ideal HEATING

INSTALLATION & SERVICING

INDEPENDENT HEAT
40 60 80 100 120 150
40P 60P 80P

When replacing any part on this appliance, use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by Ideal Heating.

For the very latest copy of literature for specification and maintenance practices visit our website idealheating.com where you can download the relevant information in PDF format.

01 / 2026
UIN 220455 A06

ERP DATA

	SYMBOL	**UNITS**	**40**	**40P**	**60**	**60P**
Condensing Boiler	n/a	n/a	yes	yes	yes	yes
Low Temperature Boiler	n/a	n/a	no	no	no	no
B1 Boiler	n/a	n/a	no	no	no	no
Cogeneration Space Heater	n/a	n/a	no	no	no	no
Equipped with a Supplementary Heater	n/a	n/a	no	no	no	no
Combination Heater	n/a	n/a	no	no	no	no
Nominal Heat Output for Space Heating						
Full Load	P_4	kW	40	40	60	60
Part Load	P_1	kW	13	13	19.5	19.5
Auxiliary Electricity Consumption						
Full Load	el_{max}	kW	0.138	0.138	0.082	0.082
Part Load	el_{min}	kW	0.029	0.029	0.0251	0.0251
Standby	P_{SB}	kW	0.003	0.003	0.003	0.003
Seasonal Space Heating Energy Efficiency						
Full Load	η_4	%	89.6	91.5	89.7	91.7
Part Load	η_1	%	97.8	99.5	97.9	99.7
Standby Loss	P_{stby}	kW	0.08	0.08	0.11	0.11
Ignition	P_{ign}	kW	0	0	0	0
Emissions	NO_x	mg/kWh	33.2	64.4	35.2	67.8
Annual Energy Consumption	Q_{HE}	GJ	124	121	186	182
Sound Power Level, Indoors	L_{WA}	dB	55.9	55.9	57.6	57.6

PRODUCT FICHE

INDEPENDENT HEAT BOILER
Ideal Heating
ERP DATA

	SYMBOL	UNITS				
			40	40P	60	60P
Condensing boiler			Yes			
Seasonal Space heating efficiency class			A			
Rated heat output		kW	40	40	60	60
Seasonal space heating energy efficiency	η_s	%	93*	93*	93*	93*
Annual energy consumption	Q_{HE}	GJ	124	121	186	182
Sound power level, indoors	L_{WA}	dB	55.9	55.9	57.6	57.6

Seasonal Space Heating Energy Efficiency of the Boiler								*%	**A**
Temperature control (from fiche of temperature control)								%	**B**
Class I	*Class II*	*Class III*	*Class IV*	*Class V*	*Class VI*	*Class VII*	*Class VIII*		
1%	*2%*	*1.5%*	*2%*	*3%*	*4%*	*3.5%*	*5%*		

Solar Contribution (from fiche of solar device)

Collector Size (in m^2) | Tank Volume (in m^3) | Collector Efficiency (in %) | Tank rating A* = 0.95, A = 0.91, B = 0.86, C = 0.83, D-G = 0.81

= (‘*III*’ x ☐ + ‘*IV*’ x ☐) x 0.9 x (☐ / 100 x ☐ = ☐ % **C**

Seasonal Space Heating Energy Efficiency of Package **TOTAL: A+B+C=** ☐ %

Seasonal Space Heating Energy Efficiency Class of Package

G	F	E	D	C	B	A	A+	A++	A+++
< 30%	≥ 30%	≥ 34%	≥ 36%	≥ 75%	≥ 82%	≥ 90%	≥ 98%	≥ 125%	≥ 150%

The energy efficiency of the package of products provided for in this document may not correspond to its actual energy efficiency once installed in a building, as the efficiency is influenced by further factors such as heat loss in the products in relation to the building size and its characteristics

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Table 1 Performance Data (Natural Gas & Propane (P))

Model			40	40P	60	60P	80	80P	100	120	150
Boiler Output (non-condensing) Mean 70°C	Max	kW	40	40	60	60	80	80	100	120	150
	Min	kW	8	8	12	12	16	16	20	24	30
Boiler Output (condensing) Mean 40°C	Max	kW	42	41.2	63.5	62.1	84.4	82.6	103.9	124.7	158
	Min	kW	8.5	8.3	12.7	12.4	17.2	16.8	21.6	26.0	32.5
Boiler Input Max Rate	Nett	kW	40.5	40.5	60.8	60.7	82	81.9	102.4	122.9	153.7
	Gross	kW	44.9	44	67.4	66	90.9	88.9	113.6	136.4	170.5
Boiler Input Min Rate	Nett	kW	8.1	8.1	12.2	12	16.4	16.2	20.5	24.6	30.7
	Gross	kW	9	8.8	13.5	13.1	18.2	17.5	22.7	27.3	34.1
Gas Rate	Max Rate	m^3/hr	4.3	1.69	6.4	2.53	8.7	3.41	10.8	13	16.2
Flue Gas Flow Rate	Max Rate	m^3/hr	54.05	61.68	80.65	88.66	110.1	121.57	140.5	173.33	210.7
CO_2 (±0.5%) *	Max Rate	%	10.2	11.2	9.4	11.4	9.3	11.4	9.4	9.6	9.4
	Min Rate	%	8.6	9.7	8.6	10.2	8.7	10.8	8.6	9.0	8.5
DB			57.7	57.7	59	59	59.9	59.9	62	62	59
NO_x (gross)	weighted	mg/kWh	33.2	64.4	35.2	67.8	34.9	63.3	34.8	36.2	35.7
Efficiency	Seasonal	%	96.2	96.7	96.4	96.9	97.2	97.7	96.7	96.6	96.7
	**SEDBUK 2009	%	89.3	90.3	89.4	90.5	n/a	n/a	n/a	n/a	n/a
Max. operating temp sealed sys.		ºC	85								
Max. operating temp open vented sys.		ºC	82								

*CO_2 measurements taken using controlled reference natural gas. Readings on mains gas quality may vary

*** The value is used in the UK Government's Standard Assessment Procedure (SAP) for energy ratings of dwellings. The test data from which it has been calculated have been certified by a notified body.*

Table 2 General Data

Model		40	40P	60	60P	80	80P	100	120	150
Gas Supply		2H – G20 – 20mbar / 3P - G31 - 37mbar								
Gas Supply Connection		G ¾								
Flow Connection		G 1¼								
Return Connection		G1¼								
Max Pressure (sealed sys)	Bar (psi)	6.0 (87)								
Maximum Static Head	m	61.0								
Electricity Supply		230V - 50Hz								
Fuse Rating	A	4.0								
Power Consumption	W	138		82		149		187	243	240
IP Rating		IPX4D								
Nominal flue dia - Concent.		80/125						100/150		
Condensate Drain	mm	25								
Water Content	L	3.0		5.0				7.0		9.2
Packaged	Kg	53.5		63.5				80		88
Unpackaged (dry weight)	Kg	47.5		57.5				73		81

Note.

Natural gas consumption is calculated using a calorific value of 37.8MJ/m^3 (1038Btu/ft^3) gross or 34 MJ/m^3 (910 Btu/ft^3) nett at 15°C and 1013.25 mbar.

a. *For l/s divide the gross heat input (kW) by the gross C.V. of the gas (MJ/m^3)*

b. *For ft/h^3 divide the gross heat input (Btu/h) by the gross C.V. of the gas (Btu/ft^3).*

c. *For m^3/h multiply l/s by 3.6.*

d. *1kW = 3412 BTU/hr.*

e. *1m^3 = 35.3ft^3*

f. *1mg/kWh (NOx) = 0.568 ppm DAF (natural gas).*

Propane gas consumption is calculated using a calorific value of 95.7 MJ/m^3 (2500 Btu/ft.^{3}) gross or 88.0 MJ/m^3 (2300 Btu/ft.^{3}) net at 15°C and 1013.25 mbar.

To obtain the fuel consumption in liquid form divide the above figures by 270.

HEALTH & SAFETY DOCUMENT NO. 635

The electricity at work regulations, 1989. The manufacturer's notes must NOT be taken, in any way, as overriding statutory obligations.

IMPORTANT. These appliances are CE certified for safety and performance. It is, therefore, important that no external control devices, e.g. flue dampers, economisers etc., are directly connected to these appliances unless covered by these Installation and Servicing Instructions or as otherwise recommended by Ideal Heating in writing. If in doubt please enquire.

Any direct connection of a control device not approved by Ideal Heating could invalidate the certification and the normal appliance warranty. It could also infringe the Gas Safety Regulations and the above regulations.

Independent Heat

40, 60, 80, 100, 120, & 150

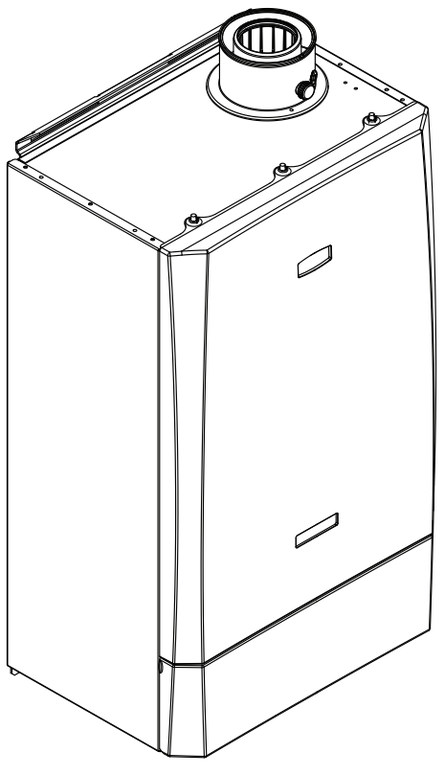
40P, 60P, 80P

Natural Gas & Propane

Destination Countries: GB, IE

CE No. 696943

Boiler size	G.C. Appliance No. (Benchmark No.)
40	41-796-70
60	41-796-71
80	41-796-72
100	41-796-73
120	41-796-74
150	41-796-75
40P	41-796-76
60P	41-796-77
80P	41-796-78



Key to symbols

IE = Ireland, GB = United Kingdom (Countries of destination)

PMS = Maximum operating pressure of water

C13 C33 C53 = A room sealed appliance designed for connection via ducts to a horizontal or vertical terminal, which admits fresh air to the burner and discharges the products of combustion to the outside through orifices which, in this case, are concentric. The fan is up stream of the combustion chamber. ***Note: Room Sealed Flues must be used.***

B23 = An appliance intended to be connected to a flue which evacuates the products of combustion to the outside of the room containing the boiler. The combustion air is drawn directly from the room. The fan is up stream of the combustion chamber. ***Note: Air Inlet Kit must be used.***

II2H3P = An appliance designed for use on 2nd or 3rd family gases, Group H or P.

NOTE TO THE INSTALLER: LEAVE THESE INSTRUCTIONS ADJACENT TO THE GAS METER.

1. GENERAL

1.1 INTRODUCTION

The boilers are fully automatically controlled, wall mounted, fanned, super efficient condensing appliances.

The condensing boilers can be installed either on the wall or into a prefabricated floor mounted frame.

The boilers are suitable for use with a room sealed flue or open flue application.

Through a sophisticated control system combined with premix burner arrangement the boilers are capable of high seasonal efficiencies of >96% and low emissions.

These boilers are fitted with an integral flue non-return valve which negates the fitting of same in shared flue (B23) systems.

These boilers are certified to meet the requirements of the EC Gas Appliance Directive, Boiler Efficiency Directive, EMC and Low Voltage Directive.

Note. *These boilers cannot be used on systems that include gravity circulation.*

The boiler are suitable for connection to fully pumped, open vented or sealed water systems. Adequate arrangements for completely draining the system by provision of drain cocks MUST be provided in the installation pipework.

1.2 OPTIONAL EXTRA KITS

- External Vertical Terminal Extension Kit 80/125
- External Vertical Terminal Extension Kit 100/150
- Vertical Roof Flue Kit 80/125
- Vertical Roof Flue Kit 100/150
- Horizontal Wall Flue Kit 80/125
- Horizontal Wall Flue Kit 100/150
- Open Flue Kit 80
- Open Flue Kit 100
- Cascade Flue Kit
- Plume kit
- Pitched and flat weather collars
- 90º Extended Elbow 80/125 Single
- 90º Extended Elbow 100/150 Single
- Expander 80/125 - 100/150

System

- Frame and Header Kits & accessories
- Pump kits

Controls

- Outside temperature sensor
- DHW tank sensor/Flow sensor/Header sensor. Pocket version
- DHW tank sensor/Flow sensor/Header sensor. Strap-on version
- Room temperature sensor
- OpenTherm room control
- 0-10V Pump control kit
- Safety interlock kit
- Cascade, first boiler
- Cascade, subsequent boiler
- Extension module
- Modulating sequencer kit
- Sequencer, OpenTherm room control
- 6 relay zone expansion kit
- Sequencer and zone expansion pocket sensor, DHW or flow temp
- RDG, remote diagnostic gateway
- OpenTherm to Modbus gateway
- OpenTherm to BACnet gateway
- OpenTherm to LONworks gateway
- OpenTherm to KNX gateway

Fuel

- Propane to Natural Gas Conversion Kit
  Please note propane variants of the boiler are Cat II_{2H3P} (20/37) and may be converted to natural gas operation only using the approved conversion kit. Natural gas variants of the Boiler are Cat I_{2H} and cannot be converted to propane operation.

1.3 SAFETY

Current Gas Safety (Installation and Use) Regulations or rules in force

The appliance is suitable only for installation in GB and IE and should be installed in accordance with the rules in force.

In GB, the installation must be carried out by a suitably qualified Gas Safe registered engineer or in IE by a competent person. It must be carried out in accordance with the relevant requirements of the:

- Gas Safety (Installation and Use) Regulations
- The appropriate Building Regulations either The Building Regulations, The Building Regulations (Scotland), Building Regulations (Northern Ireland).
- The Water Fittings Regulations or Water byelaws in Scotland.
- The Current I.E.T. Wiring Regulations.

Where no specific instructions are given, reference should be made to the relevant British Standard Code of Practice.

In IE, the installation must be carried out by a Competent Person and installed in accordance with the current edition of I.S.813 “Domestic Gas Installations” or I.S. 820 “Non-Domestic Gas Installations” as appropriate, the current Building Regulations and reference should be made to the current ETCI rules for electrical installation.

The Boiler boilers have been tested and certified to;

BSEN 15502-1, BSEN 15502-2, BSEN 15502-2-1, BSEN 60335-1, BSEN 60335-1, BSEN 60335-2-102, BSEN 55014-1 and BSEN 55014-2 for use with Natural Gas & Propane.

Detailed recommendations are contained in the following Codes of Practice:

BSEN 60529	IPX4D using test method: Figure 4 - *Test device to verify protection against spraying and splashing water; second characteristic numerals 3 and 4 (oscillating tube)*.
BS. 6891	Installation of low pressure gas pipework of up to 28mm (R1) in domestic premises (2nd family gas).
BS. 5440	Inst. and maintenance of flues and ventilation for gas appliances of rated input not exceeding 70kW net (1st, 2nd and 3rd family gases).
Part 1	Specification for installation of flues.
Part 2	Specification for installation and maintenance of ventilation for gas appliances.
BS. 6644 : 2011	Installation of gas fired hot water boilers of rated inputs between 70kW and 1.8MW (net) (2nd and 3rd family gases).
BS. 6798	Installation and maintenance of gas fired hot water boilers of rated input not exceeding 70kW net.
BS. 6880	Low temperature hot water heating systems of output greater than 45kW.
Part 1	Fundamental and design considerations.
Part 2	Selection of equipment.
Part 3	Installation, commissioning and maintenance.
BSEN.12828:2012	Heating Systems in buildings: Design for water based systems.
BSEN.12831:2017	Heating Systems in buildings: Method for calculation of the design heat load.
BSEN.13831	Specification for: Expansion vessels using an internal diaphragm, for sealed hot water heating systems.
BSEN.14336:2004	Heating Systems in buildings: Installation and commissioning of water based heating systems.
IGEM/UP/1	Soundness testing and purging of industrial and commercial gas installation.

IGEM/UP/2	Gas installation pipework, boosters and compressors on industrial and commercial premises.
IGEM/UP/10	Installation of gas appliances in industrial and commercial premises.
ICOM	Water treatment and conditioning of commercial heating systems guide.

Where reference is made throughout these instructions I.S.813:2002 “Domestic Gas Installations” reference should also be made to I.S.820:2000 “Non-Domestic Gas Installations” as applicable.

1.4 SAFE HANDLING

This boiler will require 2 or more operatives to move it to its installation site, remove it from its packaging base and during movement into its installation location. Manoeuvring the boiler may include the use of a sack truck and involve lifting, pushing and pulling.
Caution should be exercised during these operations.
Operatives should be knowledgeable in handling techniques when performing these tasks and the following precautions should be considered:

- Grip the boiler at the base.
- Be physically capable.
- Use personal protective equipment as appropriate, e.g. gloves, safety footwear.

During all manoeuvres and handling actions, every attempt should be made to ensure the following unless unavoidable and/ or the weight is light.

- Keep back straight.
- Avoid twisting at the waist.
- Avoid upper body/top heavy bending.
- Always grip with the palm of the hand.
- Use designated hand holds.
- Keep load as close to the body as possible.
- Always use assistance if required.

1.5 SAFE HANDLING OF SUBSTANCES

No asbestos, mercury or CFCs are included in any part of the boiler or its manufacture.

1.6 LOCATION OF BOILER

The boiler must be installed on a flat and vertical wall capable of adequately supporting the weight of the boiler and any ancillary equipment or on a boiler frame supplied in kit form.

The wall must be 90º (±5º) from the perpendicular. This is to allow safe operation of the integral flue non return valve.

The boiler must not be fitted outside.

1.7 GAS SUPPLY

The local gas supplier should be consulted, at the installation planning stage, in order to establish the availability of an adequate supply of gas. An existing service pipe must NOT be used without prior consultation with the local gas supplier.

A gas meter can only be connected by the local gas supplier or by a suitably qualified Gas Safe registered engineer or in IE by a competent person.

An existing meter should be checked, preferably by the gas supplier, to ensure that the meter is adequate to deal with the rate of gas supply required. A minimum working gas pressure of 17.5mbar MUST be available at the boiler inlet for Natural gas and 32mbar for Propane.

Do not use pipes of smaller size than the boiler inlet gas connection.

The complete installation MUST be tested for gas soundness and purged in accordance with the appropriate standards listed on page 8.

1.8 FLUE INSTALLATION

DANGER; ONLY USE IDEAL ROOM SEALED FLUE GAS SYSTEMS. THE BOILER CE MARK IS VALID ONLY IF THE APPLIANCE IS OPERATED WITH IDEAL ROOM SEALED FLUE KITS. OTHER FLUE SYSTEMS ARE NOT TESTED WITH THIS APPLIANCE.

DANGER; ONLY USE OPEN FLUE GAS SYSTEMS WHERE THE BOILER AIR INLET KIT IS USED. THE BOILER CE MARK IS VALID ONLY IF THE APPLIANCE IS OPERATED WITH THE IDEAL AIR INLET KIT.

The flue kits are suitable for use with this boiler range only.

These kits and the associated options are suitable for both roof and wall mounting applications.

The roof flue kits are suitable for both flat and pitched roof termination, using either concentric or flue only terminals.

All flue options are connected using the flue adaptor fitted to the boiler at the time of manufacture.

Additional information covering the selection and installation can be found with this booklet.

Weather Proofing

Where the flue passes through the roof line an adequate seal must be made. This can be achieved by using either:

- Flat weather collar
- Pitched weather collar

Flue duct extension kits are available for concentric flue configuration. These packs contain additional 1 metre ducts and may be cut to the desired length.

Flue duct extension kits are available for open flue configurations. These packs contain 2 x 1 metre ducts and may be cut to the desired length.

If obstructions prevent direct flue routing then both 90º and 45º elbows can be provided to offset the flue system.

Terminal Position

Due to the high efficiency of the boilers pluming will occur.
For this reason, vertical termination is recommended, and in any case, terminal positions which could cause problems should where possible be avoided. Particular care should be taken in the case of large multiple boiler installations, and complying with the requirements of the Clean Air Act.

IMPORTANT

It is the responsibility of the installer to ensure, in practice, that products of combustion discharging from the terminal cannot re-enter the building or any other adjacent building through ventilators, windows, doors, other sources of natural air infiltration, or forced ventilation / air conditioning.

If this should occur the appliance MUST be turned OFF, labelled as ‘unsafe’ and corrective action taken.

Where the lowest part of the terminal is fitted less than 2m above a balcony, above ground or above a flat roof to which people have access then the terminal MUST be protected by a purpose designed guard. The minimum spacing between the balcony and the terminal should be 75mm, in order to allow a terminal guard to be fitted.

Terminal guards are available from boiler suppliers - for all requirements contact:

TFC Group
www.tfc-group.co.uk
Tel: +44 (0) 1732 351 680

Ensure that the guard is fitted centrally.

The air inlet/products outlet duct and the terminal of the boiler MUST NOT be closer than 25mm to combustible material. Detailed recommendations on the protection of combustible material are given in BS. 5440-1: 2008. In IE refer to I.S.813:2002.

The flue must be installed in accordance with Building Regulations and the recommendations of BS. 5440-1:2008 for inputs up to 70kW nett. For larger installation BS. 6644 should be complied with. In IE refer to I.S.820:2000.

1.9 WATER CIRCULATION SYSTEM

The system pump MUST be connected to the boiler, see below.

The boiler must NOT be used for direct hot water supply. The hot water storage cylinder MUST be of the indirect type.

Single feed, indirect cylinders are not recommended and MUST NOT be used on sealed systems.

The appliances are NOT suitable for gravity central heating nor are they suitable for the provision of gravity domestic hot water.

The hot water cylinder and ancillary pipework, not forming part of the useful heating surface, should be lagged to prevent heat loss and any possible freezing - particularly where pipes run through roof spaces and ventilated underfloor spaces.

The boiler must be vented.

Draining taps MUST be located in accessible positions, which permit the draining of the whole system - including the boiler and hot water storage vessel. They should be at least 1/2" BSP nominal size and be in accordance with BS. 2879.

The central heating system should be in accordance with the relevant standards listed on page 8.

Due to the compact nature of the boiler the heat stored within the castings at the point of shutdown of the burner must be dissipated into the water circuit in order to avoid overheating. In order to allow pump operation after burner shutdown the boiler control box incorporates a 4 minute pump overrun facility. In order to make use of this, the pump must be supplied from the terminals inside the boiler. Note: for pumps requiring a current greater than 1.3 amps inductive, they must be connected via a relay.

When sizing pumps, reference should be made to the table below which show the boiler resistance against flow rates, to achieve the required temperature differential.

Flow rates for common systems using either 11ºC, 15ºC, 20ºC, 25ºC and 30ºC temperature differentials and hydraulic resistances are given in the table below

	Flowrate (l/min)					Hydraulic Resistance (mbar)				
	11ºC	15ºC	20ºC	25ºC	30ºC	11ºC	15ºC	20ºC	25ºC	30ºC
40/40P	52.1	38.2	28.7	23.9	19.1	875	405	225	163	100
60/60P	78.2	57.3	43	35.9	28.7	435	180	83	57	30
80/80P	104.2	76.4	57.3	47.8	38.2	750	420	180	125	70
100	*	95.6	71.7	59.8	47.8	*	315	134	97	60
120	*	*	86	71.7	57.3	*	*	218	149	80
150	*	*	107.5	89.6	71.7	*	*	230	158	85

* Not recommended due to excessive flowrates which may cause erosion of the casting.

Note.

- *With the boiler firing at maximum rate, the temperature differential should not be less than figures quoted in table above. High flow rates required for lower temperature differentials could lead to erosion of the heat exchanger water ways.*
- *With the boiler firing at minimum rate, the temperature differential should not be greater than 35ºC. Lower flow rates generating higher temperature differentials will lead to lock out of the boiler.*
- *The lower the return temperature to the boiler, the higher the efficiency.*

In installations where all radiators have been provided with thermostatic radiator valves, it is essential that water circulation through the boiler is guaranteed. This can be best achieved by means of a differential pressure valve, which is installed in a bypass between the flow and return pipes. The bypass should be fitted at least 6m from the boiler, and should use a minimum size of 28mm pipe. The bypass should be capable of allowing a minimum flow rate to achieve a temperature differential of no greater than 35ºC at minimum rate.

1.10 WATER TREATMENT

These boilers incorporate an ALUMINIUM heat exchanger.

IMPORTANT. The application of any other treatment to this product may render the warrnaty of Ideal Heating INVALID.

Ideal Heating recommend Water Treatment in accordance with Guidance Notes on Water Treatment in Central Heating Systems.

If water treatment is used Ideal Heating recommend only the use of SCALEMASTER SM-1 PRO, FERNOX, MBI, ADEY MC1, SENTINEL X100 or CALMAG CM100 inhibitors and associated water treatment products, which must be used in accordance with the manufacturers' instructions.

For further information contact:

Fernox
www.fernox.com
Tel: +44 (0) 3301 007750

Sentinel Performance Solutions
www.sentinelprotects.com
Tel: +44 (0) 1928 704330

Scalemaster Water Treatment Products
www.scalemaster.co.uk
Tel: +44 (0) 1785 811636

Calmag Ltd.
www.calmagltd.com
Tel: +44 (0) 1535 210320

Adey
www.adey.com
Tel: +44 (0) 1242 546700

Notes.

1. It is most important that the correct concentration of the water treatment products is maintained in accordance with the manufacturers' instructions.
2. If the boiler is installed in an existing system any unsuitable additives MUST be removed by thorough cleansing.
3. In hard water areas, treatment to prevent lime scale may be necessary - however the use of artificially softened water is NOT permitted.
4. Under no circumstances should the boiler be fired before the system has been thoroughly flushed.

1.11 ELECTRICAL SUPPLY

Wiring external to the appliance MUST be in accordance with the current I.E.T. (BS7671) Wiring Regulations and any local regulations which apply. For Ireland reference should be made to the current ETCI rules for electrical installations

The point of connection to the mains should be readily accessible and adjacent to the boiler.

1.12 CONDENSATE DRAIN

Refer to Section 2.19

A condensate drain is provided on the boiler. This drain must be connected to a drainage point on site. All pipework and fittings in the condensate drainage system MUST be made of plastic - *no other materials may be used.*

IMPORTANT.

Installation must be in accordance with BS 6798.

The drain outlet on the boiler is sized for standard 21.5mm overflow pipe. It is a universal fitting to allow use of different brands of pipework.

1.13 BOILER CLEARANCES AND CONNECTIONS

The following minimum clearances must be maintained for operation and servicing.

Front of boiler - 450mm

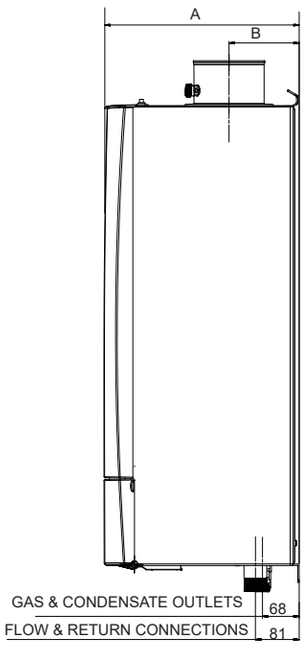
Sides of boiler - 25mm

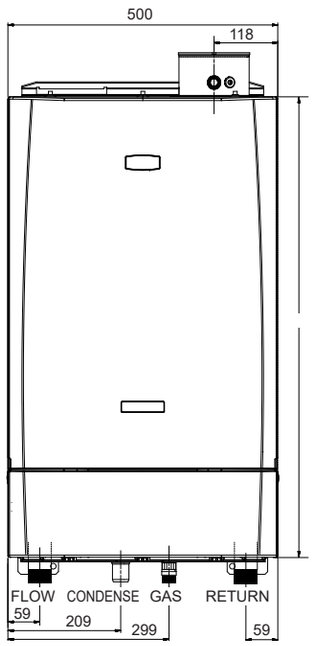
Above boiler - dependent upon the flue system see drawings

Below boiler - 300mm

Clearance between multiple boiler installations - 25mm

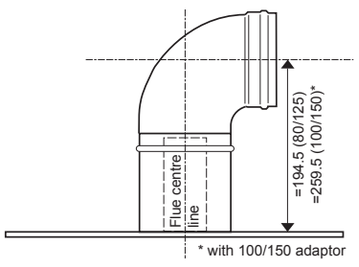
Boiler	Dim. A	Dim. B
40, 60, 80	360	130
100, 120	520	226
150	610	233





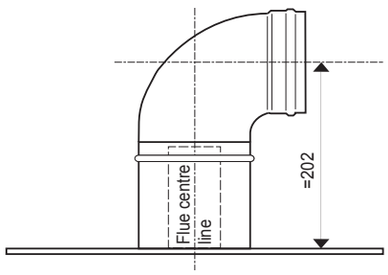
80/125 CONCENTRIC FLUE CONNECTOR

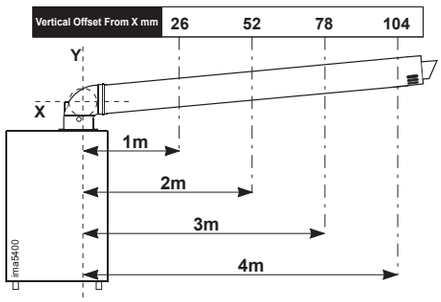
40, 60 & 80
Minimum boiler top clearances:
for vertical flue 200mm
for horizontal flue 350mm (415mm for 100/150)
for open flue 350mm



100/150 CONCENTRIC FLUE CONNECTOR

100, 120 & 150
Minimum boiler top clearances:
for vertical flue 200mm
for horizontal flue 370mm
for open flue 350mm

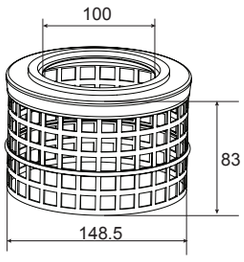




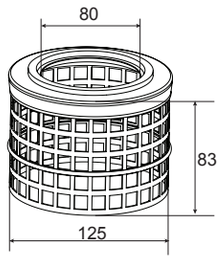
Distance from flue centre line (Y) to outside wall surface.

For lengths greater than 4m, increase offset (X) by 26mm for every additional 1m.

OPEN FLUE KIT 100 / 150



OPEN FLUE KIT 80 / 125



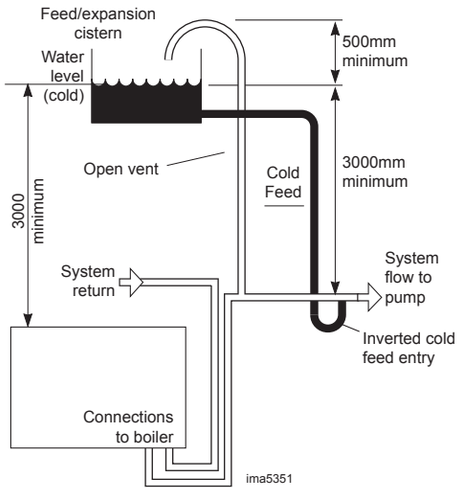
1.14 OPEN VENTED SYSTEM REQUIREMENTS

Detail reference should be made to the appropriate standards listed on page 8.

The information and guidance given below is not intended to override any requirements of the above publications or the requirements of the local authority, gas or water undertakings.

The vertical distance between the pump and feed/expansion cistern MUST comply with the pump manufacturer's minimum requirements, to avoid cavitation. Should these conditions not apply either lower the pump position or raise the cistern above the minimum requirement specified by Ideal Heating. The isolation valves should be fitted as close to the pump as possible.

The boiler is fitted with an automatic air vent, located in the left top side of the interior. This air vent must never be shut off, as this could result in dry firing of the boiler and subsequent damage to the heat exchanger.



1.15 SEALED SYSTEM REQUIREMENTS

Note. *The method of filling, refilling, topping up or flushing sealed primary hot water circuit from the mains for a non-domestic property is shown below.*

1. General

a. Detail reference should be made to the appropriate standards listed on page 8. The information and guidance given below is not intended to override any requirements of these publications or the requirements of the local authority, gas or water undertakings.

b. The installation should be capable of working with flow temperatures of up to 90°C and a temperature differential of up to 35°C at minimum rate only.

c. All components of the system, including the heat exchanger of the indirect cylinder, must be suitable for a working pressure of 6 bar (87lbf/in^2) and temperature of 110°C. Care should be taken in making all connections so that the risk of leakage is minimised.

d. The boiler is fitted with an automatic air vent, located in the left top side of the interior. This air vent must never be shut off, as this could result in dry firing of the boiler and subsequent damage to the heat exchanger.

e. Suitable isolation valves and drain points must be provided by the installer.

2. Safety Valve

A spring loaded safety valve complying with the relevant requirements of BS. 6759 Pt. 1 must be fitted in the flow pipe as close to the boiler as possible and with no intervening valve or restriction. The valve should have the following features:

a. A non-adjustable preset lift pressure not exceeding 6 bar (87lbf/in^2).

b. A manual testing device.

c. Provision for connection of a discharge pipe. The valve or discharge pipe should be positioned so that the discharge of water or steam is visible, but will not cause hazard to user or plant.

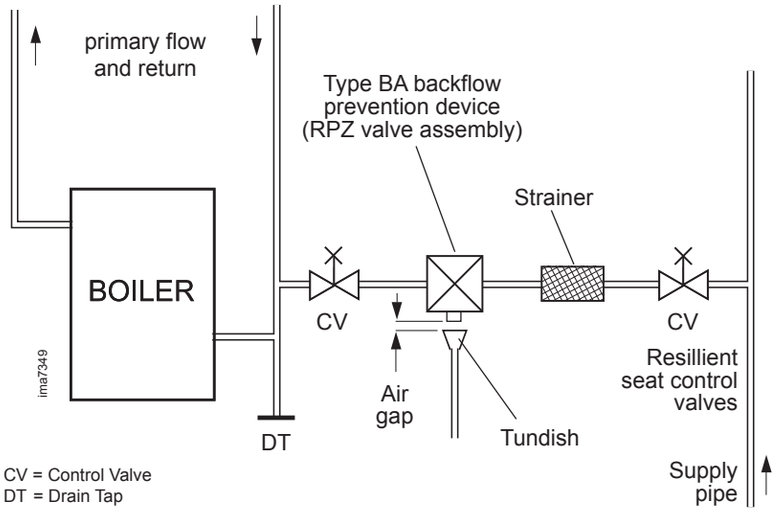
3. Pressure Gauge

A pressure gauge covering at least the range 0-6 bar must be fitted to the system. The gauge should be easily seen from the filling point and should preferably be connected at the same point as the expansion vessel.

IMPORTANT NOTE: If the boilers are installed on to an Ideal frame & header kit and operated in excess of 3 bar then all safety relief valves will require upgrading. The boiler has a maximum operating pressure of 6 bar.

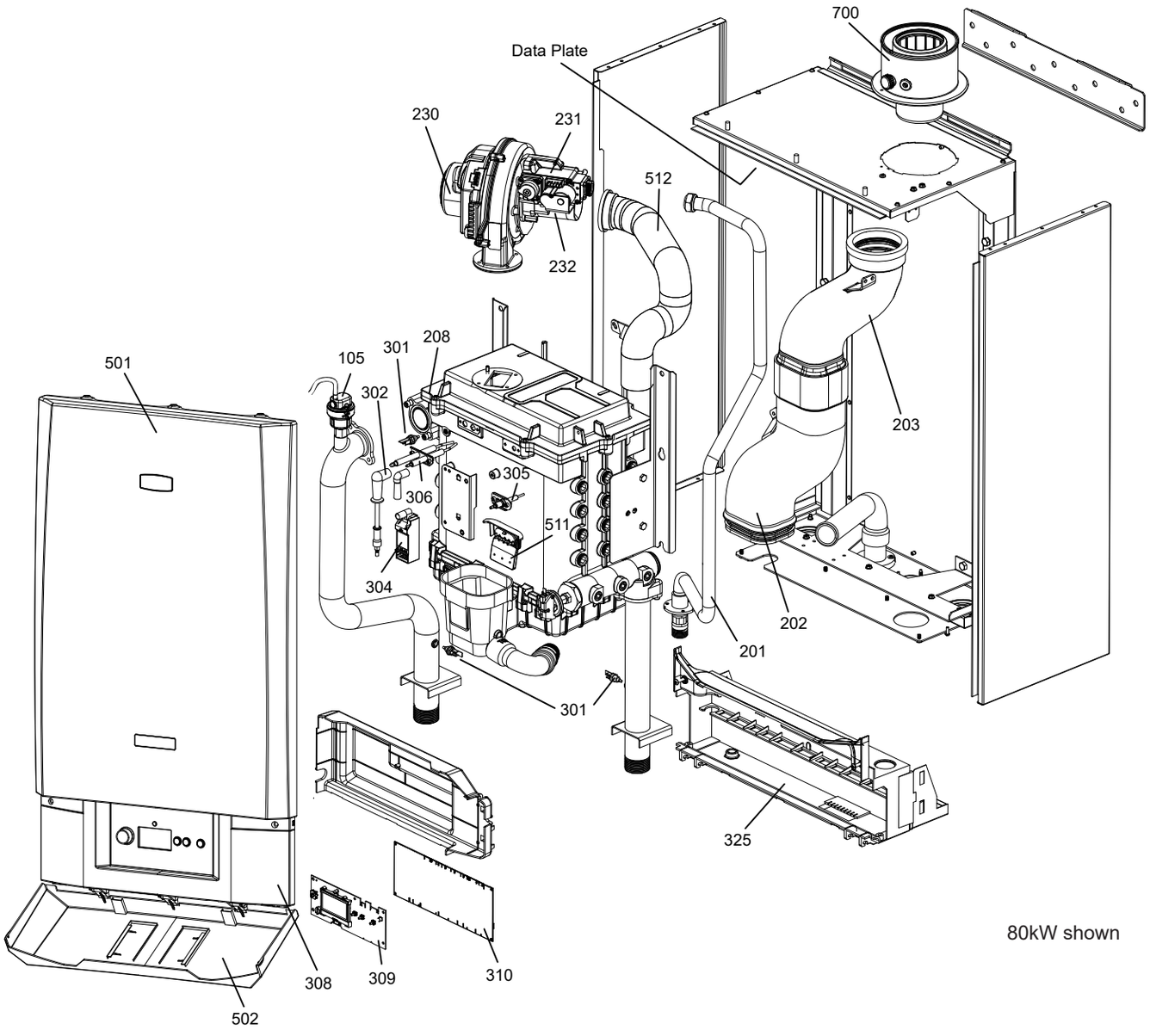
4. Expansion Vessel

Expansion vessels used must comply with BS. EN 13831. Connection to the system must not incorporate an isolating valve.



