time Schedule		Sat – Sun Time Schedule	
	CH/CH1	HW/CH2	CH/CH1	HW/CH2
PERIOD 1 ON	06:30	06:30	07:30	07:30
PERIOD 1 OFF	08:30	08:30	10:30	10:30
PERIOD 2 ON	16:30	16:30	16:30	16:30
PERIOD 2 OFF	22:30	22:30	22:30	22:30

Set Day Programme Period 3 On/Off

<i>Switching</i>	Mon – Fri Time Schedule		Sat – Sun Time Schedule	
	CH/CH1	HW/CH2	CH/CH1	HW/CH2
PERIOD 1 ON	06:30	06:30	07:30	07:30
PERIOD 1 OFF	08:30	08:30	10:30	10:30
PERIOD 2 ON	12:00	12:00	12:00	12:00
PERIOD 2 OFF	14:00	14:00	14:00	14:00
PERIOD 3 ON	16:30	16:30	16:30	16:30
PERIOD 3 OFF	22:30	22:30	22:30	22:30

15.1.6 Reviewing the Programmes

Press **TIMER** button each time to toggle through the **ON** and **OFF** settings.

15.1.7 To Change the Programme

1. Press **TIMER** key repeatedly until the particular **ON** or **OFF** time appears.
2. Press **HOUR** button and **MINUTE** button to set new **ON** or **OFF** time.

15.1.8 Mode Select

1. Press **SELECT** to toggle through **ON / AUTO / OFF** modes as indicated by the timer status.
2. **ON** mode turns on the timer.
3. **OFF** mode turns off the timer.
4. **AUTO** mode runs the set programme.

15.1.9 Manual Select

This function is only applicable when your timer is set on **AUTO** mode.

You can temporarily override the normal switching times by pressing the ADV key. The temporarily override won't affect the normal programme after execution of the override.

1. Press **CH ADV** or **HW ADV** key the CH icon or HW icon will flash.
2. In approximately 5 seconds the display CH select mode 'AUTO' or HW select mode 'AUTO' will flash and go into the manual override function.
3. OFF mode turns off the timer.
4. To cancel override by pressing **CH ADV** or **HW ADV** and the 'AUTO' will stop flash.

15.1.10 Manual Hour

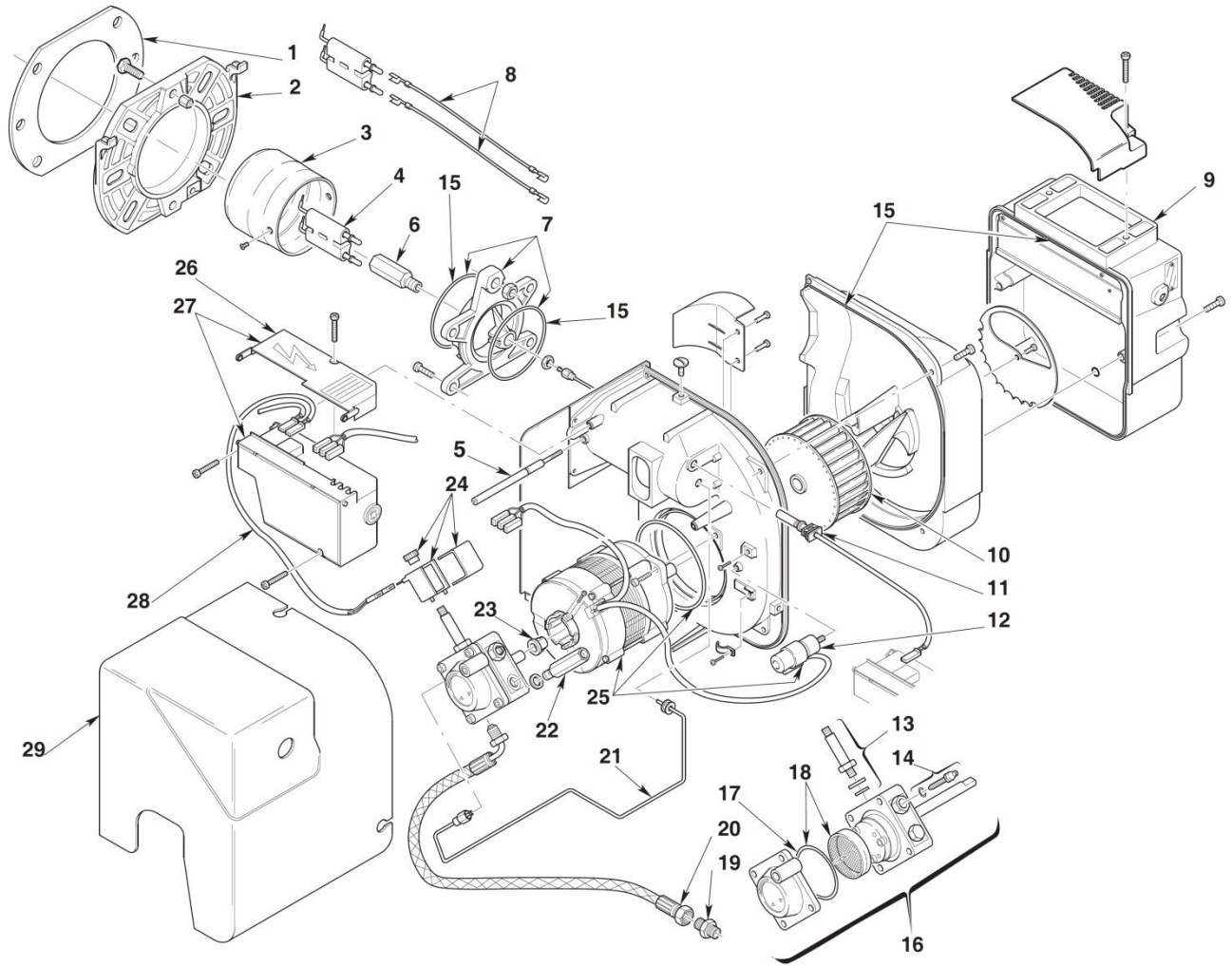
1. Press **CH ADV** or **HW ADV** key, the CH icon will flash.
2. You now have approx. 5 second to enter desired length of time by pressing **CH ADV** or **HW ADV** key once for each hour the new time set should be in effect.
3. The MANUAL HOUR function will bring the unit ON 1 hour to 3 hours in the OFF mode.
4. The MANUAL HOUR function will bring the unit OFF 1 hour to 3 hours in the ON mode.
5. The MANUAL HOUR function is in operation, a countdown clock will appear. Then normal display and countdown clock will appear on the LCD alternately.
6. The MANUAL HOUR function will bring the unit ON 1 hour to 3 hours in off, clock will count down immediately.
7. When MANUAL HOUR function will extend by 1 hour to 3 hours while ON, clock will count down after the programmed ON is finished.

