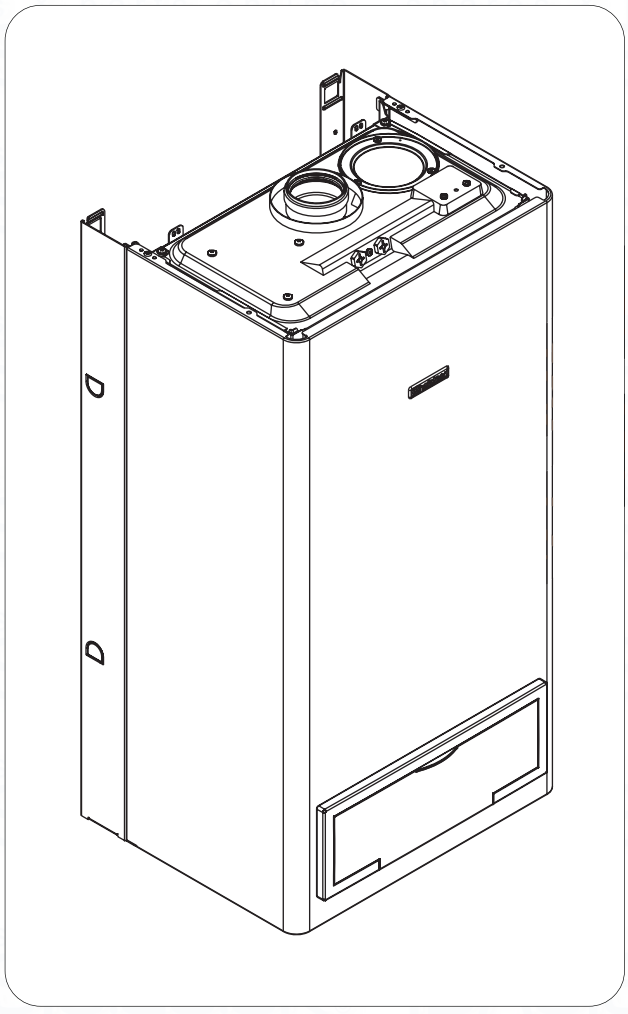
iHeat 24c
iHeat 29c

Combination Condensing Boilers



Installation and Servicing Instructions

These instructions should be left with the user

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1.0 Introduction

1.1 Description

The iHeat range of appliances is comprised of 2 models of high-efficiency combination boiler with inputs to heating & DHW of 25 and 29 kW respectively. Each appliance - by design - incorporates electronic ignition, circulating pump, expansion vessel, safety valve, pressure gauge and automatic by-pass.

The iHeat range is produced as room sealed, category II2H3P appliances, suitable for internal wall mounting applications only. They are provided with a fan powered flue outlet with an annular coaxial combustion air intake that can be rotated - horizontally - through 360 degrees for various horizontal or vertical applications. The iHeat 24c - 29c are approved for use with B22P-B52P-C12-C22-C32-C42-C52-C62-C82 type flue applications.

These appliances are designed for use with a sealed system only; consequently they are not intended for use on open vented systems.

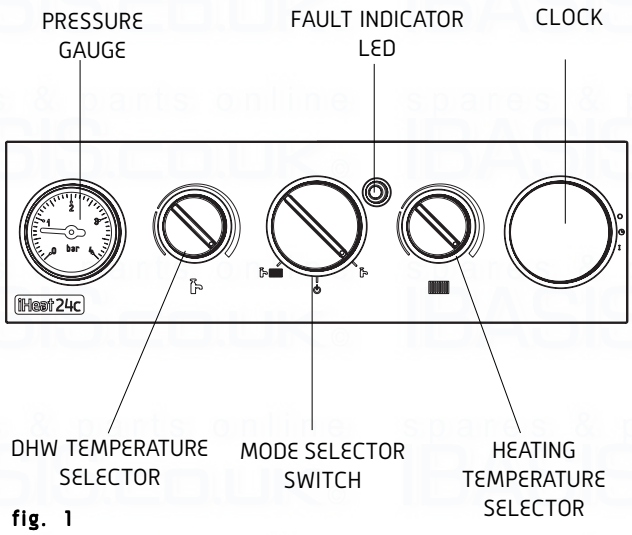
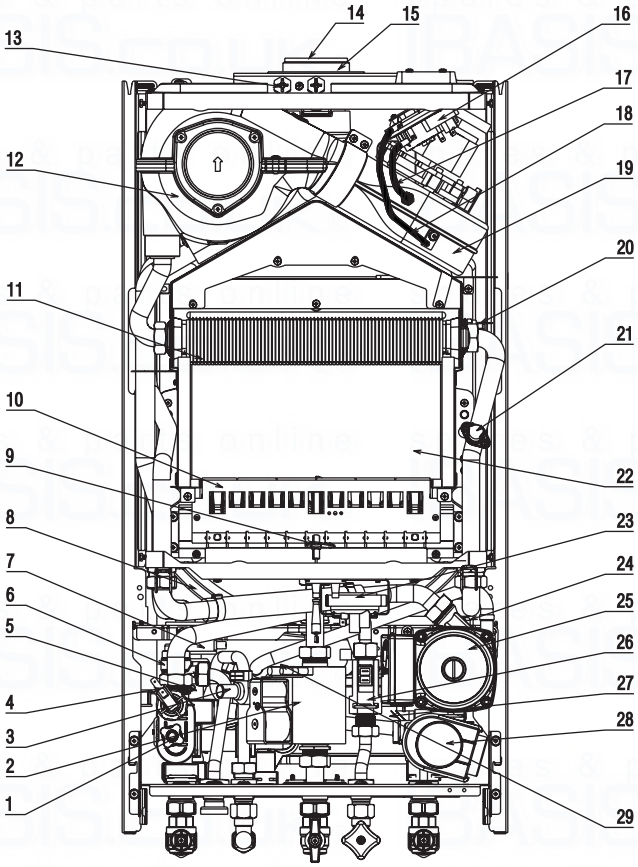


fig. 1



1 Discharge valve
2 Gas valve
3 Modulator coil
4 Pressure switch
5 Condense trap
6 Safety valve
7 Ignition transformer
8 Expansion vessel
9 Electrode
10 Main burner
11 Main heat exchanger
12 Latent heat collector
13 Flue gas analysis test point
14 Flue outlet
15 Air intake
16 Differential pressure switch
17 Silicone pressure tube (-)
18 Silicone pressure tube (+)
19 Fan assembly
20 CH NTC sensor
21 High limit thermostat
22 Combustion chamber
23 Condensate pressure switch
24 Auto air vent (AAV)
25 Pump
26 DHW flow switch
27 Domestic hot water heat exchanger
28 Diverter valve motor
29 DHW sensor

fig. 1A

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2.0 Design principles and operating sequence

2.1 Principle Components

- A fully integrated electronic control board featuring electronic temperature control, anti-cycle control, pump over-run, LED fault indicator, full gas modulation.
- Low-water-content, copper heat exchanger.
- Electronic ignition with flame supervision.
- Integral high-head pump.
- Fan.
- Air pressure switch.
- Expansion vessel.
- Water pressure switch.
- Two-stage gas valve.
- Pressure gauge.
- Safety valve.
- Condense switch.

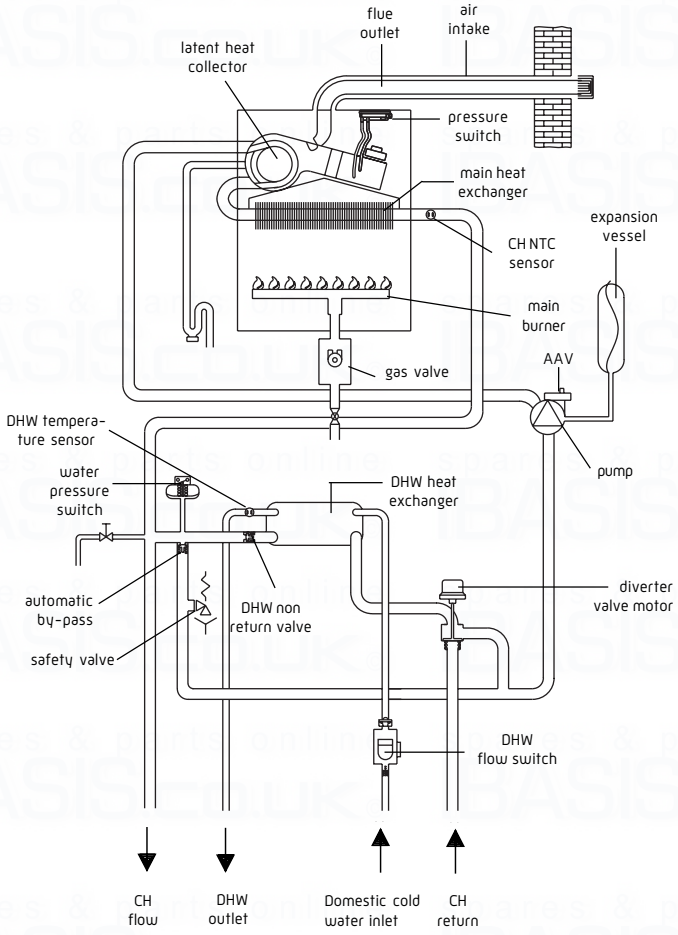


fig. 2

2.2 Mode of operation (at rest)

When the appliance is at rest and there are no requests for heating or DHW, the following functions are active:

- Frost-protection system: the frost-protection system protects the appliance against the risk of frost damage. Should the temperature of the appliance fall to 5 °C, the boiler will function in the heating mode at minimum power until it reaches 35 °C.
- Anti-block function: the anti-block function enables the pump and divertor valve actuator, to be energised for short periods, when the appliance has been inactive for more than 19-hours.

2.3 Mode of operation (Heating)

When there is a request for heat via the time clock and/or any external control, the pump and fan are started, the fan will then prove the air pressure switch. At this point an ignition sequence is enabled.

Ignition is sensed by the electronic circuitry to ensure flame stability at the burner. Once successful ignition has been achieved, the electronic circuitry increases the gas rate to 75% for a period of 15 minutes. Thereafter, the boiler's output will either be increase to maximum or modulate to suit the set requirement.