2. INSTALLATION

2.1 BOILER ASSEMBLY - Exploded View



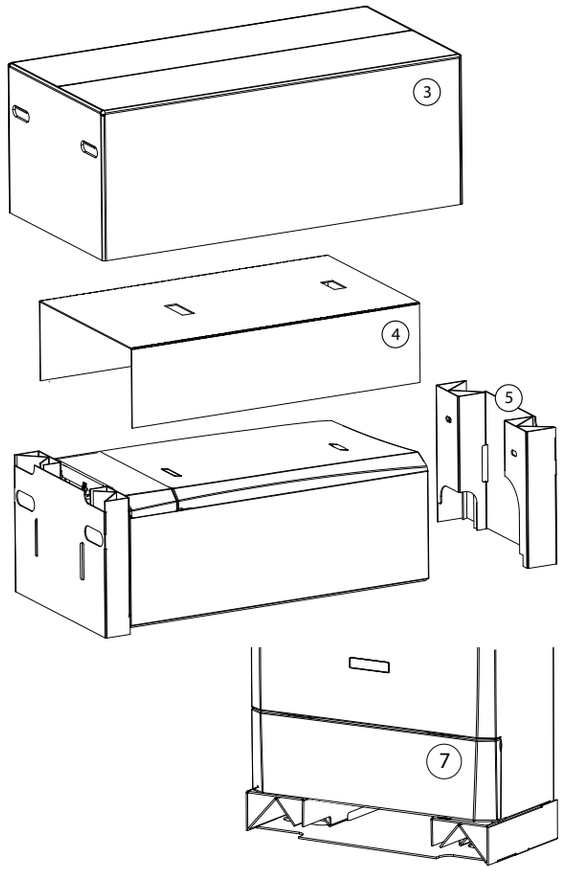
80kW shown

KEY

105	Auto Air Vent	301	Thermistor Kit	325	Bulkhead
201	Gas pipe	302	Lead Ignition Kit	501	Jacket Assembly Kit
202	Flue manifold (lower)	304	Ignitor Unit	502	Door Assembly Kit
203	Flue manifold (upper)	305	Electrode Detection Kit	511	Non Return Valve Assembly
208	Burner Fixings Kit	306	Ignition Electrode Kit	512	Air Inlet Damper
230	Fan	308	Fascia Plastic	700	Flue Adapter
231	Gas Valve Kit	309	System Manager Board		
232	Venturi 80kW Kit	310	Primary PCB		

2.2 PACKAGING REMOVAL

1. The boiler should be laying on its back with the straps removed.
2. Carefully read the installation instructions before proceeding.
3. Remove the outer packing sleeve.
4. Remove the protective cardboard wall mounting template from the front of the boiler.
5. Remove the packing piece from the top of the boiler.
6. Check the contents against the list in Section 2.3 ‘Unpacking’. Note: some items are contained within the top packing piece.
7. The boiler may now be stood on its base, with the cardboard bottom packing piece still in place to protect the connections. Due care should be taken when standing up the boilers, with respect to their weights, see Table 2 on page 6.

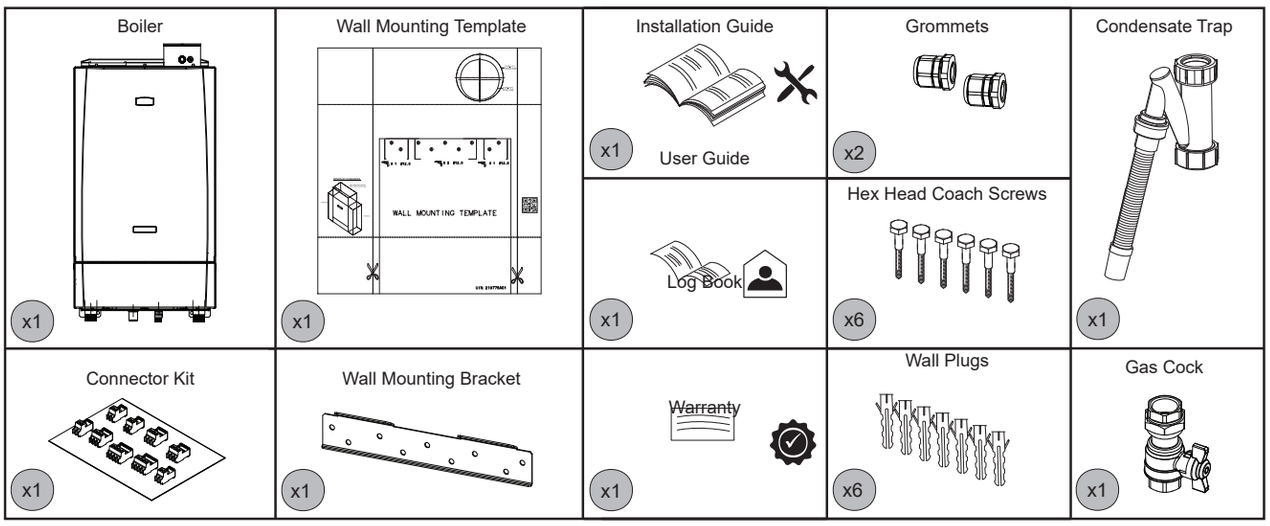


2.3 UNPACKING

The boiler is supplied fully assembled in one pack.

When unpacking the boiler check the contents against the items below.

Do not dispose of the packaging until all contents are accounted for, as some parts are held within the cardboard packing pieces.



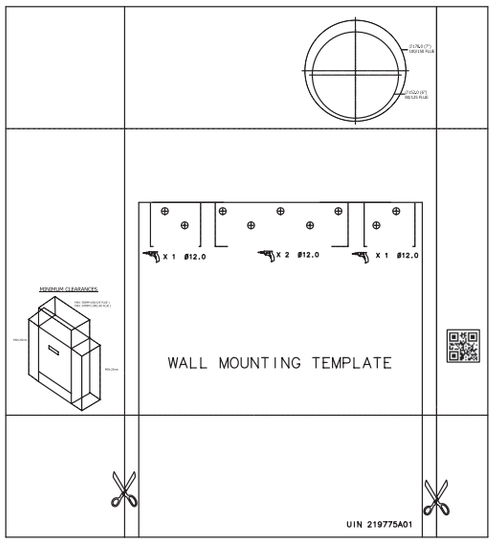
2.4 WALL MOUNTING TEMPLATE

Note. *The template shows the positions for the top fixing holes. Care must be taken to ensure the correct holes are drilled.*

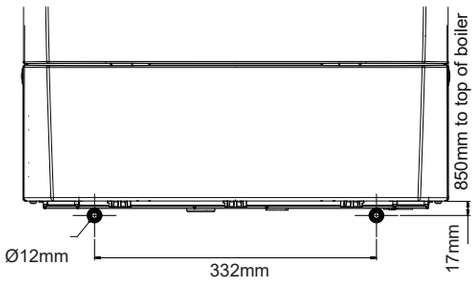
1. Tape template into the selected position.
2. Ensure squareness by hanging a plumbline.
3. Mark on to the wall:
   a. The top 4 wall mounting plate screw positions.
   b. The 2 boiler lower fixing positions using diagram below
   c. The position of the flue duct. Mark the centre of the hole as well as the circumference.
4. Remove the template from the wall.

Note: Horizontal flue runs must be inclined at 1.5-3° to the horizontal to allow condensate to drain back to the boiler.

B



BOILER LOWER FIXING POSITIONS

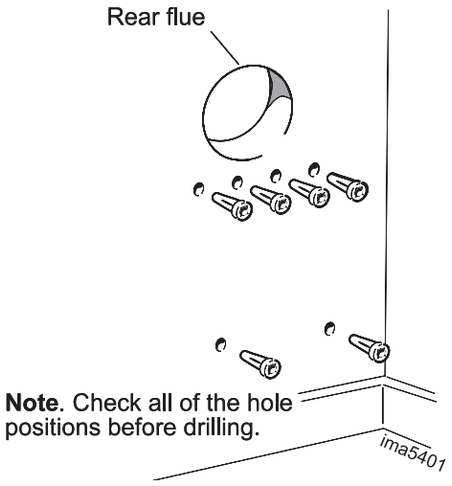


2.5 PREPARING THE WALL

IMPORTANT. The wall must be vertical 90º (±5º) from the perpendicular to allow safe operation of the integral flue non return valve.

Ensure that, during the cutting operation, masonry falling outside of the building does not cause damage or personal injury.

1. Cut the flue hole ensuring that the hole is square to the wall. Both wall faces immediately around the cut hole should be flat.
2. Drill 4 boiler top fixing holes with a 12mm masonry drill and insert the plastic plugs provided, for the wall mounting plate.
3. Drill the 2 boiler lower fixing holes with a 12mm masonry drill, insert the plastic plugs provided .
4. Fix the wall bracket into place with 4 M10x70 hex head coach screws provided.

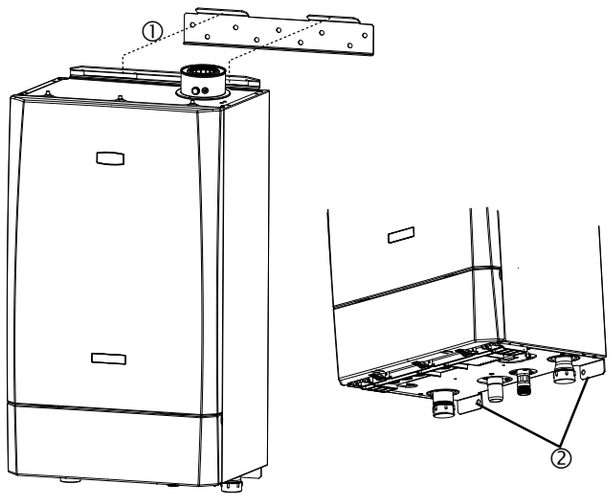


2.6 MOUNTING THE BOILER

- Due care should be taken when lifting the boilers, with respect to their weights, see Table 2 on Page 6. Also refer to Section 1.4 Safe Handling.

1. Lift the boiler onto the wall mounting plate as shown. Note: It is not necessary to hold the boiler at an angle to engage the wall mounting plate.
2. Using the remaining coach screws, secure the bottom of the boiler to the wall through the attached brackets.

IMPORTANT NOTE It is essential that these bolts be fitted prior to making up the flow and return connections to the boiler to prevent the boiler becoming detached .



2.7 VENTILATION

BOILERS NOT EXCEEDING 70kW

The ventilation requirements of these boilers is dependant on the type of flue system used, and their heat input. All vents must be permanent with no means of closing, and positioned to avoid accidental obstruction by blocking or flooding.

40/40P, 60/60P

Detail reference should be made to BS. 5440 Pt. 2. In IE refer to the current edition of I.S. 813.

The following notes are for general guidance only:

If installed as a room sealed appliance in a room or internal space, then no purpose provided ventilation is required.

If installed as an open flued appliance in a room or internal space then a permanent air vent is required. The sizes given below are for vents directly communicating with outside air. For other situations refer to BS. 5440 Pt. 2. In IE refer to the current edition of I.S. 813.

Boiler Size	40 & 40P	60 & 60P
Minimum vent free area (cm^2)	167	269

If installed in a compartment, then permanent air vents are required at high and low level. These vents may communicate direct to outside air, or to a room/internal space. If to a room/ internal space, it must itself be adequately ventilated as above.

Ventilation Requirements (not exceeding 70kW net Input) when installed in a compartment

Room Sealed Application - Min. Vent Free Area (cm^2)					Open Flue Application - Min. Vent Free Area (cm^2)			
	To a room or internal space		To outside Air		To a room or internal space		To outside Air	
Boiler Size	**40**	**60**	**40**	**60**	**40**	**60**	**40**	**60**
High Level	410	610	205	305	410	610	205	305
Low level	410	610	205	305	820	1220	410	610

The temperature within the boiler room shall not exceed 25ºC within 100mm of the floor, 32ºC at mid height and 40ºC within 100mm of the ceiling.

BOILERS 70kW AND OVER

80, 80P, 100, 120, 150 and multiple boiler applications

Detail reference should be made to BS. 6644 and IGEM/UP/10 for inputs between 70kW and 1.8MW (net). In IE refer to the current edition of I.S.820. The following notes are for general guidance only:

If ventilation is to be provided by means of permanent high and low vents communicating direct with outside air, then reference can be made to the sizes below. For other ventilation options refer to BS. 6644 and IGEM/UP/10. In IE refer to the current edition of I.S.820.

80, 80P, 100, 120 & 150

Open Flued Installations

Required area (cm^2) per kW of total rated input (net)

	Boiler Room	Enclosure
Low level (inlet)	4	10
High level (outlet)	2	5

Note: Where a boiler installation is to operate in summer months (e.g. DHW) additional ventilation requirements are stated, if operating for more than 50% of time (refer to BS6644) and IGEM/UP/10.

Room Sealed Installations

A minimum of $2cm^2$ free area per kW of net heat input at both high and low level is required for boiler rooms. For enclosures refer to BS6644 and IGEM/UP/10.

2.8 FLUE SYSTEMS

A comprehensive range of flue kits are available from Ideal Heating. Examples of horizontal and vertical concentric and open flue options are demonstrated on the following pages. Tables are provided with these examples, giving the maximum extensions which may be added.

For horizontal flues: this is the distance from the flue outlet centre line on the boiler to the outside wall.

For vertical flue: this is the distance from the top of the boiler case to the aperture in the weather collar.

If elbows are to be used, then the equivalent length of that fitting (see page 21) must be subtracted from the maximum flue extensions allowed for that flue option.

Note: *Horizontal terminal resistance includes 1 x 90° elbow.*

A multiple boiler flue header system is available 'Ideal Multiline'. This permits up to 6 boilers to be connected to a single flue header with a maximum total output of 600kW.

Other flue header systems should be designed and supplied by a specialist flue company. BS 6644 and IGE UP/10 provide guidance on design and the drainage of condensate from flue stack and headers. Condensate from a flue stack and header must be collected and drained before entering the boiler.

For room sealed flues concentric flues must be used.

NOTE. When installing an Independent boiler onto an exisitng Muliline system, you must remove the non-return valve assembly and replace with either of the following Multline Extensions (exluding NRV):

80 dia = Part No. 220968

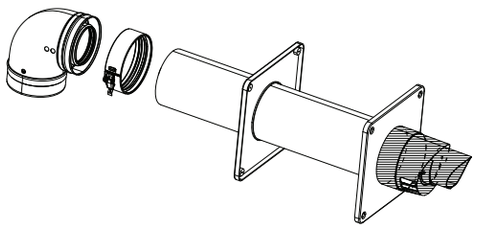
100 dia = Part No. 222068

2.9 HORIZONTAL WALL FLUE KIT

Horizontal concentric flue application ~ maximum lengths						
Model	40/40P	60/60P	80/80P	100	120	150
Max flue length (m)	30	17.5	10	10	9	6
Flue Size	80 / 125			100 / 150		
Wall flue kit No	220919			220921		

Contents

- 90° elbow
- Terminal
- Locking collar
- Wall plates (x2)



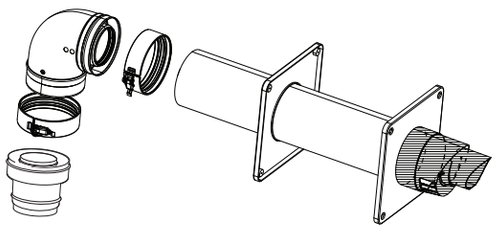
Note: See Section 2.15 for elbow equivalent lengths.

2.10 HORIZONTAL WALL FLUE KIT - For longer flue lengths for the 60 & 80kW

60 & 80 horizontal concentric flues of longer length		
Model	60/60P	80/80P
Max flue length (m)	28	18
Flue Size	100 / 150	
Wall flue kit No	220920	

Contents

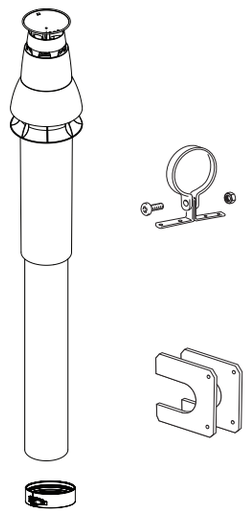
- Increaser
- 90° elbow
- Terminal
- Locking collars (x2)
- Wall plates (x2)



Note: See Section 2.15 for elbow equivalent lengths.

2.11 VERTICAL ROOF FLUE KIT

Vertical concentric flue application ~ maximum lengths						
Model	40/40P	60/60P	80/80P	100	120	150
Max flue length (m)	30	17.5	10	10	9	6
Flue Size	80 / 125			100 / 150		
Vertical flue kit No	220915			220918		

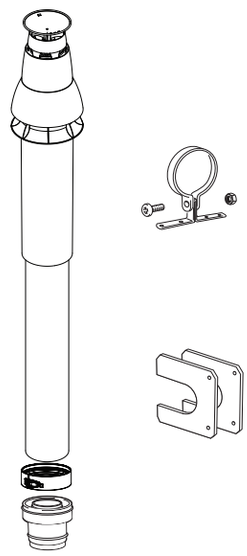


Contents
- Terminal
- Locking Collar
- Finishing plates (x2)
- Bracket

Note: See Section 2.15 for elbow equivalent lengths.

2.12 VERTICAL ROOF FLUE KIT

60 & 80 vertical concentric flues of longer length		
Model	60/60P	80/80P
Max flue length (m)	28	18
Flue Size	100 / 150	
Vertical flue kit No	220916	

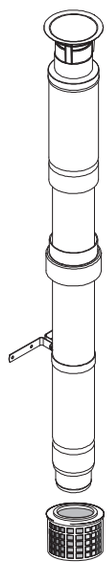


Contents
- Increaser
- Terminal
- Locking Collar
- Finishing plates (x2)
- Bracket

Note: See Section 2.15 for elbow equivalent lengths.

2.13 OPEN FLUE KITS

Open flue application ~ maximum lengths and pressure differentials						
Model	40/40P	60/60P	80/80P	100	120	150
Max flue length (m)	70	25	15.3	20	49	32
Max flue press diff (Pa)	277	146	312	220	473	332
Flue Size	80/125			100/150		
Open flue kit No	221216 + 158771 + 158769			221218 + 158772 + 158770		



Contents

221216 / 221218
- Air inlet grille

158771 / 158772
- Extension tube (x2)*

158769 / 158770
- Terminal

Note: See Section 2.15 for elbow equivalent lengths.

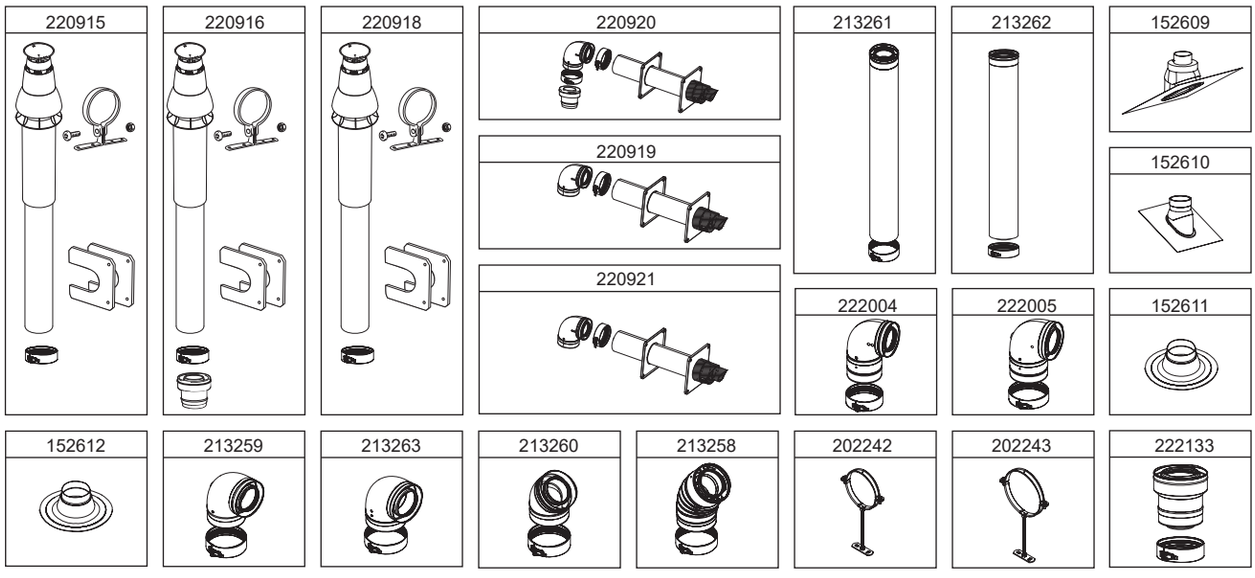
FLUE OUTLET

2.14 FLUE KIT ACCESSORIES

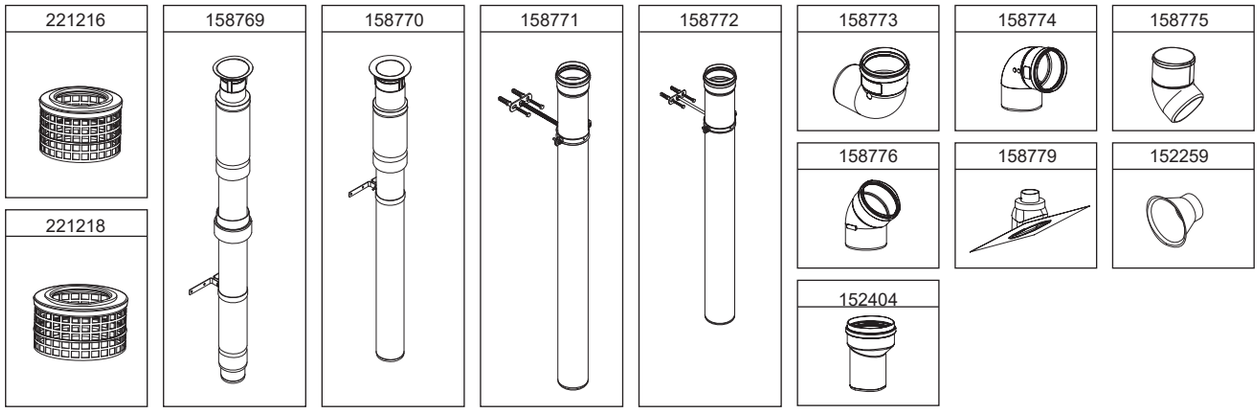
Flue Kits - Concentric	
Flue Kit Description	**UIN**
Vertical Roof Flue Kit 80/125 (40 - 80kW)	220915
Vertical Roof Flue Kit 100/150 (60 & 80kW)	220916
Vertical Roof Flue Kit 100/150 (100 - 150kW)	220918
Horizontal Wall Flue Kit 100/150 (60 & 80kW)	220920
Horizontal Wall Flue Kit 80/125 (40 - 80kW)	220919
Horizontal Wall Flue Kit 100/150 (100 -150kW)	220921
Extension Kit 80/125	213261
Extension Kit 100/150	213262
Pitched Weather Collar 80/125	152609
Pitched Weather Collar 100/150	152610
Flat Weather Collar 80/125	152611
Flat Weather Collar 100/150	152612
90° Elbow 80/125 (single)	213259
90° Elbow 100/150 (single)	213263
45° Elbow 80/125 (single)	213260
45° Elbow 100/150 (single)	213258
90º Extended Elbow 80/125 Single	222004
90º Extended Elbow 100/150 Single	222005
Expander 80/125 - 100/150	222133

Flue Kits - Open Flue	
Flue Kit Description	**UIN**
Wall Bracket 125mm	202242
Wall Bracket 150mm	202243
Open Flue Kit 80	221216
Open Flue Kit 100	221218
Vertical Flue Terminal 80	158769
Vertical Flue Terminal 100	158770
Extension Pipes 80 (pair)	158771
Extension Pipes 100 (pair)	158772
90° Elbow 80 (single)	158773
90° Elbow 100 (single)	158774
45° Elbow 80 (pair)	158775
45° Elbow 100 (pair)	158776
Pitched Weather Collar 80 & 100	158779
Flat Weather Collar 80 & 100	152259
Increaser 80-100	152404

FLUE KITS CONCENTRIC



FLUE KITS - OPEN FLUE



2.15 PERMISSIBLE FLUE LENGTH

The maximum permissible flue lengths for each model is shown in Table A below, these lengths are inclusive of the terminal resistance.

The value shown is the max available length for extension.

The equivalent length of elbows is shown in Table B.

Table A
Max Permissible Equivalent Flue Length (inc terminal resistance) meters

	Concentric		Open Flue	
Flue Size	80/125	100/150	80	100
Model				
40/40P	30	-	70	-
60/60P	17.5	28	25	-
80/80P	10	18	15.3	-
100	-	10	-	20
120	-	9	-	34
150	-	6	-	32

Table B
Equivalent Length of Elbows (meters)

	Concentric		Open Flue	
Size	80/125	100/150	80	100
45º	0.85	1.25	0.45	0.60
90º	1.6	1.9	1.0	1.0

Table C
19 Examples of Flue Length Calculation

Example		Max Permissible Equivalent Length (Table A)	Elbows				Max permissible Straight Length
Model	Flue Type		Type	Equivalent Length (Table B)	No	Total Equivalent Length	
60	80/125	17.5	90	1.6	2	3.2	14.3
60	100/150	28	90	1.9	2	3.8	24.2
80	80/125	10	90	1.6	3	4.8	5.2
120	100/150	9	90	1.9	4	7.6	1.4

Maximum lengths due to the resistance presented by extended concentric flue lengths a slight reduction in the maximum boiler output will occur where flue lengths exceed the stated lengths. In such cases the boiler output will be reduced up to 0.8% per additional metre and should not exceed those stated in Table D.

Table D
Maximum lengths

Model	Flue Size	Reduction per Additional Metre
40/40P	80/125mm	0.16% (up to 42m max flue)
60/60P	80/125mm	Max flue 17.5m
80/80P	80/125mm	0.5% (up to max 12m max flue)
60/60P	100/150mm	0.18% (up to 30m max flue)
80/80P	100/150mm	0.27% (up to 35m max flue)
100	100/150mm	0.5% (up to 14.3m max flue)
120	100/150mm	0.55% (up to 16.0m max flue)
150	100/150mm	0.8% (up to 7.5m max flue)

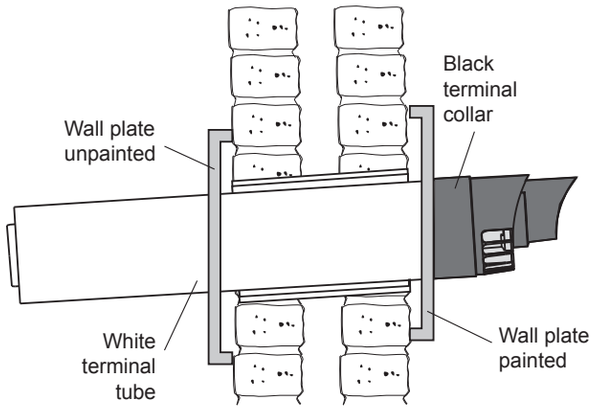
2.16 ASSEMBLING THE FLUE

Flue terminals or extension ducts may be cut to shorter lengths if required. When cutting a duct ensure it is square by marking the length all the way around and only cut back the plain end. When cutting concentric duct it is important that the inner duct is maintained at 20mm longer than the outer duct to allow correct connection of the ducts. Care should be taken to support the inner duct when cutting the flue.

Note. *Horizontal flue runs must be angled down between 1.5° - 3° towards the boiler to allow the condensate to drain. For this reason it is recommended that a support bracket is used for every 1m of extension pipe.*

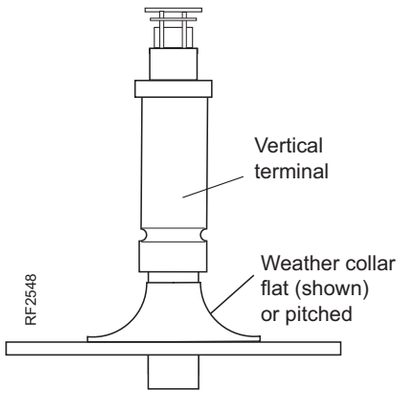
Care must be taken when assembling flues, not to damage the seals.

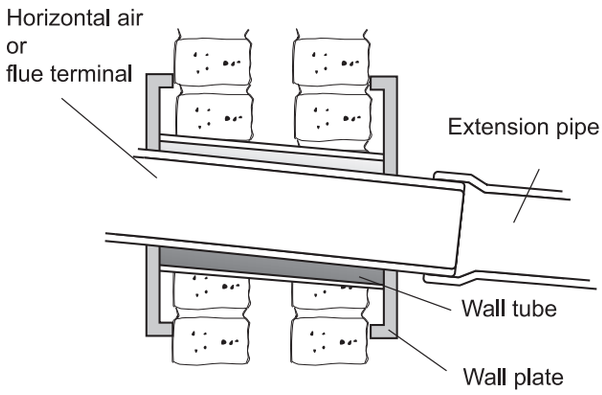
See below for flue assembly examples.



Cut the white terminal tube to the correct length and ensure the painted wall plate is pushed hard up to the black terminal collar when fitted.

Important. There should be NO white terminal tube visible when viewed from the outside.





2.17 FLUE TERMINATION POSITION

Due to the high efficiency of these boilers pluming will occur. For this reason vertical termination is recommended, and in any case, terminal positions which could cause problems should where possible be avoided.

Particular care should be taken in the case of large multiple boiler installations, and complying with the requirements of the Clean Air Act.

The information below is extracted from BS. 5440 Pt. 1 and is for boilers with heat inputs not exceeding 70kW nett, and the latest Building Regulation Part J. Detailed reference should still be made to these standards. In IE refer to I.S. 813:2002.

Concentric Wall Terminal Positions	Minimum spacing
A. Below an opening (1)	300 mm
B. Above an opening (1)	300 mm
C. Horizontally to an opening (1)	300 mm
D. Below gutters, soil pipes or drain pipes	75 mm
E. Below eves	200 mm
F. Below balcony or car port roof	200 mm
G. From a vertical drain pipe or soil pipe	150 mm
H. From an internal or external corner or to a boundary alongside the terminal	300 mm
I. Above ground, roof or balcony level	300 mm
J. From a surface or a boundary facing the terminal	600 mm
K. From a terminal facing the terminal	1200 mm
L. From an opening in the car port into the building	1200 mm
M. Vertically from a terminal on the same wall	1500 mm
N. Horizontally from a terminal on the same wall	300 mm
Concentric Roof Terminal Positions	
Directly below an opening, air brick, windows, etc.	300 mm
Below plastic/painted gutters	500 mm*
Below painted surface	500 mm*
Below eaves or balcony	500 mm
From wall	1000 mm
Below velux window	2000 mm
Above or side of velux window	600 mm

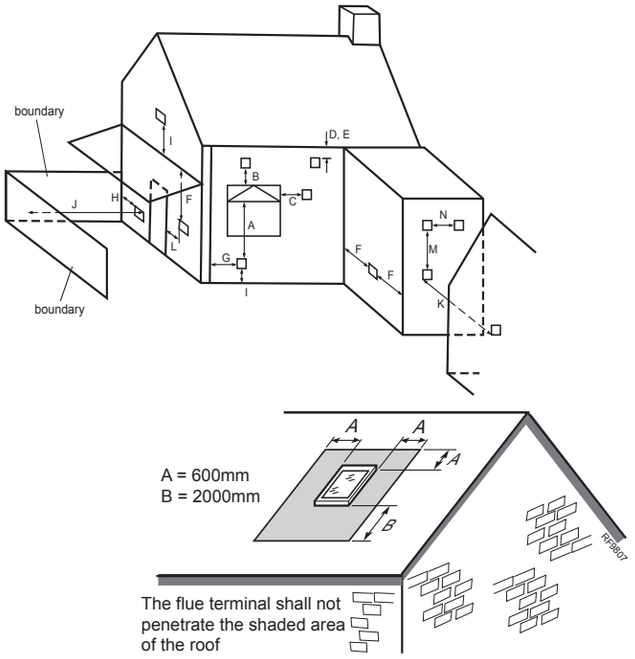
** may be reduced to 300mm if a shield fitted*

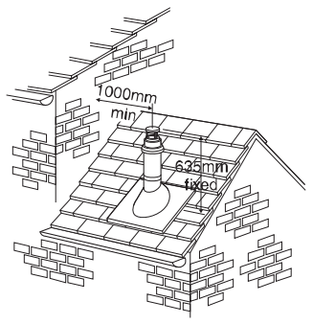
(1) An opening here means an openable element, such as a openable window, or a fixed opening such as an air vent. However, in addition, the outlet should not be nearer than 150mm (fanned draught) to an opening into the building fabric formed for the purpose of accommodating a built in element, such as a window frame.

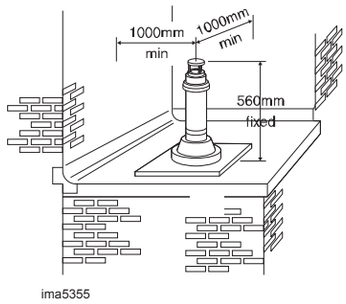
If the terminal is fitted less than 500 mm below plastic gutters, painted eaves or any other painted surface then an aluminium shield at least 1m long should be fitted to protect the surface.

Vertical terminals must be a minimum of 550mm apart.

For positioning of open flue terminals reference should be made to BS. 5440 Pt. 1. In IE refer to I.S.813.2002.







HEAT INPUTS IN EXCESS OF 70kW NETT

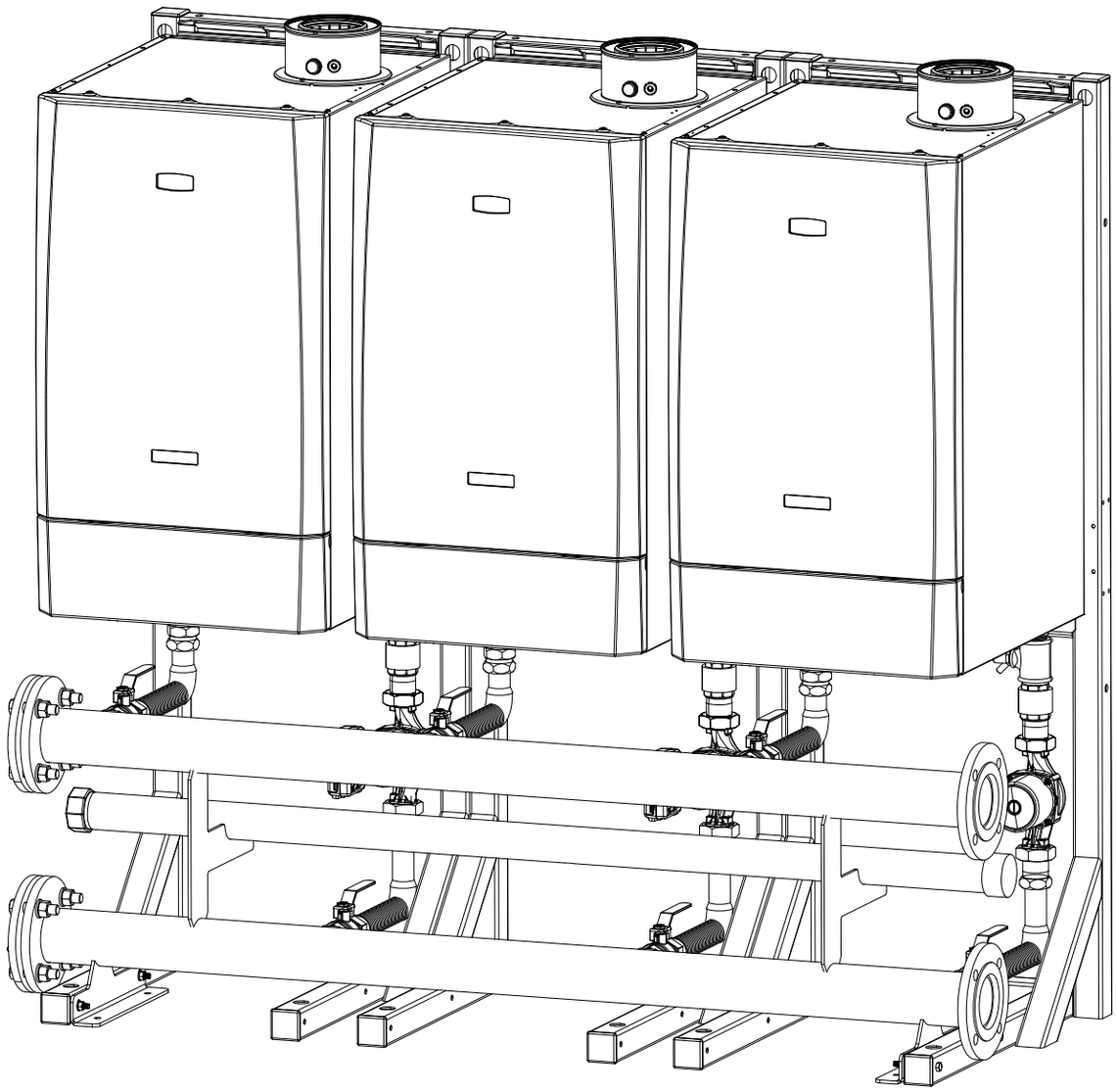
For boiler installations with total heat inputs in excess of 70kW nett, reference should be made to BS6644 and IGEM/UP/10. In IE refer to I.S.820.2000.