15.1.11 Cancel Manual Hour Function

Press **CH ADV** or **HW ADV** button again the LCD display and switching status will return to normal.

16 SPARES

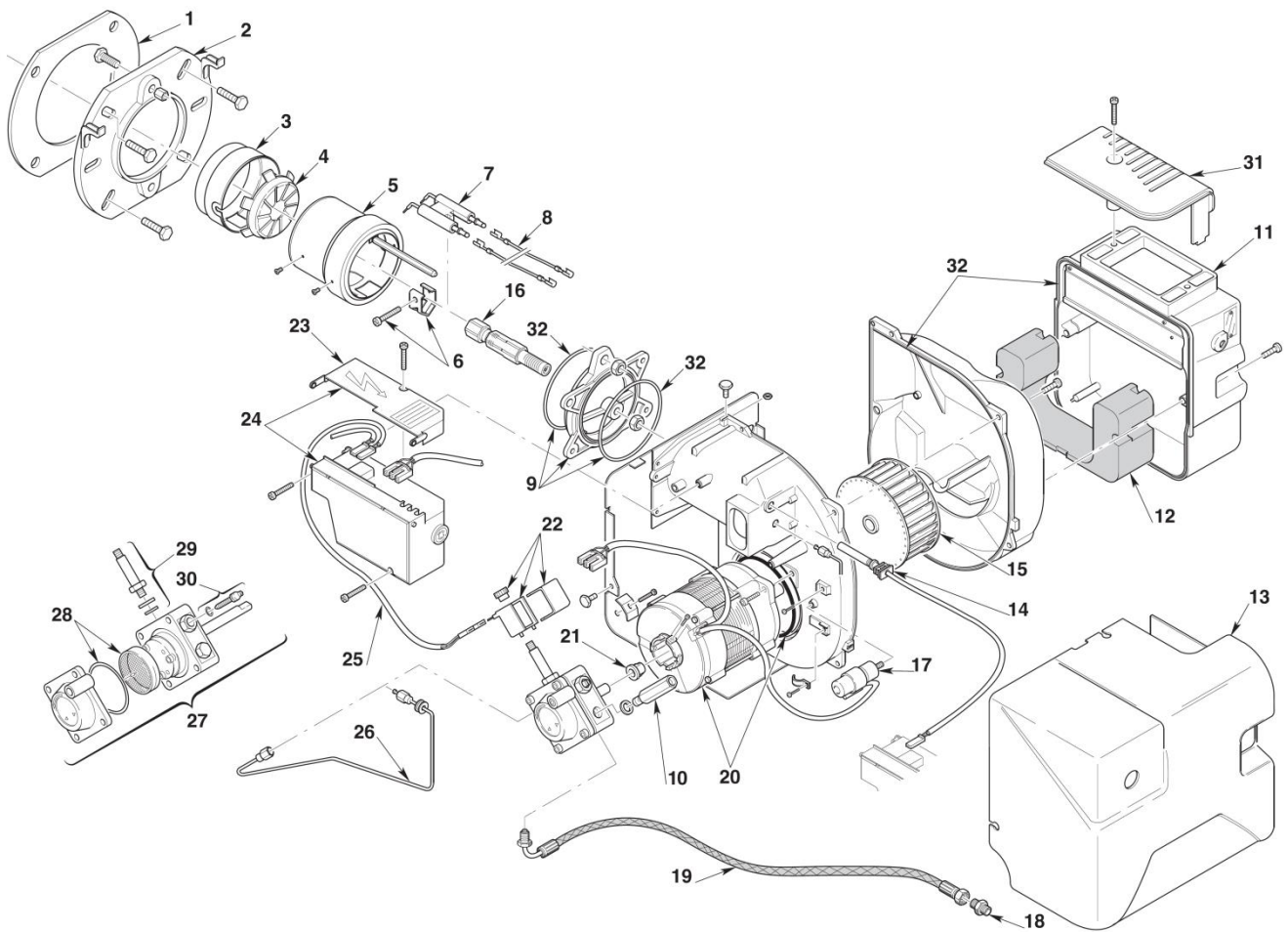
16.1 RDB 2.2 Spares



No	CODE	3514157	3514257	3514557	DESCRIPTION
1	3005787	•	•	•	Gasket
2	3006384	•	•	•	Flange
3	3020494	•			Cup-Shaped Head
3	3020258		•		Cup-Shaped Head
3	3020055			•	Cup-Shaped Head
4	3008860	•	•	•	Electrode Assembly
5	3008875	•	•	•	Screw
6	3008861	•	•	•	Nozzle Holder
7	3008862	•	•	•	Collar
8	3008794	•	•	•	High Voltage Lead
9	3008647	•	•		Air Damper Assembly
9	3008839			•	Air Damper Assembly
10	3005788	•	•	•	Fan
11	3008646	•	•	•	PE Cell
12	3002837	•	•	•	Capacitor 4.5µF
13	3007871	•	•	•	Needle Valve
14	20032135	•	•	•	Regulator

No	CODE	3514157	3514257	3514557	DESCRIPTION
15	3008878	•	•	•	Kit Seals
16	20030953	•	•	•	Pump
17	3007175	•	•	•	O-Ring
18	3020436	•	•	•	Filter O-Ring
19	3003602	•	•	•	Connector
20	3005720	•	•	•	Flexible Oil Line
21	3008644	•	•	•	Tube
22	3008876	•	•	•	Pressure Gauge
23	3000443	•	•	•	Joint
24	3008648	•	•	•	Coil-Shell & Knob