When the appliance reaches the desired temperature the burner will shut down and the boiler will perform a three-minute anti-cycle (timer delay).

When the request for heat has been satisfied the appliance pump and fan may continue to operate to dissipate any residual heat within the appliance.

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2.0 Design principles and operating sequence

2.4 Mode of operation (Hot water)

When there is a request for DHW via a hot water outlet or tap, the pump and fan are started, the fan will then prove the air pressure switch. At this point an ignition sequence is enabled.

Ignition is sensed by the electronic circuitry to ensure flame stability at the burner. Once successful ignition has been achieved, the electronic circuitry increases the gas rate to maximum or will modulate output to stabilise the temperature.

In the event of the appliance exceeding the desired temperature the burner will shut down until the temperature drops.

When the request for DHW has been satisfied the appliance pump and fan may continue to operate to dissipate any residual heat within the appliance.

2.5 Safety Devices

When the appliance is in use, safe operation is ensured by:

- A water pressure switch that monitors system water pressure and will deactivate the pump, fan and burner should the system water pressure drop below the rated tolerance.
- A high limit thermostat that over-rides the temperature control circuit to prevent or interrupt the operation of the burner.
- An air pressure switch that requires the fan to prove operation before the gas valve is energised.
- A pressure switch that interrupts the operation of the appliance if the condense pipe becomes blocked.
- A safety valve which releases excess pressure from the primary circuit.

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3.0 Technical Data

3.1 Central heating	24c	29c
Heat input (kW)	25.00	29.00
Maximum heat output (kW) 80/60 °C	24.35	28.30
Minimum heat output (kW) 80/60 °C	14.25	14.28
Maximum heat output (kW) 50/30 °C	25.90	29.93
Minimum heat output (kW) 50/30 °C	14.85	14.75
Minimum working pressure	0.5 bar	
Maximum working pressure	3.0 bar	
Minimum flow rate	350 l/h	
3.2 Domestic hot water	**24c**	**29c**
Maximum output (kW)	25.00	29.00
Minimum output (kW)	9.50	9.90
Flow rate (35 °C rise)	10.2 l/min	11.9 l/min
Maximum inlet pressure	6.0 bar	
Minimum inlet working pressure	0.15 bar	
Minimum flow rate	2 l/min.	
3.3 Gas pressures	**24c**	**29c**
Inlet pressure G20	20.0 mbar	20.0 mbar
Maximum burner pressure	9.40 mbar	9.20 mbar
Minimum burner pressure (central heating)	3.50 mbar	2.70 mbar
Minimum burner pressure (domestic hot water)	1.50 mbar	1.20 mbar
Gross rate (central haeting, max - min)	2.64 - 1.59 m^3/h	3.07 - 1.59 m^3/h
Injectors size (mm)	12 x 1.35	14 x 1.35
3.4 Expansion vessel	**24c**	**29c**
Capacity	8 litres	10 litres
Maximum system volume	76 litres	
Pre-charge pressure	1.0 bar	
3.5 Dimensions	**24c**	**29c**
Height (mm)	780	780
Width (mm)	400	450
Depth (mm)	332	332
Dry weight (kg)	40	44
3.6 Clearances	**iHeat Range**	
Sides	12 mm	12 mm
Top	150 mm from casing or 25 mm above flue elbow, whichever is applicable	
Bottom	150 mm	150 mm
Front	600 mm	600 mm
3.7 Connections	**iHeat Range**	
Flow & return	22 mm	22 mm
Hot & cold water connections	15 mm	15 mm
Gas	15 mm	15 mm
Safety valve	15 mm	15 mm
Condense	21 mm	21 mm
3.8 Electrical	**24c**	**29c**
Voltage	230V/~ 50hz	230V/~ 50hz
Power consumption	153 W	153 W
Internal fuse	2 A	2 A
External fuse	3 A	3 A
3.9 Flue details (concentric)	**24c**	**29c**
Maximum horizontal flue length (60/100mm)	4.5 m	4.0 m
Maximum vertical flue length (60/100mm)	5.5 m	5.0 m
3.9A Flue Details (twin pipes)	**24c**	**29c**
Maximum horizontal flue length (80mm/80mm)	20m/20m	12m/12m
Maximum vertical flue length (80mm/80mm)	20m/20m	12m/12m
3.10 Efficiency	**24c**	**29c**
SEDBUK %	86.9 Band "B"	86.7 Band "B"
3.11 Emissions	**24c**	**29c**
CO_2 @ maximum output (%)	6.75	7.05
CO_2 @ minimum output (%)	3.90	3.50
CO/CO_2 ratio @ maximum output	0.001 to 1	0.001 to 1
CO/CO_2 ratio @ minimum output	0.002 to 1	0.002 to 1
CO @ maximum output (p.p.m.*)	less than 85.92	less than 107.4
CO @ minimum output (p.p.m.*)	less than 85.92	less than 64.44
NOx @ maximum output (mg/kWh)	317.52	317.52
NOx @ minimum output (mg/kWh)	229.32	194.04
NOx rating	class 2	class 2

*** p.p.m. = parts per million**

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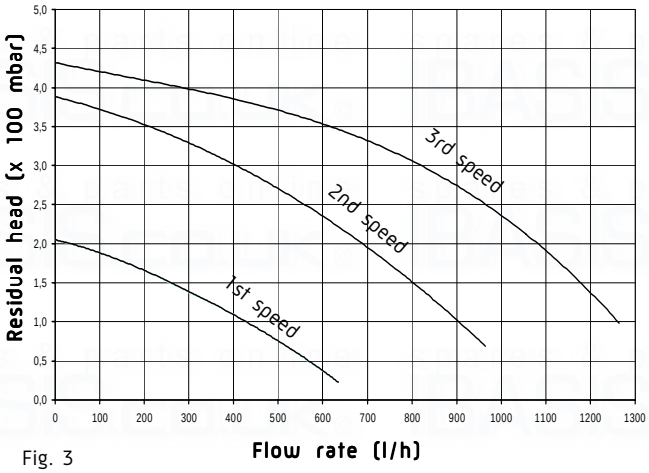
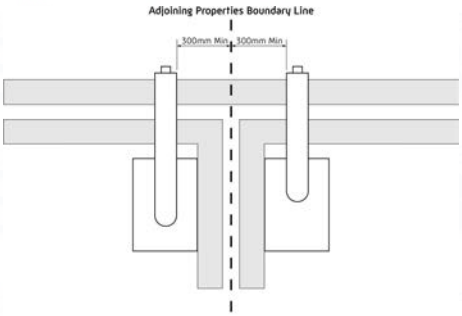


Fig. 3

3.0 Technical Data

3.12 Pump duty

Fig. 3 shows the flow-rate available – after allowing for pressure loss through the appliance – for system requirements. When using this graph, apply only the pressure loss of the system. The graph is based on a 20°C temperature differential.



NOTE: The minimum distance from a flue terminal to a boundary line is 300mm.
If fitting a plume diverter kit, the air inlet should be a minimum of 100mm from any opening windows or doors.

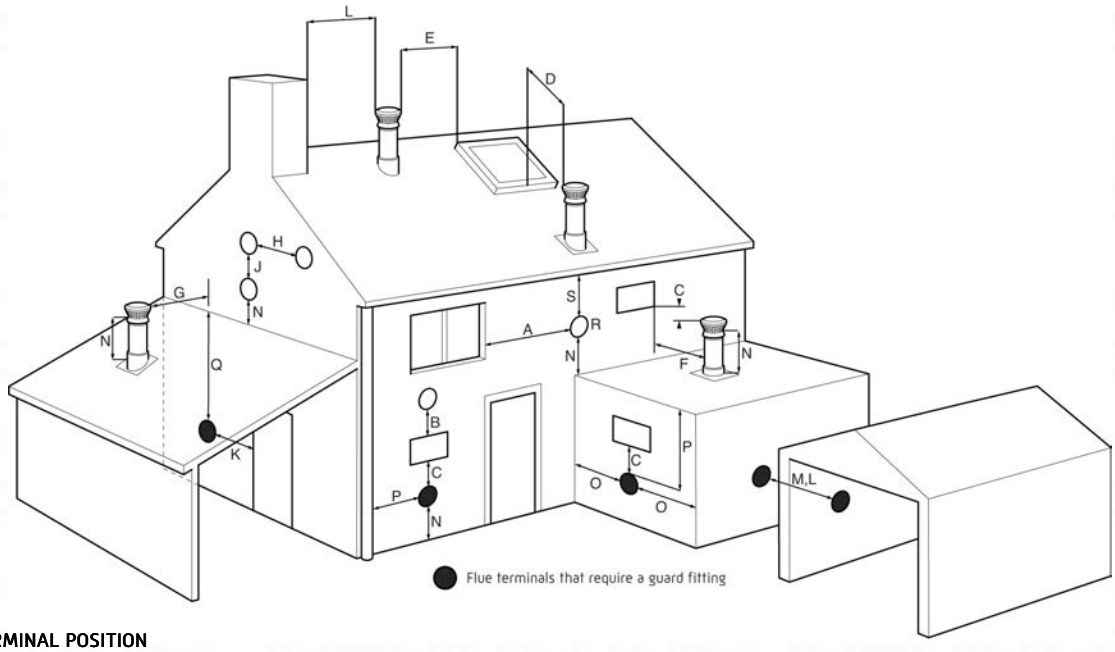


Fig. 4

TERMINAL POSITION

Position	Description	Minimum Distance (mm)
A	Horizontally to an opening, air brick, opening window	300
B	Above an opening, air brick, opening window etc.	300
C	Below an opening, air brick, opening window etc.	300
D	Below windows or openings on pitched roofs	2000
E	Adjacent to windows or openings on pitched and flat roofs	600
F	From an adjacent opening window (vertical only)	1000
G	From an adjacent wall to flue (vertical only)	300
H	Horizontally from a terminal on the same wall	300
J	Vertically from a terminal on the same wall	1500
K	From an opening in a carport (e.g. door, window) into the dwelling	1200
L	From a terminal facing a terminal (horizontal flue)	1200
L	From a terminal facing a terminal (vertical flue)	600
M	From a surface or boundary line facing a terminal	600
N	Above ground, roof or balcony level	300
O	From an internal or external corner	300
P	From a vertical drain pipe or soil pipe	25
Q	Below balconies or car port roof	25
R	Below eaves	25
S	Below gutters, soil pipes or drain pipes	25

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4.0 General requirements (UK)

4.1 Related documents

This appliance must be installed by a competent person in accordance with the Gas Safety (Installation & Use) Regulations.