FLUE OUTLET

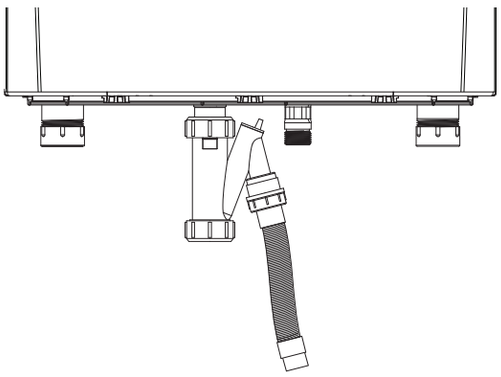
2.18 BOILER FRAME AND HEADER KITS

Standard Height Frame & Header Kit - Heat output to a maximum of 900kW, except when using the multiline flue when a maximum of 600kW (See Multiline flue manual) can be achieved by cascading up to six boilers. Boilers can be fitted side by side using the standard height frame and header kits.

Low Height Frame and Header Kit - Heat output to a maximum of 600kW can be achieved by cascading up to four boilers. Boilers can either be fitted side by side or back to back using the low height frame and header kits.



2.19 CONDENSATE DRAIN



This appliance is fitted with a 75mm condensate trap system that requires filling before operating the appliance for the 1st time or after maintenance.

All condensate pipework should conform to the following:

a. Where a new or replacement boiler is being installed, access to an internal 'gravity discharge' termination should be one of the main factors considered in determining boiler location.

b. Plastic with push fit or solvent connections.

c. Internal plastic pipe work a minimum of 19mm ID (typically 22mm OD)

d. External plastic pipe must be a minimum of 30mm ID (typically 32 OD) before it passes through the sleeved wall.

e. All horizontal pipe runs, must fall a minimum of 45mm per metre away from the boiler at a minimum gradient of 1:19.

f. External & unheated pipe work should be kept to a minimum and insulated with Class "O" waterproof pipe insulation.

g. All installations must be carried out in accordance to the relevant connection methods as shown in the "Condensate installation diagrams" & BS6798:2009

h. Pipe work must be installed so that it does not allow spillage into the dwelling in the event of a blockage (through freezing)

i. All internal burrs should be removed from the pipe work and any fittings.

In order to minimise the risk of freezing during prolonged very cold spells, one of the following methods of terminating condensate drainage pipe should be adopted.

Internal Drain Connections

Wherever possible, the condensate drainage pipe should be routed to drain by gravity to a suitable internal foul water discharge point such as an internal soil and vent stack or kitchen or bathroom waste pipe etc. See Figs 1 and 2.

Condensate Pump

Where gravity discharge to an internal termination is not physically possible or where very long internal pipe runs would be required to reach a suitable discharge point, a condensate pump of a specification recommended by the boiler or pump manufacturer should be used terminating into a suitable internal foul water discharge point such as an internal soil and vent stack or internal kitchen or bathroom waste pipe etc. (fig 3).

External Drain Connections

The use of an externally run condensate drainage pipe should only be considered after exhausting all internal termination options as described previously. An external system must terminate at a suitable foul water discharge point or purpose designed soak away. If an external system is chosen then the following measures must be adopted:

The external pipe run should be kept to a minimum using the most direct and "most vertical" route possible to the discharge point, with no horizontal Sections in which condensate might collect.

- For connections to an external soil/vent stack see Fig 4. Insulation measures as described should be used.
- When a rainwater downpipe is used, an air break must be installed between the condensate drainage pipe and the downpipe to avoid reverse flow of rainwater into the boiler should the downpipe become flooded or frozen, see Fig 5.
- Where the condensate drain pipe terminates over an open foul drain or gully, the pipe should terminate below the grating level, but above water level, to minimise "wind chill" at the open end. The use of a drain cover (as used to prevent blockage by leaves) may offer further prevention from wind chill.
- Where the condensate drain pipe terminates in a purpose designed soak away (see BS 6798) any above ground condensate drain pipe Sections should be run and insulated as described above. See Fig 6.

Unheated Internal Areas

Internal condensate drain pipes run in unheated areas, e.g. lofts basements and garages, should be treated as external pipe.

Ensure the customer is aware of the effects created by a frozen condensate and is shown where this information can be found in the user manual.

Figure 1 - Connection of Condensate Drainage Pipe to Internal Soil & Vent Stack

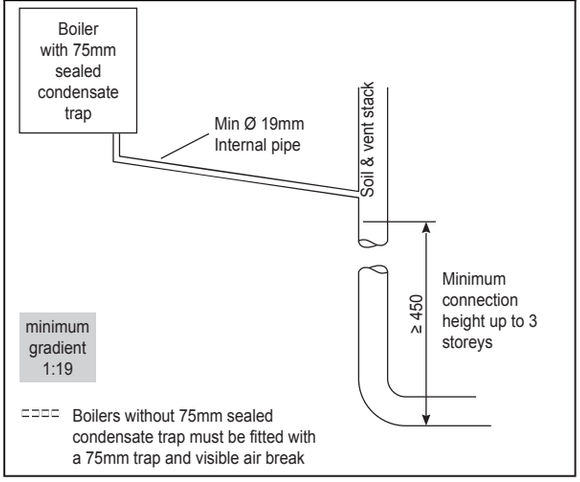
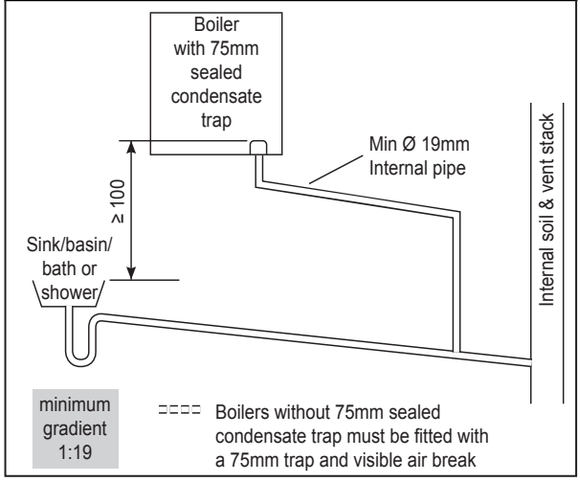


Figure 2 - Connection of a Condensate Drainage Pipe Downstream of a Sink, Basin, Bath or Shower Water Trap to Internal Soil Vent Stack



continued . . . . .

Figure 3 - Connection of a Condensate Pump Typical Method (see manufacturers detailed instructions)

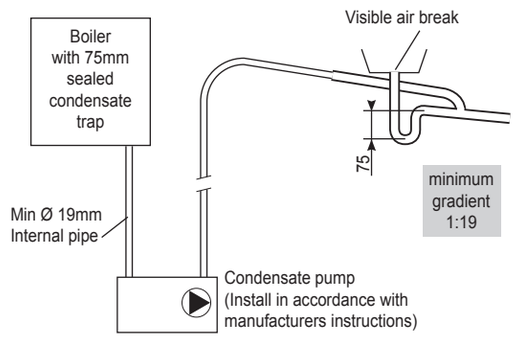


Figure 4 - Connection of condensate Drainage Pipe to External Soil & Vent Stack

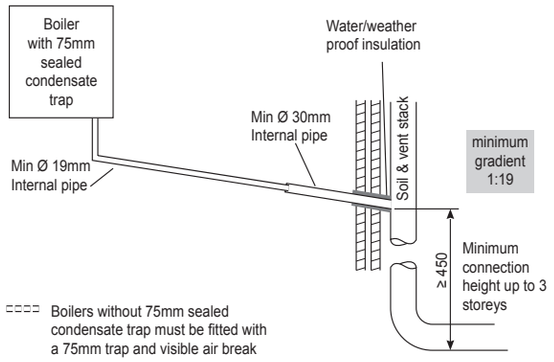


Figure 5 - Connection of a Condensate Drainage Pipe to an External Rainwater Downpipe (only combined foul/rainwater drain)

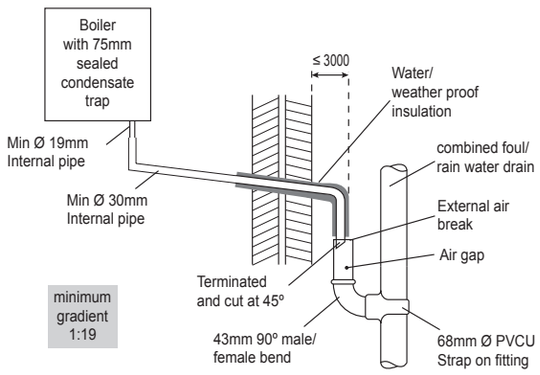
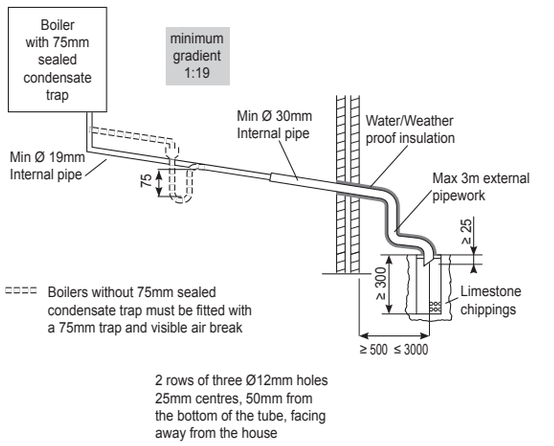


Figure 6 - Connection of a Condensate Drainage Pipe to an External Purpose Made Soak Away.

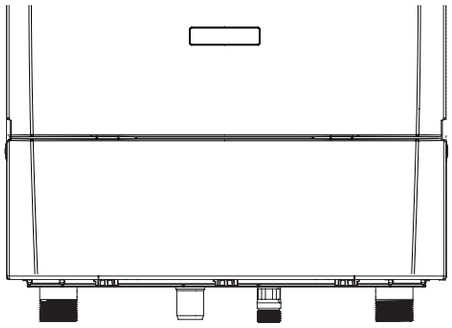


2.20 BOILER WATER CONNECTIONS

The boiler flow and return pipes are terminated with a 1 $^{1}/_{4}$" BSP male taper connection located at the bottom of the appliance.

Note. *This appliance is NOT suitable for use with a direct hot water cylinder.*

Plastic plugs if fitted into the open ends of the flow and return pipes must be removed before connecting the system pipework.



FLOW RETURN

2.21 FROST PROTECTION

The boiler has built into its control system the facility to protect the boiler, only against freezing.

If the boiler flow temperature T_1, falls below 5°C the pump and burner run until the temperature exceeds 19°C.

Central heating systems fitted wholly inside the building do not normally require frost protections as the building acts as a 'storage heater' and can normally be left at least 24 hours without frost damage. However, if parts of the pipework run outside the building or if the boiler will be left off for more than a day or so, then a frost thermostat should be wired into the system.

2.22 GAS CONNECTION

Refer to Section 1.13 for details of the position of the gas connection.

A MINIMUM working gas pressure of 17.5 mbar (7" w.g.) must be available at the boiler inlet for natural gas and minimum of 32mbar for propane with the boiler firing. Refer to Section 3.3 for details of the pressure test point position.

Extend a gas supply pipe NOT LESS THAN 22mm O.D. to the boiler and connect using the gas cock provided.

IMPORTANT. The gas service cock contains a non-metallic seal so must not be overheated when making capillary connections.

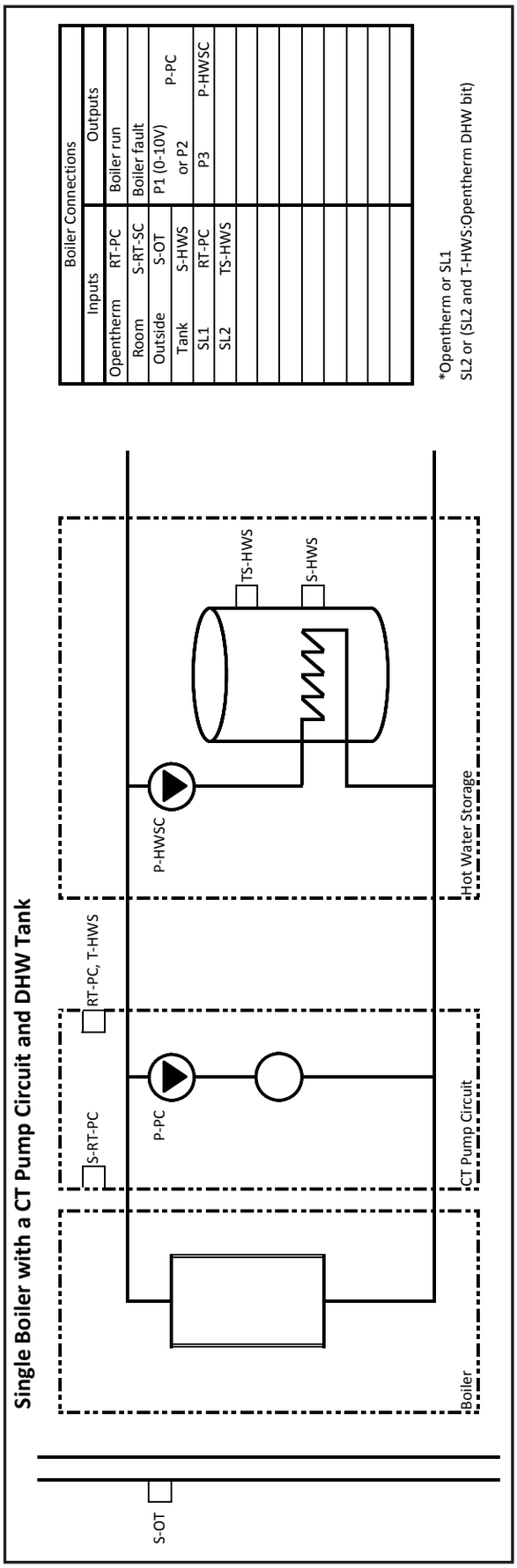
In order to determine the actual working gas pressure at the boiler inlet the figure from the table below must be added to the measured pressure (refer to Section 3.3).

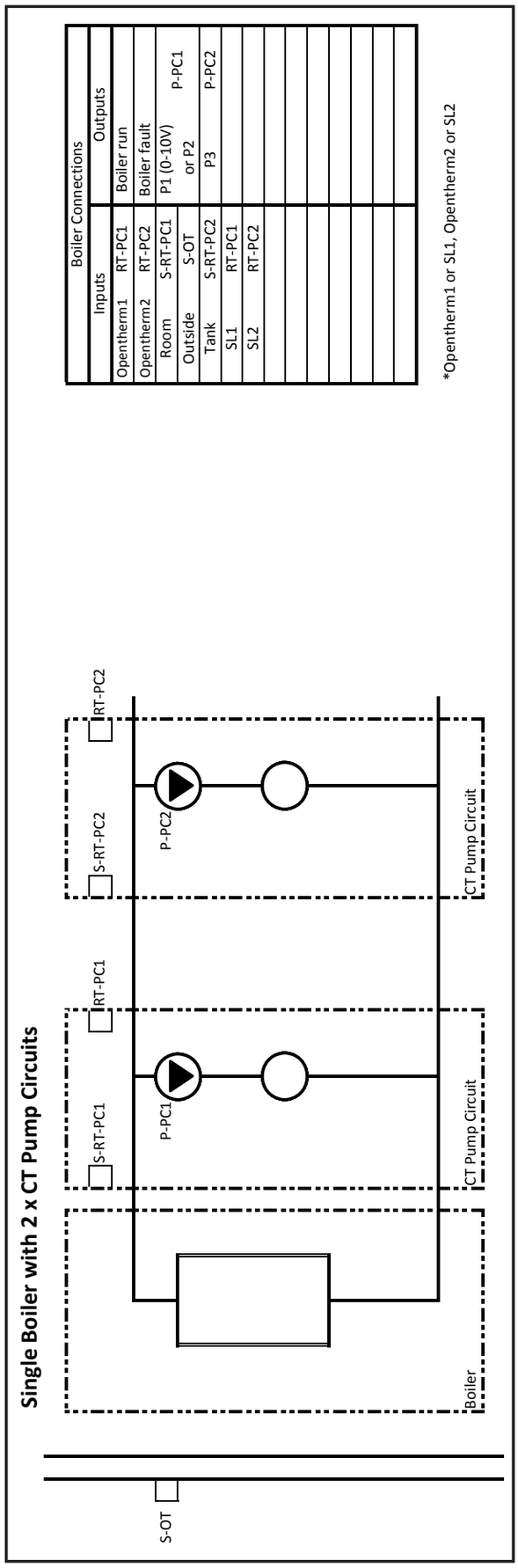
Gas Line Pressure Drop (Natural Gas)	
Boiler Model	**mbar**
40	0.8
60	1.4
80	1.6
100	1.1
120	2.7
150	3.0

The pressure loss for LPG versions is negligible due to the very low velocity through the pipe work.

Note. *It should be noted that this pressure drop is present within the internal boiler pipe work and is irrespective of the fact that manifold headers are used. This pressure drop will be experienced on each individual boiler regardless of single or multiple installation.*

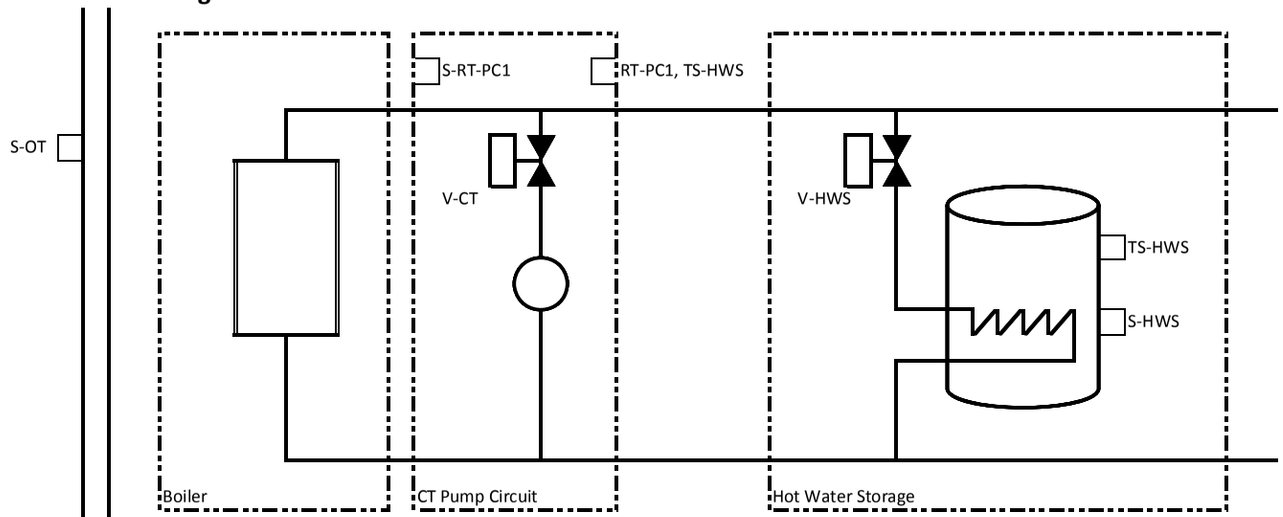
2.23 STAND ALONE BOILER - PARTIAL HYDRAULICS





continued.....

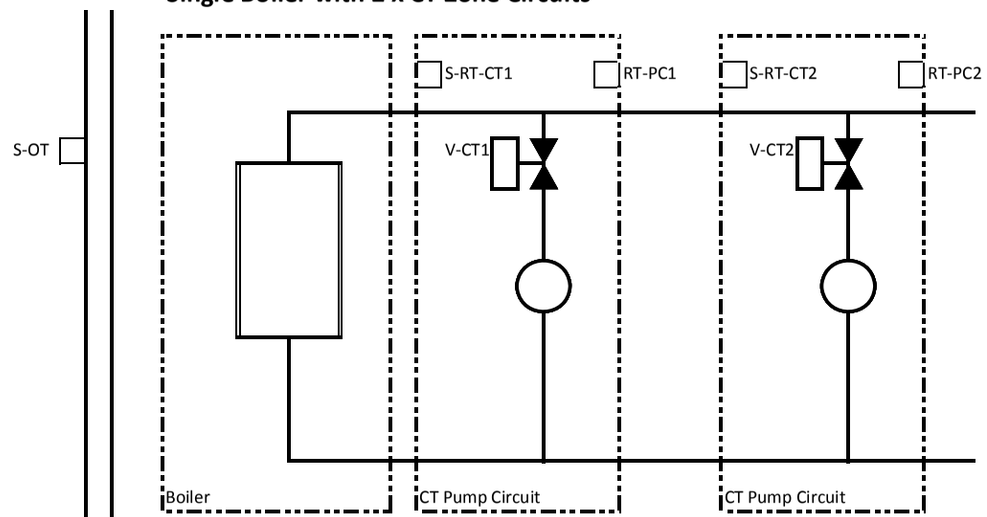
Single Boiler with CT and HWS Zone Circuits



Boiler Connections			
Inputs		Outputs	
Opentherm	RT-PC1	Boiler run	
Room	S-RT-PC1	Boiler fault	
Outside	S-OT	P1 (0-10V)	
Tank	S-RT-CT2	or P2	
SL1	RT-CT1	P1 (0-10V)	V-CT1
SL2	TS-HWS	or P2	
		P3	V-HWS

*Opentherm or SL1
SL2 or (SL2 and T-HWS:Opentherm DHW bit)

Single Boiler with 2 x CT Zone Circuits



Boiler Connections			
Inputs		Outputs	
Opentherm1	RT-PC1	Boiler run	
Opentherm2	RT-PC2	Boiler fault	
Room	S-RT-PC1	P1 (0-10V)	
Outside	S-OT	or P2	
Tank	S-RT-CT2	P1 (0-10V)	V-CT1
SL1	RT-CT1	or P2	
SL2	RT-CT2	P3	V-CT2

*Opentherm1 or SL1, Opentherm2 or SL2

2.24 ABBREVIATIONS

Abbreviation	Description
AH-HC	Air heater of Heater Circuit
Bn	On/Off Boiler n
CP	Circulating pump (controlled by Sequence Control)
F-PP-HWSC	Fault contact of primary pump of Hot Water Storage Circuit
FM	Fault Messages Function
F-B	Fault contact of Boiler
F-CP	Fault contact of Circulating pump
F-P-HWSC	Fault contact of pump of Hot Water Storage Circuit
Gen	General Function
HC	Heater Circuit Function
HD-SC	Heat demand contact of Sequence Control
HWS	Hot Water Storage Circuit Function
MC	Mixing Circuit Function
NC	No Connection
PC	Pump Circuit Function
P-HWSC	Pump of Hot Water Storage Circuit
P-MC	Pump of Mixing Circuit
P-PC	Pump of Pump Circuit
PP-HWS	Primary pump of Hot Water Storage Circuit

Abbreviation	Description
S-FT	Flow temperature sensor
S-FT-HC	Flow temperature sensor of Heating Circuit
S-FT-MC	Flow temperature sensor Mixing Circuit
S-FT-SC-PT	Common Flow temperature sensor of Sequence Control and Pump Circuit
S-HWS	Water temperature sensor Hot Water Storage Circuit
S-OT	Outdoor temperature sensor
S-RT-HC	Room temperature sensor of Heating Circuit
S-RT-MC	Room temperature sensor Mixing Circuit
S-RT-PC	Room temperature Pump Circuit
S-RT-SC	Room temperature sensor Sequence Control
SC	Sequence Control Function (Plant Control)
T-HC	Overtime contact of Heater Circuit
T-HWS	Overtime contact of Hot Water Storage Circuit
T-MC	Overtime contact of Mixing Circuit
T-PC	Overtime contact of Pump Circuit
T-SC	Overtime contact of Sequence Control
T-SC-HWS	Overtime contact of both Sequence Control and Hot Water Storage Circuit
V-MC	3-Way valve of Mixing Circuit

2.25 ELECTRICAL CONNECTIONS

Warning. This appliance MUST be efficiently earthed.

A mains supply of 230V 50Hz is required. The supply wiring MUST be suitable for mains voltage. Wiring should be 3 core PVC insulated cable NOT LESS than 0.75mm^2 (24 x 0.2 mm) and to BS. 6500, Table 16. The fuse rating should be 4A.

Wiring external to the boiler MUST be in accordance with the current I.E.T. (BS7671) Wiring Regulations and any local regulations. For Ireland reference should be made to the current ETCI rules for electrical installations.

Connection should be made in a way that allows complete isolation of the electrical supply - such as a double pole switch, having a 3mm contact separation in both poles, or a plug and unswitched socket serving only the boiler and system controls. The means of isolation must be accessible to the user after installation.

2.26 EXTERNAL WIRING

External wiring MUST be in accordance with the current I.E.T. (BS7671) Wiring Regulations. For Ireland reference should be made to the current ETCI rules for electrical installations.

The wiring diagrams illustrated in Section 2.28 covers examples of the range of systems that may be used with this appliance.

For wiring external controls to the boiler, reference should be made to the systems wiring diagram supplied by the relevant manufacturer in conjunction with the connection diagram shown in Section 2.28.

Difficulty in wiring should not arise, providing the following directions are observed:

1. The appliance must be wired with a permanent live supply.
2. Four Multi Function Relay Volts free outputs are provided that may be configured to control Pumps, Valves and other devices over the voltage ranges specified: 24V DC to 230V 50Hz.

   An additional option kit may be added to control a Pump using a modulating 0-10V DC control signal.
3. Input terminals are available for connecting a variety of system controls for heating demand, and optionally for DHW demand.

Heating demand can be controlled by:

- 230V SL1 and SL2 inputs where configured for two heating circuits
- Two OpenTherm bus interfaces for the connection of OpenTherm compatible room control kits. One per heating circuit.
- Modulating sequencer kit
- an external BMS
- an outside temperature sensor.
- Optional Room Temperature sensor kit, one for each heating circuit configured.
- Optional Header Temperature sensor where hydraulic separation or a combined flow temperature control is required

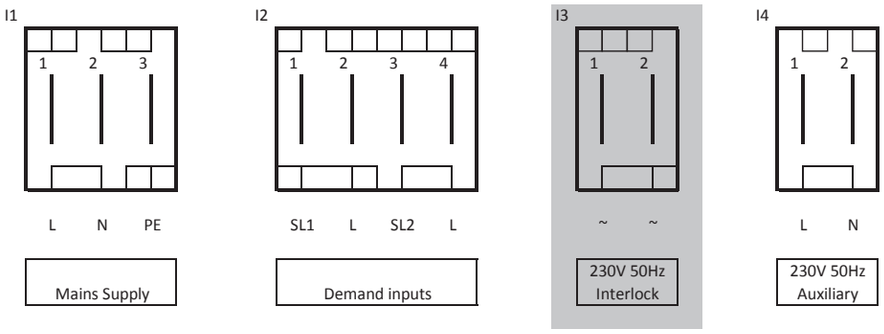
DHW demand can be controlled by:

- 230V programmer and/or cylinder thermostat
- tank sensor kit.
- One 2 channel OpenTherm interface for a Heating and a DHW circuit.

The electrical supply and other inputs for the boiler can be seen in Section 2.27.

2.27 INSTALLER CONNECTIONS

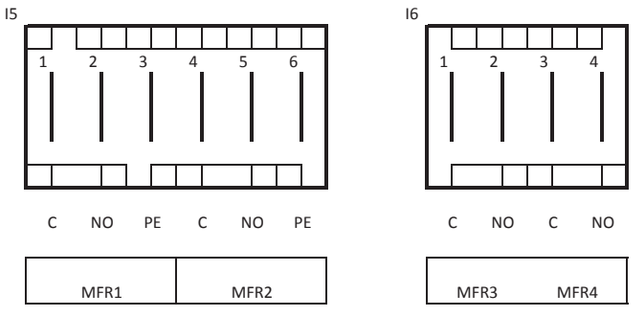
Mains Voltage/230V 50Hz



KEY

- **I1** Mains Supply Connector, 230V 50Hz. Live, Neutral, PE.
- **I2** Demand inputs, Multifunctional, 230V 50Hz. Typical setting:
  SL1, Heating Circuit 1
  SL2, Heating Circuit 2/DHW
- **I3** Optional Interlock input, 230V 50Hz
- **I4** Auxiliary Mains Supply Output, 230V 50Hz. Live, Neutral.

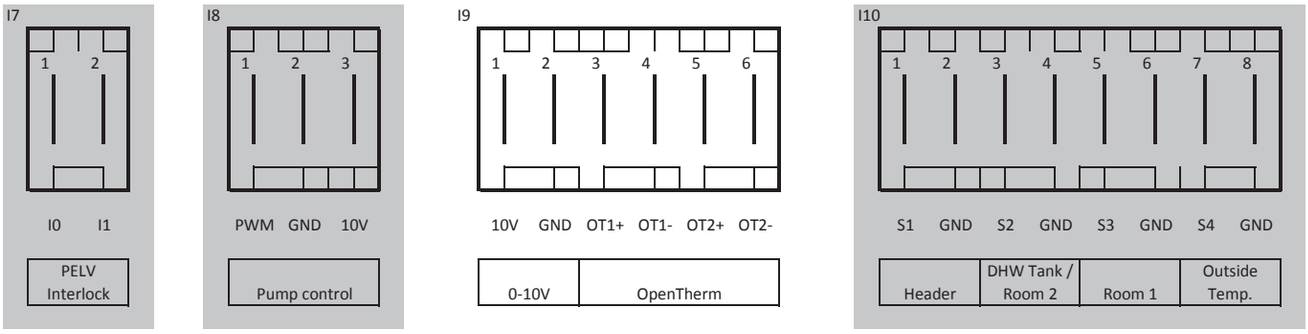
Volts Free Contacts



KEY

- **I5** Multifunction Volts Free Relay Outputs, 24V DC to 230V 50Hz. Typical setting:
  MFR1 Heating Circuit 1 Pump
  MFR2 DHW Circuit Pump
- **I6** MFR3 Burner On Indication
  MFR4 Boiler Fault Indication

PELV



KEY

PELV Only

- **I7** Optional Interlock input.
- **I8** Optional Pump Modulation Control, 0-10V.
- **I9** Boiler Control:
  0-10V Capacity or Temperature.
  OpenTherm Interface 1. Boiler, Heating Circuit 1 and/or DHW Circuit Control.
  OpenTherm Interface 2. Heating Circuit 2 Control.
- **I10** Optional Sensors:
  Header Sensor for Cascade Control.
  DHW Tank Temperature or Heating Circuit 2 Room Temperature.
  Heating Circuit 1 Room Temperature.
  Outside Temperature Sensor for Heating Curve.

**Note: The items grayed out are not standard and are connections provided by the relevant option kits.*

2.28 BOILER WITH EXTERNAL CONTROLS

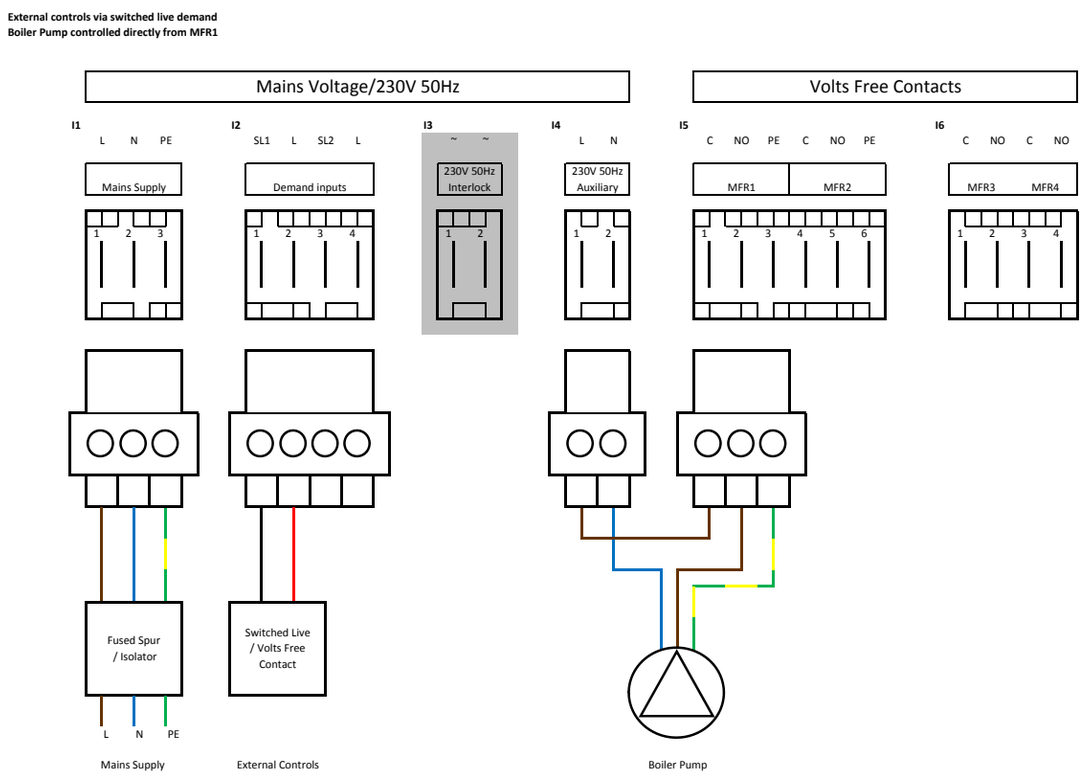
1. If the boiler circulating pump is not controlled by the boiler then the overrun time of this pump MUST be set to a minimum of 30 seconds. Failure to do so may invalidate the warranty.
2. It is preferable that any pump used to circulate water through an individual boiler is controlled by the local boiler. Either as a 230V 50Hz supply as shown, enabled by the Volts Free Contacts e.g. MFR1 or controlled by the option kit for 0-10V pump control. If not then a pump overrun function MUST be provided by the controlling system.
3. The pump load and switch on surge current must be within the limits of the output if it is powered directly from the Volts Free Contact. The limits are as specified in the Electrical Specification Table below.

   A slave contactor may be used to power the pump where needed.
4. If the switched live is provided without a Volts Free Contact then this MUST be taken from the same phase as the boiler mains supply, preferable through the same isolator.