25	3002836	•	•	•	Motor & Capacitor
26	3008649	•	•	•	Protection
27	3008652	•	•	•	Control Box 535RSE/LD
28	3008851	•	•	•	Lead Coil
29	3008879	•	•	•	Cover

16.2 RDB 3.2 Spares

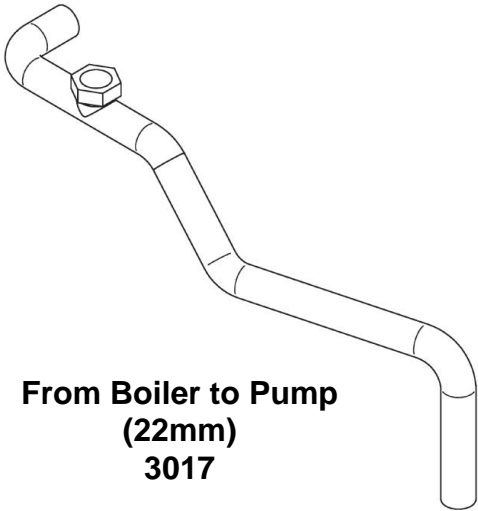


No	CODE	3748941	DESCRIPTION
1	3005795	•	Gasket
2	3008637	•	Flange
3	3005714	•	End Ring
4	3005713	•	Diffuser Disc
5	3007714	•	Blast Tube Assembly
6	3006552	•	Electrode Bracket
7	3007513	•	Electrode Assembly
8	3008794	•	High Voltage Lead
9	3008957	•	Collar
10	3008876	•	Pressure Gauge
11	3008839	•	Air Damper Assembly
12	3008958	•	Deadening
13	3008962	•	Cover
14	3008646	•	PE Cell
15	3005799	•	Fan
16	3008955	•	Nozzle Holder
17	3008960	•	Capacitor 5 μ F

No	CODE	3748941	DESCRIPTION
18	3003602	•	Connector
19	3005720	•	Flexible Oil Line
20	3008964	•	Motor
21	3000443	•	Joint
22	3008648	•	Coil-Shell & Knob
23	3008649	•	Protection
24	3008652	•	Control Box 535SE/LD
25	3008851	•	Lead Coil
26	3008961	•	Tube
27	20030953	•	Pump
28	3020436	•	Filter O-Ring
29	3007871	•	Needle Valve
30	20032135	•	Regulator
31	3008959	•	Air Intake
32	3008963	•	Kit Seals