The installation of this boiler must be in accordance with the relevant requirements of the Gas Safety (Installation & Use) Regulations, the local building regulations, the current I.E.E. wiring regulations, the bylaws of the local water undertaking, the Building Standards (Scotland) Regulation and Building Standards (Northern Ireland) Regulations.

It should be in accordance also with any relevant requirements of the local authority and the relevant recommendations of the following British Standard Codes of Practice.

4.2 Location of appliance

The appliance may be installed in any room or internal space, although particular attention is drawn to the requirements of the current I.E.E. wiring regulations, and in Scotland, the electrical provisions of the Building Regulations, with respect to the installation of the appliance in a room or internal space containing a bath or shower.

When an appliance is installed in a room or internal space containing a bath or shower, the appliance or any control pertaining to it must not be within reach of a person using the bath or shower.

The location chosen for the appliance must permit the provision of a safe and satisfactory flue and termination. The location must also permit an adequate air supply for combustion purposes and an adequate space for servicing and air circulation around the appliance. Where the installation of the appliance will be in an unusual location special procedures may be necessary, BS 6798 gives detailed guidance on this aspect.

A compartment used to enclose the appliance must be designed and constructed specifically for this purpose. An existing compartment/cupboard may be utilised provided that it is modified to suit.

Details of essential features of compartment/cupboard design including airing cupboard installations are given in BS 6798. This appliance is not suitable for external installation.

Codes of Practice - refer to the most recent version

In GB the following Codes of Practice apply:

Standard	Scope
BS 7967	Carbon monoxide in dwelling and the combustion performance of gas fired appliances.
BS 7967-2	guide for using electronic portable combustion gas analyser in the measurement of carbon monoxide and the determination of combustion performance.
BS 7967-3	guide for responding to measurements obtained from electronic portable combustion gas analyser.
BS 7967-4	Guide for using electronic portable combustion gas analyser as part of the process of servicing and maintenance of gas appliances.
BS 6891	Gas installation
BS 5546	Installation of hot water supplies for domestic purposes
BS 5449	Forced circulation hot water systems
BS 6798	Installation of gas fired hot water boilers
BS 5440	Part 1 Flues
BS 5440	Part 2 Ventilation
BS 7074	Expansion vessels and ancillary equipment for sealed water systems
BS 7593	Treatment of water in domestic hot water central heating systems

In IE the following Codes of Practice apply:

Standard	Scope
I.S. 813	Domestic Gas Installation

The following standards give valuable additional information;

BS 5546	Installation of hot water supplies for domestic purposes
BS 5449	Forced circulation hot water systems
BS 7074	Expansion vessels and ancillary equipment for sealed water systems
BS 7593	Treatment of water in domestic hot water central heating systems

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4.0 General requirements (UK)

4.3 Gas supply

The gas meter – as supplied by the gas supplier – must be checked to ensure that it is of adequate size to deal with the maximum rated input of all the appliances that it serves. Installation pipes must be fitted in accordance with BS 6891.

Pipe work from the meter to the appliance must be of adequate size. Pipes of a smaller size than the appliance gas inlet connection must not be used. The installation must be tested for soundness in accordance with BS6891.

If the gas supply serves more than one appliance, it must be ensured that an adequate supply is maintained to each appliance when they are in use at the same time.

4.4 Flue System

The terminal should be located where the dispersal of combustion products is not impeded and with due regard for the damage and discoloration that may occur to building products located nearby. The terminal must not be located in a place where it is likely to cause a nuisance (see fig. 4).

In cold and/or humid weather, water vapour will condense on leaving the terminal; the effect of such pluming must be considered.

If installed less than 2m above a pavement or platform to which people have access (including balconies or flat roofs) the terminal must be protected by a guard of durable material.

The guard must be fitted centrally over the terminal. Refer to BS 5440 Part 1, when the terminal is 0.5 metres (or less) below plastic guttering or 1 metre (or less) below painted eaves.

4.5 Air supply

The following notes are intended for general guidance only. This appliance is a room-sealed, fan-flued boiler, consequently it does not require a permanent air vent for combustion air supply. When installed in a cupboard or compartment, ventilation for cooling purposes is also not required.

4.6 Water circulation

Detailed recommendations are given in BS 5449 Part 1 and BS 6798. The following notes are for general guidance only.

4.6.1 Pipe work

It is recommended that copper tubing to BS 2871 Part 1 is used in conjunction with soldered capillary joints. Where possible pipes should have a gradient to ensure air is carried naturally to air release points and that water flows naturally to drain cocks.

Except where providing useful heat, pipes should be insulated to avoid heat loss and in particular to avoid the possibility of freezing. Particular attention should be paid to pipes passing through ventilated areas such as under floors, loft space and void areas.

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4.0 General requirements (UK)

4.6.2 Automatic by-pass

The appliance has a built-in automatic by-pass, consequently there is no requirement for an external by-pass, however the design of the system should be such that it prevents boiler 'cycling'.

4.6.3 Drain cocks

These must be located in accessible positions to facilitate draining of the appliance and all water pipes connected to the appliance. The drain cocks must be manufactured in accordance with BS 2879.

4.6.4 Air release points

These must be positioned at the highest points in the system where air is likely to be trapped. They should be used to expel trapped air and allow complete filling of the system.

4.6.5 Expansion Vessel

The appliance has an integral expansion vessel to accommodate the increased volume of water when the system is heated. It can accept up to 8 (24c) or 10 (29c) litres of expansion from within the system, generally this is sufficient, however if the system has an unusually high water content, it may be necessary to provide additional expansion capacity (see fig. 7.27).

4.6.6 Filling point

A method for initial filling of the system and replacing water lost during servicing etc. directly from the mains supply, is required (see fig. 5). This method of filling complies with the local water authority regulations.

4.6.7 Low pressure Sealed System

An alternative method of filling the system would be from an independent make-up vessel or tank mounted in a position at least 1 metre above the highest point in the system and at least 5 metres above the boiler (see fig. 5A).

The cold feed from the make-up vessel or tank must be fitted with an approved non-return valve and stopcock for isolation purposes. The feed pipe should be connected to the return pipe as close to the boiler as possible.

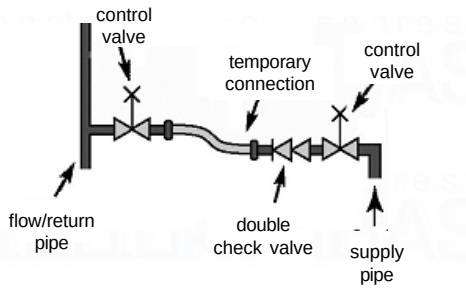
4.6.8 Frequent Filling

Frequent filling or venting of the system may be indicative of a leak. Care should be taken during the installation of the appliance to ensure all aspects of the system are capable of withstanding pressures up to at least 3 bar.

4.7 Electrical supply

The appliance is supplied for operation on 230V @ 50Hz electrical supply; it must be protected with a 3-amp fuse. The method of connection to the mains electricity supply must allow for complete isolation from the supply. The preferred method is by using a double-pole switch with a contact separation of at least 3mm. The switch must only supply the appliance and its corresponding controls, i.e. time clock, room thermostat, etc. Alternatively an un-switched shuttered socket with a fused 3-pin plug both complying with BS 1363 is acceptable.

fig.5



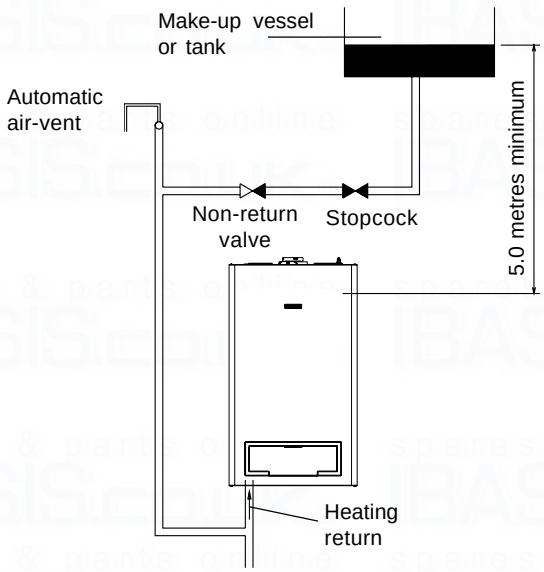


fig.5A

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4.0 General requirements (UK)

4.8 Mounting on a Combustible Surface

If the appliance is to be fitted on a wall of combustible material, a sheet of fireproof material must protect the wall.

4.9 Timber Framed Buildings

If the appliance is to be fitted in a timber framed building, it should be fitted in accordance with the Institute of Gas Engineers publication (IGE/UP/7) 'Guide for Gas Installations in Timber Frame Buildings'.

4.10 Inhibitors

It is recommend that an inhibitor – suitable for use with copper and aluminium heat exchangers – is used to protect the boiler and system from the effects of corrosion and/or electrolytic action. The inhibitor must be administered in strict accordance with the manufacturers instructions*.

*Water treatment of the complete heating system – including the boiler – should be carried out in accordance with BS 7593 and the Domestic Water Treatment Association's (DWTA) code of practice.

4.11 Showers

If the appliance is intended for use with a shower, the shower must be thermostatically controlled and be suitable for use with a combination boiler.

4.0 General requirements (EIRE)

This appliance must be installed by a competent person in accordance with and defined by, the Standard Specification (Domestic Gas Installations) Declaration (I.S. 813).

4A.1 Related documents

The installation of this boiler must be in accordance with the relevant requirements of the local building regulations, the current ETCI National Rules for Electrical Installations and the bylaws of the local water undertaking.

It should be in accordance also with any relevant requirements of the local and/or district authority.

4A.2 Location of appliance

The appliance may be installed in any room or internal space, although particular attention is drawn to the requirements of the current ETCI National Rules for Electrical Installations, and I.S. 813, Annex K.

When an appliance is installed in a room or internal space containing a bath or shower, the appliance or any control pertaining to it must not be within reach of a person using the bath or shower.