Electrical Specifications for External Connections		
	Voltage	**Load**
Input - SL1, SL2	230V 50Hz	3kΩ min
Input - 0-10V	0 to 10V DC	5mA max
Sensor - Outside Sensor - Header Sensor - Room Sensor - DHW Tank	5V DC	10kΩ @ 25ºC β(25/85)=3977
Output - MFR1..4 output	24 V DC to 230V 50Hz	1.0 A max at CosØ = 0.6
	230V 50Hz	Peak Surge 20A < 20ms
	230V 50Hz	Peak Transient 100A < 10uS
Output - Pump 0-10V output	0 to 10V DC	10mA max
Bus - OT1, OT2	OpenTherm V 4.0	
Bus - VariCAN	CAN Open, proprietary protocol	

External Controls via Switched Live Demand

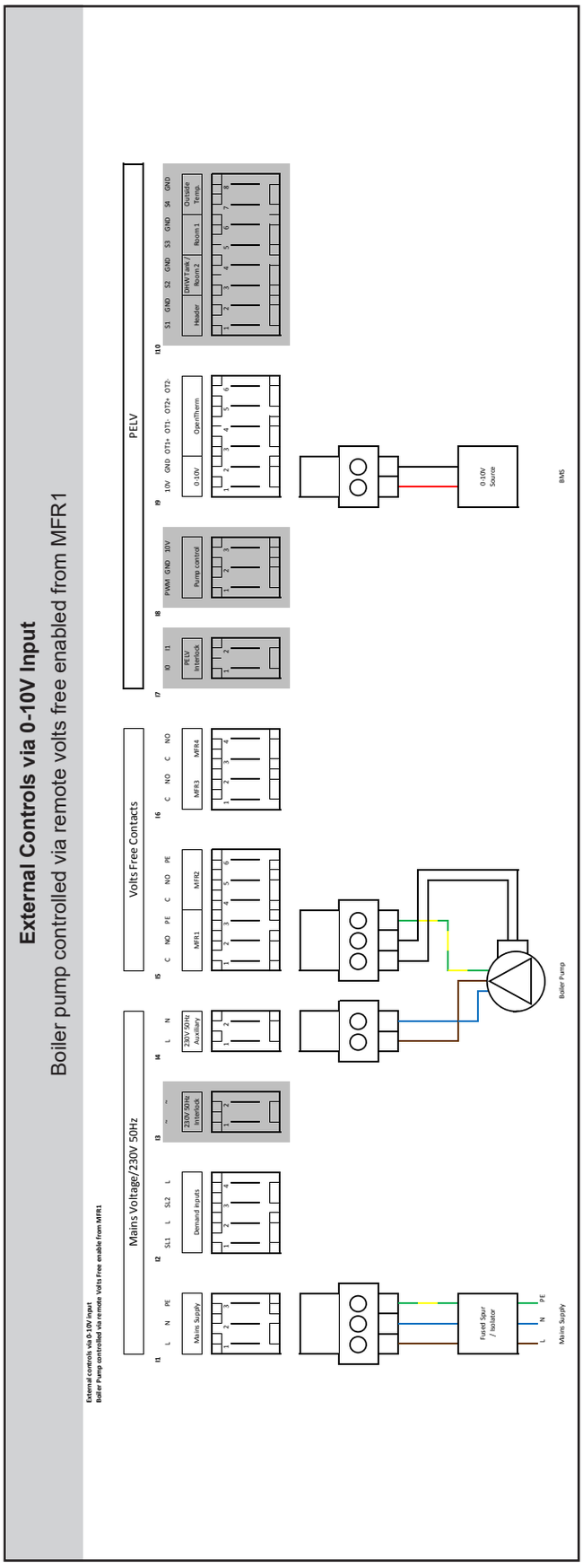
Boiler pump controlled directly from MFR1



continued.....

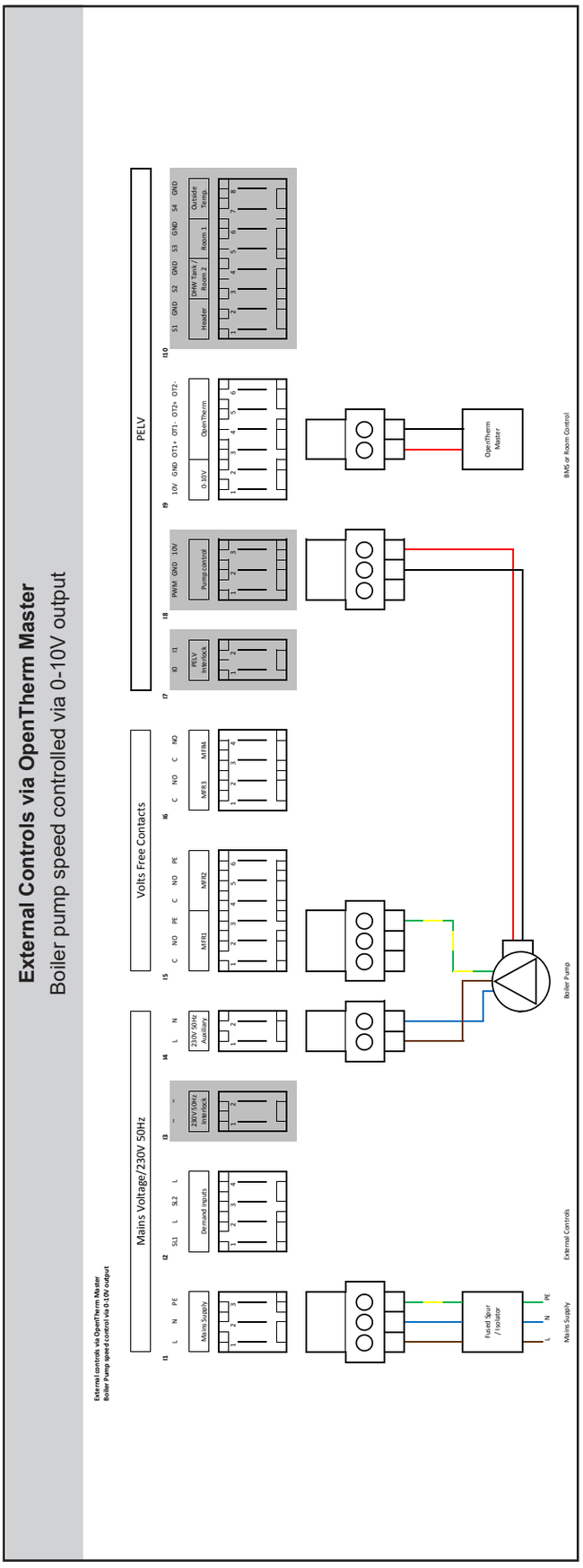
External Controls via 0-10V Input

Boiler pump controlled via remote volts free enabled from MFR1



External Controls via OpenTherm Master

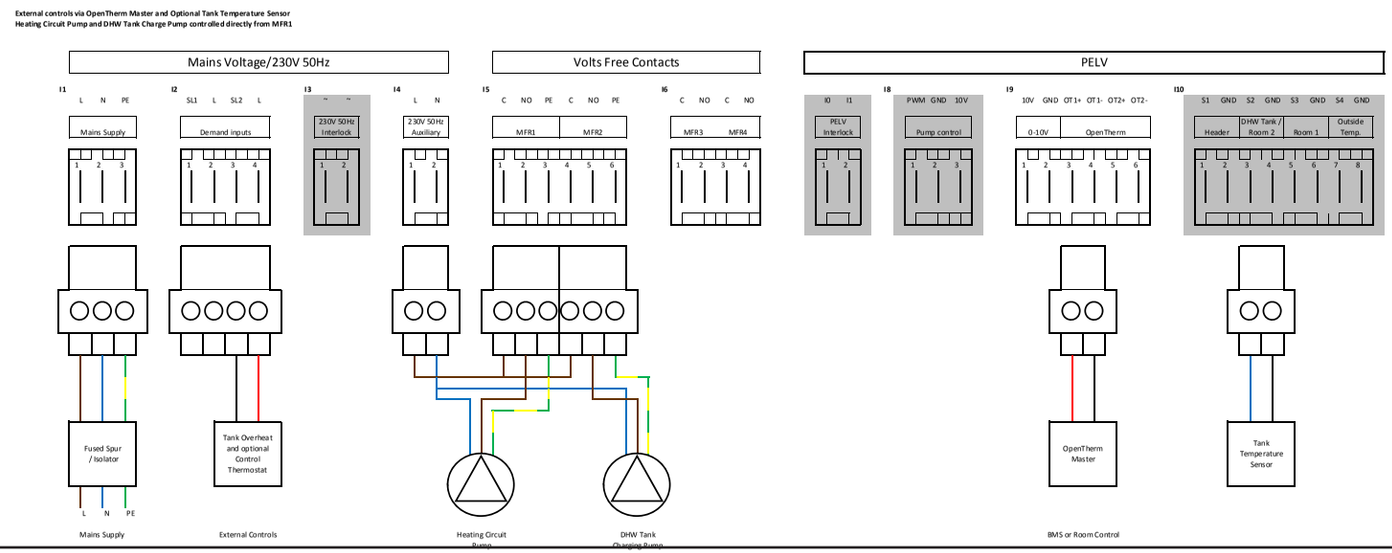
Boiler pump speed control via 0-10V output



continued.....

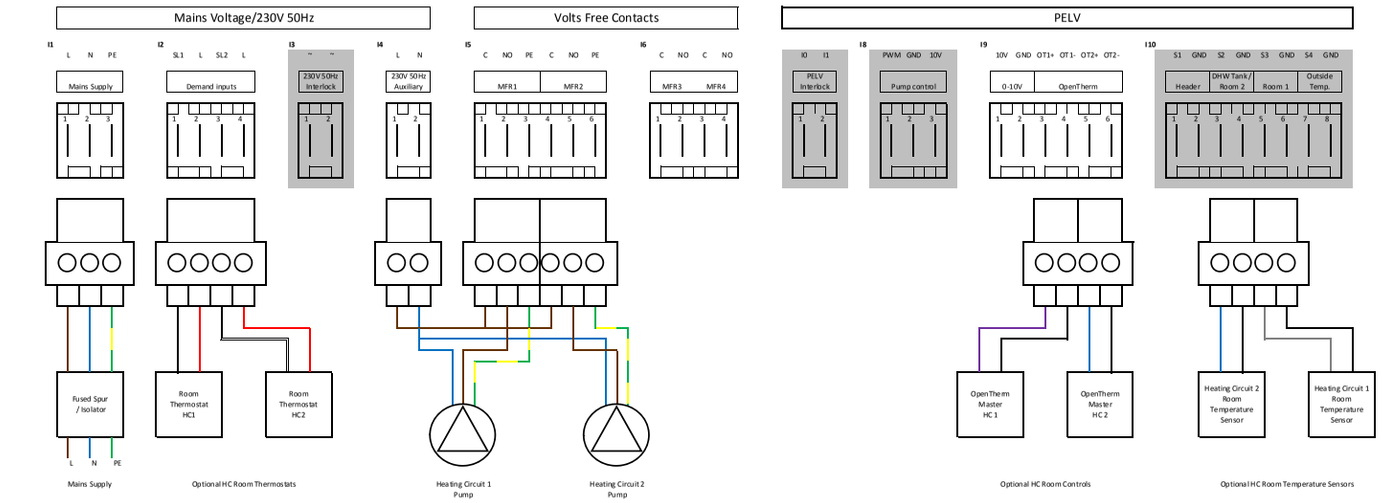
External Controls via OpenTherm Master and Optional Tank Temperature Sensor

Heating Circuit Pump and DHW Tank Charge Pump controlled directly from MFR1



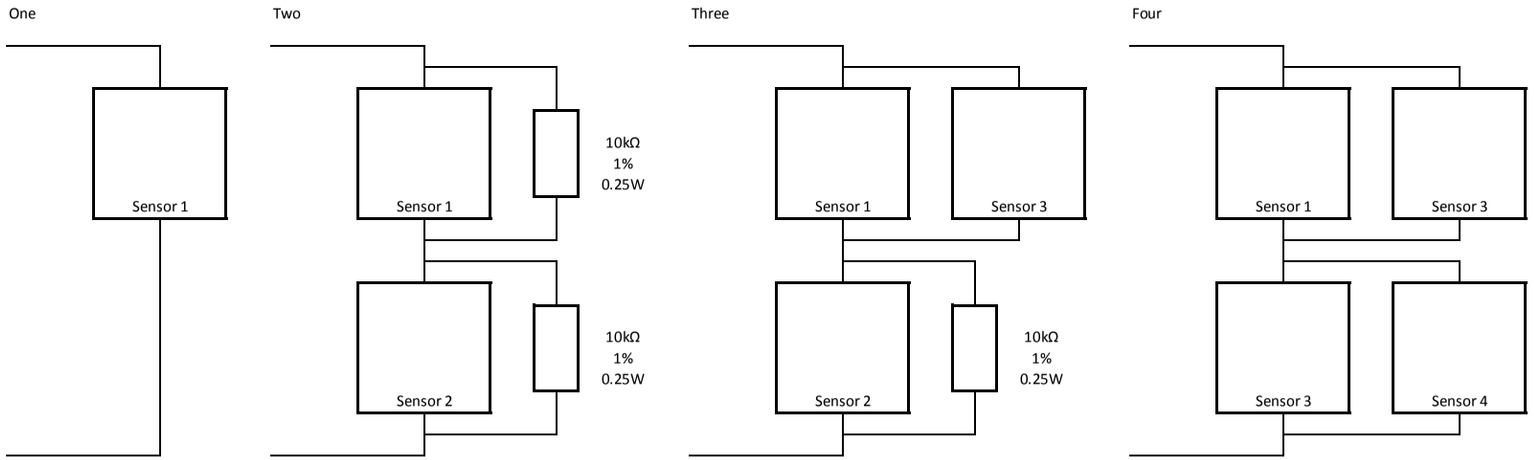
External Controls via Switched Live or OpenTherm or Room Temperature Sensors for Two Heating Circuits

Heating Circuit Pumps controlled directly from MFR1 and MFR2



continued.....

Connecting Multiple Room Sensors

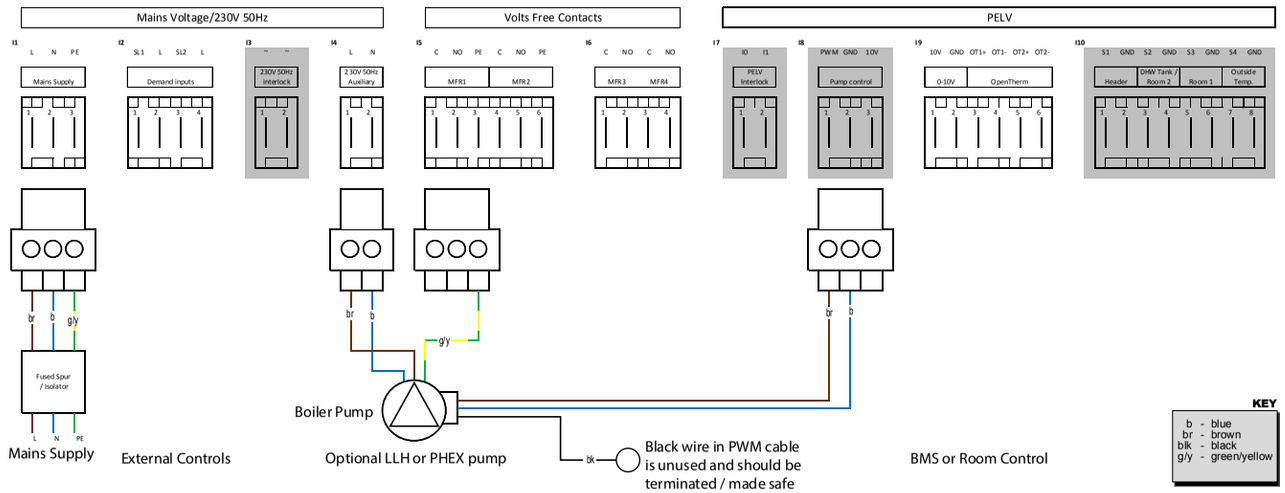


Note.

Where multiple sensors are used the overall accuracy of temperature measurement is reduced, this can be compensated for by trimming the parallel resistors

Siting of multiple room sensors for large spaces should be carefully considered to avoid significant temperature differences between sensors

Boiler Pump Speed Control Via PWM Output for Cascade Frame and Header Kits using Optional LLH or PHEX Pumps



2.29 CONTROLS CONFIGURATION, COMMISSIONING AND TESTING

A. ELECTRICAL INSTALLATION

1. Checks to ensure electrical safety should be carried out by a competent person.
2. ALWAYS carry out the preliminary electrical system checks, i.e. earth continuity, polarity, resistance to earth and short circuit, using a suitable meter.

B. GAS INSTALLATION

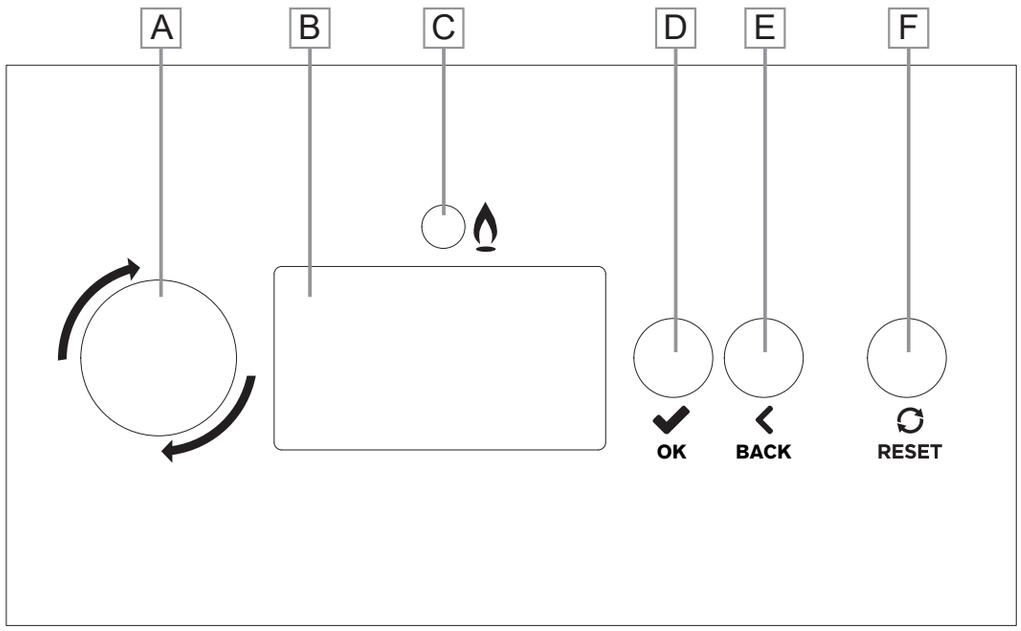
1. The whole of the gas installation, including the meter, should be inspected and tested for soundness and then purged in accordance with the recommendations of the relevant standards listed on page 8, by the installer.

   In IE refer to I.S.813:2002.

TO QUALIFY FOR FREE COMMISSIONING, BOILERS MUST BE COMMISSIONED WITHIN 3 MONTHS OF INSTALLATION. TO ARRANGE COMMISSIONING REFER TO CONTACT DETAILS ON BACK PAGE.

WARNING. *Whilst effecting the required gas soundness test and purging air from the gas installation, open all windows and doors, extinguish naked lights and DO NOT SMOKE.*

2.30 USER INTERFACE



A. **ROTARY KNOB**
- Enter a menu, if in the normal operation screen, and highlight the first menu item.
- Scroll up (anti-clockwise) or down (clockwise) in a menu
- Change the value in parameter setting.
- If an error is showing in the title bar, scroll to the associated error screen(s), and return.

B. **LCD DISPLAY SCREEN**
- Menu and status display.

C. **BURNER LED**
- Will be on if the burner is lit.

D. **SELECT BUTTON**
- Enter a menu, if in the normal operation screen, and highlight the first menu item.
- Enter the highlighted menu (sub menu or parameter), if in a menu or sub menu.
- If in a parameter setting, select a parameter which will then flash for adjustment, once adjusted using the rotary knob press again to store and move on.

E. **BACK BUTTON**
- In a menu, return to the previous menu layer.
- In parameter setting, exit the parameter without storing the value.
- In a guided assistant, go back to the previous screen.

F. **RESET BUTTON**
- Reset the associated boiler module error, if a resettable (lockout) error is active.
- Return to the normal operation screen.

2.31 GLOSSARY OF TERMS

2.31.1 Menu function resource definitions

- Plant – related to the master or standalone boiler for plant control (common) functions
- Boiler – only related to an individual boiler and only used by that boiler
- Heating Circuit – only related to an individual heating circuit
- DHW circuit – only related to an individual DHW circuit

2.31.2 Pump definitions

- System pump – used to circulate water through the Heating and/or DHW circuits as well as either the boiler or the secondary side of a LLH or Plate H/X
- Shared boiler pump – used to only circulate water through more than one boiler
- Shunt pump – used to circulate an amount of water between flow and return to limit the temperature differential
- Boiler pump – used to only circulate water through a single boiler
- HC pump – a pump or valve that allows flow through a HC
- DHW pump – a pump or valve that allow flow through a DHW circuit

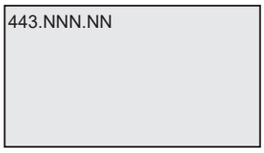
2.32 BOILER GUIDED CONFIGURATION STAND ALONE

BOILER

Power up the boiler

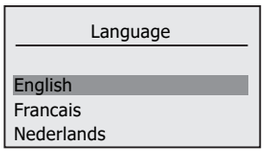
Initailly the software revision of the System Manager with be displayed in the top LHS of the screen.

The following screens will then be sequentially displayed:



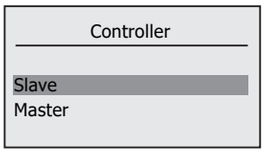
2.32.1 Initial Settings

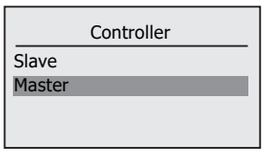
At start up the default language is selected and shown on the display, this can be changed if required or just confirmed:

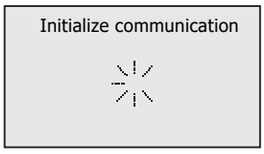


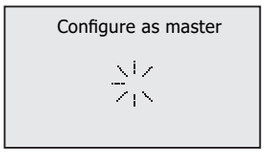
Once the language is either confirmed or selected then this is stored and set as the default.

For a standalone boiler the controller must be selected as a Master:

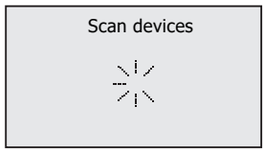


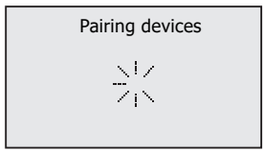




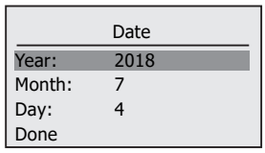


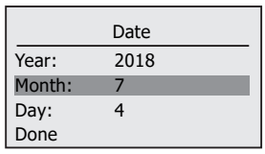
The system will then scan the bus to determine if any other devices are present:

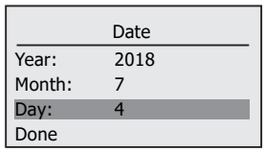


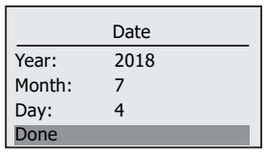


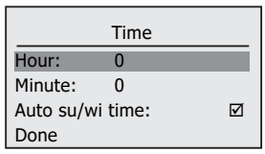
The current date followed by the time can now be set:

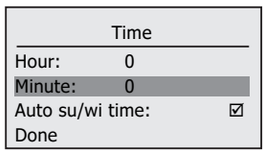


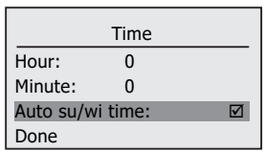


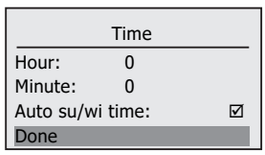






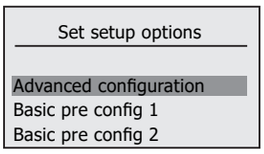


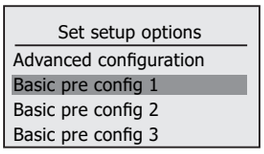


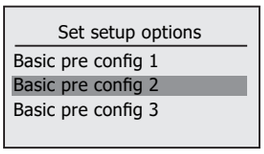


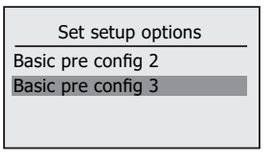
2.32.2 Boiler setup options - Pre configuration selection

A standalone or non-VariCAN cascade boiler can be set up quickly to a selected configuration at this step. One of the following options can be selected:



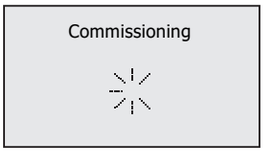




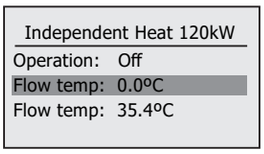


By selecting Advanced Configuration the system will continue to follow the guided configuration as detailed in Section 2.32.3.

If one of the basic pre config options is selected then the configuration will be set to a specific set up, then the system will reboot:



Followed by the boiler status screen.



For each of the selected basic pre config options the setting for the boiler are detailed below.

These pre configurations can also be used as a starting point and then adapted to match the requirement.

Basic pre config 1

Standalone boiler with the following configuration:

Plant options for Boiler run and Boiler fault on MFR3 and MFR4 respectively.

One Heating circuit with HC enable on SL1 with an ON/OFF Pump/Valve on MFR1. Maximum and minimum flow temperature settings of 80 and 30 degrees respectively. With DHW priority and set to run immediately in Day operating mode.

One DHW circuit with DHW enable (Overheat and control) on SL2 with an ON/OFF Pump/Valve on MFR2. Set to run in Time clock single day operating mode.

Basic pre config 2

Standalone/non-VariCAN cascade boiler with the following configuration:

Plant control enable on SL1 with a modulating boiler pump, and with options for Boiler run and Boiler fault on MFR3 and MFR4 respectively.

Basic pre config 3

Standalone boiler with the following configuration:

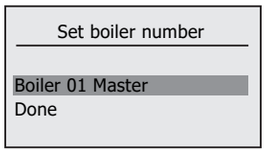
Plant options for a modulating System pump with Boiler run and Boiler fault on MFR3 and MFR4 respectively.

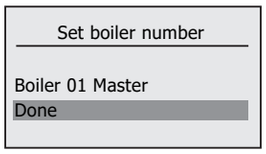
One Heating circuit with HC enable on SL1 with an ON/OFF Valve on MFR1. Maximum and minimum flow temperature settings of 80 and 30 degrees respectively. With DHW priority and set to run immediately in Day operating mode.

One DHW circuit with DHW enable (Overheat and control) on SL2 with an ON/OFF Valve on MFR2. Set to run in Time clock single day operating mode.

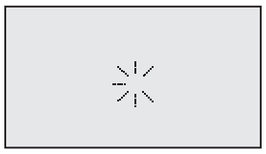
2.32.3 Advanced Configuration

The display will now prompt for selection of the boiler number, this is necessary to identify the boiler should it become part of a iCCS (Commercial Control System), by default a Master boiler will have a setting of 01:

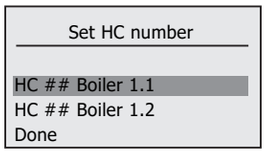




The system will now scan the known devices on the bus to determine what Heating Circuits are available in the boiler for configuration:

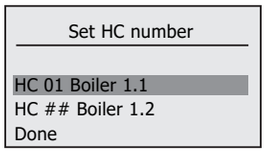


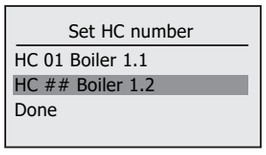
Once this is completed, the display will prompt with the available heating circuits so that they may have HC numbers allocated, and then later configured.

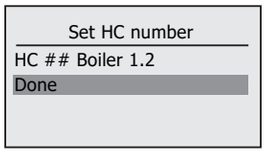


If any heating circuits are required for the boiler, then number them sequentially from 1. If there are no heating circuits to be configured to this boiler just move on past by selecting "Done". Examples:

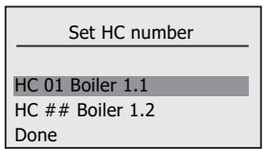
Single Heating Circuit:

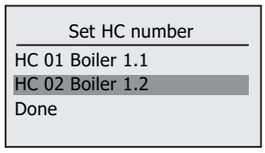


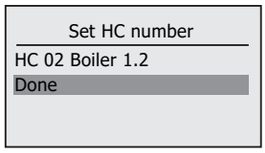




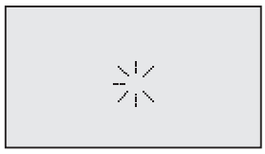
Two Heating Circuits:



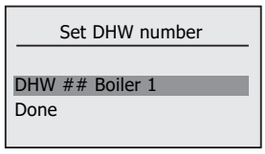




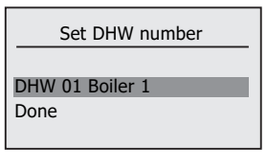
The system will now scan the known devices on the bus to determine what DHW circuits are available in the boiler for configuration:

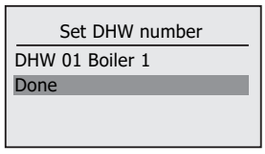


Once this is completed, the display will prompt with the available DHW circuits so that they may have DHW circuit numbers allocated, and then later configured.



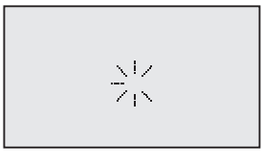
If any DHW circuits are required for the boiler then number them sequentially from 1. If there are no DHW circuits to be configured to this boiler just move on past by selecting 'Done'. Example:





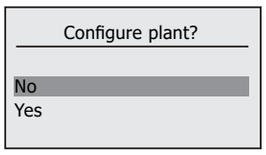
The system will now configure the System Manager for these circuits.

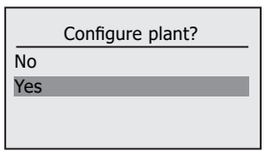
The system will now scan the known devices on the bus to determine what Plant functions are available in the boiler for configuration:



2.32.4 Plant Settings

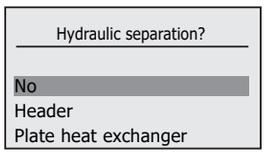
If you wish to configure any of the following plant functions, then select 'Yes', if not continue by selecting 'No' and move to Section 2.31.3. ONLY configure these functions here if you are not going to use them in any HC's or DHW circuits.

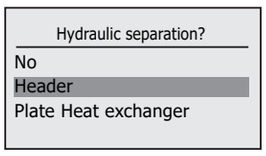


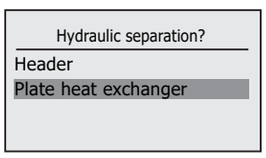


Hydraulic Separation:

If the boiler has Hydraulic Separation from the intermediate or final circuits in the heating system, or if the boilers have a combined flue system then set this option to either ‘Header’ or ‘Plate heat exchanger’.

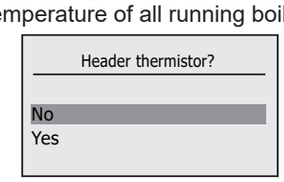


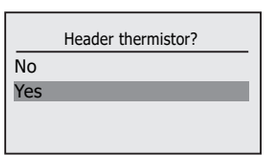




Header Thermistor:

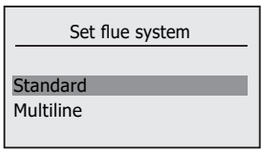
If the system has a header sensor fitted, combined flow, then select ‘Yes’, otherwise the system will use the average flow temperature of all running boilers.

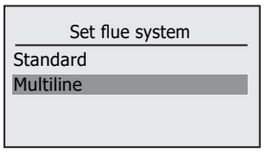




Set Flue System:

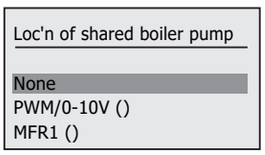
If the boilers are connected into a common or cascade flue system then you can choose multiline flue system where the minimum capacity of the boiler in a cascade can be increased in order to ensure no backflow in the flue system.

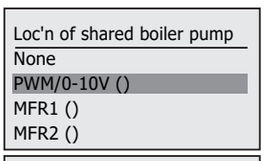


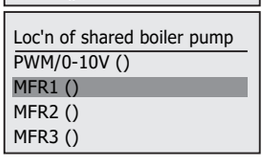


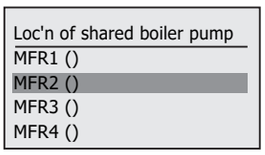
Shared Boiler Pump:

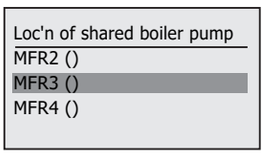
If the Master boiler has a pump that is shared across the plant then select the output that is used to control it from the list. Otherwise select ‘None’.

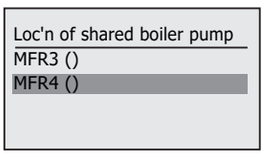








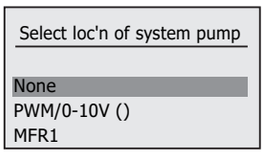


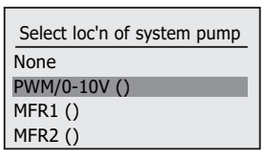


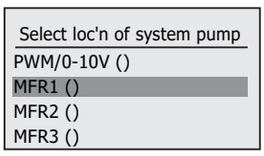
System Pump:

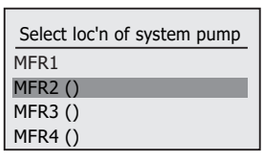
If the boiler has a Plant System Pump connected then select the output that is used to control it from the list. Otherwise select 'None'.

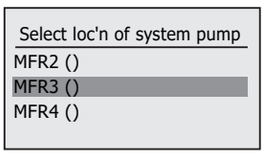
Once an output has been configured the selected function is shown in brackets behind the output name.

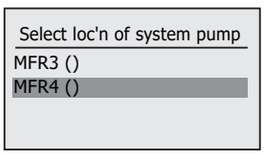








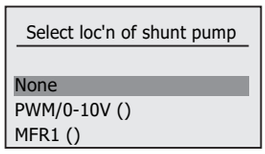


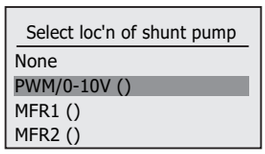


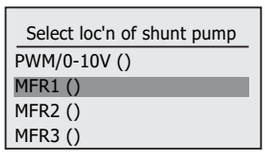
Shunt Pump:

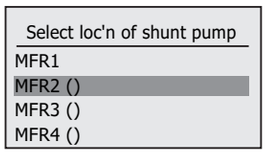
Shunt Pump. If the boiler has a Plant Shunt Pump connected between the Flow and Return headers then select the output that is used to control it from the list. Otherwise select 'None'.

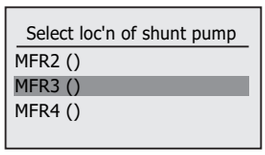
Once an output has been configured the selected function is shown in brackets behind the output name.

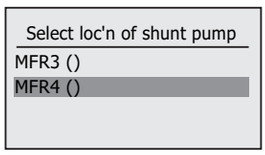






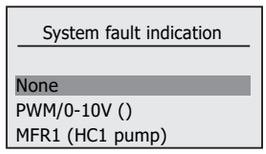


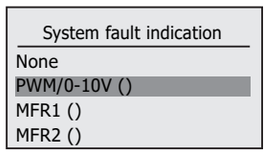


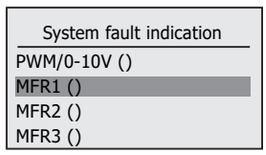


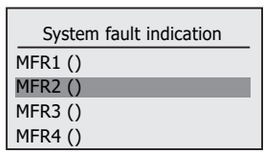
System Fault Indication:

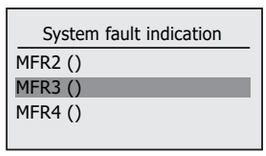
If the Master boiler has Slave boilers or Extension Modules connected and the requirement to signal errors for the plant then select the output that is used to control it from the list. Otherwise select 'None'.

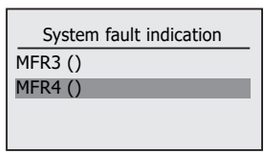








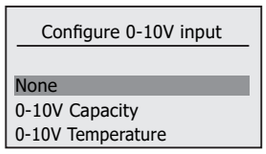


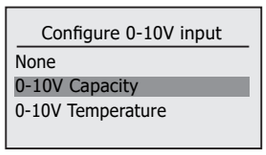


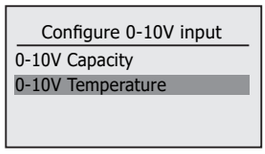
0-10V Input:

If the Plant is to be controlled by a single 0-10V signal, this can be configured. Otherwise set to 'None'.

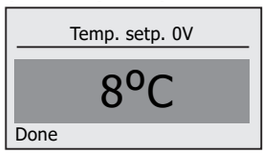
The options are Capacity or Temperature control, with additional parameters for Temperature control:

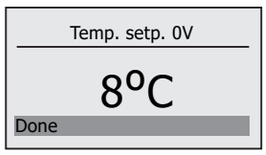




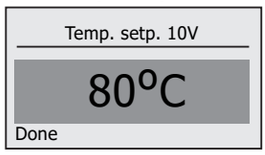


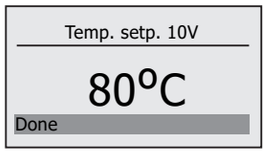
0-10V input Temp. Setp. 0V:



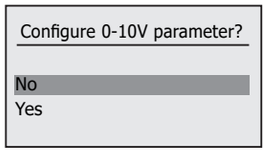


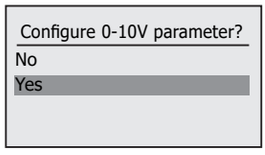
0-10V input Temp. Setp. 10V:



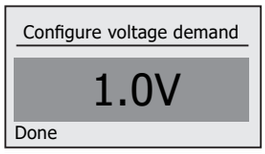


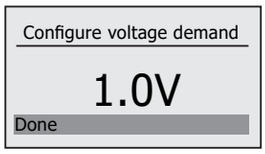
Configure 0-10V Parameters:



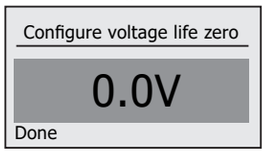


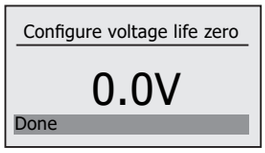
Voltage demand. This setting determines the switching point at which demand is expected by the system, anything below this is at keep alive voltage:





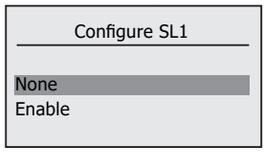
Voltage life zero. This setting determines the minimum keep alive voltage where the system expects a voltage to be present on an operational interface, anything below this indicates a wiring fault:

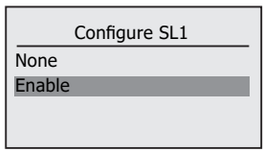


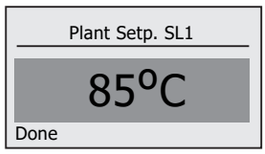


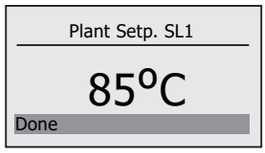
Switched Live 1 Input Function:

The SL1 input can be configured as a Plant function, if this is not required select 'None'.