16.3 Pipe Spares

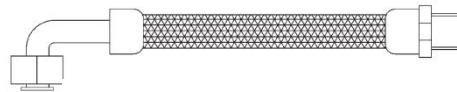
Utility Pumped & System Models –
UP70HE, UP90HE, UP120HE, US70HE, US90HE & US120HE



**From Boiler to Pump
(22mm)
3017**

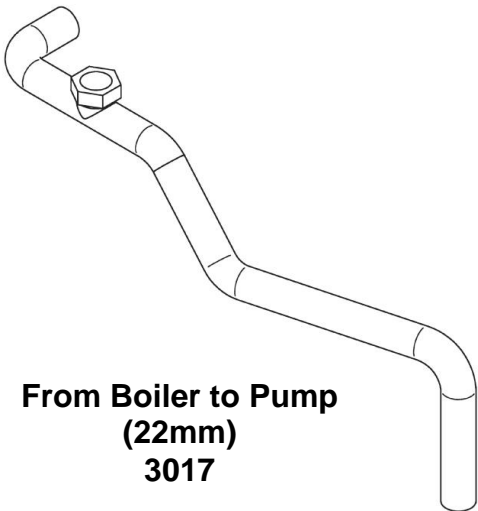


**Pump Flow Pipe
(22mm)
3015**



**Expansion Vessel
Pressure Hose
3020**

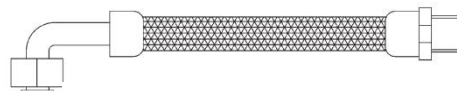
Kabin Pak Pumped & System Models –
KP70HE, KP90HE, KP120HE, KS70HE, KS90HE & KS120HE



**From Boiler to Pump
(22mm)
3017**

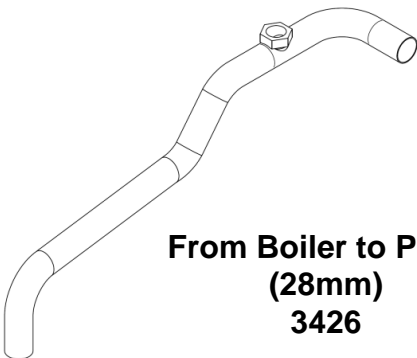


**Pump Flow Pipe
(22mm)
3015**

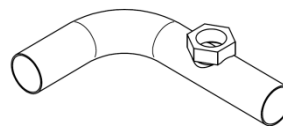


**Expansion Vessel
Pressure Hose
3020**

150HE Pumped Models – UP150HE & KP150HE



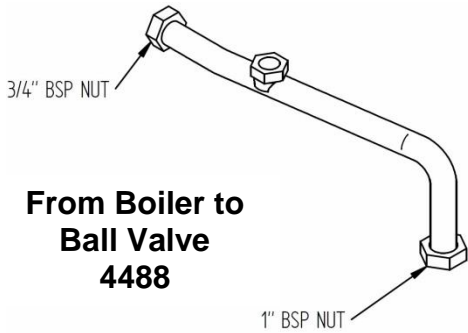
**From Boiler to Pump
(28mm)
3426**



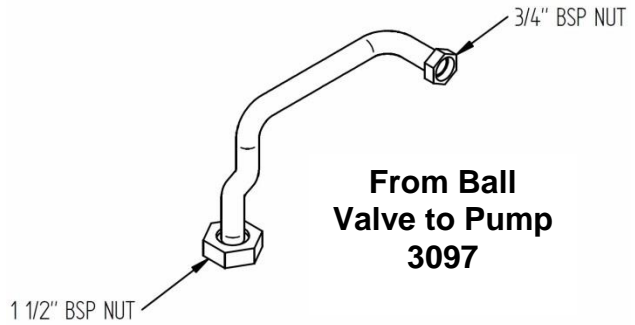
**Pump Flow Pipe
(28mm)
3425**

Pipe Spares cont'd

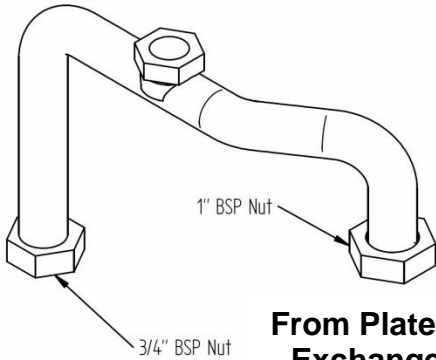
Utility and Kabin Pak Combi Models –
UC70HE, UC90HE, UC120HE, KC70HE, KC120HE & KC120HE