The location chosen for the appliance must permit the provision of a safe and satisfactory flue and termination. The location must also permit an adequate air supply for combustion purposes and an adequate space for servicing and air circulation around the appliance. Where the installation of the appliance will be in an unusual location special procedures may be necessary, refer to I.S. 813 for detailed guidance on this aspect.

A compartment used to enclose the appliance must be designed and constructed specifically for this purpose. An existing compartment/cupboard may be utilised provided that it is modified to suit.

This appliance is not suitable for external installation.

4A.3 Gas supply

The gas meter – as supplied by the gas supplier – must be checked to ensure that it is of adequate size to deal with the maximum rated input of all the appliances that it serves. Installation pipes must be fitted in accordance with I.S. 813.

Pipe work from the meter to the appliance must be of adequate size. Pipes of a smaller size than the appliance gas inlet connection must not be used. The installation must be tested for soundness in accordance with I.S. 813.

If the gas supply serves more than one appliance, it must be ensured that an adequate supply is maintained to each appliance when they are in use at the same time.

4A.4 Flue system

The terminal should be located where the dispersal of combustion products is not impeded and with due regard for the damage and discoloration that may occur to building products located nearby. The terminal must not be located in a place where it is likely to cause a nuisance (see I.S. 813).

In cold and/or humid weather, water vapour will condense on leaving the terminal; the effect of such pluming must be considered.

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4.0 General requirements (EIRE)

If installed less than 2m above a pavement or platform to which people have access (including balconies or flat roofs) the terminal must be protected by a guard of durable material. The guard must be fitted centrally over the terminal. Refer to I.S. 813, when the terminal is 0.5 metres (or less) below plastic guttering or 1 metre (or less) below painted eaves.

4A.5 Air supply

The following notes are intended for general guidance only.

This appliance is a room-sealed, fan-flued boiler, consequently it does not require a permanent air vent for combustion air supply.

When installed in a cupboard or compartment, ventilation for cooling purposes is also not required.

4A.6 Water circulation

Specific recommendations are given in I.S. 813. The following notes are for general guidance only.

4A.6.1 Pipework

It is recommended that copper tubing be used in conjunction with soldered capillary joints.

Where possible pipes should have a gradient to ensure air is carried naturally to air release points and that water flows naturally to drain cocks.

Except where providing useful heat, pipes should be insulated to avoid heat loss and in particular to avoid the possibility of freezing. Particular attention should be paid to pipes passing through ventilated areas such as under floors, loft space and void areas.

4A.6.2 Automatic by-pass

The appliance has a built-in automatic by-pass, consequently there is no requirement for an external by-pass, however the design of the system should be such that it prevents boiler 'cycling'.

4A.6.3 Drain cocks

These must be located in accessible positions to facilitate draining of the appliance and all water pipes connected to the appliance.

4A.6.4 Air release points

These must be positioned at the highest points in the system where air is likely to be trapped. They should be used to expel trapped air and allow complete filling of the system.

4A.6.5 Expansion vessel

The appliance has an integral expansion vessel to accommodate the increased volume of water when the system is heated. It can accept up to 8 (iHeat24c) or 10 (iHeat29c) litres of expansion from within the system, generally this is sufficient, however if the system has an unusually high water content, it may be necessary to provide additional expansion capacity (see 7.27).

4A.6.6 Filling point

A method for initial filling of the system and replacing water lost during servicing etc. directly from the mains supply, is required (see fig. 5). This method of filling complies with the local water authority regulations.

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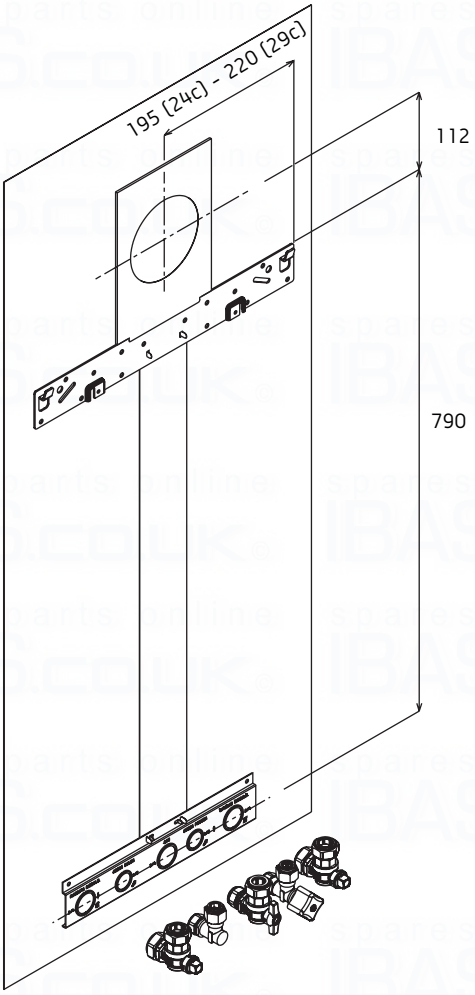


fig. 6

4.0 General requirements (EIRE)

4A.6.7 Low pressure sealed system

An alternative method of filling the system would be from an independent make-up vessel or tank mounted in a position at least 1 metre above the highest point in the system and at least 5 metres above the boiler (see fig. 5A). The cold feed from the make-up vessel or tank must be fitted with an approved non-return valve and stopcock for isolation purposes. The feed pipe should be connected to the return pipe as close to the boiler as possible.

4A.6.8 Frequent filling

Frequent filling or venting of the system may be indicative of a leak. Care should be taken during the installation of the appliance to ensure all aspects of the system are capable of withstanding pressures up to at least 3 bar.

4A.7 Electrical supply

The appliance is supplied for operation on 230V @ 50Hz electrical supply; it must be protected with a 3-amp fuse. The method of connection to the mains electricity supply must allow for complete isolation from the supply. The preferred method is by using a double-pole switch with a contact separation of at least 3,5 mm (3° high-voltage category). The switch must only supply the appliance and its corresponding controls, i.e. time clock, room thermostat, etc.

4A.8 Mounting on a combustible surface

If the appliance is to be fitted on a wall of combustible material, a sheet of fireproof material must protect the wall.

4A.9 Timber framed buildings

If the appliance is to be fitted in a timber framed building, it should be fitted in accordance with I.S. 813 and local Building Regulations.

The Institute of Gas Engineers publication (IGE/UP/7) 'Guide for Gas Installations in Timber Frame Buildings' gives specific advice on this type of installation.

4A.10 Inhibitors

We recommend that an inhibitor – suitable for use with aluminium heat exchangers – is used to protect the boiler and system from the effects of corrosion and/or electrolytic action. The inhibitor must be administered in strict accordance with the manufacturers instructions*.

*Water treatment of the complete heating system – including the boiler – should be carried out in accordance with I.S. 813 and the Domestic Water Treatment Association's (DWTA) code of practice.

4A.11 Showers

If the appliance is intended for use with a shower, the shower must be thermostatically controlled and be suitable for use with a combination boiler.

4A.12 Declaration of conformity

A Declaration of Conformity (as defined in I.S. 813) must be provided on completion of the installation.

A copy of the declaration must be given to the responsible person and also to the gas supplier if required.