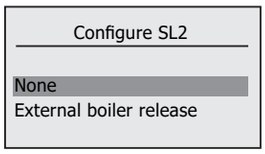


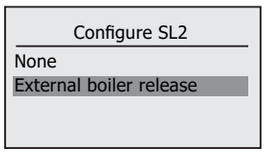


External boiler release:

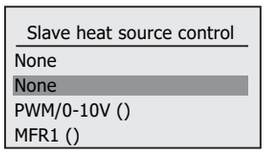
If the System manager is controlling an external heat source then this can be configured next.

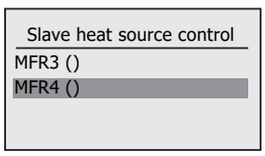
The SL2 input is now configured to indicate to the System manager that the slave heat source is available to deliver heat into the cascade.



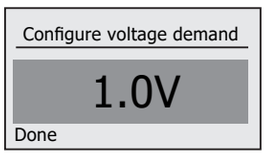


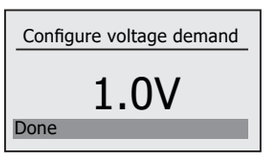
The control signal for the external heat source must now be identified, this will be the demand control for the external heat source when it becomes available.

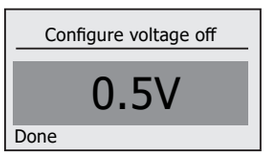


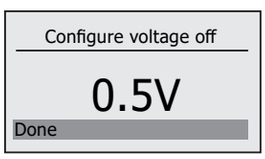


If the PWM/0-10V output is configured to control the External heat source, then additional parameters must be set:

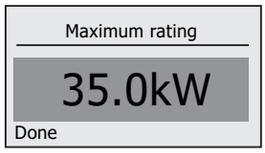


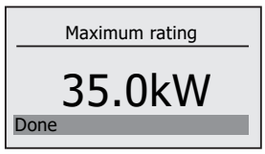






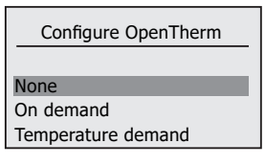
When an external heat source is configured, the available heat capacity of that source must be set.

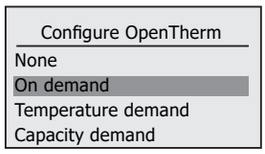




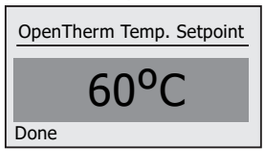
Plant OpenTherm interface:

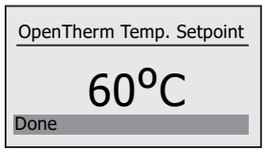
Plant OpenTherm control. If the boiler has the requirement to use the OpenTherm interface then select the connection type used from the list. Otherwise set to ‘None’.



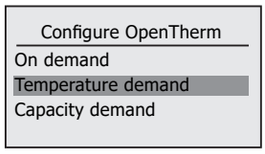


For On demand there is an associated flow temperature setpoint:

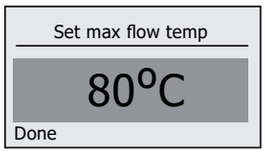


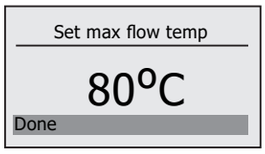


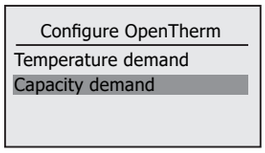
For temperature demand the maximum flow temperature set oint can be set.



OpenTherm Max. Flow temperature:

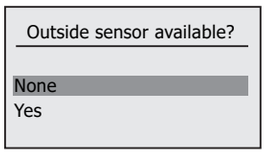


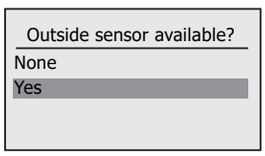




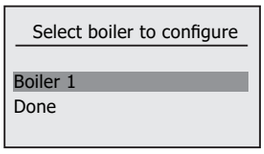
Outside Sensor:

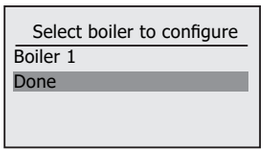
This sensor can be selected and used for all demands to the boiler, if this is not required select ‘None’:





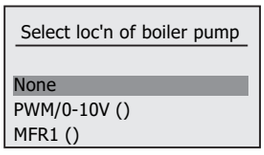
2.32.5 Boiler Configuration:

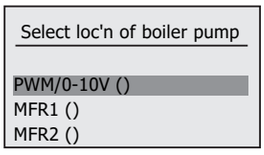


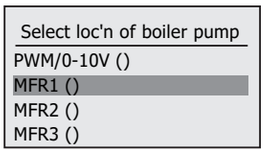


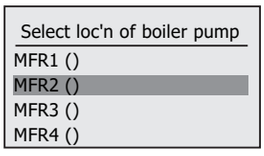
Boiler Pump Location:

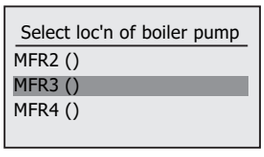
If the boiler has an individual Boiler Pump connected then select the output that is used to control it from the list. Otherwise select 'None'.

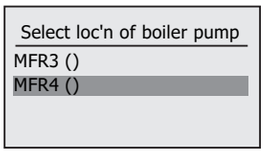






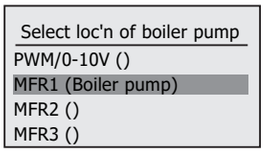






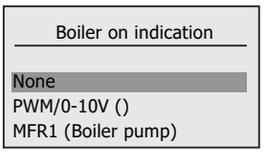
Once an output has been configured the selected function is shown in brackets behind the output name:

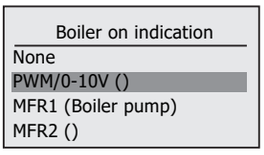
Example MFR1 as a boiler pump.

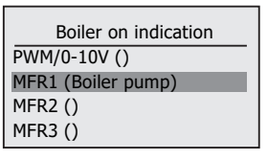


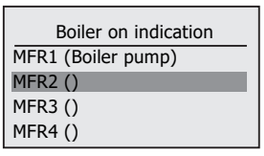
Boiler On Indication:

If the boiler has the requirement to signal when the burner is lit then select the output that is used to control it from the list. Otherwise select 'None'.



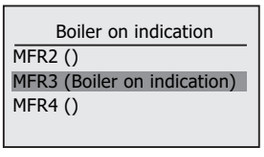






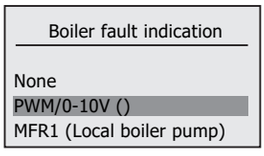
Once an output has been configured the selected function is shown in brackets behind the output name:

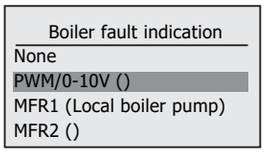
Example MFR3 as a boiler on indication:

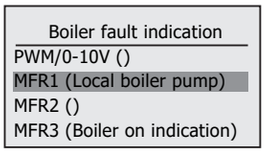


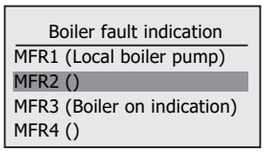
Boiler Fault Indication:

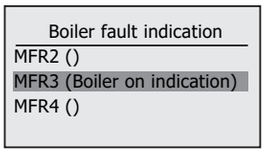
Boiler fault indication. If the boiler has the requirement to signal when the Boiler is at fault then select the output that is used to control it from the list. Otherwise select 'None'.





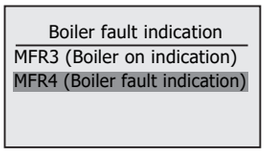






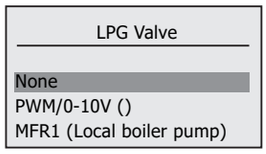
Once an output has been configured the selected function is shown in brackets behind the output name:

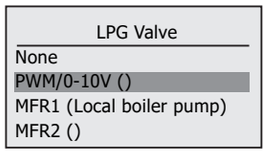
Example MFR4 as a boiler fault indication.

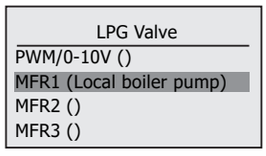


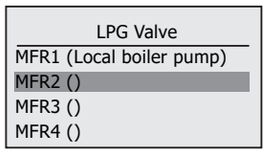
LPG Valve:

If the boiler has the requirement to control an external LPG valve then select the output that is used to control it from the list. Otherwise select 'None'.



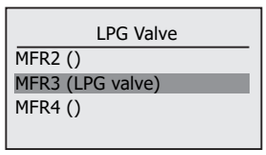






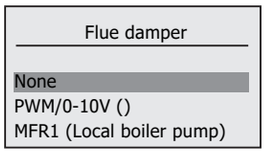
Once an output has been configured the selected function is shown in brackets behind the output name:

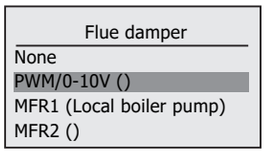
Example MFR3 as an LPG valve control.

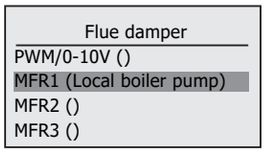


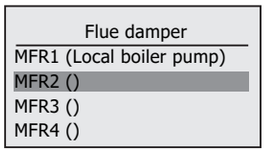
Flue Damper:

If the boiler has the requirement to control an external flue damper then select the output that is used to control it from the list. Otherwise select 'None'.



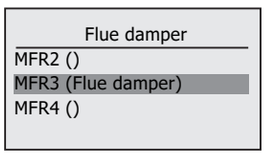




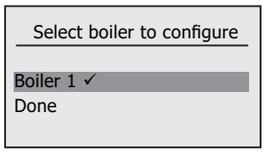


Once an output has been configured the selected function is shown in brackets behind the output name:

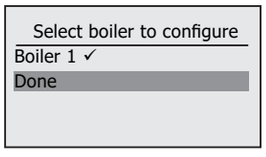
Example MFR3 as a flue damper control:



The boiler has now been configured and the display will return to:

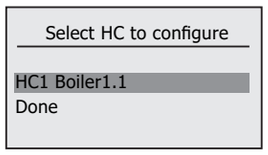


Note. The boiler number now has a tick next to it showing that it has been configured. If you completed the boiler configuration, select 'Done'.

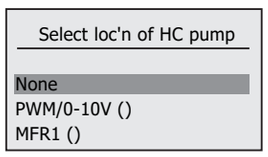


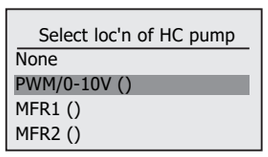
2.32.6 Heating Circuit Configuration:

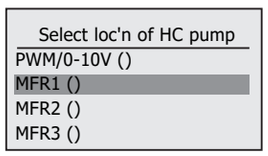
Heating circuit selection for configuration. Select the HC from the available heating circuits in the list:

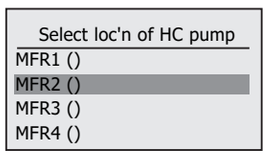


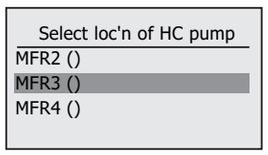
HC pump location. If the HC has an individual HC Pump connected then select the output that is used to control it from the list. Otherwise select 'None'.

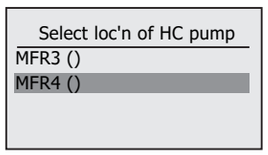






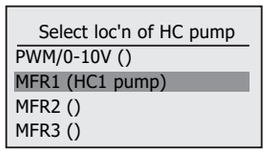




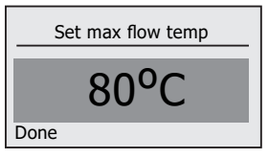


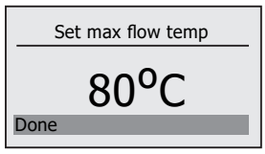
Once an output has been configured the selected function is shown in brackets behind the output name:

Example, MFR1 as a HC pump:

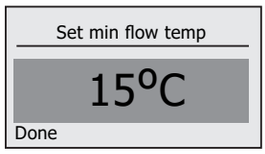


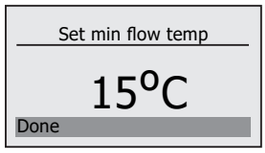
The HC maximum temperature set-point can be set, it defaults to the maximum output of the boiler model, but this can be decreased:



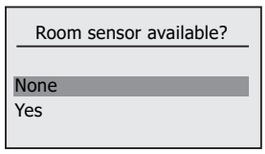


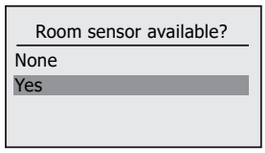
The HC minimum set-point can be set, it defaults to the minimum output of the boiler model, but this can be increased:



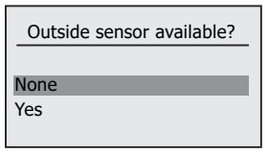


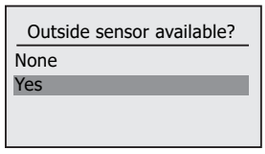
Room Sensor. If the HC has a Room Sensor connected then select 'Yes' from the list. Otherwise set to 'None'.



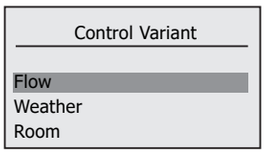


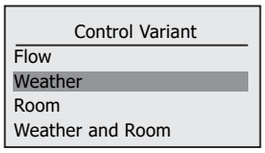
Outside Sensor. If the HC has a specific Outside Sensor connected then select 'Yes' from the list. Otherwise set to 'None'.

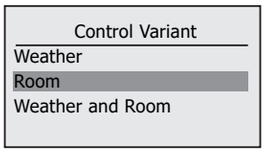


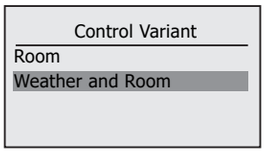


Control variant. The HC must have a control variant that is used to determine the demand. This is usually set to Flow Temperature unless specific configuration options are chosen.

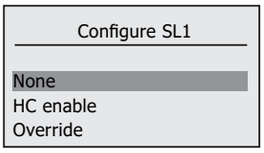


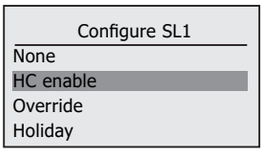


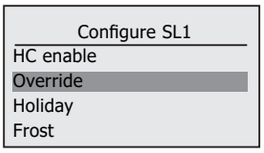


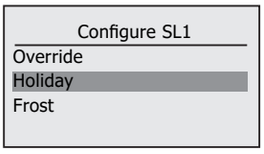


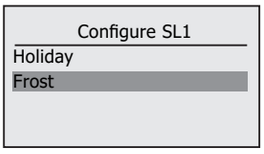
Switched Live 1 input function. The SL1 input can be configured as a HC function, if this is not required select 'None'.



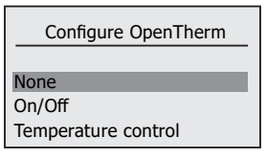


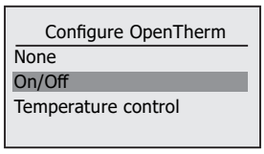


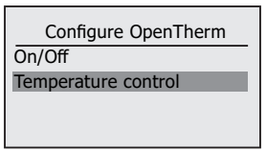




OpenTherm input function. The OpenTherm interface can be configured as a HC function, if this is not required select 'None'.

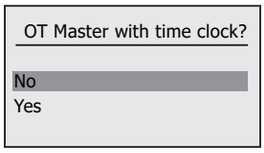


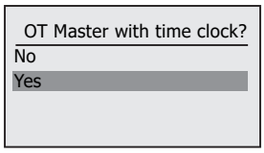




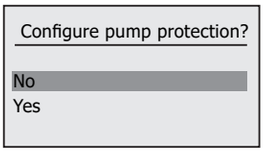
If the external OpenTherm device has its own timeclock then confirm this on the next screen.

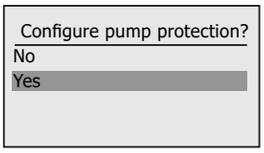
OT Master with time clock.



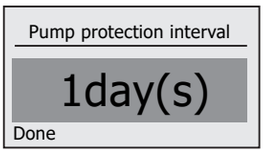


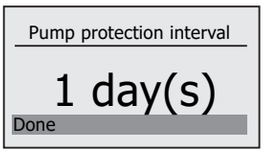
Pump protection. To enable seizure protection on pumps/valves connected to the HC, select 'Yes'.



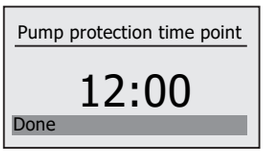


Pump protection. The pump protection and interval operation time can now be set:

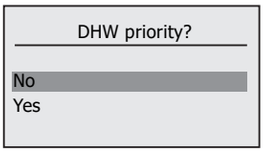


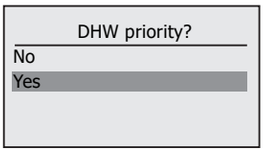




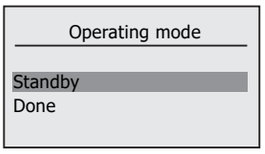


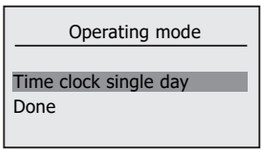
DHW priority. If the HC is requried to give priority to any DHW demands in the system then select 'Yes'.

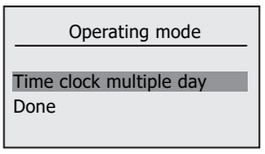


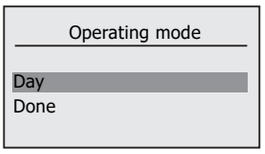


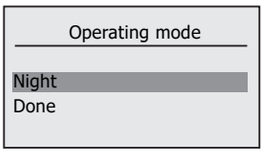
Operating mode. The operating mode of the HC can be set from a scrolling field, once this is set then the HC configuration is completed by selecting 'Done'.



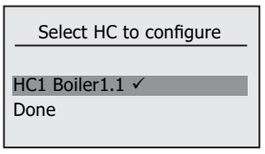




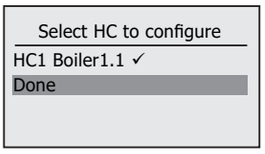




The HC has now been configured and the display will return to:

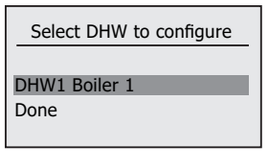


Note, that the HC number now has a tick next to it showing that it has been configured. If you have completed the HC configuration, select 'Done'.



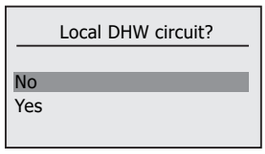
2.32.7 DHW Configuration

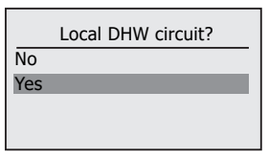
DHW circuit selection for configuration. Select the DHW circuit from the available DHW circuits in the list:



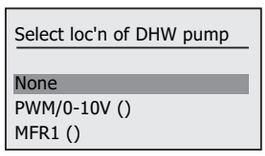
Local DHW Circuit

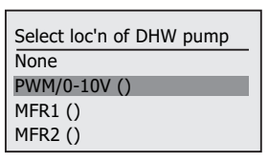
If the Master boiler has its own independent DHW circuit then select ‘Yes’, if not select ‘No’.

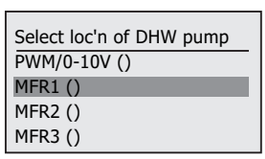


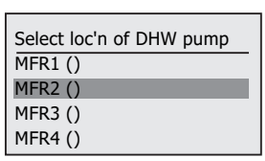


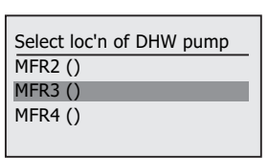
DHW pump location. If the DHW circuit has an individual DHW Pump connected then select the output that is used to control it from the list. Otherwise select 'None'.

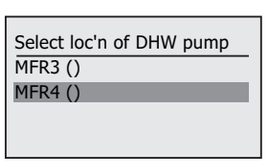




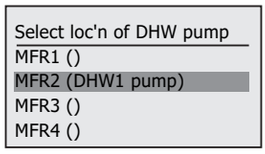




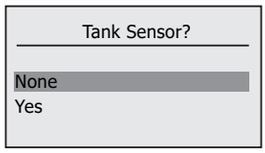


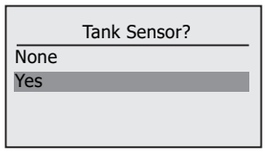


Example, MFR2 as a DHW pump:

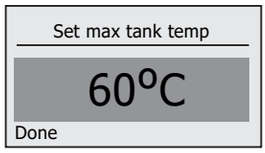


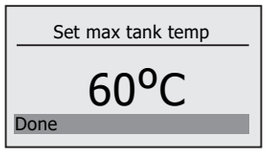
Tank Sensor. If the DHW has a Tank Sensor connected then select 'Yes' from the list. Otherwise set to 'None'.



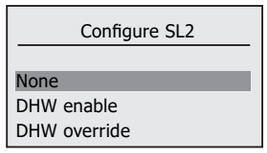


The DHW maximum tank temperature set-point can be set, it defaults to the maximum DHW output of the boiler model, but this can be decreased:

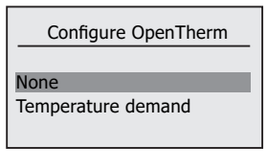


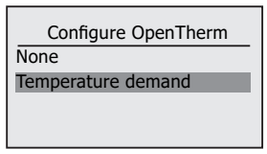


SL2 input function: The SL2 input can be configured to act as an enable, in the case of a tank thermostat with the internal timer, or as an override switch/tank thermostat with external timer. By default the SL2 input must be wired via a safety thermostat and isolating valve on a pressurised DHW tank, and must always be present for the DHW tank charge to operate.

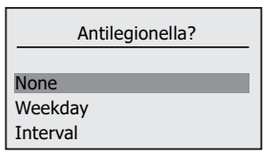


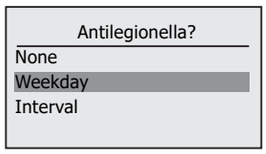
OpenTherm Input Function. The OpenTherm interface can be configured as a DHW circuit control function, if this is not required, select 'None'.



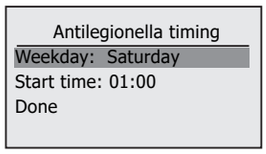


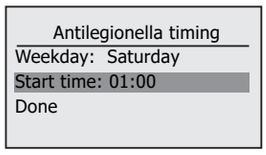
Antilegionella. If the DHW tank requires the Antilegionella function then select either 'Weekday' or 'Interval' from the list. Otherwise set to 'None'.





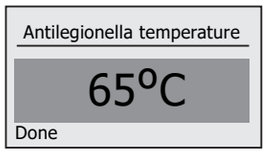
For weekday set the following parameters, followed by 'Done':

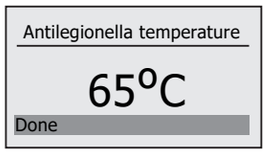




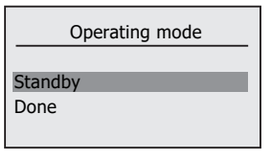


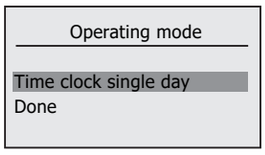
Then set the desired Antilegionalla temperature, followed by 'Done':

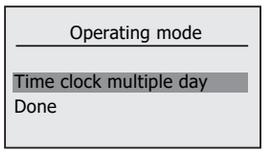




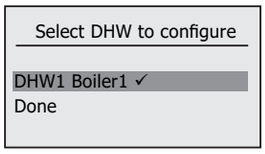
Operating mode. The operating mode of the DWH Circuit can be set from a scrolling field, once this is set then the DHW Circuit configuration is completed by selecting 'Done'.



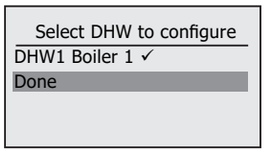




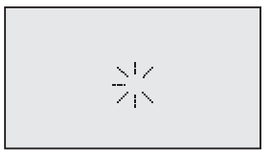
The DHW circuit has now been configured and the display will return to:

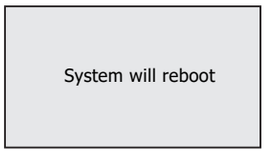


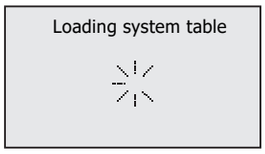
Note, that the DHW circuit number now has a tick next to it showing that it has been configured. If you have completed the DHW circuit configuration, select 'Done':



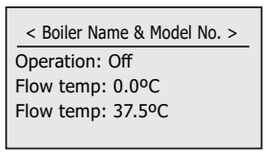
The system will now reboot:







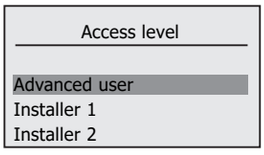
The boiler configuration is now complete and the display will show the boiler status screen:

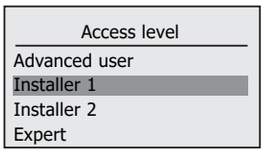


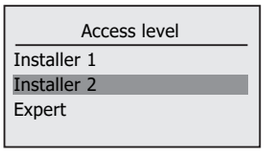
If you need to re-configure a function in the boiler then the appropriate access level needs to be enabled.

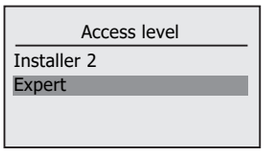
2.32.8 Menu – Configuration – General – Access level

The Access level screen is then displayed and each item can be selected and the default access level code can be changed:

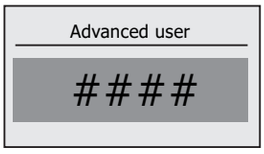




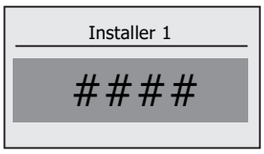




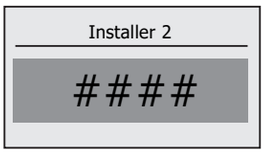
Once an access level is selected then the display will allow the current access level code to be entered. Each access level has its own initial code:



Default code 2222

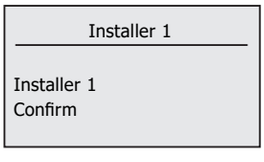


Default code 3333



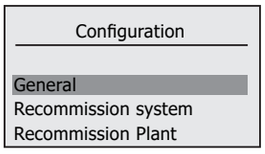
Default code 4444

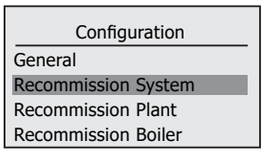
Once the correct code has been entered the following confirmation screen will be displayed for a short period, depending upon which access level was selected:

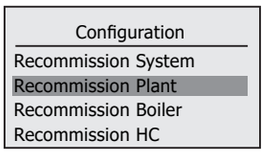


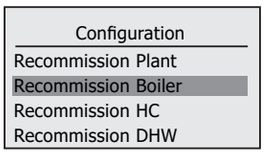
2.32.9 Menu - Configuration

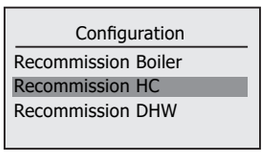
All menus and setting will now be available for that particular access level. There will now also be the chance to reconfigure different functions within the system:

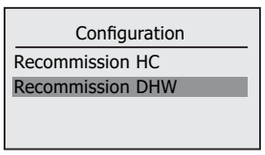












Depending upon the access level, not all configuration options will be available.

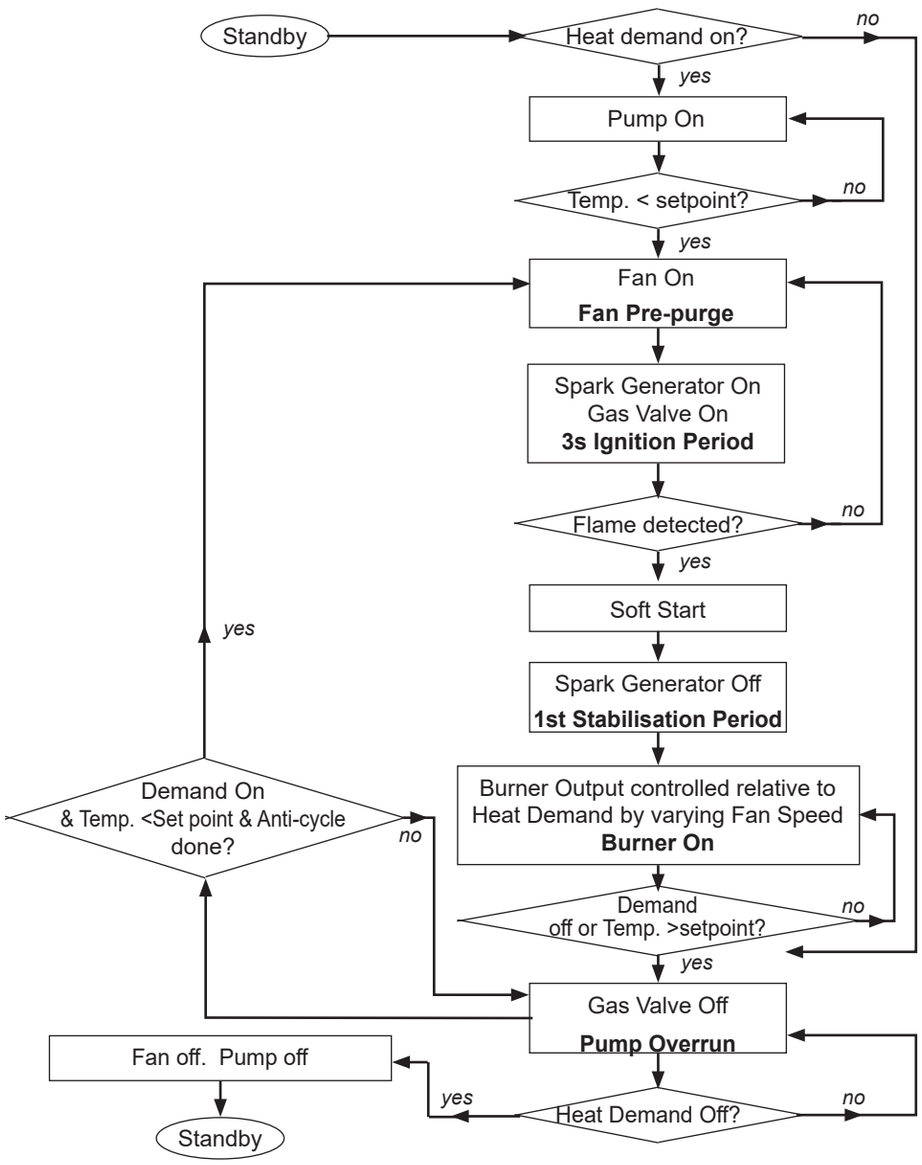
Once selected, refer to the Configuration section above for guidance.

2.33 INITIAL LIGHTING

1. Check that the system has been filled and the boiler is not air locked - air in the boiler could damage the heat exchanger. For this reason the air vent located in the left top side must never be shut off.
2. Check that all the drain cocks are closed and any valves in the flow and return are open.
3. Check that the GAS SERVICE COCK IS ON.
4. Fill the condensate trap with water before putting the unit into operation (see Section 3.7 for condensate trap removal).
5. Check the indication on the pressure gauge. If the pressure is less than 1 bar the installation should be filled up first (sealed system only).
6. Switch the electricity supply ON and check that all the external controls are calling for heat. Check boiler is set for winter operation - see boiler user interface basic operating instructions.
7. The boiler will commence the ignition sequence. If after 5 attempts the boiler has failed to light then it will lock out. Press the reset button to restart the ignition sequence.
8. Operate the boiler for 10 minutes and check the gas rate (Table 1). You should be able to read at least 90% of the nominal. If this is not possible contact the boiler manufacturer.

Flue CO_2 % measurements (hot condition)									
	40	60	80	100	120	150	40P	60P	80P
Max Rate	10.2	9.4	9.3	9.4	9.6	9.4	11.2	11.4	11.4
Min Rate	8.6	8.6	8.7	8.6	9.0	8.5	9.7	10.2	10.8

OPERATING SEQUENCE



2.34 GENERAL CHECKS

Make the following checks for correct operation.

1. The correct operation of ANY secondary system controls should be proved. Operate each control separately and check that the main burner or circulating pump, as the case may be, responds.
2. Water circulation system;
   a. With the system HOT examine all water connections for soundness.
   b. With the system still HOT, turn off the gas, water and electricity supplies to the boiler and drain down to complete the flushing process.
   c. Refill and vent the system, clear all air locks and again check for water soundness.
   d. Balance the system.
3. Check the condensate drain for leaks and check it is discharging correctly.
4. Finally set the controls to the User's requirements.

Note. *If an optional programmer kit is fitted then refer to the instructions supplied with the kit.*

2.35 HANDING OVER

ROUTINE OPERATION

Full instructions covering routine lighting and operation of the boiler are given in the User Guide located on the inside of the lower controls door..

Draw the attention of the boiler owner or his representative to the User Guide. Give a practical demonstration of the lighting and shutting down of the boiler.

Describe the function of the boiler and system controls and show how they are adjusted and used.

Hand these Installation and Servicing Instructions, and Log book to the customer and request him to keep them in a safe place for ready reference. Place the User Guide back into the lower controls door. For IE, it is necessary to complete a "Declaration of Conformity" to indicate compliance to the appropriate standard.

IMPORTANT. Point out to the owner that the boiler must have regular maintenance and cleaning, at least annually, in order to ensure reliable and efficient operation. Regular attention will also prolong the life of the boiler and should preferably be performed at the end of the heating season.

After servicing, complete the service Section of the log book and return to the owner or their representative.

Recommend that a contract for this work should be made with the regional gas authority or a suitably qualified Gas Safe Registered Engineer. In IE servicing work must be carried out by a competent person.

2.36 SAFETY

It is the law that any service work must be carried out by a Suitably qualified Gas Safe Registered Engineer. In IE service work must be carried out by a competent person.

***WARNING*. Always turn off the gas supply at the gas service cock, and switch off and disconnect the electricity supply to the appliance and any external controls before servicing or replacing components.**

IMPORTANT.

After completing the servicing or replacement of components always:

- Test for gas soundness.
- Check the water system is correctly filled and free of air. Air in the boiler could cause damage to the heat exchanger. For this reason the automatic air vent / vent tube in the left top side must never be blocked.
- Check the jacket front panel is correctly fitted, ensuring that a good seal is made. Secure the controls fascia in place.
- With the system hot examine all water connections for soundness.
- Check the gas rate and measure the combustion CO/CO_2 content. The CO/CO_2 ratio of the flue gas should not be greater than 0.004 ratio & the CO should not exceed 350ppm.
- Carry out functional checks as appropriate.

3. SERVICING

3.1 SERVICING SCHEDULE

Note. *Refer to "System Set up information" at rear of User Guide.*

To ensure the continued safe and efficient operation of the appliance it is recommended that it is checked at regular intervals and serviced as necessary. The frequency of servicing will depend upon the installation condition and usage but should be carried out at least annually.

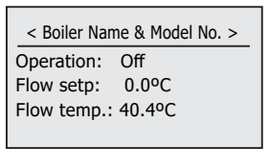
Ideal Heating does not accept any liability resulting from the use of unauthorised parts or the repair and servicing of appliances not carried out in accordance with the Company's recommendations and specifications.