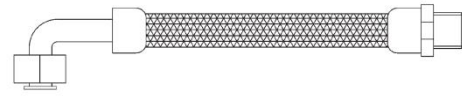
**From Boiler to Ball Valve
4488**



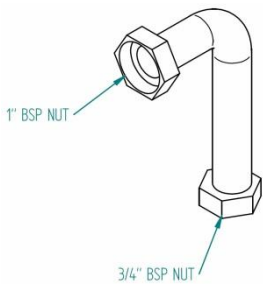
**From Ball Valve to Pump
3097**



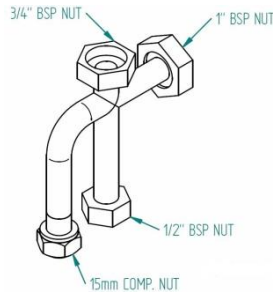
**From Plate Heat Exchanger to Boiler Return
3096**



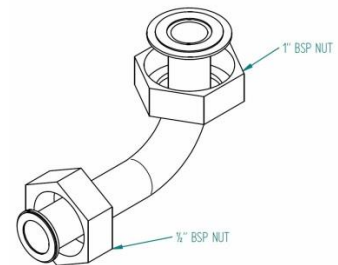
**Expansion Vessel Pressure Hose
3020**



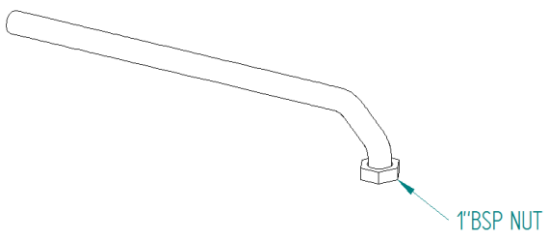
**From Heat Store to Plate Heat Exchanger
1997**



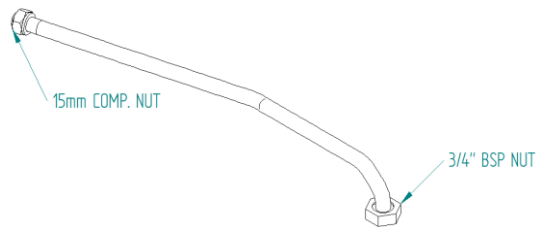
**From Flow Switch to Mixing Valve & Plate Heat Exchanger
1992**



**From Plate Heat Exchanger to Mixing Valve
1994**



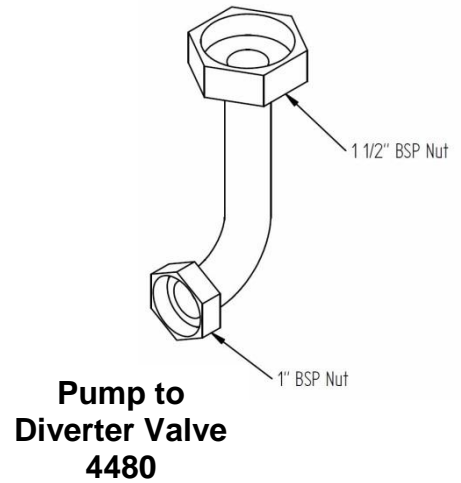
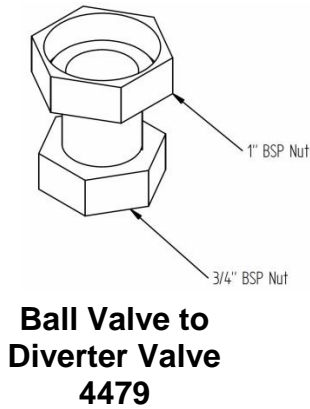
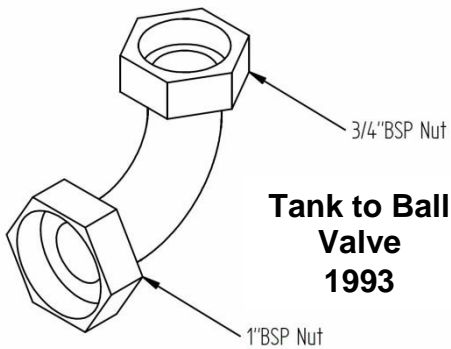
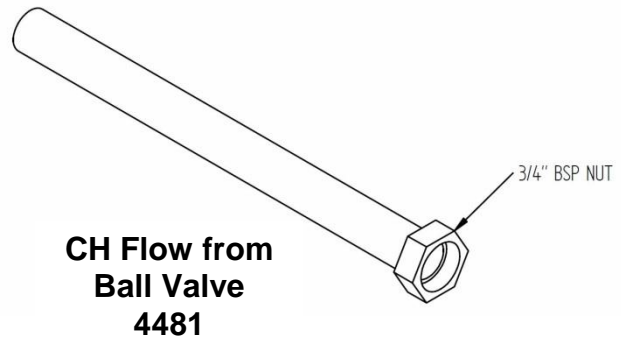
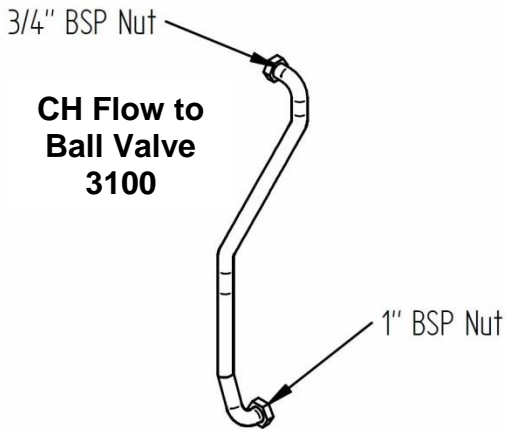
**DHW Flow from Mixing Valve
3101**