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5.0 Installation

5.1 Boiler dimensions (fig. 7)

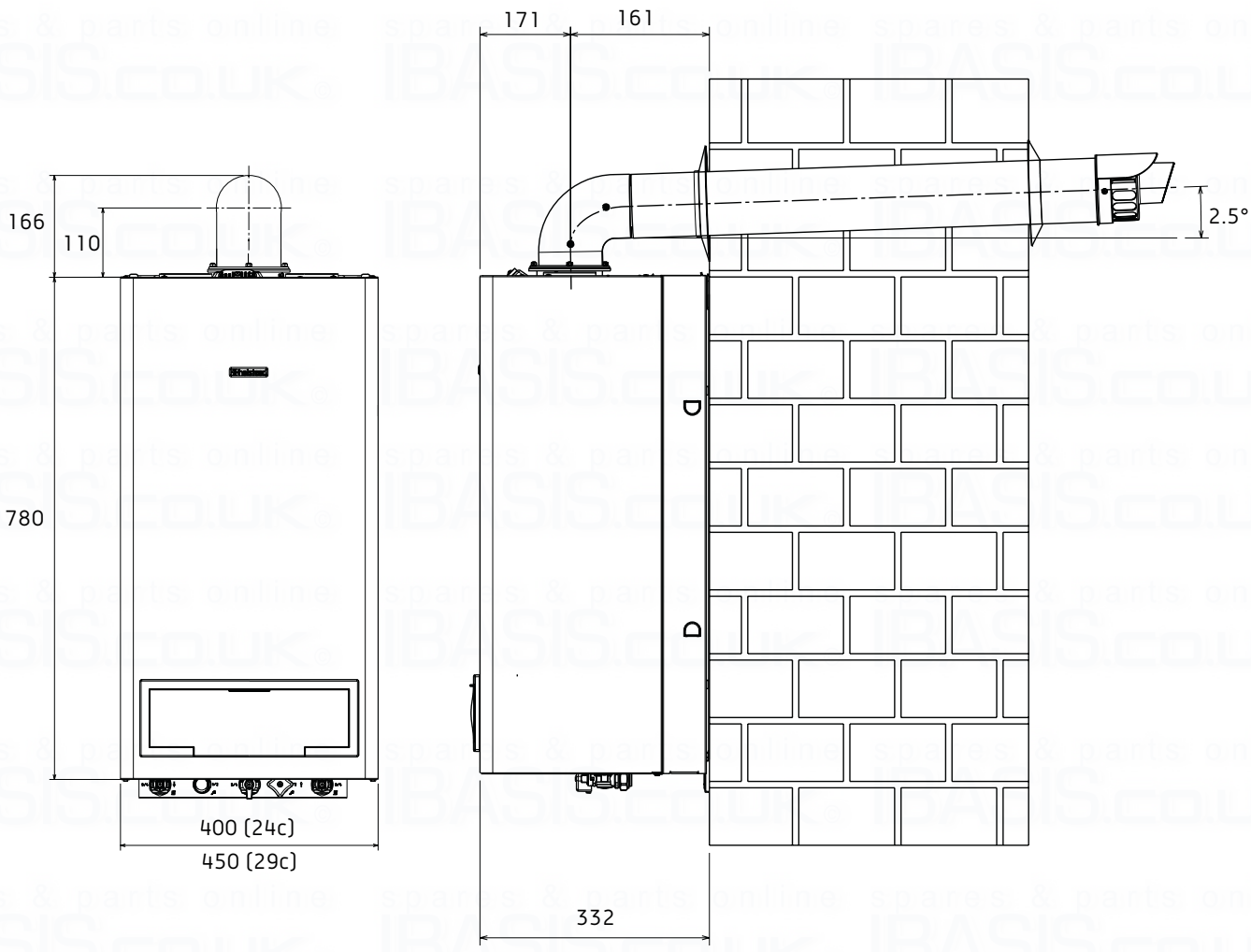


fig. 7

5.2 Tap rail (fig. 8)

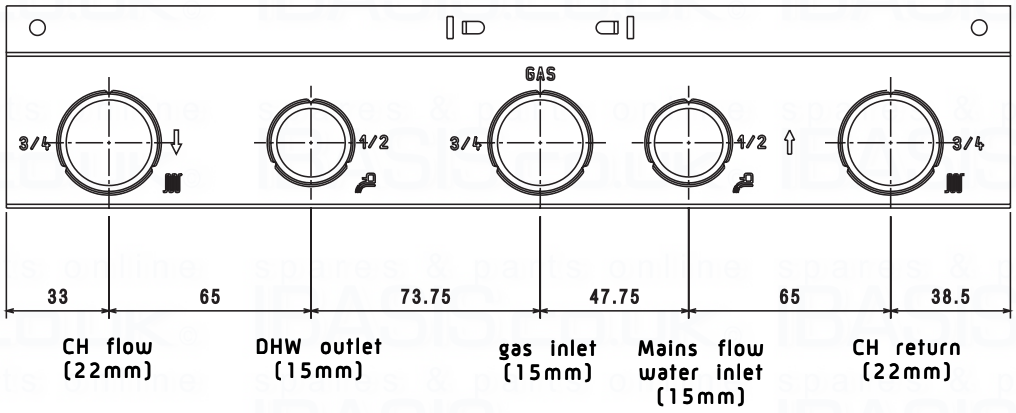


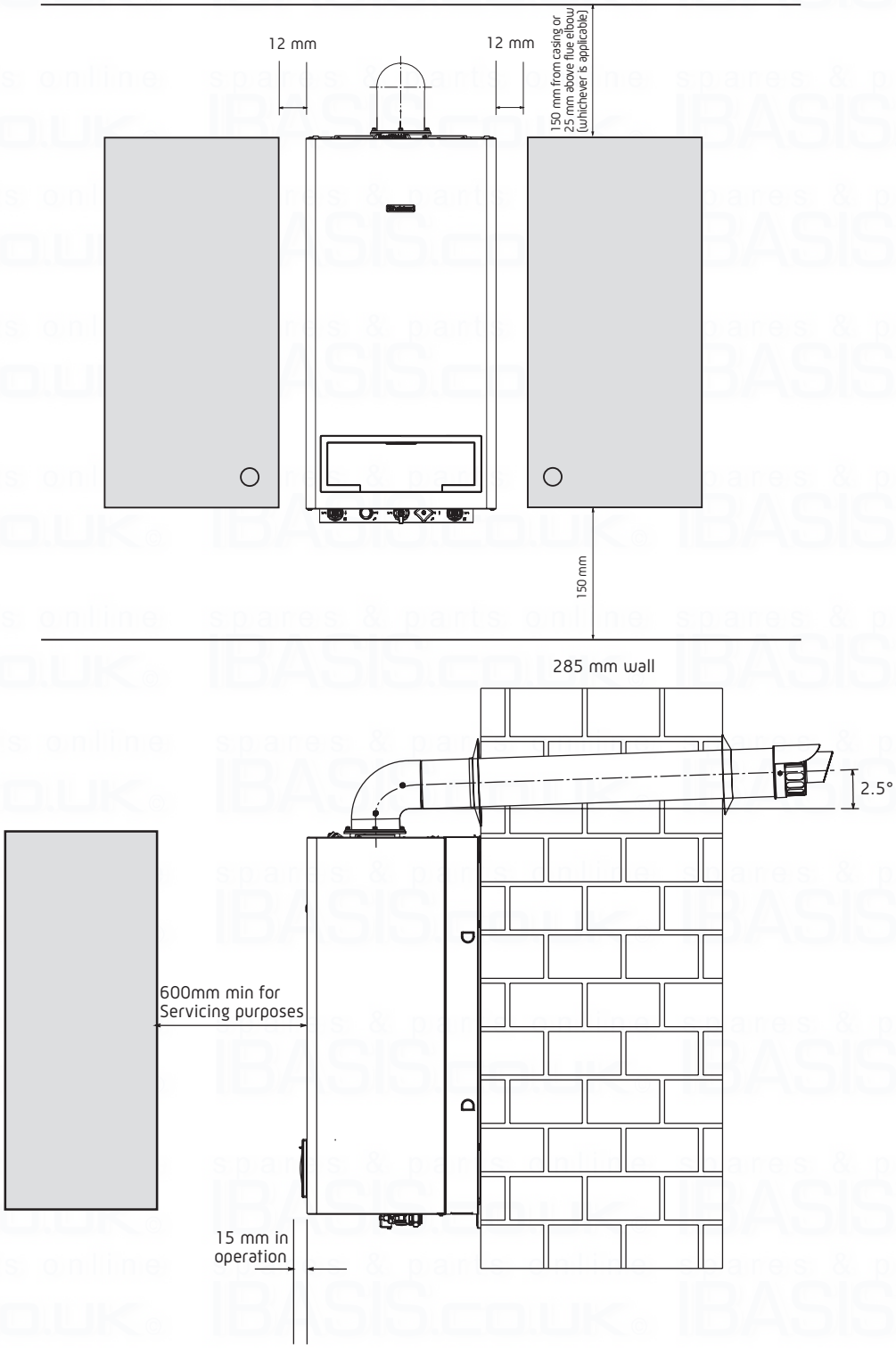
fig. 8

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5.3 Clearances (fig. 9)

fig. 9

1. A flat vertical area is required for the installation of the boiler
2. These dimensions include the necessary clearance around the boiler for case removal, spanner access and air movement. Additional clearances may be required for the passage of pipes around local obstructions such as joists running parallel to the front face of the boiler.



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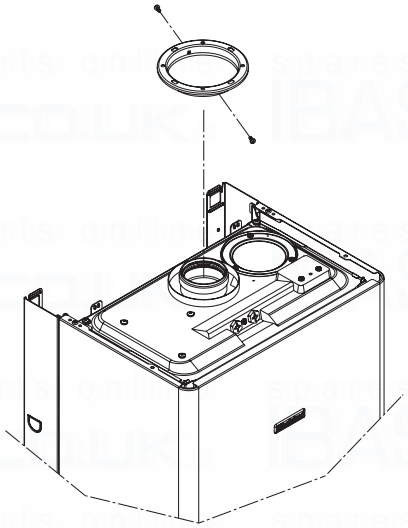


fig. 10A

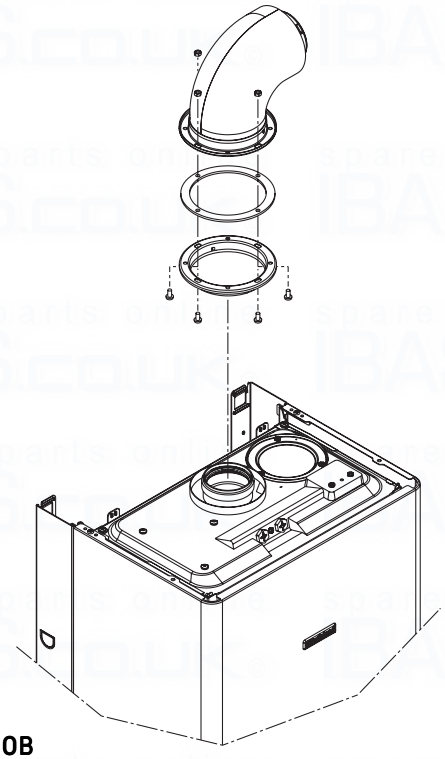


fig. 10B

5.4 Boiler flue ring

Attention: this component must be used on all concentric horizontal or vertical installations

The boiler flue spigot adaptor is fit to the appliance. The spigot adaptor enables the standard Halstead horizontal flue terminal to be rotated through 360° in any direction.

Kit content:

Spigot adaptor 100 mm	Qty. 1	fitted
Sealing gasket	Qty. 1	inside manual envelop
Screws and nuts	Qty. 1	inside manual envelop

Instructions for the installation

The installation must be carried out by suitably qualified personnel and in accordance with the appliance installation instructions.

Before attempting any operation on the appliance, move the selector switch to the OFF position and isolate the appliance from the electrical supply.

To connect the (flue spigot) adaptor to the boiler:

- remove the adaptor from the boiler (fig. 10A)
- Positioning the vertical flue section or flue bend over the spigot adaptor and insert the gasket (supplied) between the flanges of the adaptor and the corresponding flue component (vertical flue section or bend).
- Secure/tighten the adaptor to the corresponding flue component using the M5 screws and nuts (supplied) (fig. 10B).
- Connect the assembly (adaptor & flue component) to the appliance flue spigot (outlet), ensuring that the inner – 60mm – pipe is fully inserted into the corresponding outlet of the appliance.
- NOTE: in the case of a 90°/45° bend, ensure that the bend is rotated to the correct (final) position.
- Refit the adaptor to the appliance flue spigot and secure it in position with 2-screws previously removed, into the holes.

ENSURE

- That the components are properly secured and that the seal is correctly made
- The maximum flue length is not exceeded.
- On completion of the installation, re-check to ensure that the entire flue system is secure and sealed.

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5.5 Delivery

Due to the weight of the appliance it may be necessary for two people to lift and attach the appliance to its mounting. The appliance is contained within a heavy-duty cardboard carton. Lay the carton on the floor with the writing the correct way up.

5.6 Contents

Contained within the carton is:

- the boiler
- the wall bracket
- 60/100 carton flue template
- an accessories pack containing appliance service connections and washers
- the instruction pack containing the installation & servicing instructions, user instructions, guarantee registration card, a 3-amp fuse and screws-gasket for flue ring.