Note. *Some aluminium oxide build-up within the heat exchanger assembly is quite usual with this type of condensing boiler. Though removal and cleaning is recommended annually, the heat exchanger, sump and condensate trap must be inspected and cleaned after a maximum of 2 years operation.*

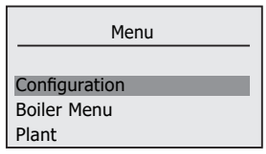
1. Light the boiler and carry out function checks, noting any operational faults.
2. Run the boiler for 5 minutes and then check the gas consumption rate. Refer to procedure opposite on how to force the burner to maximum rate.
3. Optional test - Connect a suitable gas analyser to the sampling point fitted in the flue adapter. For correct boiler operation the CO/CO_2 ratio of the flue gas should not be greater than 0.004 ratio and the CO_2 values should match those in table 1. If this is the case and the gas input is at least 90% of the nominal, once compliance with the note above is ensured, then no further action need be taken. If not proceed to 4.
4. Remove and clean the burner. Refer to Sections 3.5. If after cleaning the burner the gas input is not at least 90% of the nominal then contact the boiler manufacturer.
5. Inspect the heat exchanger through the burner opening. If there are signs of aluminium oxide build up, spray water down the flueways. Refer to Section 3.6.
6. Remove the sump cover/Helmholtz where fitted and scrape out any deposits. Refer to Section 3.8.
7. Remove the condensate trap and flush through with water. Refer to Section 3.7.
8. Check that the flue terminal is unobstructed and that the flue system is sealed correctly.
9. After completion of servicing Refer to Section 2.35 for reference to final safety checks.

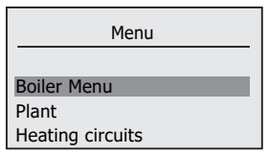
SETTING TO MAXIMUM OR MINIMUM OUTPUT

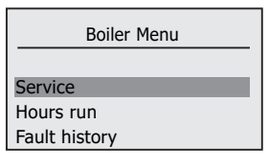
Ensure that there is a current CH demand to the boiler (e.g. the CH Switched Live is on)

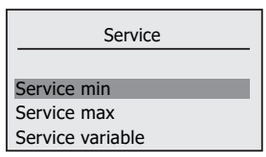


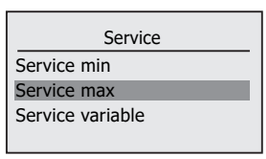
Press "OK" and the following screen witll be displayed.

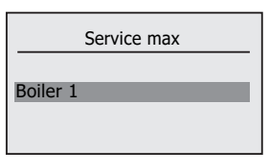


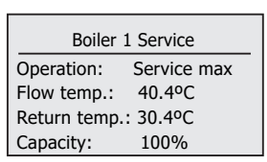








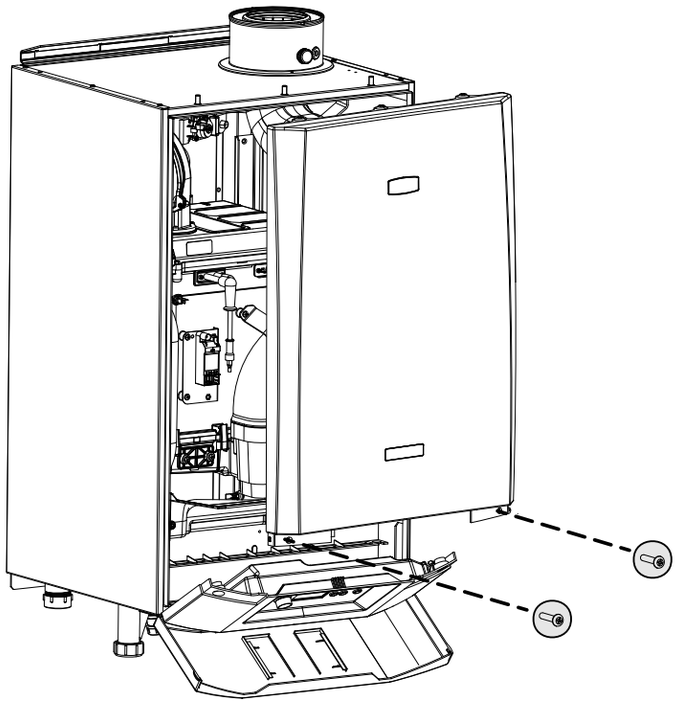




Press "OK" and the boiler will go to Maximum Rate for 10 minutes after which normal operation will resume.

3.2 REMOVAL OF CASING

Refer to Section 2.35.



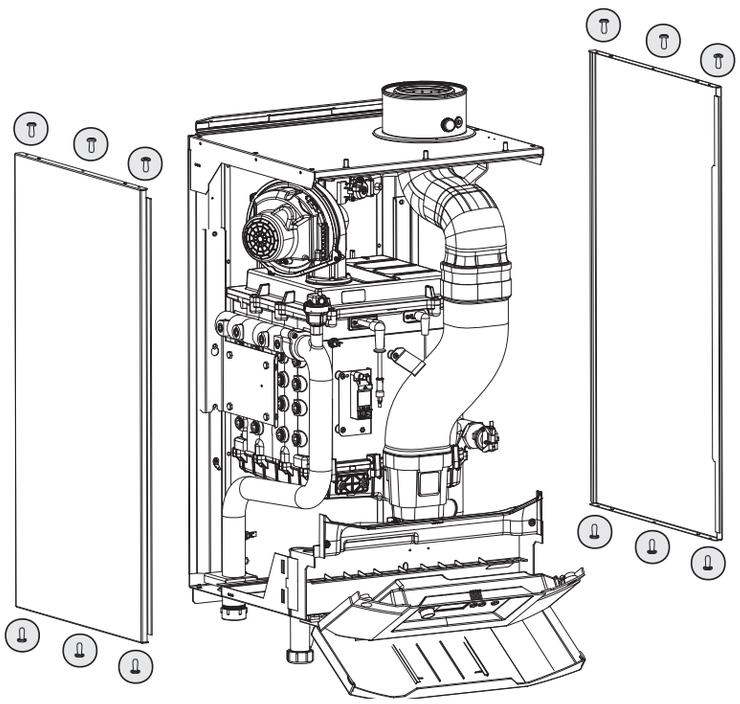
Front Panels

1. Open the control casing door.
2. Remove the two screws retaining the front panel, lift the panel to remove.
3. Lower the control panel to the service position.

Side Panels

Note. Removal of side panels is not required for normal service.

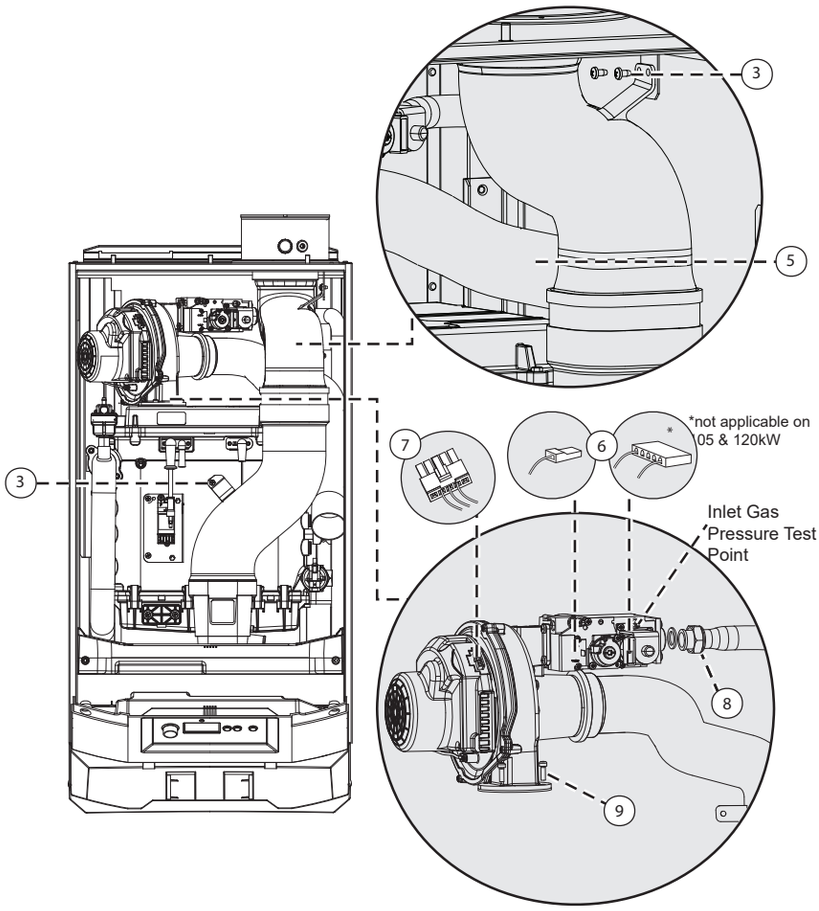
4. Remove the screws from the top and bottom of the side panels.
5. Re-assemble in reverse order.



3.3 REMOVAL OF FAN AND GAS VALVE ASSEMBLY

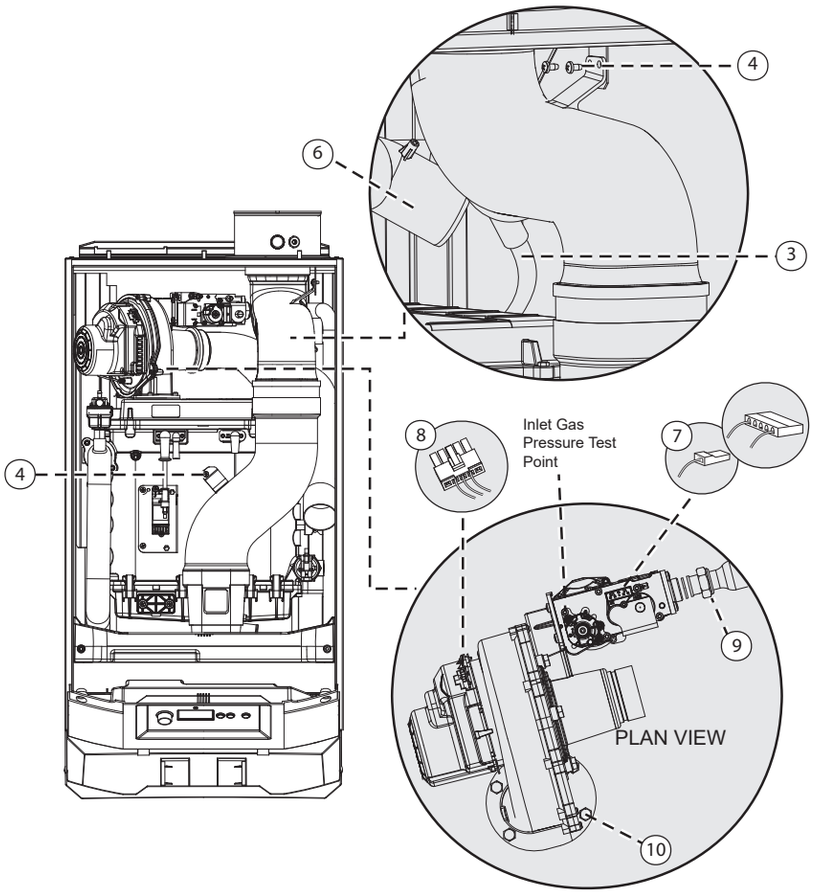
MODELS: 40 / 60 / 80 / 100 / 120

1. Refer to Section 2.35.
2. Remove the upper front panel, Refer to Section 3.2.
3. Remove the three screws retaining the upper and lower flue manifold.
4. To remove the flue manifold lift up the flue Sections and disengage from the sump then pull the flue Sections downwards and remove.
5. Remove the air inlet damper fixing screw and then remove the air inlet damper and seal.
6. Disconnect the electrical connections from the gas valve.
7. Disconnect the electrical connections from the fan.
8. Undo the gas valve union nut and replace the fibre washer.
9. Remove the three screws retaining the fan assembly and remove the fan assembly.
10. Inspect & clean as necessary.
11. Re-assemble in reverse order replacing all gaskets.



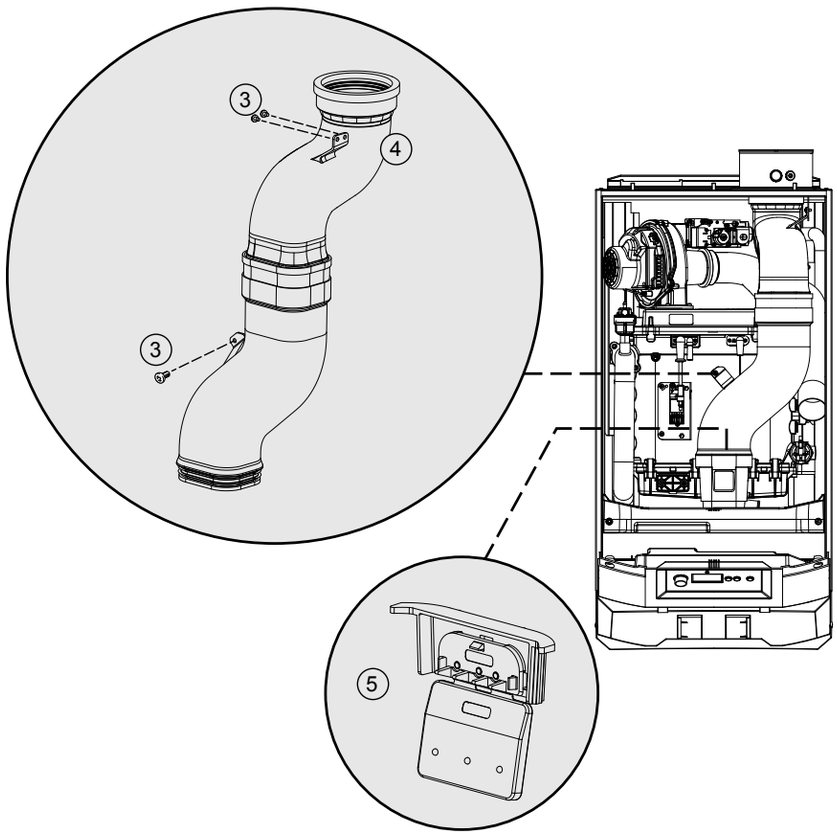
MODEL: 150

1. Refer to Section 2.35.
2. Remove the upper front panel, Refer to Section 3.2.
3. Disconnect the condensate pipe from the upper flue elbow.
4. Remove the three screws retaining the upper and lower flue manifold.
5. To remove the flue manifold lift up the flue Sections and disengage from the sump then pull the flue Sections downwards and remove.
6. Remove the air inlet damper.
7. Disconnect the electrical connections from the gas valve.
8. Disconnect the electrical connections from the fan.
9. Undo the gas valve union nut and replace the fibre washer.
10. Remove the four screws retaining the fan assembly and remove the fan assembly.
11. Inspect & clean as necessary.
12. Re-assemble in reverse order replacing all gaskets.



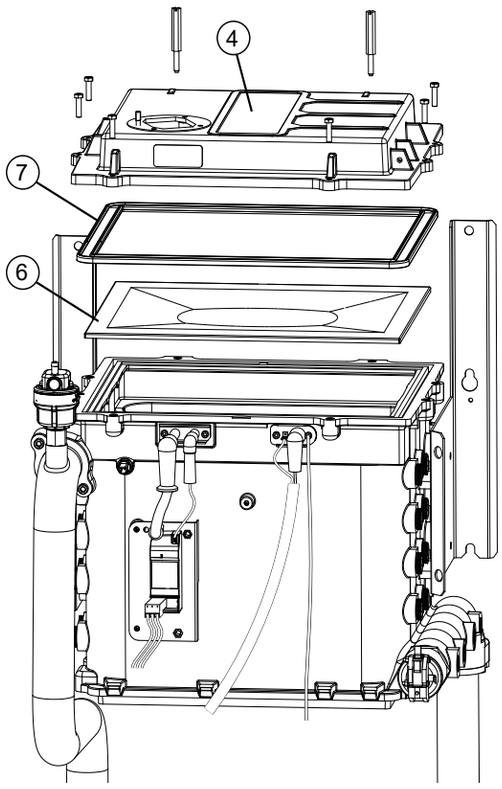
3.4 REMOVAL OF NON RETURN VALVE

1. Refer to Section 2.35.
2. Remove the upper front panel. Refer to Section 3.2.
3. Remove the screw retaining the lower flue manifold to the heat exchanger.
4. Lift up the flue Sections and disengage from the sump then pull the flue Sections downwards and remove.
5. Remove the Non Return Valve assembly and check for damage and that the non return valve moves freely. If any damage is apparent the whole assembly must be replaced. Ensure correctly sized non return valve is fitted.
6. Reassemble in reverse order, ensuring all flue manifold seals are located and undamaged. Replace if required.
7. Check the operation of the boiler. Refer to Section 2.35.

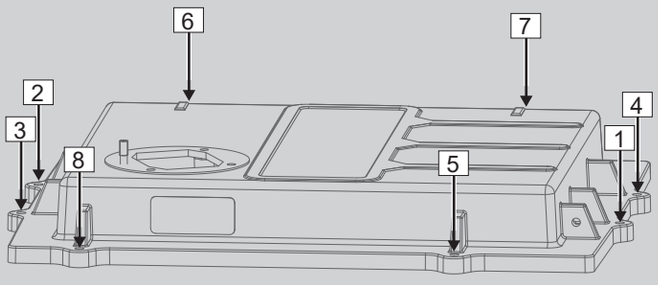


3.5 REMOVAL OF BURNER

1. Refer to Section 2.35.
2. Remove the front panel. Refer to Section 3.2.
3. Remove the fan and gas valve assembly. Refer to Section 3.3.
4. Remove the four or six screws and the two extended nuts securing the burner to release the burner body.
5. Lift the burner body by lifting out of its recess.
6. The burner can now be cleaned on the back face only, the metal fibre surface must not be touched. The burner must be replaced if it shows signs of damage.
7. After cleaning the burner replace it in the recess and check the burner body seal for signs of damage. If damage is apparent it must be replaced. The upstream (stainless steel) side may be cleaned of dust and debris.
8. Reassemble in reverse order. Ensure the notch in the burner aligns with the up-stand feature in the heat engine. The four or six screws and 2 extended nuts should be fitted following a diagonal tightening sequence twice*. All fittings should be secured firmly.
9. Check the operation of the boiler (Refer to Section 2.35).

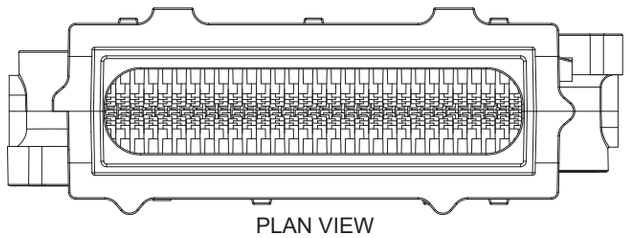


Optimum Sequence Assembly
(Items 1 & 2 only applicable to 40/60/80kW boilers)



3.6 HEAT EXCHANGER INSPECTION / CLEANING

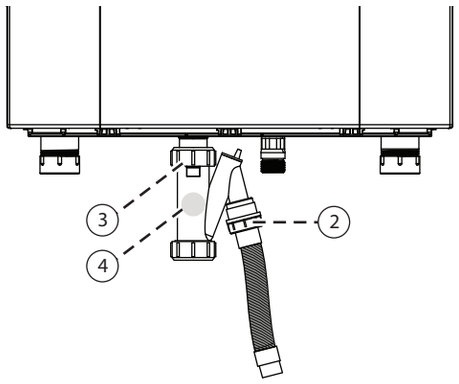
1. Refer to Section 2.35.
2. Remove the front panel. Refer to Section 3.2.
3. Remove the fan and gas assembly. Refer to Section 3.3.
4. Remove the burner. Refer to Section 3.5.
5. Remove the ignition and detection electrodes. Refer to Sections 3.12 & 3.13.
6. Inspect the heat exchanger for signs of aluminium oxide deposits. If necessary clean the heat exchanger by spraying water down the flue ways.
7. Reassemble in reverse order replacing all gaskets.
8. Check the operation of the boiler. Refer to Section 2.35.



PLAN VIEW
40kW shown

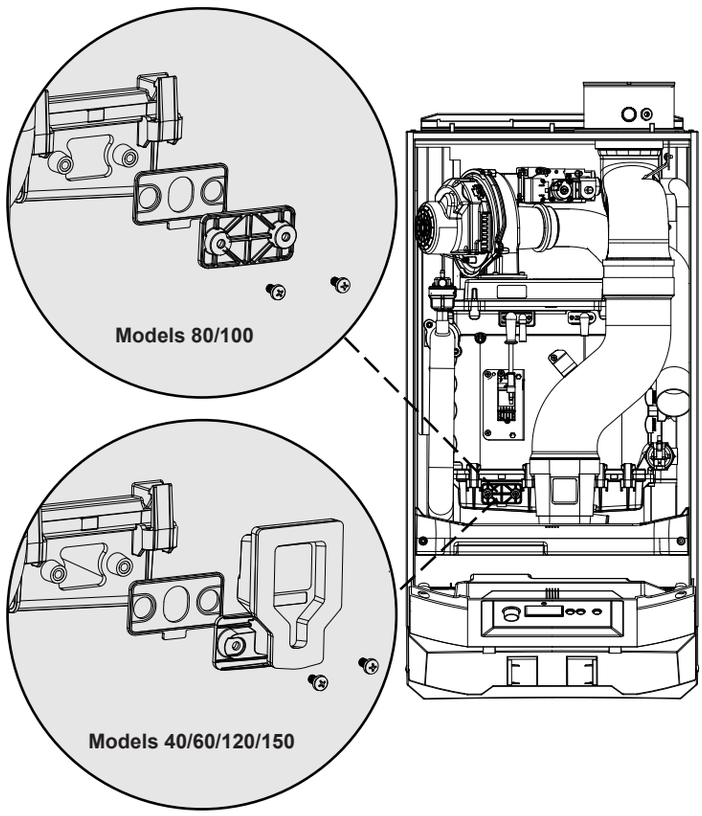
3.7 REMOVAL OF CONDENSATE TRAP

1. Refer to Section 2.35.
2. Unscrew the nut and disconnect the flexible pipe.
3. Unscrew the top nut and remove the condensate trap.
4. Remove the ball from the condensate trap and flush out with water to remove any debris.
5. Reassemble in reverse order.
6. Check the operation of the boiler. Refer to Section 2.35.



3.8 REMOVAL OF SUMP COVER

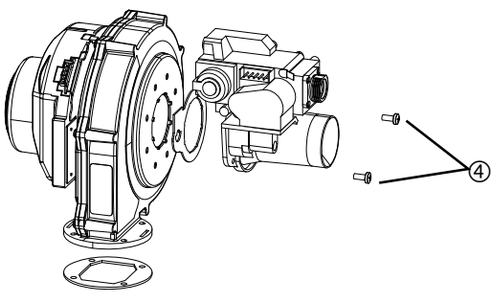
1. Refer to Section 2.35.
2. Remove the front panel. Refer to Section 3.2.
3. Prepare boiler for possible condensate spillage during the process.
4. Remove the two screws from the helmholtz / sump cover and pull away from the boiler.
5. Scrape out any deposits.
6. Reassemble in reverse order replacing all gaskets.
7. Check the operation of the boiler. Refer to Section 2.35.



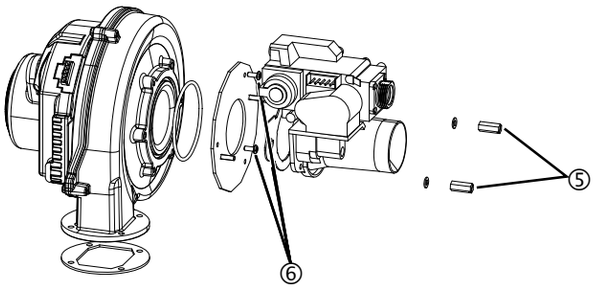
3.9 REMOVAL OF FAN

1. Refer to Section 2.35.
2. Remove the upper front panel (Refer to Section 3.2).
3. Remove the fan and gas assembly and air inlet damper (Refer to Section 3.2).
4. Remove the screws retaining the venturi to the fan (for 40, 60, 100 & 120).
5. Remove the extended nuts holding the venturi to the fan (80 only).
6. Remove the screws retaining the fan plate (80 only).
7. Transfer venturi and gas valve assembly to the new fan.
8. Reassemble in reverse order replacing all gaskets.
9. Check the operation of the boiler.
10. Refer to Section 2.35

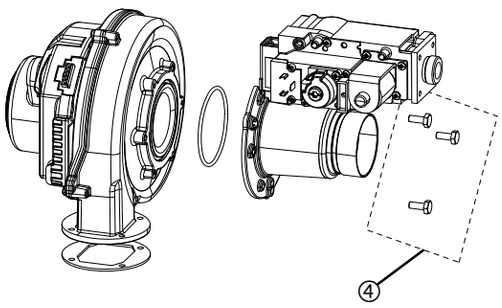
40 & 60kW



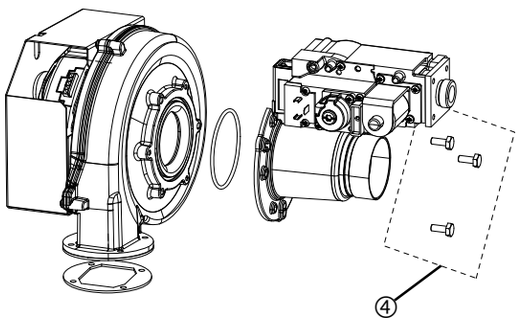
80kW



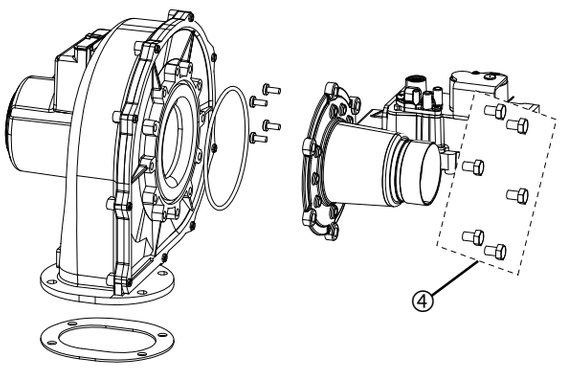
100kW



120kW



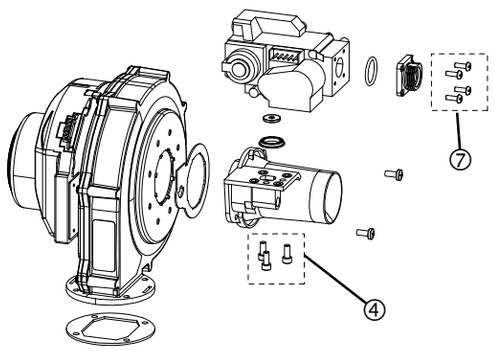
150kW



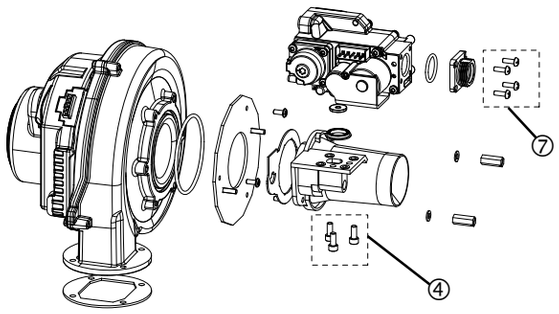
3.10 REMOVAL OF GAS VALVE

1. Refer to Section 2.35.
2. Remove the upper front panel (Refer to Section 3.2).
3. Remove the fan and gas assembly and air inlet damper (Refer to Section 3.2).
4. Remove the 3 screws holding the gas valve to the venturi (40,60,80 only).
5. Remove the venturi from the fan to access the gas valve fixing screws (100, 120 & 150 only Refer to Section 3.9).
6. Remove the four screws retaining the gas valve (100, 120 & 150).
7. Remove the 4 screws retaining the inlet flange to gas valve & transfer to new valve.
8. Fit new gas valve to venturi using the new seal provided, ensure gas injector is fitted correctly.
9. Reassemble in reverse order replacing all gaskets.
10. Check the operation of the boiler.
11. Refer to Section 2.35.

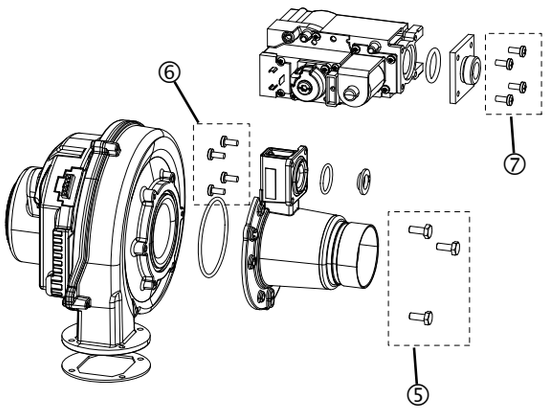
30, 40 & 60kW



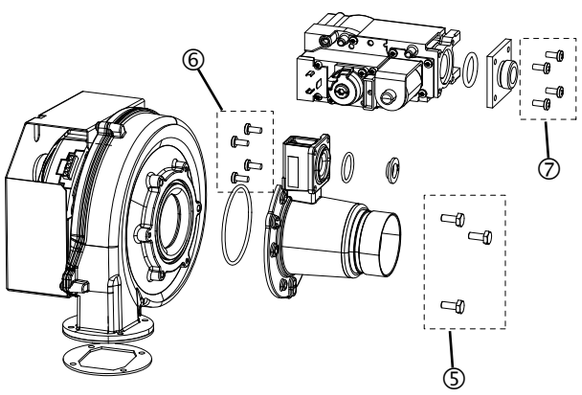
80kW



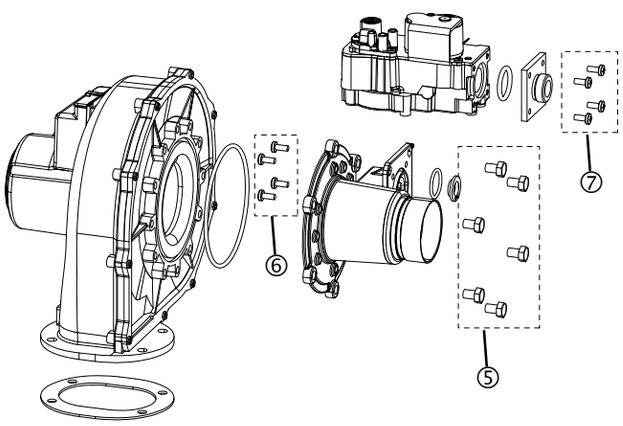
100kW



120kW

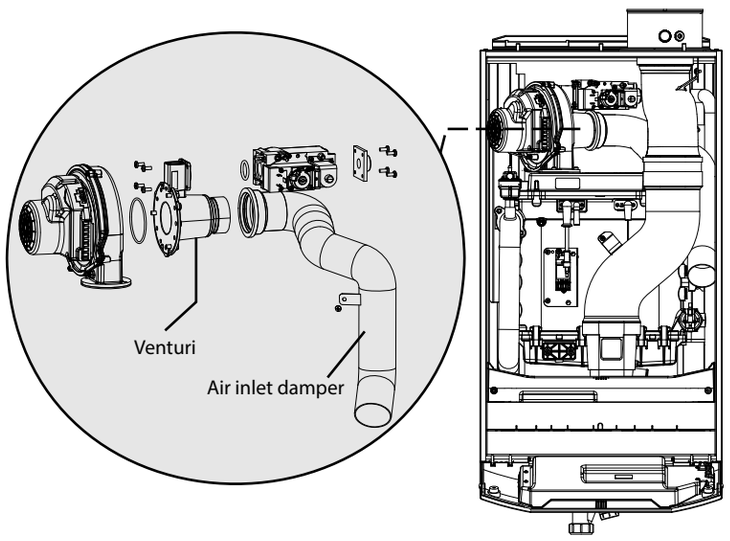


150kW



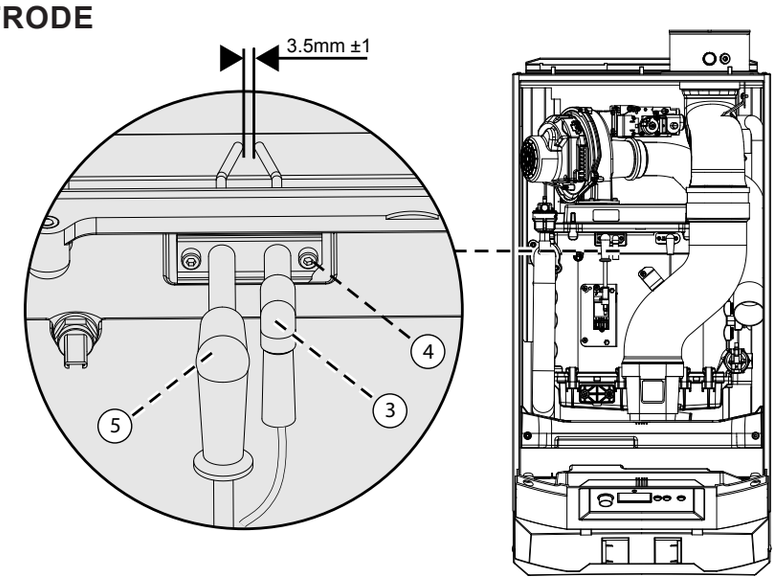
3.11 REMOVAL OF VENTURI / AIR INLET DAMPER

1. Refer to Section 2.35.
2. Remove the front panel. Refer to Section 3.2.
3. Remove the flue manifold complete with seal and remove the air damper Section (all but the 150kW have a fixing screw) refer to Section 3.4. If the air inlet damper is damaged go to points 6-8.
4. Remove the fan and gas assembly. Refer to Section 3.3.
5. Remove venturi from fan and gas valve. Refer to Sections 3.9 & 3.10.
6. Replace with new venturi/ air inlet damper if necessary ensuring the gas orifice is fitted and seal is replaced.
7. Reassemble in reverse order replacing all gaskets.
8. Check the operation of the boiler. Refer to Section 2.35



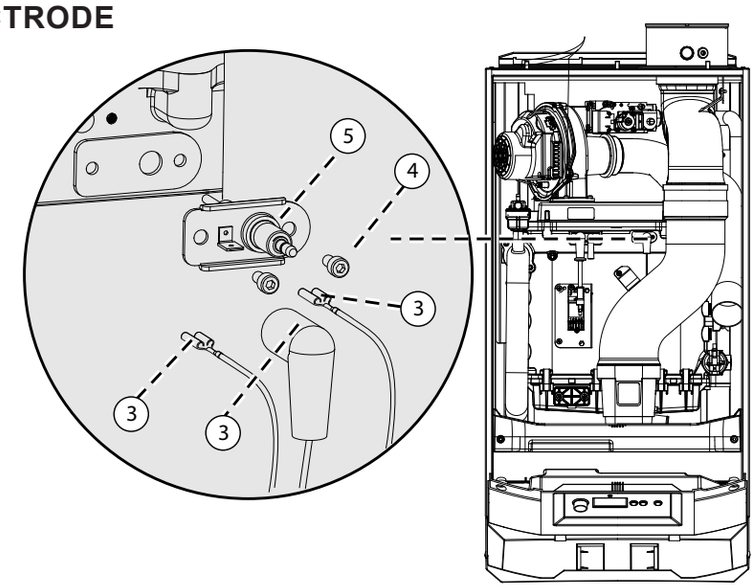
3.12 REMOVAL OF IGNITION ELECTRODE

1. Refer to Section 2.35.
2. Remove the front panel. Refer to Section 3.2.
3. Pull off the spark lead and earth connection.
4. Remove the two retaining cap head screws.
5. Pull out the electrode and pull off the old gasket.
6. Replace with new electrode and gasket supplied checking the spark gap is 3.5mm ±1.
7. Reassemble in reverse order.
8. Check the operation of the boiler (Refer to Section 2.35).



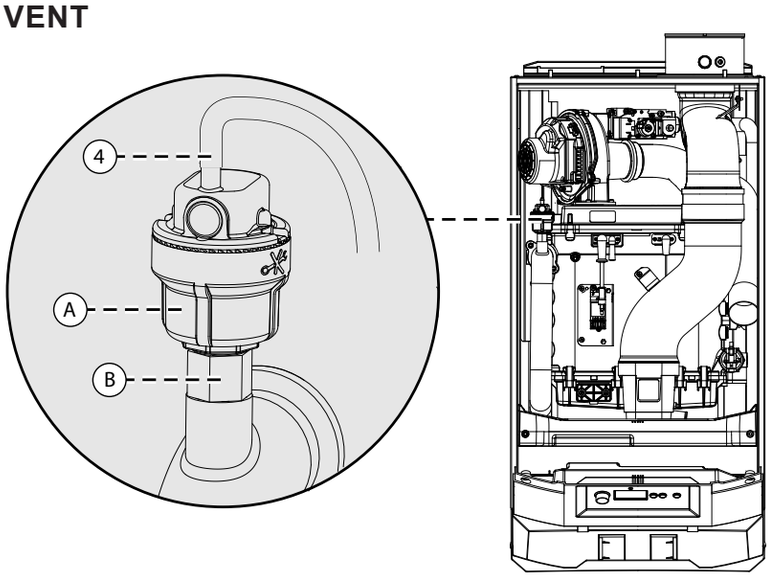
3.13 REMOVAL OF DETECTION ELECTRODE

1. Refer to Section 2.35.
2. Remove the front panel. Refer to Section 3.2.
3. Pull off the detection lead and earth connection.
4. Remove the two retaining cap head screws.
5. Pull out the electrode and pull off the old gasket.
6. Replace with new electrode and gasket ensuring correct electrode is fitted.
7. Reassemble in reverse order.
8. Check the operation of the boiler. Refer to Section 2.35.