**From Strainer to Flow Switch
3099**

Pipe Spares cont'd

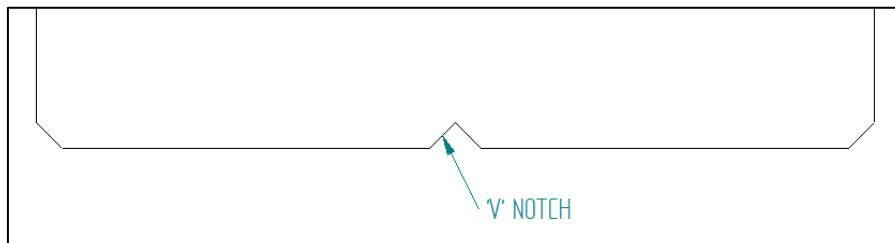
Utility and Kabin Pak Combi Models –
UC70HE, UC90HE, UC120HE, KC70HE, KC120HE & KC120HE



16.4 Replacement Baffles – from September 2016 Manufacture

For appliances with a date manufacture date during or after September 2016, the baffles have a V Notch in the burner facing edge for identification.

Do not attempt to fit baffles without this identification marker to appliances manufactured after this date.



16.4 Short Parts List – Boiler

Part Description	Code
Flow Switch	1476
Pressure Switch	3529
Tank & Boiler Control Thermostat	2131
Boiler Limit Thermostat	281
Tank Limit Thermostat	2126
Pump Overrun Thermostat	3108
Plate Heat Exchanger	599
Grundfos UPS2 Circulating Pump	4413
Auto Air Vent c/w Check Valve	614
Pressure Relief Valve	2132
Filling Loop	2133
Pressure Gauge	3019
Thermostatic Mixer Valve	1621
Eco Combi PCB	4491
12 Litre Pressure Vessel	2128
Flue Thermostat	3535
3 Port Valve Actuator	4496
Vulcanised Fibre washer ID 13mm x OD 18.85mm	631
Vulcanised Fibre washer ID 16mm x OD 24mm	630
Vulcanised Fibre washer ID 20mm x OD 30.5mm	4506
Vulcanised Fibre washer ID 32mm x OD 44.45mm	4505
O Ring ID11 x 2mm CS	4521
Dual-Safe Thermostat for Non-Combi Models	WDS2
Optional Programmer for Combi Models	PC1
Optional Programmer for Non-Combi Models	PU1

When ordering replacement casing panels it should be noted that due to the painting process there may be some variation in colour.

YOUR GUARANTEES, TERMS & CONDITIONS

1. Warmflow Guarantees

The boiler, including all controls, plate heat exchangers, pipework and unions, and associated equipment contained within the boiler casing, and the burner and flue system, if supplied by Warmflow, are guaranteed against defective parts and workmanship, providing the boiler is installed and commissioned in accordance with the instructions supplied with the boiler.

The period of guarantee will be 12 months from the date of installation in Northern Ireland and the Republic of Ireland. The period of guarantee in Great Britain will be 24 months from the date of installation.

NOTE: In Northern Ireland and the Republic of Ireland the period of guarantee can only be increased to 24 months through the purchase of an extended warranty.

The primary heat exchanger, secondary heat exchanger and thermal store (in the case of a combination boiler) is guaranteed against defective parts and workmanship for a total of 5 years from the appliance date code, provided the boiler is installed and commissioned in accordance with the instructions supplied with the boiler. This warranty will be a parts only warranty after expiry of the initial parts and labour warranty period, i.e. after 12 months in Northern Ireland and in the Republic of Ireland and after 24 months in Great Britain. This warranty is subject to a full service record with details of annual service logged in the OFTEC Boiler Passport.

Warmflow reserves the right to repair or replace components within the guarantee period at a time and location that is most convenient to the company.

2. Conditions of Guarantee

The boiler must be installed, commissioned and serviced in accordance with the installation instructions supplied with the boiler.

Additionally:

- The Boiler Passport must be fully completed and the commissioning certificate returned to Warmflow within 30 days from the date of

installation, and 90 days from the date code stamped on the appliance.

- The boiler must be installed and commissioned by a Warmflow or other competent engineer, who is OFTEC registered. Commissioning of the boiler must be completed immediately after the boiler is installed.
- The boiler must be serviced by a Warmflow or other competent engineer, who is OFTEC registered, 12 months after the date of installation and thereafter, at 12 monthly intervals.