5.7 Unpacking

At the top of the carton pull both sides open – do not use a knife – unfold the rest of the carton from around the appliance, carefully remove all protective packaging from the appliance and lay the accessories etc. to one side. Protective gloves should be used to lift the appliance, the appliance back-frame should be used for lifting points.

5.8 Preparation for mounting the appliance

The appliance should be mounted on a smooth, vertical, non-combustible surface, which must be capable of supporting the full weight of the appliance. Care should be exercised when determining the position of the appliance with respect to hidden obstructions such as pipes, cables, etc.
When the position of the appliance has been decided – using the template supplied – carefully mark the position of the wall-mounting bracket and flue-hole (Fig. 6).

5.9 Fitting the flue

The top flue outlet permits both horizontal and vertical flue applications to be considered.

5.0 Installation

5.10 Concentric air/flue duct specifications

The iHeat boilers can be installed to a number of different concentric flue systems. The different flue applications as shown in Fig. 10C are available as kits usually comprising the connecting parts to the appliance and end terminal. Flue extension ducts and extension elbows are available as accessories.

5.11 Flue template (fig. 6)

Template for telescopic horizontal wall terminal is available with the boiler. Positioning the template on the boiler bracket. Drill the wall according template for the telescopic flue kit.

5.12 Kit A + Telescopic Horizontal Wall Terminal (C13) - Part No. 956120

Traditional concentric flue system, Fig. 10D, with a maximum length of 10000mm. The flanged flue elbow is designed with a 3° slope towards the appliance so that the condensate can easily drain off. It has to be considered that for every metre horizontal flue length the terminal exit centreline is approx. 45 mm higher than the elbow's centreline.
The standard telescopic terminal is 615mm max length and 430mm min length, but can be cut to a minimum flue length of 250mm, which is suitable for single, 100mm (4"), brick walls.

5.13 Kit B Vertical Concentric Flue Terminal (C33) - HBL Part 956081

Standard concentric (60/100) vertical flue application, Fig. 10E-10F, through roof attics with a maximum length of 12000mm.
The kit comprises of the roof terminal, flashing kit, vertical adaptor with sampling point and bracket.
The maximum length is measured from the top of the appliance casing to the underside of the air cowl.
For installation details refer to the flue kit instructions.

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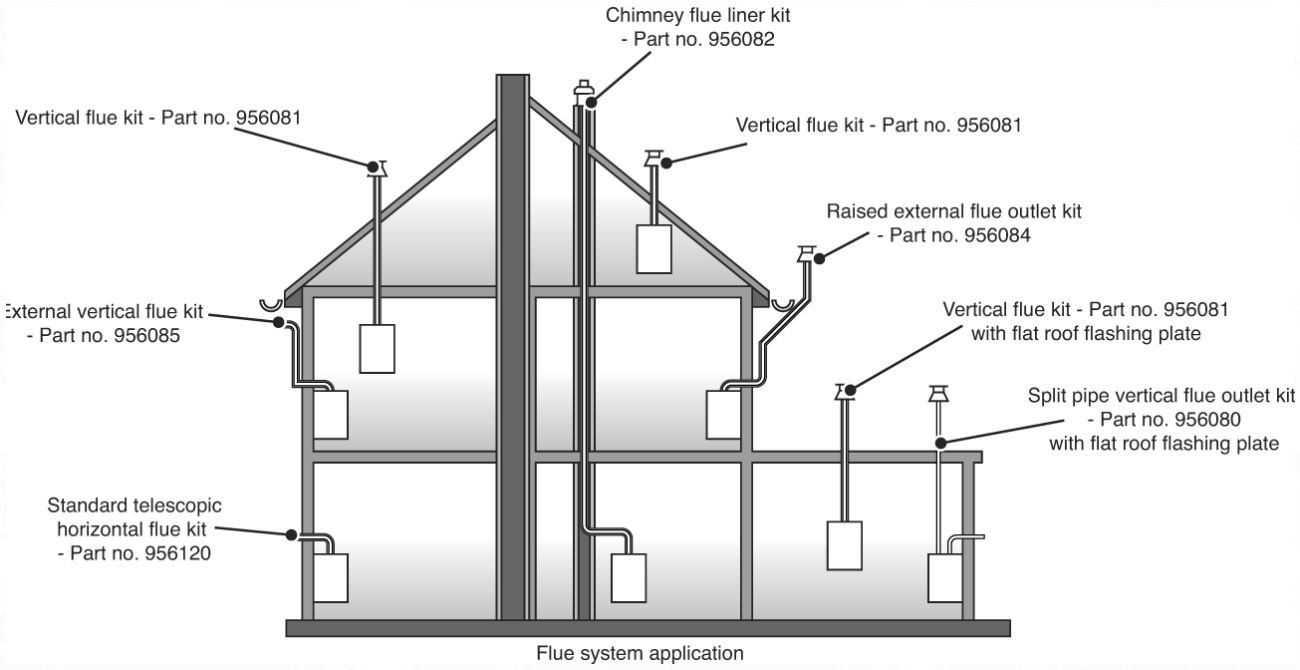


fig. 10C

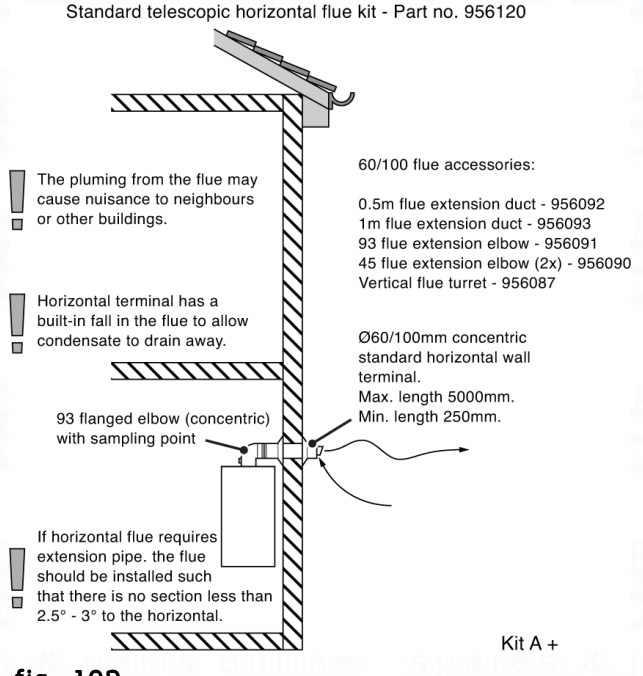


fig. 10D

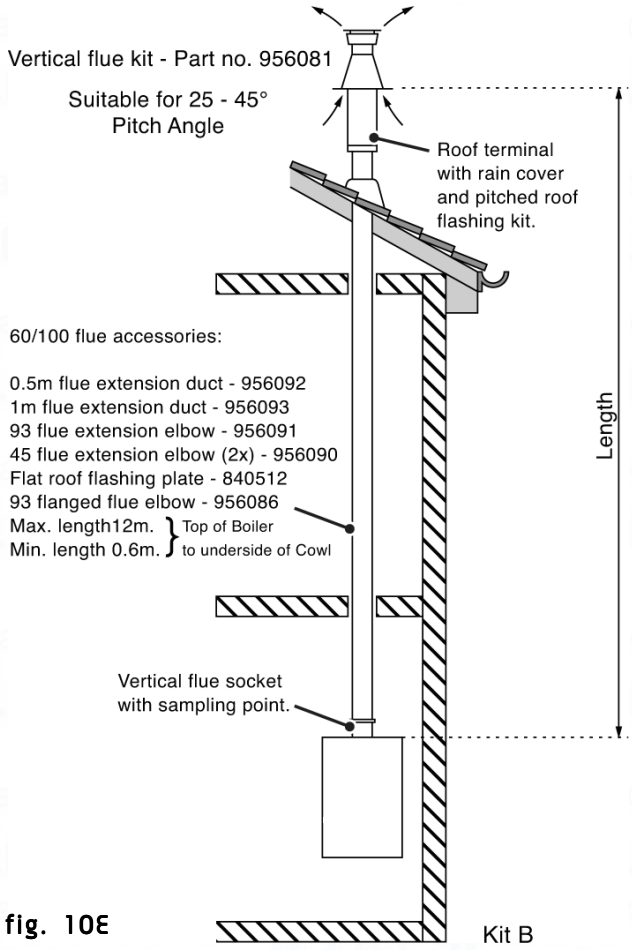


fig. 10E

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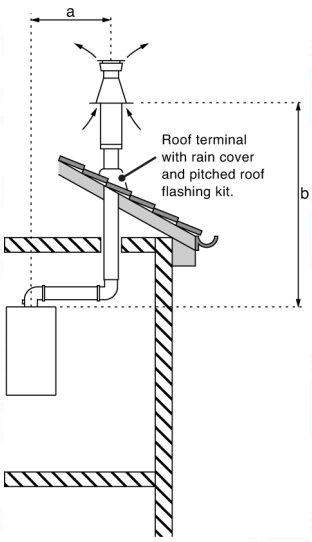


fig. 10F

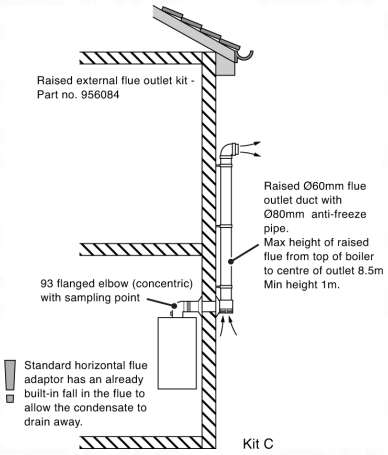


fig. 10G

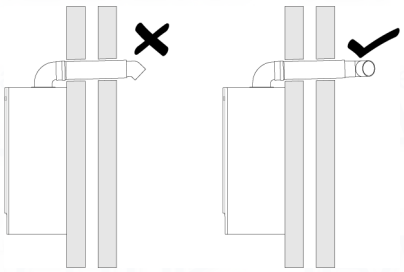


fig. 10H

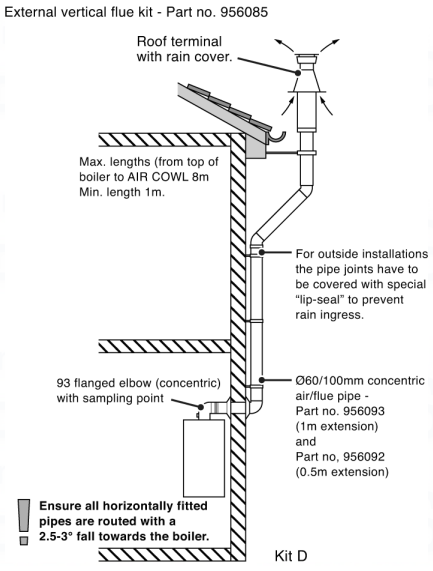


fig. 10I

5.0 Installation

5.14 Offset Vertical Flue Terminal (fig. 10F)

(C33) - HBL Part 000000

'a' measured from boiler flue outlet centre line to the centre line of the extension elbow.
'b' measured from the top of the boiler to the underside of the air cowl.
Maximum allowable length of a + b = 6800mm