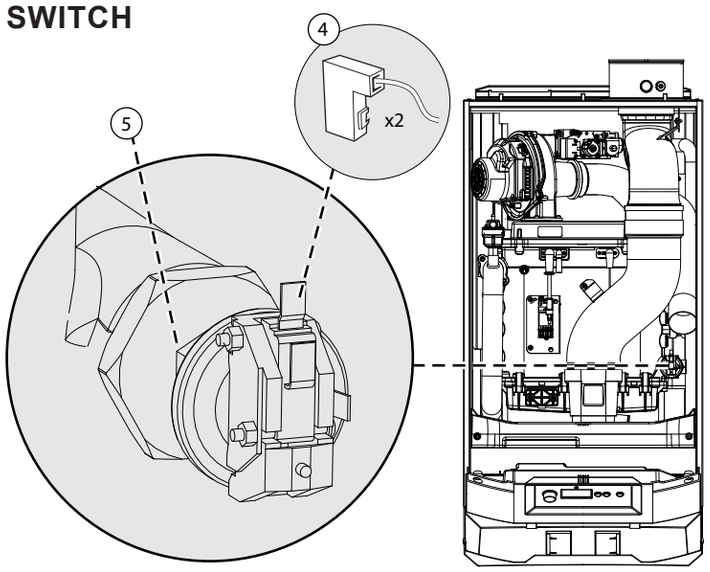
3.14 REMOVAL OF AUTOMATIC AIR VENT

1. Refer to Section 2.35.
2. Remove the front panel. Refer to Section 3.2.
3. Unscrew the air vent (A) from the self sealing fitting (B) on the top left of the flow pipe.
4. Remove the clear tubing from the air vent spigot.
5. Fit the new air vent.
6. Refit the clear plastic drain tubing ensuring there are no kinks as air in the boiler could cause damage to the heat exchanger.
7. Re-assemble in reverse order.
8. Check the operation of the boiler. Refer to Section 2.35.



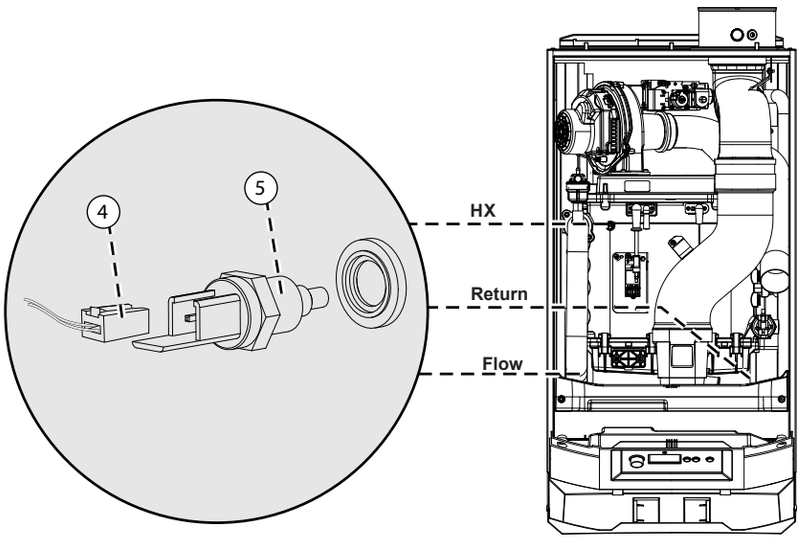
3.15 REMOVAL OF WATER PRESSURE SWITCH

1. Refer to Section 2.35.
2. Remove the front panel. Refer to Section 3.2.
3. Isolate the water circuit and drain the boiler.
4. Disconnect the electrical connections from the switch.
5. Unscrew the water pressure switch.
6. Refit new switch.
7. Connect electrical connections.
8. Refill the system ensuring all the air escapes via the air vent.
9. Reassemble in reverse order.
10. Check the operation of the boiler. Refer to Section 2.35.



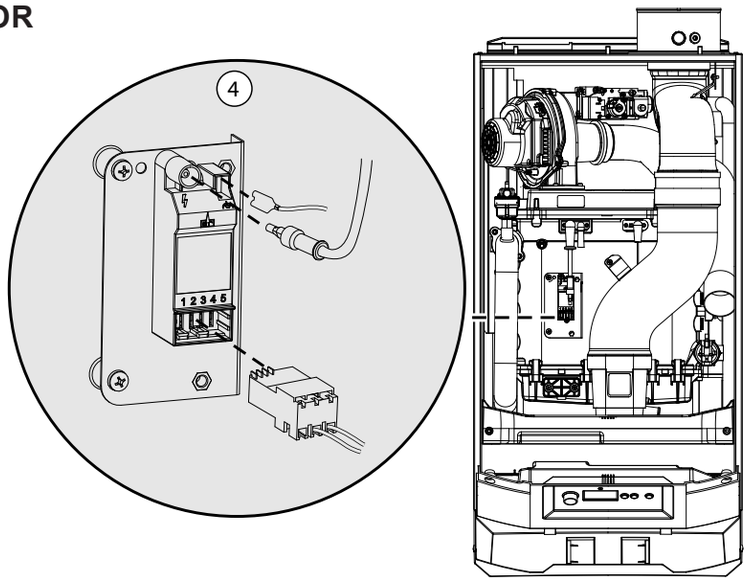
3.16 REMOVAL OF FLOW / RETURN / HEAT EXCHANGER THERMISTOR

1. Refer to Section 2.35.
2. Remove the front panel. Refer to Section 3.2.
3. Isolate the water circuit and drain the system.
4. Disconnect the electrical connections from the thermistor.
5. Unscrew the thermistor.
6. Fit the new thermistor and seal. Do not overtighten.
7. Refill the system ensuring all the air in the heat exchanger is vented through the air vent.
8. Re-assemble in reverse order.
9. Check the operation of the boiler. Refer to Section 2.35.



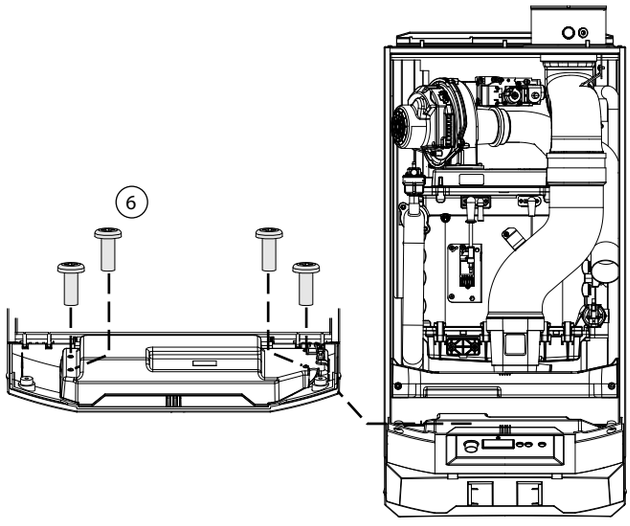
3.17 REMOVAL OF SPARK GENERATOR

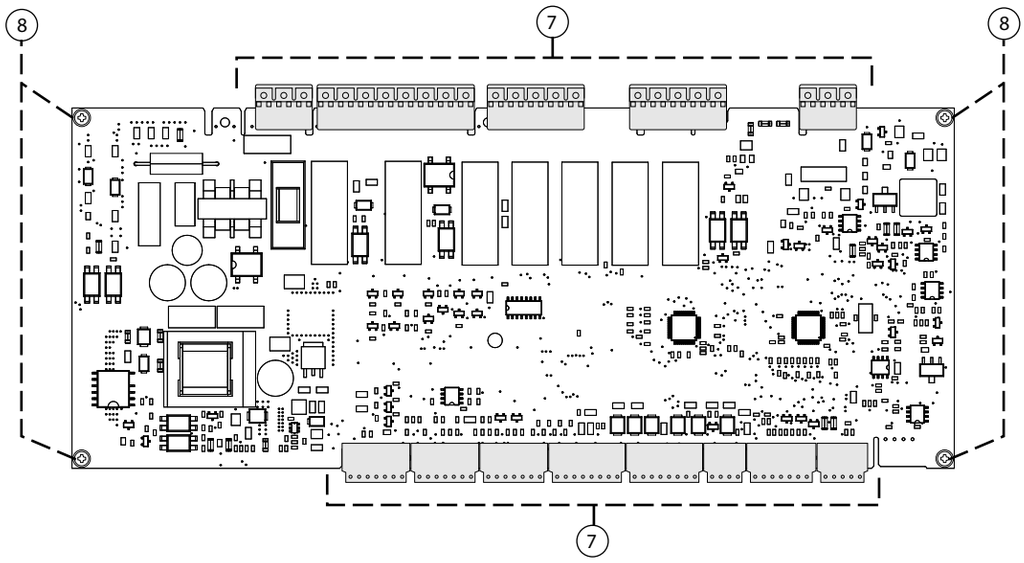
1. Refer to Section 2.35.
2. Remove the front panel. Refer to Section 3.2.
3. Isolate the electrical supply to the boiler and fully isolate the boiler from any external supply.
4. Remove the three electrical connections from the spark generator.
5. Gently push down the ignitor to remove from the bracket.
6. Replace unit and reasseble in reverse order, ensuring all connections are fully inserted.
7. Check the operation of the boiler. Refer to Section 2.35.



3.18 REMOVAL OF MAIN PCB

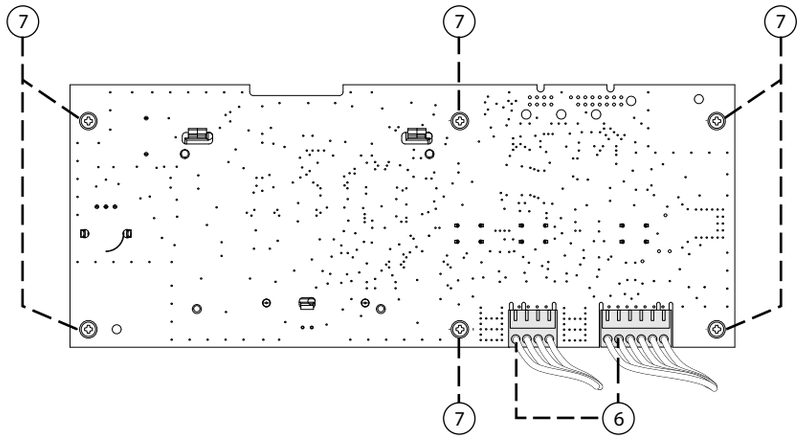
1. Refer to Section 2.35.
2. Isolate the electrical supply to the boiler and fully isolate the boiler from any external supply.
3. Remove the upper front panel and put the control panel into the service position. Refer to Section 3.2.
4. Fit the earth strap provided with the spare PCB to your wrist and to a suitable earthed metal.
5. Remove the PELV harness from the securing clips located on the rear of the control box cover.
6. Remove 4 control box cover retaining screws
7. Pull off all of the main PCB connectors.
8. Remove the 4 PCB retaining screws.
9. Fit new PCB, refit in reverse order and refer to Replacement PCB Instructions.
10. Check the operation of the boiler. Refer to Section 2.35.





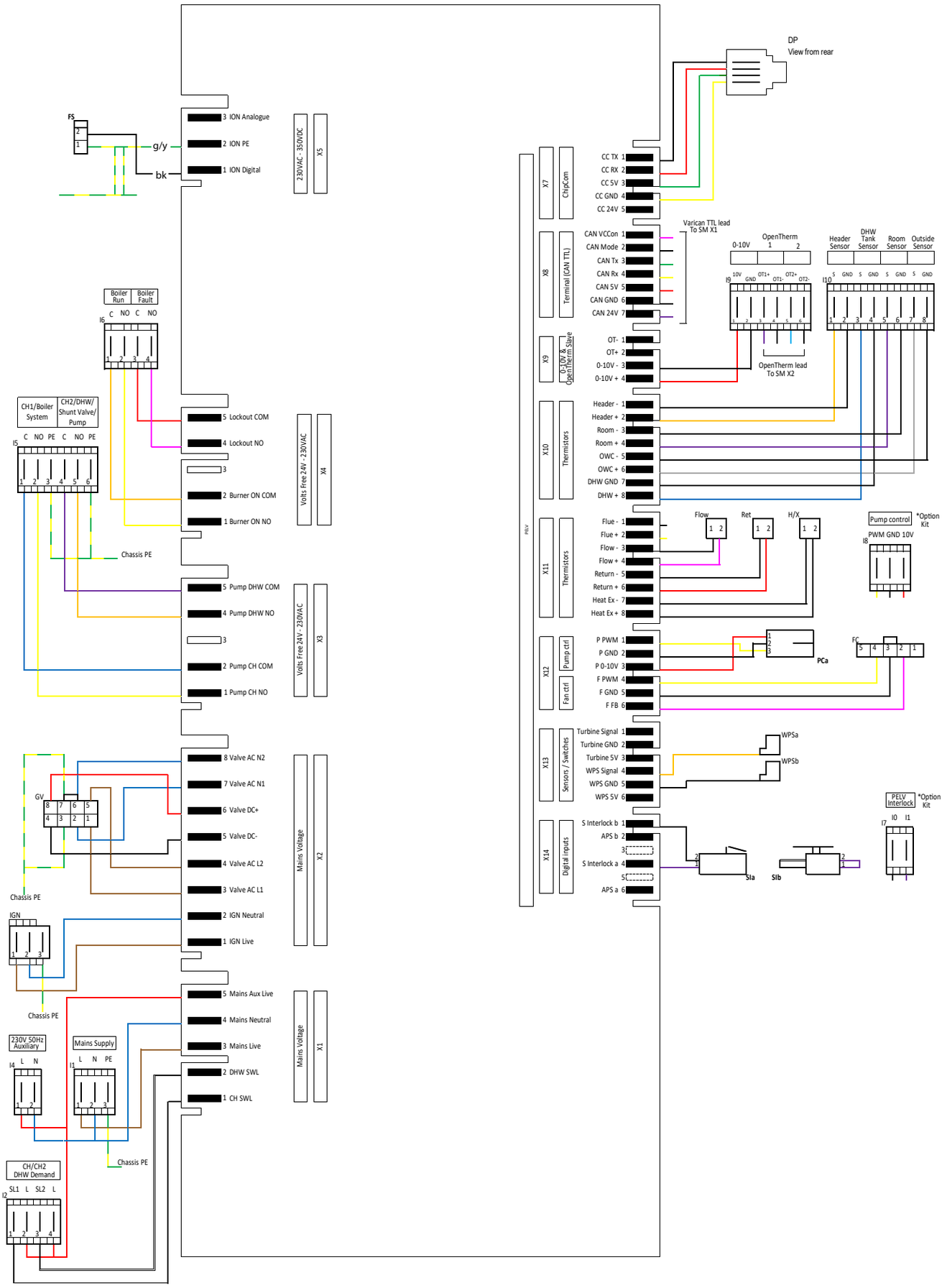
3.19 REMOVAL OF SYSTEM MANAGER

1. Refer to Section 2.35.
2. Isolate the electrical supply to the boiler and fully isolate the boiler from any external supply.
3. Remove the upper front panel and put the control panel into the service position. Refer to Section 3.2.
4. Fit the earth strap provided with the spare PCB to your wrist and to a suitable earthed metal.
5. The System Manager is fitted beneath the main PCB. To access follow points 5 - 7 in Section 3.18.
6. With access to the System Manager, remove the electrical connections
7. Remove the six retaining screws.
8. Replace with new system manager, refit in reverse order and refer to System Manager Replacement Instructions.
9. Check the operation of the boiler. Refer to Section 2.35.

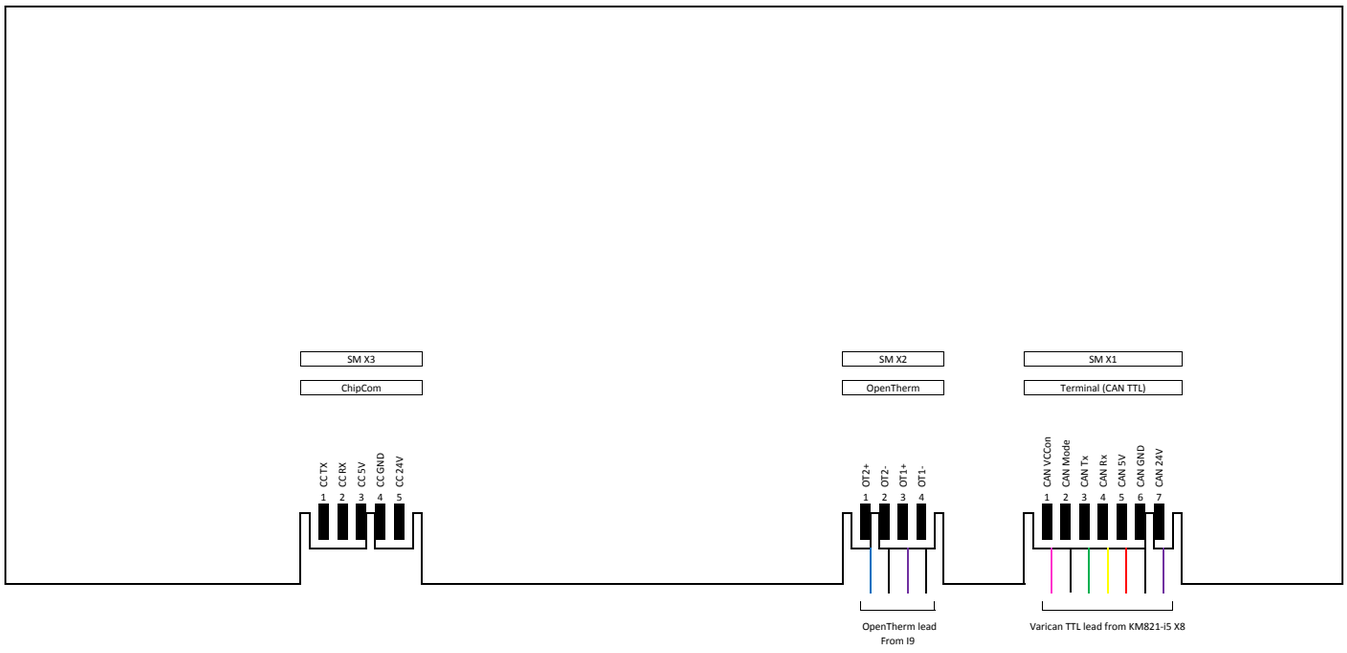


4. WIRING

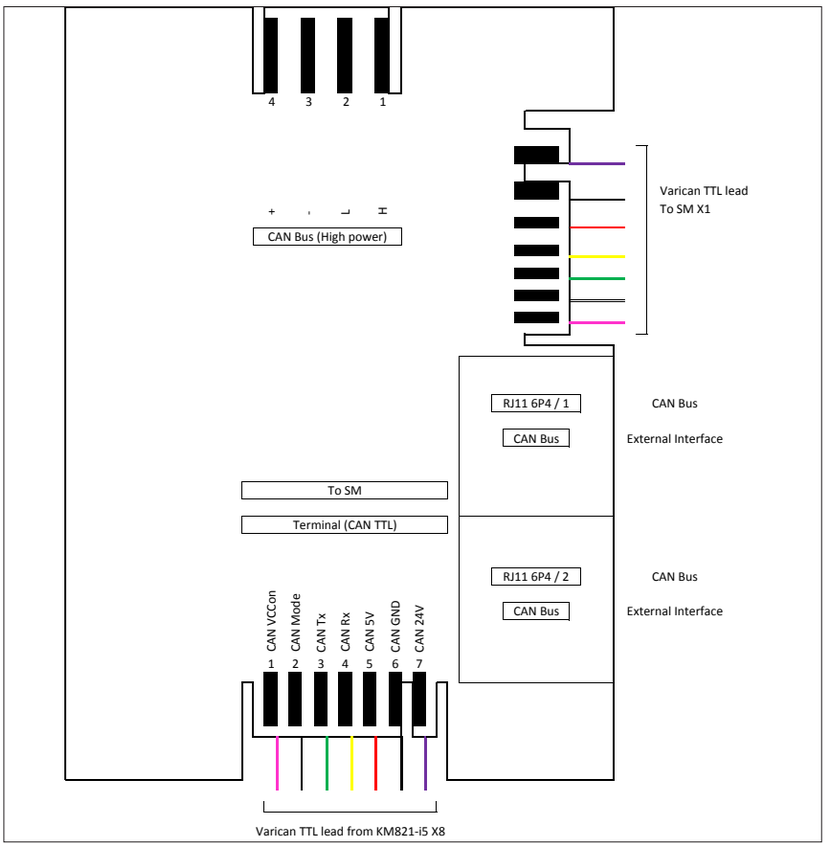
4.1 INTERNAL WIRING COMBUSTION MANAGER



4.2 SYSTEM MANAGER WIRING DIAGRAM



4.3 OPTIONAL VARICAN ADAPTER WIRING DIAGRAM



5. FAULT FINDING

5.1 FAULT FINDING SCREENS

Fault management
When a fault occurs on the boiler the status screen with alternate as shown below:

< Boiler Name & Model No. >
Operation: Htg. With temp.
Flow setp: 82.ºC
Flow temp.: 40.4ºC

Fault >
Operation: Htg. With temp.
Flow setp: 82.0ºC
Flow temp.: 40.4ºC

To show the fault description scroll right (Clockwise) to show the detail.
If a single fault is present then the screen will show:

Fault ## {Description}
{Fault description for the actual error}
Press Reset

If multiple faults are present a list will appear in fault priority order:

Fault List
Fault ##
Fault ##
Fault ##

Fault List
Fault ##
Fault ##
Fault ##

Fault List
Fault ##
Fault ##

The list can now be scrolled and any of the faults may be selected to retrieve the fault description:

Fault ## {Description}
{Fault description for the actual error}
Press Reset

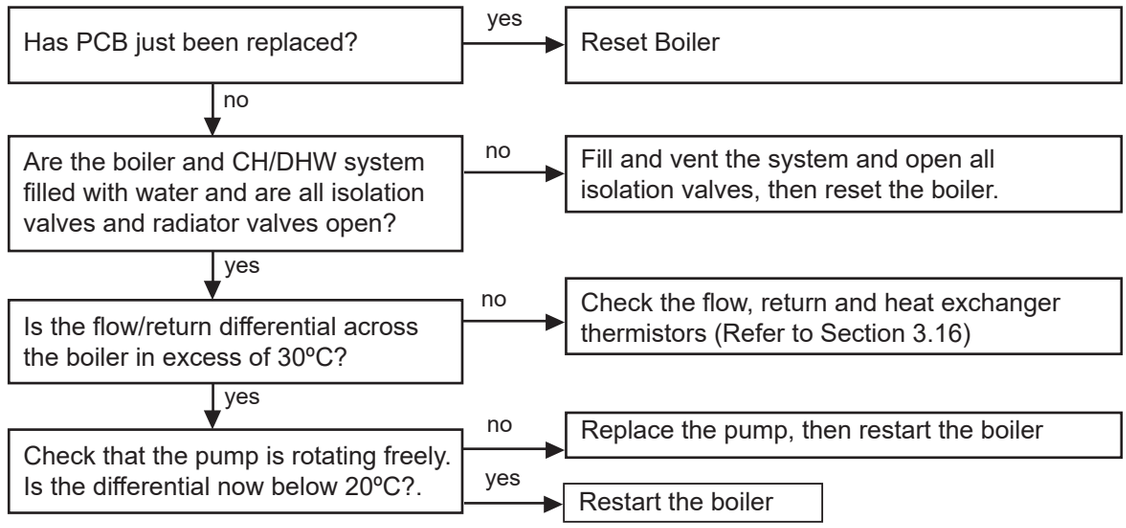
5.2 FAULT FINDING MENU

ERROR TYPE (Warning, Blocking, Lockout)	DESCRIPTION	ERROR CODE (OpenTherm)	REFER TO SECTION...
	HARDWARE (THERMISTORS, ACTUATORS)		
B	Flow thermistor open circuit (blocking)	1	5.9
B	Flow thermistor short circuit (blocking)	2	5.9
B	Return thermistor open circuit (blocking)	3	5.9
B / W	Return thermistor short circuit (blocking)	4	5.9
B / W	Flue thermistor open circuit (blocking)	5	n/a
B	Flue thermistor short circuit (blocking)	6	n/a
W	DHW thermistor open circuit	7	5.12
W	DHW thermistor short circuit	8	5.12
W	Outside thermistor defect (open / short)	9	5.10
B	Water pressure sensor defect	10	n/a
L	Flow thermistor open circuit (lockout after 24h)	11	5.9
L	Flow thermistor short circuit (lockout after 24h)	12	5.9
L	Return thermistor open circuit (lockout after 24h)	13	5.9
L	Return thermistor short circuit (lockout after 24h)	14	5.9
L	Flue thermistor open circuit (lockout after 24h)	15	n/a
L	Flue thermistor short circuit (lockout after 24h)	16	n/a
L	Heat thermistor open circuit (lockout after 24h)	17	5.9
L	Heat thermistor short circuit (lockout after 24h)	18	5.9
B	Heat thermistor open circuit (blocking)	19	5.9
B	Heat thermistor short circuit (blocking)	20	5.9
W	Header thermistor open circuit	21	5.10
W	Header thermistor short circuit	22	5.10
W	Room (hc1) thermistor open circuit	23	5.10
W	Room (hc1) thermistor short circuit	24	5.10
	TEMPERATURE SUPERVISIONS		
B	Blocking due to flow overheat	30	5.3
B	Blocking due to return overheat	31	5.3
B	Blocking due to flue overheat	32	n/a
B	Flow & return reversed	33	5.11
B	Flow gradient supervision	36	5.3
B	Flue gradient supervision (reserved)	37	n/a
B	Blocking delta temp flow/return	38	5.3
L	Lockout flow overheat	39	5.3
L	Lockout return overheat	40	5.3
L	Lockout flue overheat (flue thermistor) Lockout thermal fuse (thermal fuse)	41	1-6
B	Blocking due to heat exchanger overheat	42	5
	SYSTEM (FLAME, FAN, HYDRAULIC, ETC.)		
B	Blocking due to no CH water flow	50	1-4, 6
B	Low water pressure	51	5.6
W	No flame signal at start (restart)	52	5.7
W	Flameloss during operation => endless restarts (Parameter “endless restarts” activated)	53	5.7
L	Flameloss during operation, => Lockout after restarts attempts are used (Parameter “endless restarts” deactivated)	54	5.7
W	Flameloss during stabilisation => restart attempts	55	5.7
L	Flameloss during stabilisation => Lockout after restarts attempt are used	56	5.7
L	False flame (with heat demand)	57	5.7
L	No flame after restarts	58	5.4
B/L	Fan speed, stand still check	59	5.8
L	Fan speed not achieved, e.g. Pre-purge-test, post-purge-test etc.	60	5.8
B/L	Error fan speed during pre-purge (5* restarts => lockout)	61	5.8
W	Error min/max supervision fan speed during operation (restart)	62	5.8
W	Warning due to mains overvoltage	63	check mains supply
B	Blocking due to mains undervoltage	64	check mains supply
W	Opentherm plus error (communication faulty; no connection anymore , etc)	65	5.14, 5.15
L	Too many remote resets	66	power cycle the boiler
B	HX water flow fault (feedback < min flow rate)	70	n/a

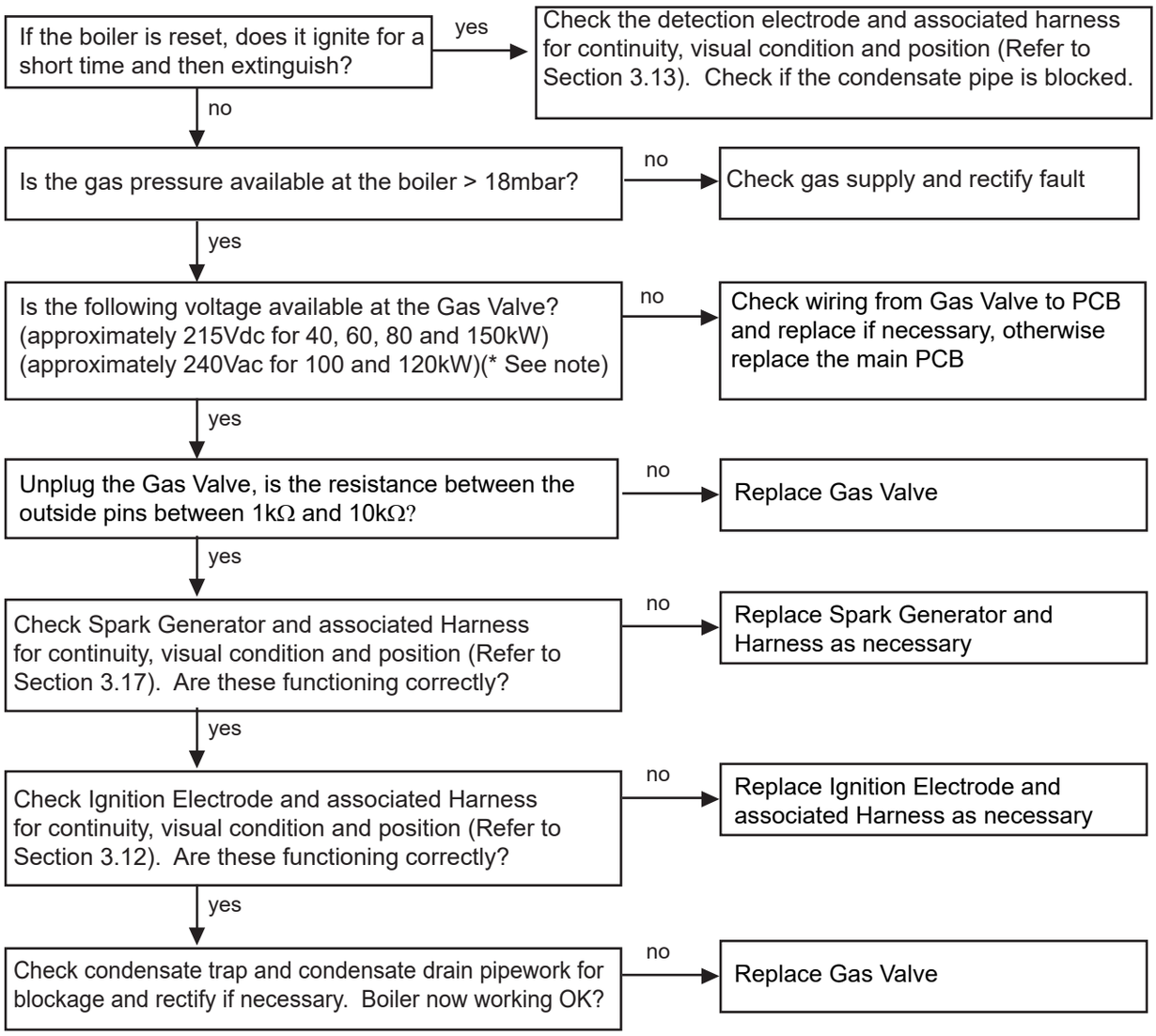
5.2 FAULT FINDING MENU - CONTINUED

ERROR TYPE (Warning, Blocking, Lockout)	DESCRIPTION	ERROR CODE (OpenTherm)	REFER TO SECTION...
	SYSTEM (FLAME, FAN, HYDRAULIC, ETC.) - CONTINUED		
B	PWM pump dry run error (feedback 80%)	71	4
B	Warning code from pump (feedback 75%)	72	4
W	VariCAN Error	73	Check Bus
B	Safety Interlock Function activated (controlled shutdown)	74	Info
L	Air Pressure Switch error	75	n/a
W	Air Pressure Switch warning (restart)	76	n/a
B	High water pressure	77	n/a
B/L	Min water flow rate	78	n/a
W	Maximum water flow rate exceeded	79	n/a
W	Quartz crystal error	80	contact service provider
B	0-10V Input out of range	81	Info
	INTERNAL SYSTEM		
L	Retails supervision error (COM-, Valve-Retails)	93	Reset, contact service if repeated
L	Request for re-update	94	contact service provider
B	Blocking due to programming mode	95	contact service provider
L	Lockout parameter mismatch	96	contact service provider
L	Lockout parameter set	97	contact service provider
B/L	Internal blocking error	98	contact service provider
L	System lockout (internal lockout error)	99	contact service provider

5.3 OVERHEAT LOCKOUT

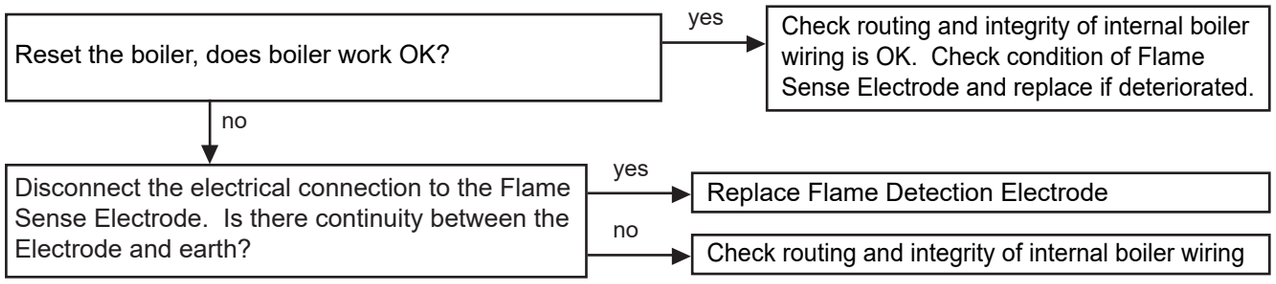


5.4 IGNITION LOCKOUT

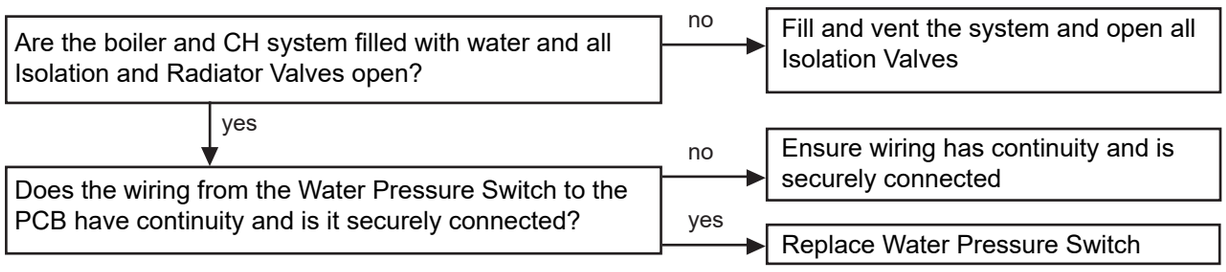


* Note: due to the wave form of the rectified voltage, the reading will vary depending on the type of meter used to measure the value. In general terms a reading of greater than 150V indicates that the correct voltage is supplied to the gas valve.