Warmflow will accept no liability for the cost of repairs resulting from incorrect installation, inadequate commissioning, lack of regular maintenance, misuse, tampering or repair by unqualified persons.

All repairs must be authorised in writing by Warmflow prior to any work being carried out. Unauthorised claims are not covered by the guarantee.

Faults and any associated costs occurring due to lack of fuel, power, water supply, scale formation or corrosion are not covered by these guarantees.

If the boiler has not been installed within 3 months of the date of despatch from Warmflow, then the warranty will deem to have started.

Claims for consequential loss or damage are not covered by these guarantees.

In the event of a breakdown please contact your commissioning engineer who should then contact our service department whilst at your home, to report the fault.

The statutory rights of the customer are not affected by the guarantee.

NB: The nozzle, fuel lines and refractory items supplied with the boiler are deemed to be consumable items and are therefore excluded from the guarantee.

NOTE: Failure to complete & return the boiler passport at the time of installation will invalidate all guarantees.

17 END OF LIFE INFORMATION

Warmflow High Efficiency Condensing Boilers must be disposed of according to local regulations by using a public or private waste collection service.

17.1 Safety Risks

Prior to disassembly, the appliance should be electrically isolated and disconnected.

Any fluids within must be drained, and disposed of in-line with local regulations.

Care should be taken when handling the appliance due to weight, use appropriate PPE and lifting aids.

Glass fibre insulation – suitable PPE should be used for respiration protection, and to avoid skin or eye contact.

17.2 Disassembly of the Product

The main materials of the components are:

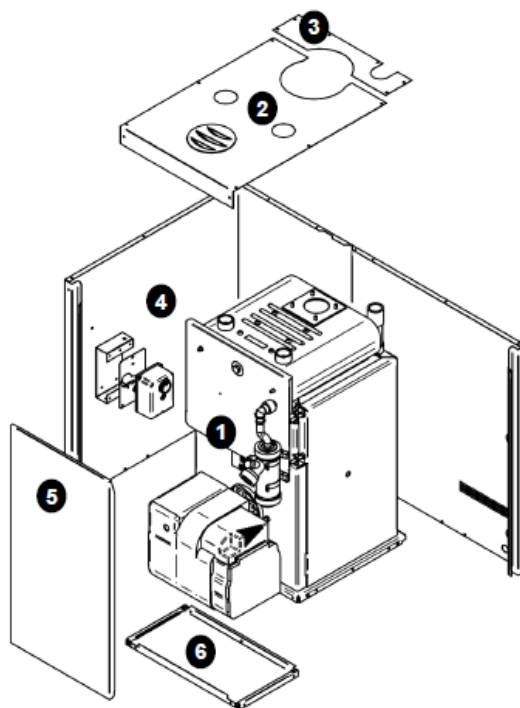
- Mild Steel
- Stainless Steel
- Copper
- Brass
- Ceramic Fibre
- Plastic components
- Electronic components

These may be recycled – depending on the local recycling facilities available.

The appliance assembly includes various mechanical fasteners and can be disassembled with standard tools.

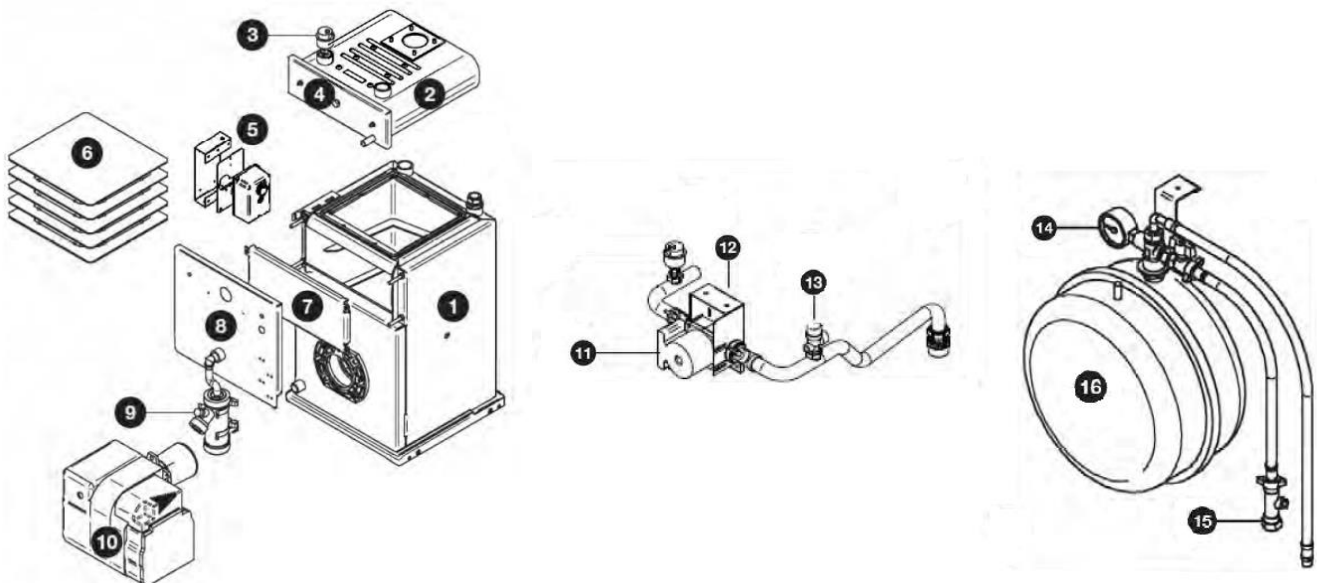
The components of a typical appliance including heat generator are shown below (not all components may be fitted, depending on appliance specification)