5.15 Kit C Horizontal Anti-Plume Flue Kit (fig.10G)

(C13) - Part No. 956084

If the standard horizontal terminal is likely to cause nuisance to a neighbour or buildings, because of excess pluming, then this particular flue kit raises the flue gas outlet point to a higher elevation with the minimum amount of changes. The flue gas duct is teed-off from the concentric part and covered by an 80mm outer tube to protect the flue duct from freezing. The air in-take remains at the lower level (see Fig. 10G).
If choosing this option then the external flue duct length should be taken into account when calculating equivalent flue length.
For installation details refer to the flue kit instructions.
Dimensions from vertical terminals to opening windows should be in line with Fig. 4.

5.16 Plume Diverter Terminal Kit (fig. 10H)

Part No. 956103

(For use with Standard horizontal telescopic flue kit - Part no. 956120 - only).
This kit is provided to assist in fitting a condensing boiler with reduced clearances when fitted in good practice according to the Guide to Condensing Boiler Installation published by DEFRA/HMSO.
This kit allows the boiler flue outlet to be directed to the left or to the right only.

5.17 Kit D External Vertical Flue (fig. 10I)

(C33) - Part no. 956085

Suitable for installations if the appliance cannot be repositioned and where other horizontal flue options may cause some nuisance to neighbours or buildings. The flue kit contains some additional 45° elbows and extension ducts as well as a special wall bracket to pass the guttering (see Fig. 10I). The concentric flue will be routed vertically alongside the outside wall to above the roofline. Special seals are required to prevent rainwater penetrating the pipe joints.
For installation details refer to the flue kit instructions.

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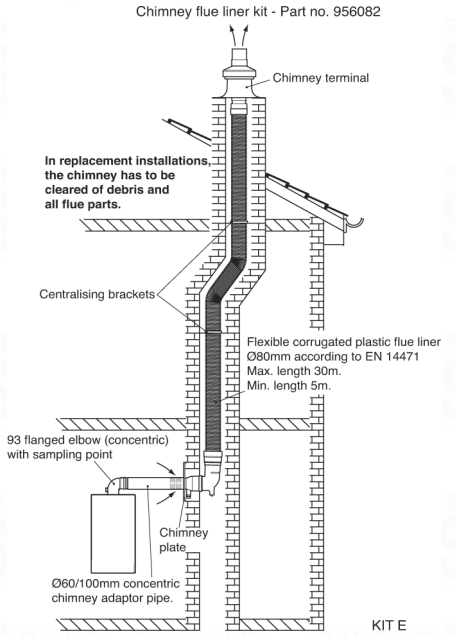


fig. 10J

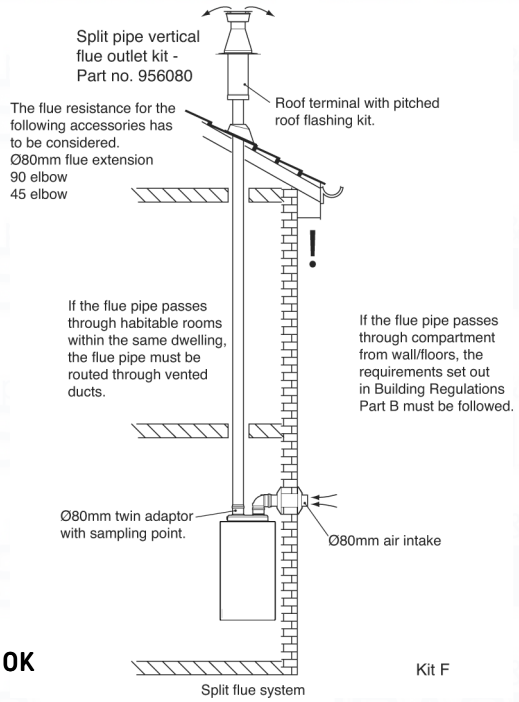


fig. 10K

5.0 Installation

5.18 Kit E Chimney Flue Liner Kit (fig. 10J)

(B23) - Part no. 956082

This kit is suitable for open flue application in accordance with BS5440 where a room sealed flue installation is impractical.

The kit comprises of a flue adaptor from the appliance to the chimney, a flexible plastic flue liner with connection parts and chimney terminal (see Fig. 10J). Where an open flue system is used, then an air vent must be provided in the same room or internal space as the flue duct air inlet. For installation details refer to the flue kit instructions.

Maximum flue resistive length = 30m.

A flue system can be built up from the components detailed in the table, but the total flue resistance must not exceed the maximum stated.

5.19 Kit F: Twin Flue System (fig. 10K)

(C53) - Part no. 956080

This flue system kit is designed for installations where the air intake position is different than the flue duct exit point. The kit comprises of a twin adaptor from which the air intake is taken from the adjacent outside wall (see Figure opposite) and the flue duct is routed vertically through the roof.

It has to be noted that the flue duct is under pressure when the appliance is in operation and the duct can leak poisonous carbon monoxide if the duct components are not correctly assembled. It is not recommended to route the flue duct through living space areas, i.e. bedrooms, living rooms etc.

For installation details refer to the instructions provided with the twin flued kit.

For C53 flue systems the terminal for the supply of combustion air and for the evacuation of combustion products shall not be installed on opposite walls of the building.

Maximum flue lenght resistance permitted for a twin flued system = 35m

Flue Component	Flue Resistance (Pa)	Part Number
Twin Flue Adaptor (required)	9.5	-
Air Inlet Terminal (required)	3	-
Chimney Terminal (required)	0.5	-
80 mm dia straight duct 1 metre	1	956101
80 mm dia straight duct 2 metre	2	956102
90° Elbow (80/80)	8	956100
45° Elbow (80/80)	4	956099

A flue system can be built up from the components detailed in the table, but the total flue resistance must not exceed the maximum stated.

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5.20 Flue lengths

For equivalent flues length refer to technical data table.

Length supplied in standard kit - horizontal		815mm
Length supplied in standard kit - vertical (available in 10m, 20m an 30m length)		N/A
Flexitube must be purchased as an accessory to complete the kit (see below)		
Flexitube min length		5m
Flexitube max length		30m
Accessories		
Description	Part No.	Equivalent Length
Horizontal - 60/100 Accessories		
Flue extension duct - 500mm	956092	450mm
Flue extension duct - 1000mm (incl. 1 x support bracket)	956093	950mm
93° extension elbow	956091	1550mm
45° extension elbow (pair)	956090	775mm
Air inlet duct - included in kit	N/A	N/A
Straight adaptor (60/80) - included in kit	N/A	N/A
91.5° adaptor elbow (80/80) - included in kit	N/A	N/A
Support bracket - 100mm	840517	N/A
93° flanged elbow - included in kit	956082	N/A
Vertical turret socket	956087	N/A
Vertical - Accessories		
Flexi tube - 10m	956110	10m
Flexi tube - 20m	956111	20m
Flexi tube - 30m	956112	30m
Straight duct (80) - included in kit	N/A	N/A
Chimney terminal - included in kit	N/A	N/A

Note: Equivalent length information only required for coaxial flue parts.
The corrugated (Flexi tube) flue parts are fixed and all parts are required for every application.

5.21 Additional Concentric Flue Kits

The following additional concentric kits are available as optional extras.

Flue Extension Ducts - 1000 mm and 500 mm long, (each duct extends the flue length by up to 950 mm and 450 mm respectively).

93° Extension Elbow - Allows an additional bend in the flue, and has an 'equivalent length' of 1550 mm. This elbow is mechanically different from the flanged elbow supplied as standard with the appliance, but has the same equivalent length.

45° Extension Elbow - Allows an additional bend in the flue and has an 'equivalent length' of 775 mm.

Vertical Turret Socket - For use with elevated horizontal flues and vertical terminals.

Vertical Roof Terminal - For use where an external wall is not available, or where it is desirable to route the ducts vertically.

For installation details refer to the instructions provided with the individual flue kits.

These optional kits may be used with the standard flue kits to produce an extensive range of flue options, providing that the following rules are strictly obeyed.

a) The maximum/minimum permissible length of the room sealed flue system are specified on technical data. The 'equivalent' flue length must not exceed the maximum values stated.

b) The standard terminal must be fitted horizontally; horizontal ducts must have a continuous fall towards the appliance of 1.5° to 3°. This ensures condensate runs back into the appliance from the flue system. The vertical terminal must always be used if a vertical outlet is required.

c) The concentric flue system must use either a flanged elbow or a vertical flue turret socket at the entry/exit to the appliance.

d) All joints must be correctly made and secured in accordance with the installation instructions. When cutting ducts, avoid swarf, uneven and sharp edges to maintain duct integrity.
Refer to Fig.10C to determine which option kits are required before commencing the installation. Instructions for installing the appliance with a horizontal flue and straight extension ducts are included in the main text of these instructions.

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5.0 Installation

5.22 Connecting the gas and water kit

The appliance is supplied with an accessory pack that includes service valves. The service valves are of the compression type. The accessories pack contains sealing washers etc., for use with the service valves.

When connecting pipe work to the valves, tighten the compression end first then insert the sealing washers before tightening the valve to the appliance.

NOTE

It will be necessary to hold the valve with one spanner whilst tightening with another.