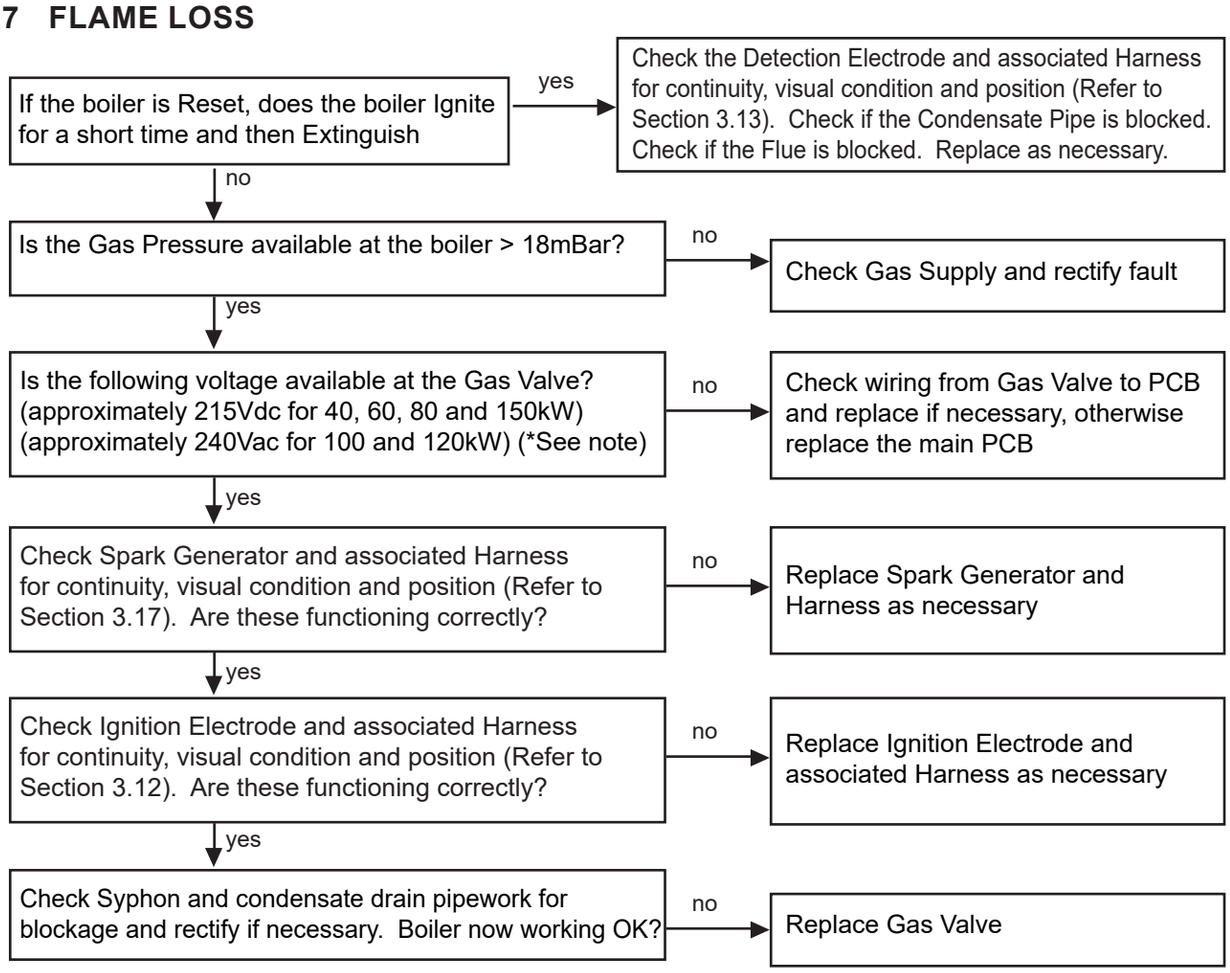
5.5 FALSE FLAME LOCKOUT



5.6 LOW WATER PRESSURE

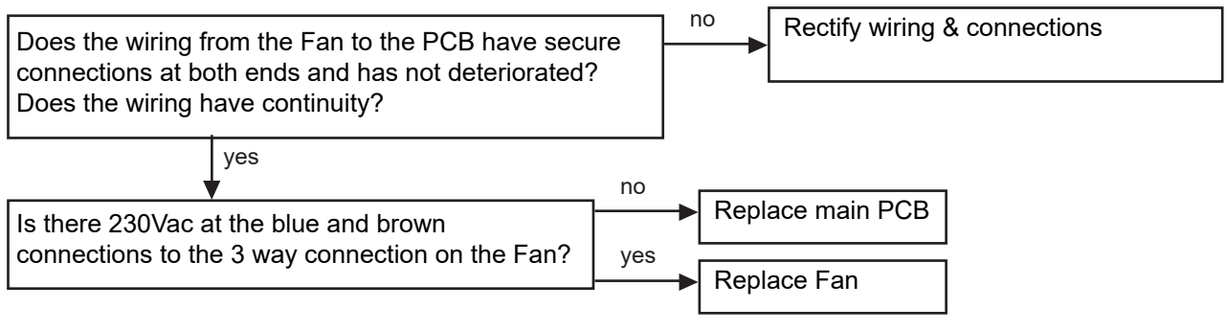


5.7 FLAME LOSS

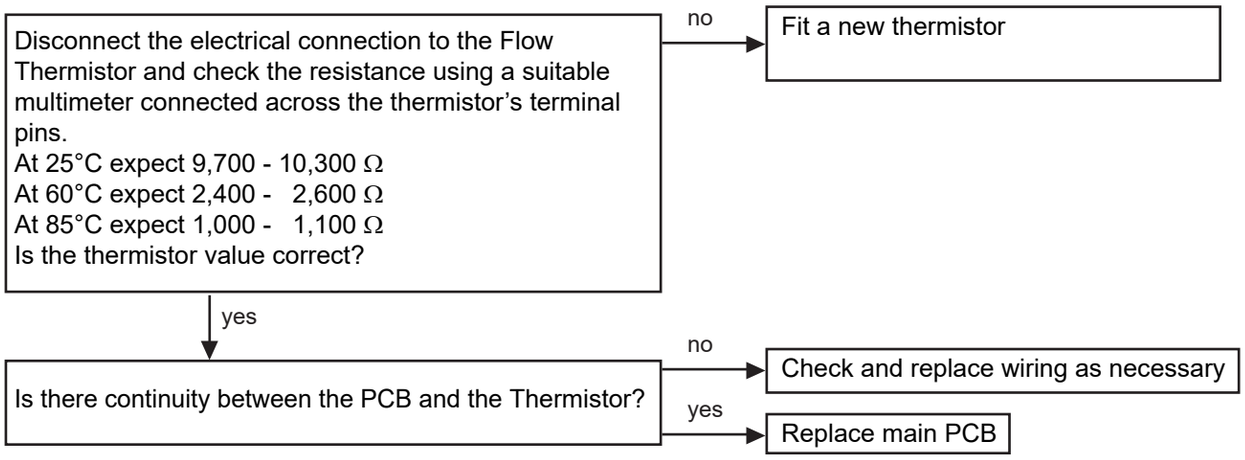


* Note: due to the wave form of the rectified voltage, the reading will vary depending on the type of meter used to measure the value. In general terms a reading of greater than 150V indicates that the correct voltage is supplied to the gas valve

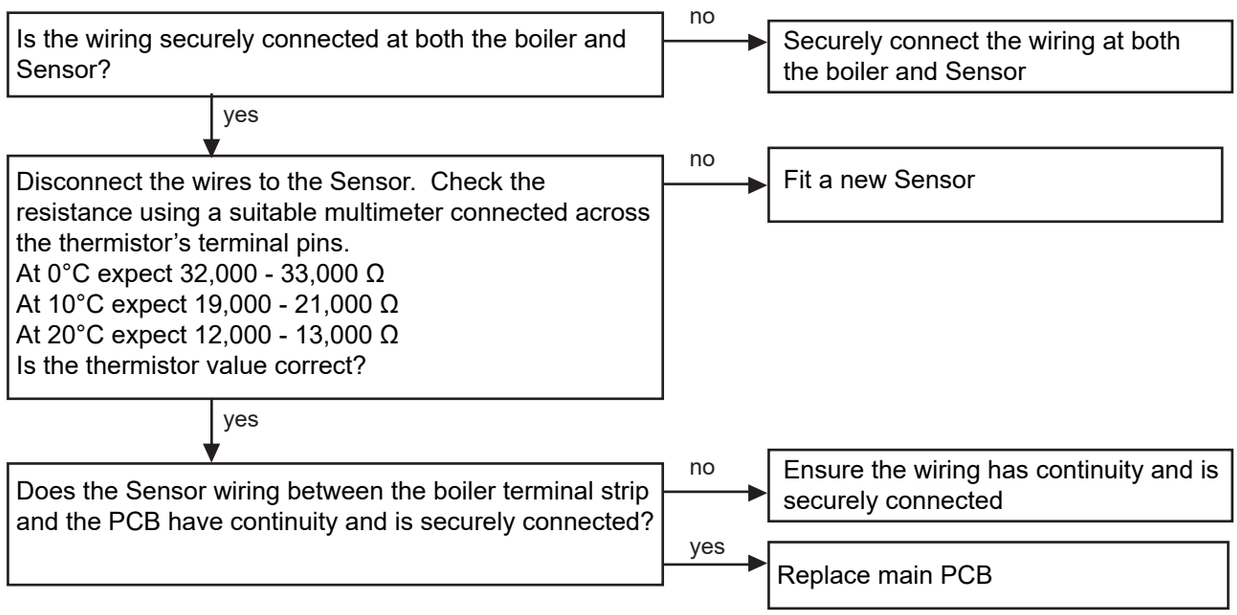
5.8 FAN FAULT



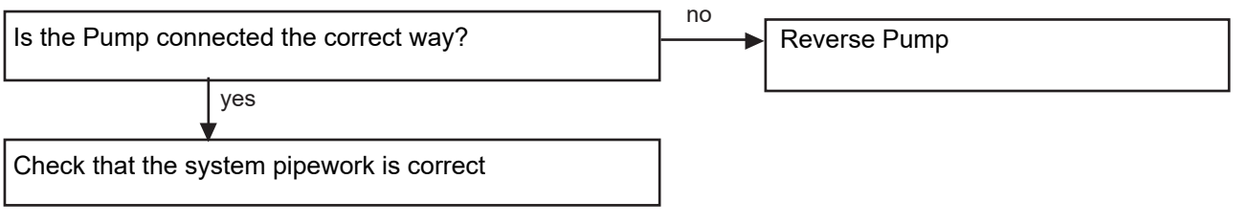
5.9 FLOW / RETURN THERMISTOR OR HEAT EXCHANGER THERMISTOR FAULT



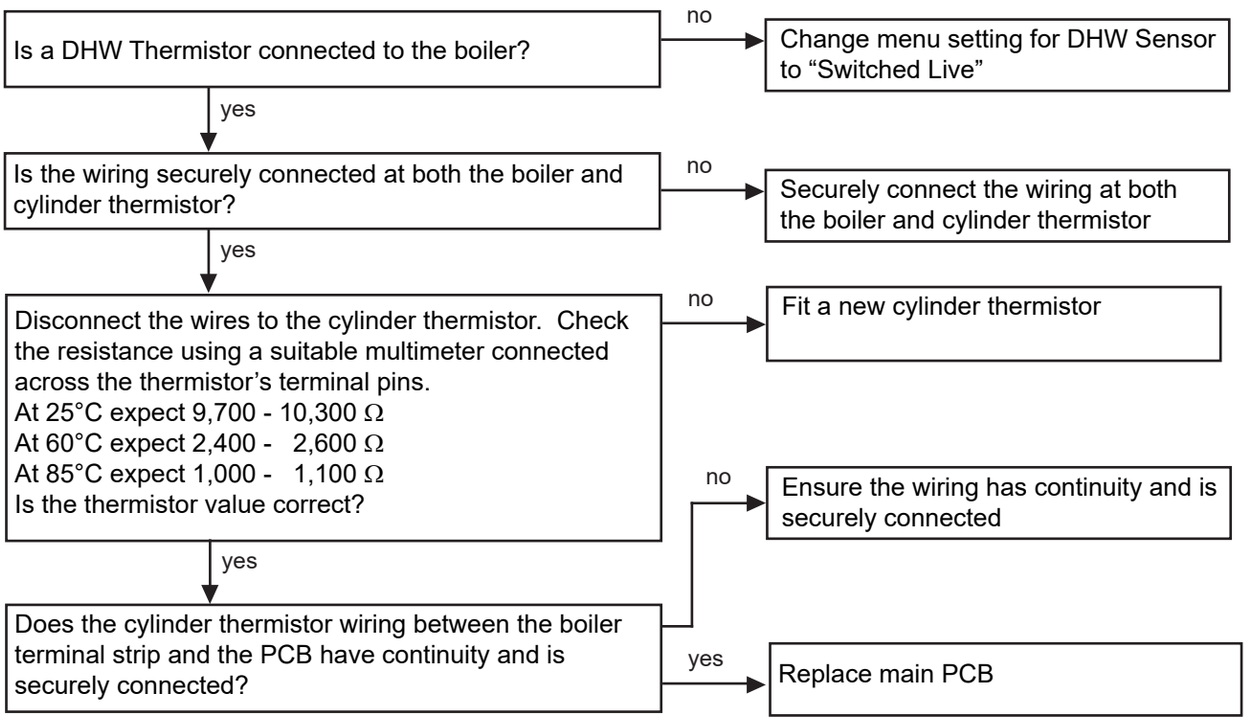
5.10 OUTSIDE / HEADER / ROOM SENSOR FAULT (IF FITTED)



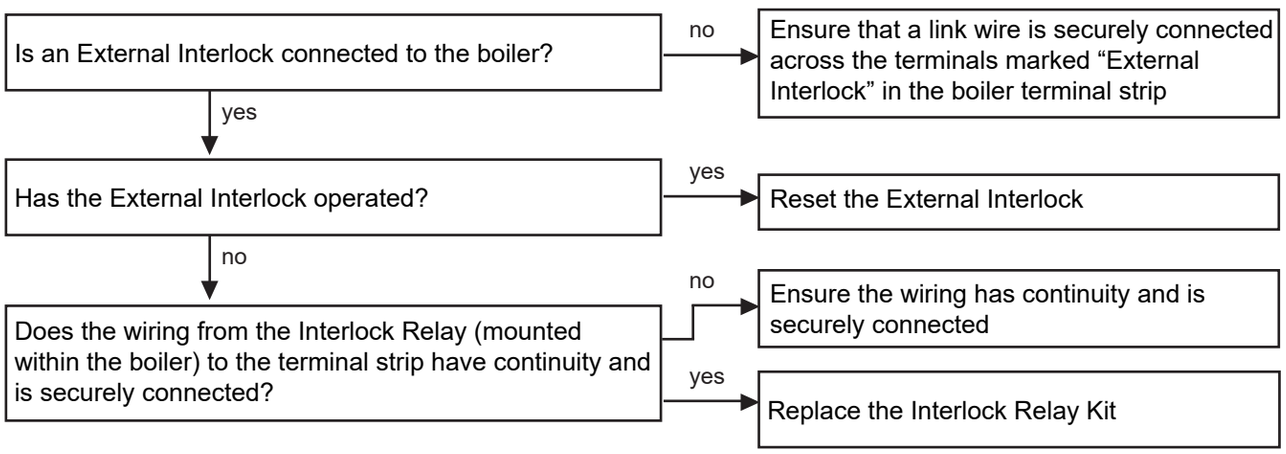
5.11 FLOW/RETURN REVERSED



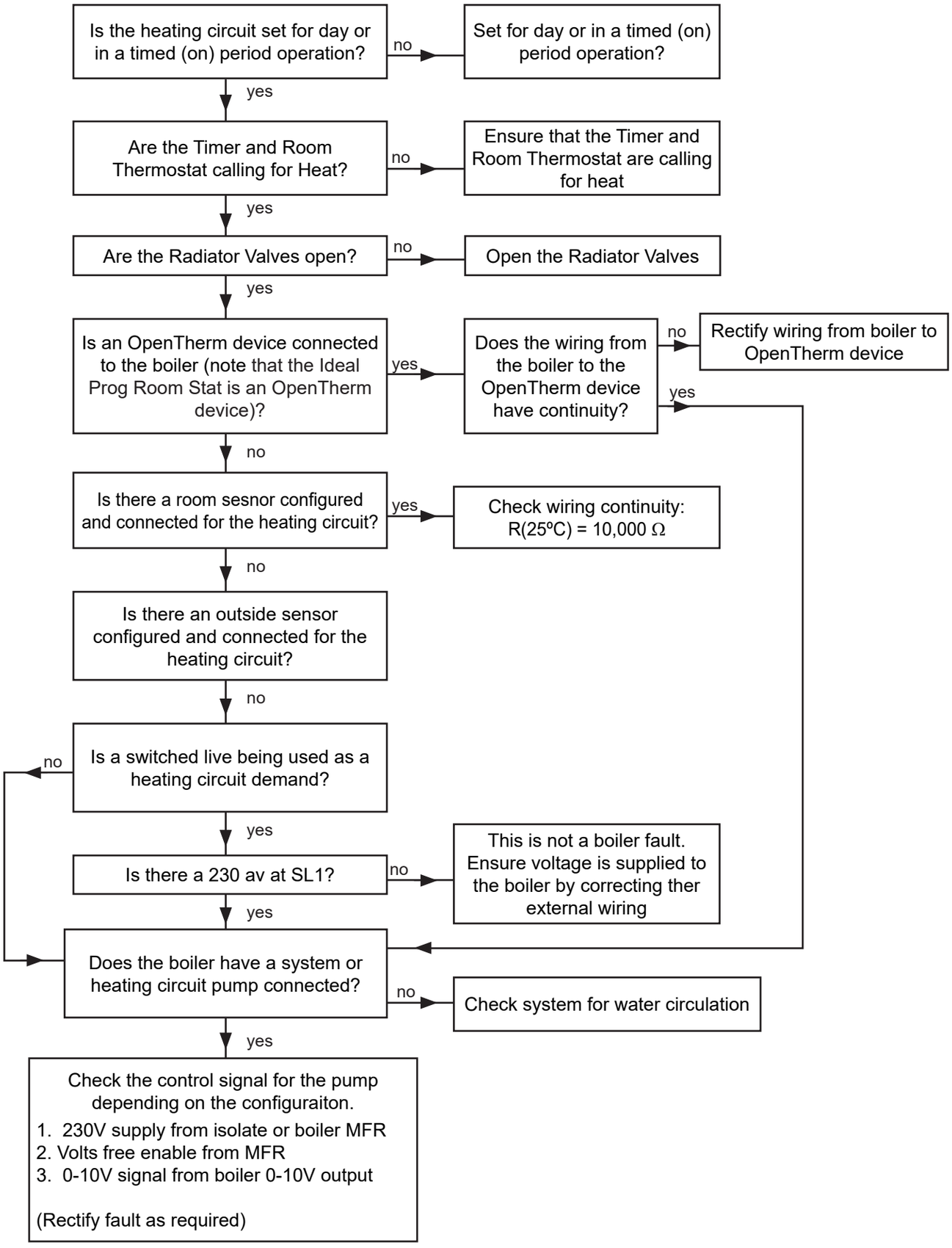
5.12 CYLINDER THERMISTOR FAULT (IF FITTED)



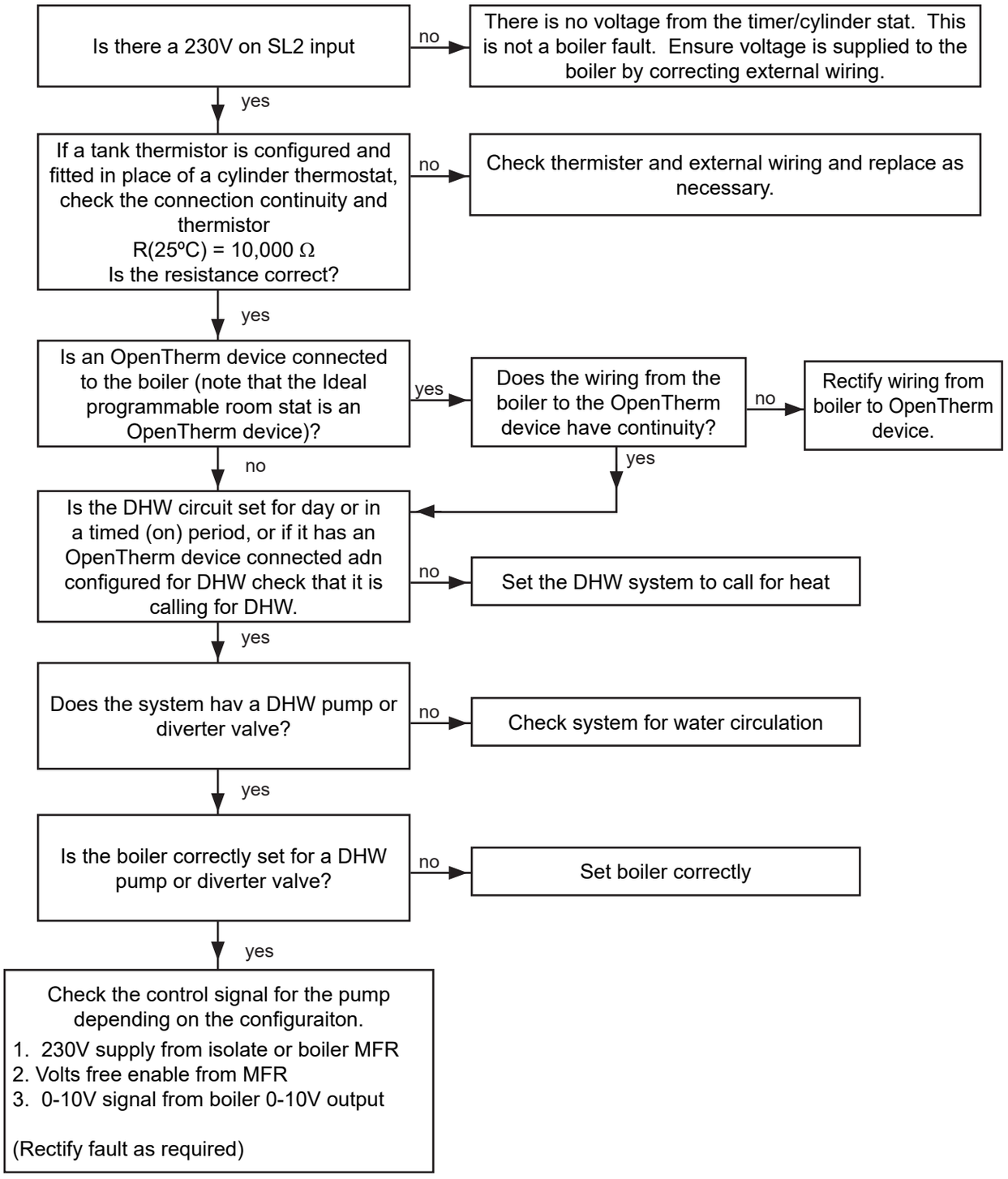
5.13 EXTERNAL INTERLOCK OPEN



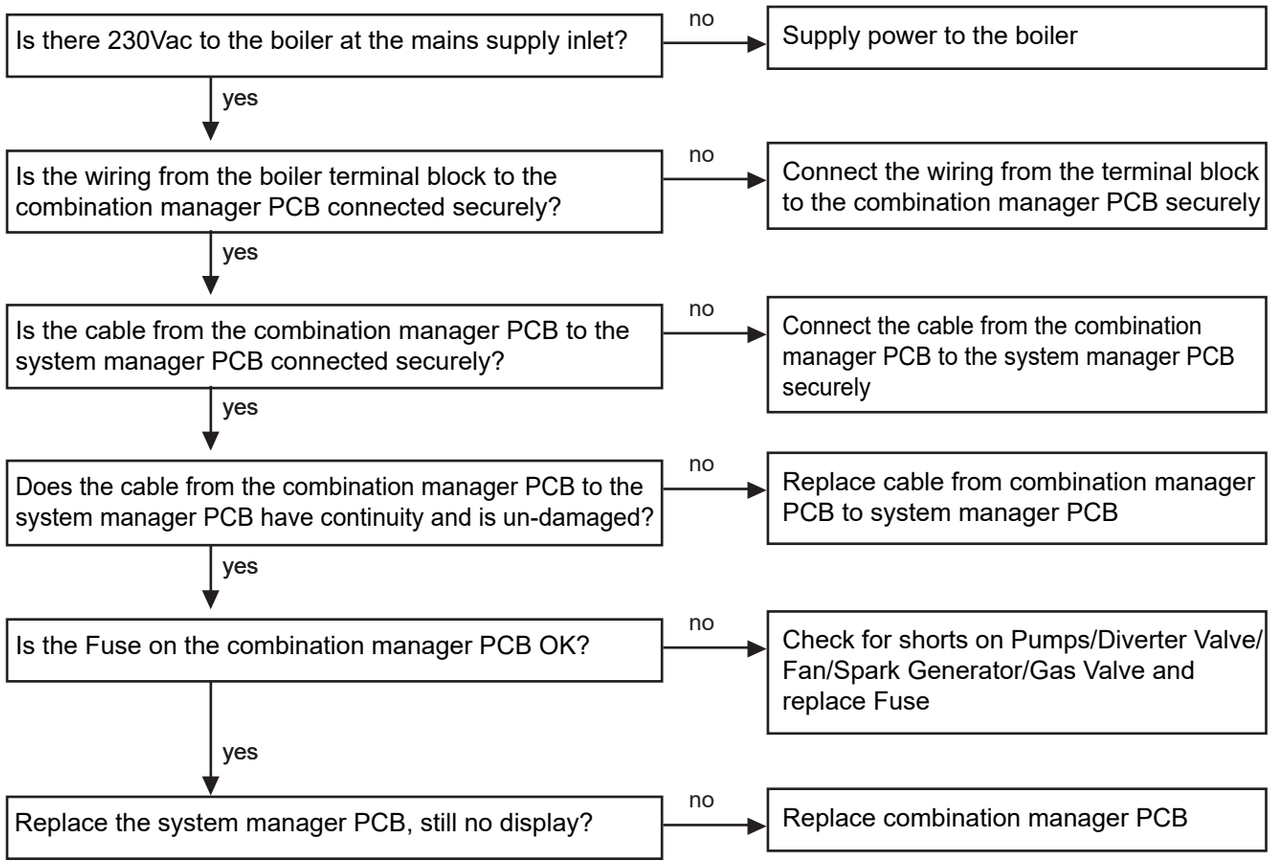
5.14 NO CH BUT DHW OK



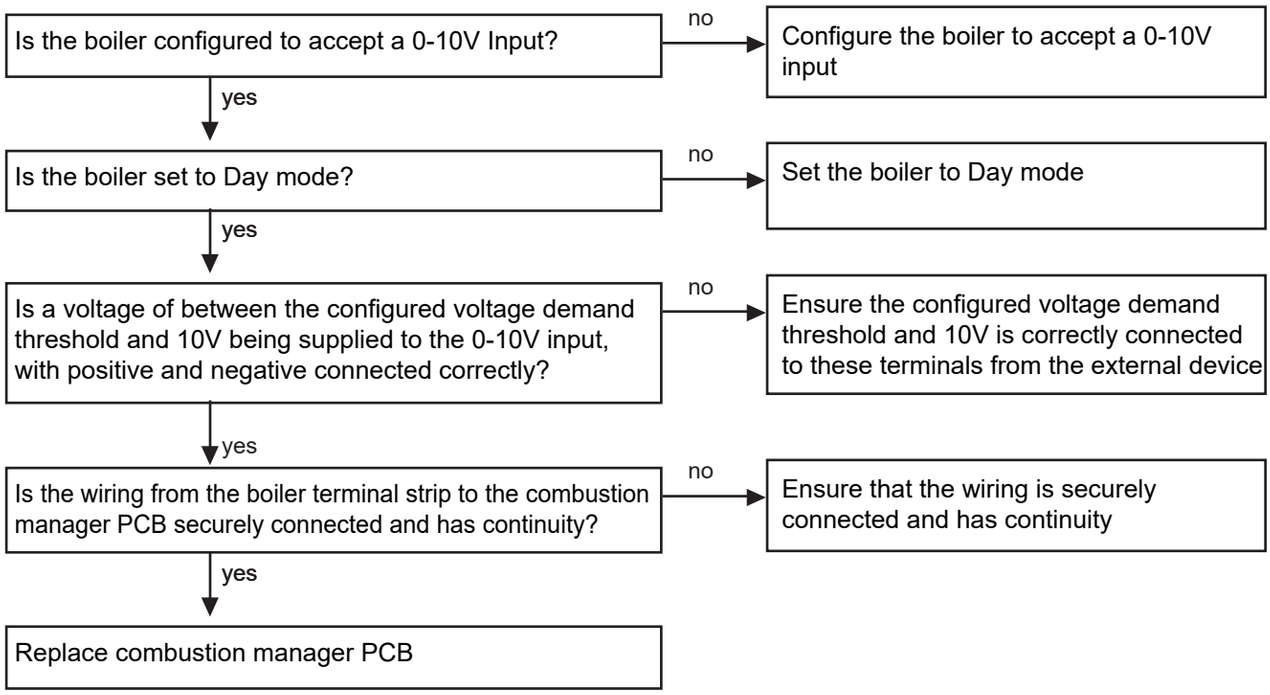
5.15 NO DHW BUT CH OK



5.16 NO DISPLAY



5.17 0-10V INTERFACE



6. SPARE PARTS

When replacing any part on this appliance use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by ourselves. Failure to do so could affect safety or performance of this appliance.

When calling, and to ensure we can provide you with the most accurate parts information, please ensure you have the following to hand;

- Boiler Model e.g. 120
- Appliance GC Number (UK only) e.g. 41-750-38A
- Boiler Serial Number e.g. ACK 205962000000480101

7. COMBUSTION AND FLUE INTEGRITY

7.1 FLOWCHART FOR CO LEVEL AND COMBUSTION RATIO CHECK ON COMMISSIONING A CONDENSING BOILER

Important Preliminary Information on Checks

The air gas ratio valve is factory-set and must not be adjusted DURING COMMISSIONING.

If the boiler requires conversion to operate with a different gas family (e.g. conversion from natural gas to LPG) separate guidance is provided with the conversion kit supplied and this must be followed.

PRIOR TO CO LEVEL AND COMBUSTION RATIO CHECK

The installation instructions must have been followed, gas type verified and gas supply pressure / gas rate checked as required prior to commissioning.

As part of the installation process, ESPECIALLY WHERE A FLUE HAS BEEN FITTED BY PERSONS OTHER THAN THE BOILER INSTALLER, visually check the integrity of the whole flue system to confirm that all components are correctly assembled, fixed and supported. Check that maximum flue lengths have not been exceeded and all guidance has been followed (e.g. Gas Safe Register Technical Bulletin (TB) 008 where chimney/flues are in voids).

The ECGA should be of the correct type, as specified by BS 7967.

Prior to its use, the ECGA should have been maintained and calibrated as specified by the manufacturer. The installer must have the relevant competence for use of the analyser.

Check and zero the analyser IN FRESH AIR in accordance with the analyser manufacturer's instructions.

KEY:

CO = carbon monoxide

CO_2 = carbon dioxide

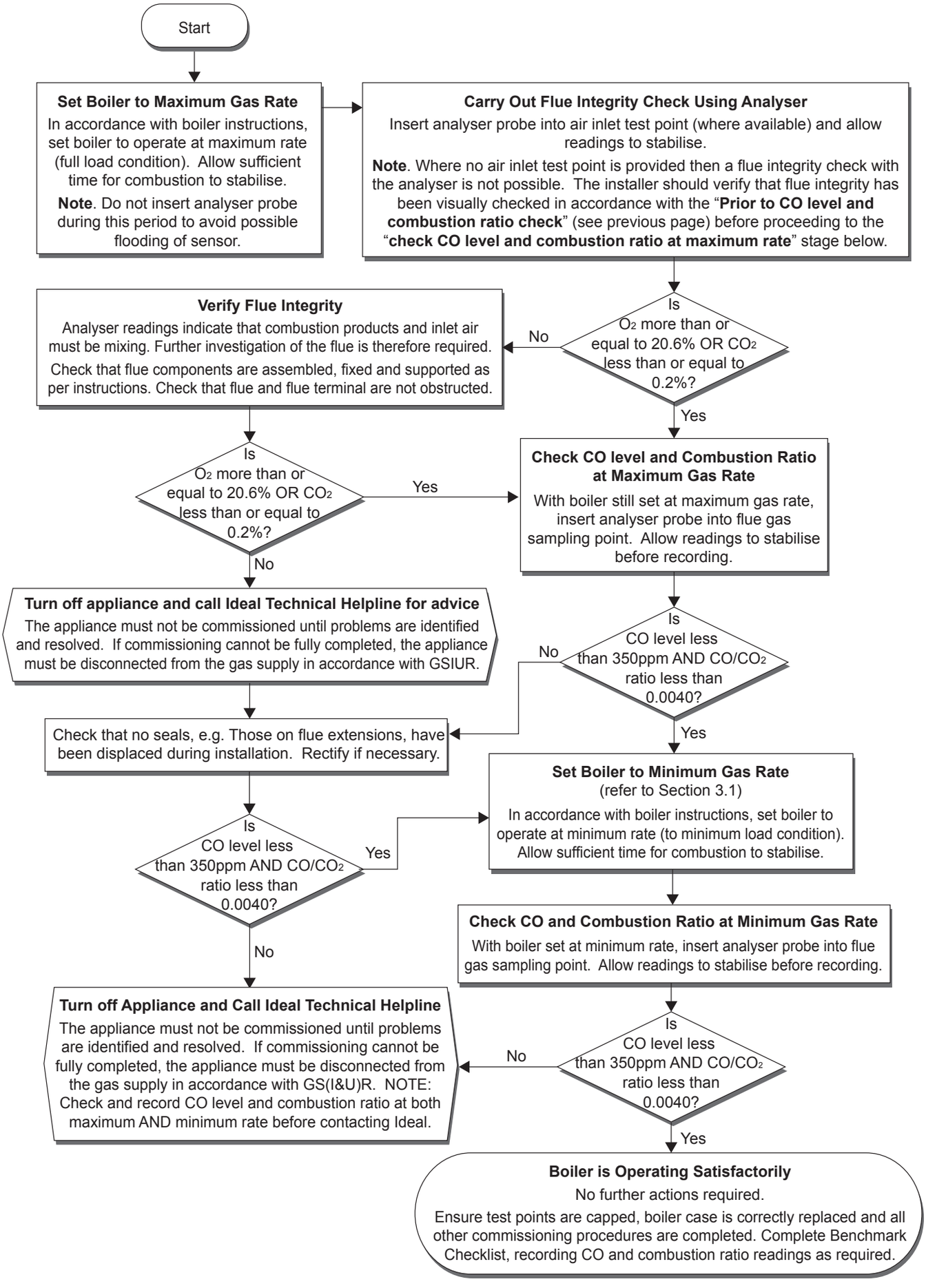
O_2 = oxygen

Combustion Ratio = The CO reading measured in ppm divided by the CO_2 reading first converted to ppm

ppm = parts per million

GS(I&U)R = Gas Safety (Installation and Use) Regulations

continued.....


Start
Set Boiler to Maximum Gas Rate
In accordance with boiler instructions, set boiler to operate at maximum rate (full load condition). Allow sufficient time for combustion to stabilise.
Note. Do not insert analyser probe during this period to avoid possible flooding of sensor.
Carry Out Flue Integrity Check Using Analyser
Insert analyser probe into air inlet test point (where available) and allow readings to stabilise.
Note. Where no air inlet test point is provided then a flue integrity check with the analyser is not possible. The installer should verify that flue integrity has been visually checked in accordance with the "Prior to CO level and combustion ratio check" (see previous page) before proceeding to the "check CO level and combustion ratio at maximum rate" stage below.
Is O2 more than or equal to 20.6% OR CO2 less than or equal to 0.2%?
No
Verify Flue Integrity
Analyser readings indicate that combustion products and inlet air must be mixing. Further investigation of the flue is therefore required.
Check that flue components are assembled, fixed and supported as per instructions. Check that flue and flue terminal are not obstructed.
Yes
Check CO level and Combustion Ratio at Maximum Gas Rate
With boiler still set at maximum gas rate, insert analyser probe into flue gas sampling point. Allow readings to stabilise before recording.
Is O2 more than or equal to 20.6% OR CO2 less than or equal to 0.2%?
Yes
No
Turn off appliance and call Ideal Technical Helpline for advice
The appliance must not be commissioned until problems are identified and resolved. If commissioning cannot be fully completed, the appliance must be disconnected from the gas supply in accordance with GSIUR.
Is CO level less than 350ppm AND CO/CO2 ratio less than 0.0040?
No
Yes
Check that no seals, e.g. Those on flue extensions, have been displaced during installation. Rectify if necessary.
Set Boiler to Minimum Gas Rate
(refer to Section 3.1)
In accordance with boiler instructions, set boiler to operate at minimum rate (to minimum load condition). Allow sufficient time for combustion to stabilise.
Is CO level less than 350ppm AND CO/CO2 ratio less than 0.0040?
Yes
No
Check CO and Combustion Ratio at Minimum Gas Rate
With boiler set at minimum rate, insert analyser probe into flue gas sampling point. Allow readings to stabilise before recording.
Turn off Appliance and Call Ideal Technical Helpline
The appliance must not be commissioned until problems are identified and resolved. If commissioning cannot be fully completed, the appliance must be disconnected from the gas supply in accordance with GS(I&U)R. NOTE: Check and record CO level and combustion ratio at both maximum AND minimum rate before contacting Ideal.
Is CO level less than 350ppm AND CO/CO2 ratio less than 0.0040?
No
Yes
Boiler is Operating Satisfactorily
No further actions required.
Ensure test points are capped, boiler case is correctly replaced and all other commissioning procedures are completed. Complete Benchmark Checklist, recording CO and combustion ratio readings as required.

NOTES



WEEE DIRECTIVE 2012/19/EU
Waste Electrical and Electronic Equipment Directive

- At the end of the product life, dispose of the packaging and product in a corresponding recycle centre.
- Do not dispose of the unit with the usual domestic refuse.
- Do not burn the product.
- Remove the batteries.
- Dispose of the batteries according to the local statutory requirements and not with the usual domestic refuse.

At Ideal Heating we take our environmental impact seriously, therefore when installing any Ideal Heating product please make sure to dispose of any previous appliance in an environmentally conscious manner. Households can contact their local authority to find out how.
See https://www.gov.uk/managing-your-waste-an-overview for guidance on how to efficiently recycle your business waste.

Technical Training

Our Expert Academy offer a range of training options designed and delivered by our experts in heating.
For details please contact:
expert-academy.co.uk

Ideal Boilers Ltd., pursues a policy of continuing improvement in the design and performance of its products.
The right is therefore reserved to vary specification without notice.

Ideal is a trademark of Ideal Boilers.

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Ideal Parts: 01482 498665

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