17.3 Casing and key components



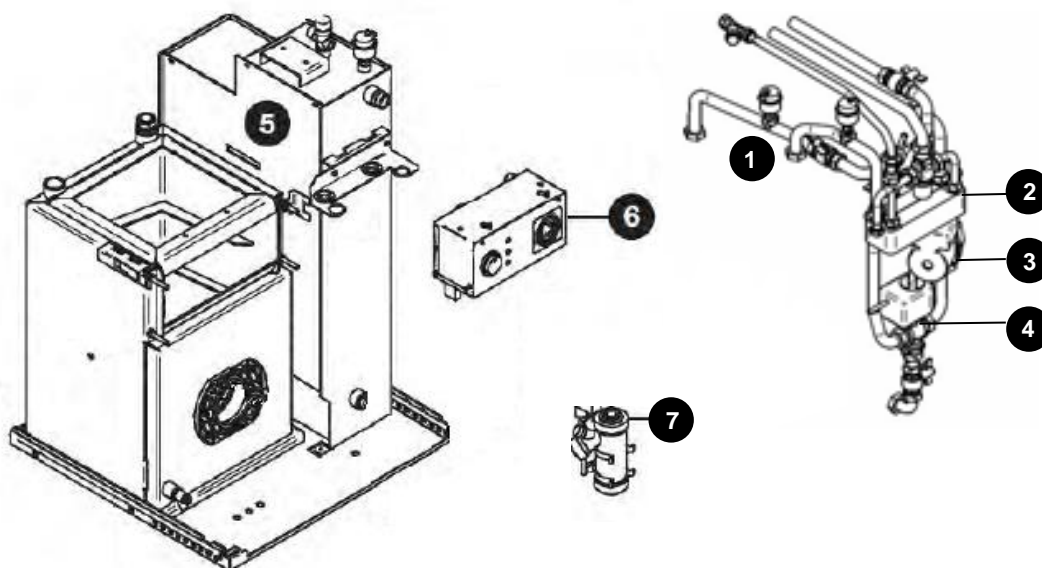
Item	Description	Main Materials	Special Notes
1	Boiler Assembly	Various	See Table Below
2	Top Front Casing	Galvanised Steel	
3	Top Rear Casing	Galvanised Steel	
4	Sides & Rear Casing	Galvanised Steel	
4	Insulation	Foil Backed Glass Fibre	Wear Appropriate PPE
5	Front Casing	Galvanised Steel	
6	Bottom Front Casing	Galvanised Steel	

17.4 Boiler Assembly



Item	Description	Main Materials	Special Notes
1	Heat Exchanger	Mild Steel	Welded Construction
2	Condensing Unit	Stainless Steel & Viton Seal	
3	Auto Air Vent	Brass	
4	Service Door	Stainless Steel & Natural Rubber	
5	Thermostat	Plastic, Copper, Electronic Components	
6	Heat Exchanger Baffles	Mild Steel	
7	Service Door	Mild Steel, Ceramic Fibre	Wear Appropriate PPE
8	Service Door Cover	Galvanised Steel	
9	Condensate Trap	Plastic	
10	Heat Generator	Various	Consult Manufacturer
11	Circulating Pump	Various	Consult Manufacturer
12	Circulating Pump Bracket	Galvanised Steel	
13	Relief Valve	Brass	
14	Pressure Gauge	Brass & Glass	
15	Valves and Flexible Pipework	EPDM, Stainless Steel, Brass	
16	Pressure Vessel	Mild Steel, Rubber	Consult Manufacturer

17.5 Additional information for Combi appliances



Item	Description	Main Materials	Special Notes
1	Pipework Assembly	Copper and Brass	
2	Plate Heat Exchanger	Brass and Stainless Steel	
3	Circulating pump	Various	Consult Manufacturer
4	Diverter Valve	Plastic, Brass, Electronic Components	
5	Heat Store	Mild Steel	Welded Construction
6	Control Box	Mild Steel, Plastic, Copper, Electronic Components	
7	Condensate Trap	Plastic	

Various other brackets, fasteners and components may be used, with up to 5% of appliance weight

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This manual is accurate at the date of printing (E&OE) but will be superseded and should be disregarded if specifications and/or appearances are changed in the interests of continued product improvement.

CODE 3307 ISSUE 6 AUG 2016