A – flow
B – DHW outlet
C – gas
D – DHW inlet
E – return

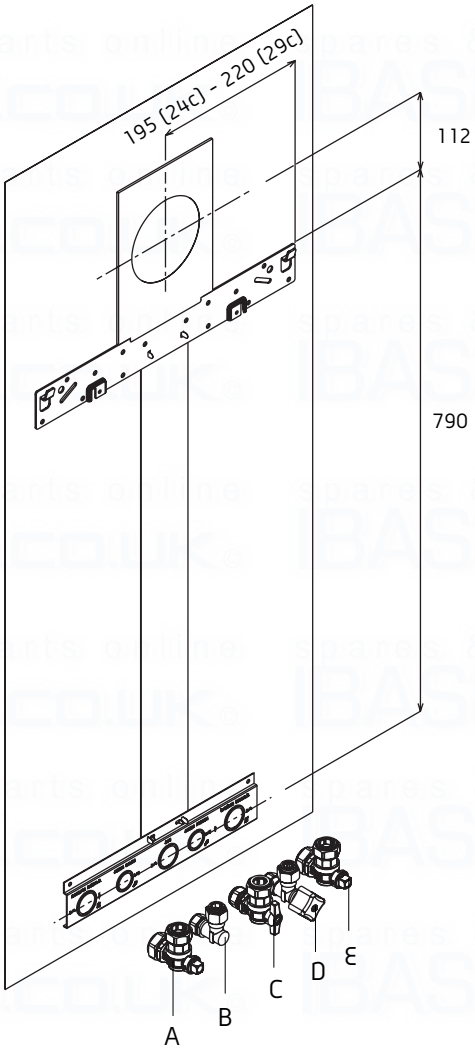


fig. 10L

5.22.1 GAS (fig. 10L)

The appliance is supplied with a 15mm service valve, connect a 15mm pipe to the inlet of the valve and tighten both nuts.

NOTE

It will be necessary to calculate the diameter of the gas supply pipe to ensure the appliance has an adequate supply of gas.

5.22.2 Flow & Return (fig. 10L)

The appliance is supplied with 22mm service valves for the flow and return connections, connect a 22mm pipe to the inlet of each valve and tighten both nuts.

NOTE

Depending on system requirements, it may necessary to increase the size of the flow & return pipe work after the service valve connections.

5.22.3 Cold water inlet (fig. 10L)

The appliance is supplied with a 15mm combined stopcock, connect a 15mm pipe to the outlet connection and tighten both nuts.

5.22.4 Hot Water outlet (fig. 10L)

The appliance is supplied with a 15mm outlet connection, connect a 15mm pipe to the outlet connection and tighten both nuts.

5.22.5 Safety Valve

Connect a safety valve connection pipe to the safety valve outlet. Connect a discharge pipe to the other end of the safety valve connection pipe and tighten. The discharge pipe must have a continuous fall away from the appliance to outside and allow any water to drain away thereby eliminating the possibility of freezing. The discharge pipe must terminate in a position where any water – possibly boiling – discharges safely without causing damage or injury, but is still visible.

5.22.6 Condense pipe

During normal operation the boiler produces condense which is collected in a trap located in the lower part of the boiler. A flexible pipe (condense outlet pipe) is connected to the outlet of the trap. The flexible pipe must be connected to a plastic waste pipe only. The plastic waste pipe must have a minimum of a 3° fall towards the drain. Any external run of pipe should be insulated to prevent the risk of freezing.

CONNECTING THE CONDENSATE OUTLET

Gently pull the condense outlet pipe down from its location inside the boiler until approximately 100mm protrudes from the underside of the boiler. Connect a suitable plastic (not copper) pipe (no less than 20mm diameter) to the outlet pipe and ensure it discharges in accordance with building regulations or other rules in force.

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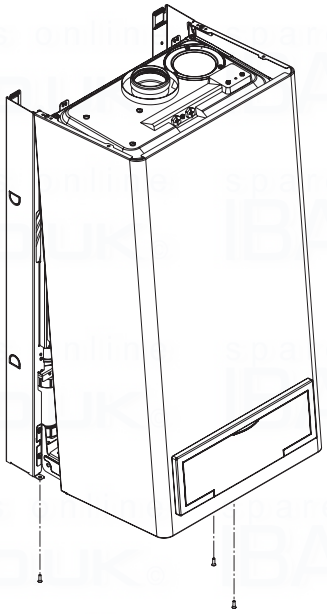


fig. 11

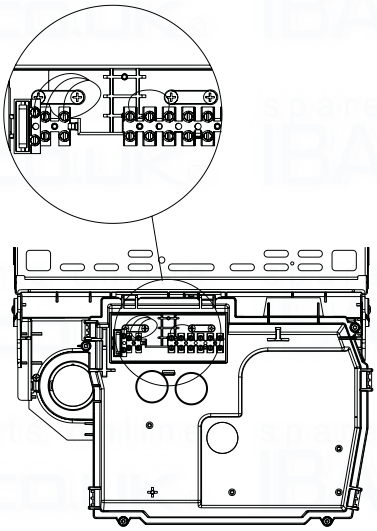


fig. 12

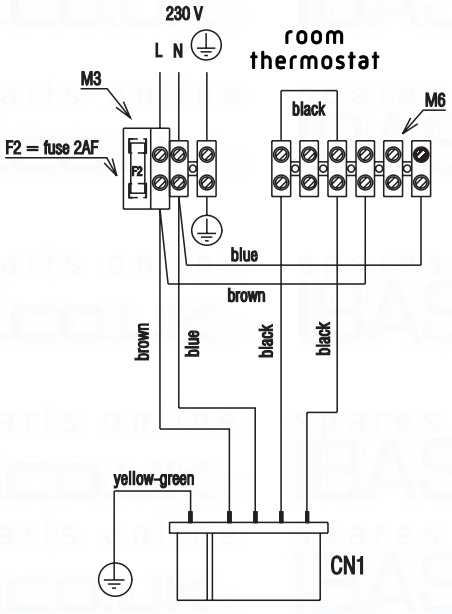


fig. 13

5.0 Installation

5.23 Electrical connections

The boiler is supplied with a 2-metre fly-lead. This lead can be used for connection to the electrical supply. Connect the fly-lead to a fused plug or fused isolator in the following way:

- brown wire to LIVE supply
- blue wire to NEUTRAL supply
- green/yellow to EARTH connection.

Insert the supplied 3-AMP fuse into the fused isolator or fused plug.

Should the fly-lead be unsuitable, refer to 4.7 for details on how to connect the electrical supply directly to the boiler.

The electrical supply must be as specified in section 4.7/ 4A.7. A qualified electrician should connect the appliance to the electrical supply. If controls - external to the appliance - are required, a competent person must undertake the design of any external electrical circuits, please refer to section 8 for detailed instructions. ANY EXTERNAL CONTROL OR WIRING MUST BE SERVED FROM THE SAME ISOLATOR AS THAT OF THE APPLIANCE. The supply cable from the isolator to the appliance must be 3-core flexible sized 0.75mm to BS 6500 or equivalent. Wiring to the appliance must be rated for operation in contact with surfaces up to 90 °C.

5.23.1 Casing removal (fig. 11)

To gain internal access to the appliance you must first remove the casing, proceed as outlined below:

- locate and unscrew the screws that secure the outer casing to the appliance (see fig. 11)
- lift the casing upward to disengage it from the top locating hooks and then remove
- store the casing and screws safely until required. Refit in the reverse order
- gently lower the control fascia until it rests.

5.23.2 Appliance terminal block

The appliance terminal block is located on the left side of the control fascia. Locate and remove the screw that secures the terminal block cover.

NOTE

The applian10Le comes with a factory fitted clock to allow basic operation of the boiler. If it is anticipated that additional controls - such as a room thermostat - will be required please refer to the wiring diagrams in section 8 for more detailed information.

Connecting the mains (230V) input (fig. 13)

Lift the terminal block cover as described in 4.7.

Pass the cable through the cable anchorage point. At the terminal block on the extreme left, there are 3 terminals from left to right they are:

LIVE - NEUTRAL - EARTH

Connect the supply cable wires (LIVE, NEUTRAL & EARTH) to their corresponding terminals on the appliance terminal block (see fig. 13). Ensure that the EARTH wire is left slightly longer than the others, this will prevent strain on the EARTH wire should the cable become taut.

The securing screw on the cable anchorage should now be tightened. This must be done before the control fascia is re-fitted in the upright position. The appliance casing and screws can now be re-fitted.

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6.0 Commissioning

6.1 Gas Supply Installation

Inspect the entire installation including the gas meter, test for soundness and purge. Refer to BS 6891 for specific instruction.

6.2 The Heating System

The appliance contains components that may become damaged or rendered inoperable by oils and/or debris that are residual from the installation of the system, consequently it is essential that the system be flushed in accordance with the following instructions.

6.3 Initial Filling of the System

Ensure both flow and return service valves are open, remove appliance casing as described in 5.23.1, identify the automatic air release valve and loosen the dust cap by turning the cap anti-clockwise one full turn. IMPORTANT, THERE ARE NO MANUAL AIR RELEASE VALVES LOCATED ON THE APPLIANCE. Ensure all manual air release valves located on the heating system are closed. Connect the filling loop (not supplied) and slowly proceed to fill the system. As water enters the system the pressure gauge will begin to rise. Once the gauge has reached 1 BAR close the filling loop and begin venting all manual air release valves, starting at the lowest first. It may be necessary to go back and top-up the pressure until the entire system has been filled. Inspect the system for water soundness, rectifying any leaks.

6.4 Initial flushing of the system

The whole of the heating system must be flushed both cold and hot as detailed in 6.9. Open all radiator or heating valves and the appliance flow & return service valves. Drain the boiler and system from the lowest points. Open the drain valve full bore to remove any installation debris from the boiler prior to lighting. Refill the boiler and heating system as described in 6.3.

6.5 Filling the hot water system

Close all hot water outlets, turn appliance stopcock to the normal operating position (fully counter clockwise), slowly open each outlet until air has been expelled and clear water is discharged. Check pipe-work etc. for water soundness.

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6.0 Commissioning

6.6 Pre-Operation Checks

Before attempting the initial lighting of the appliance, the following checks must be carried out:

- ensure all gas service valves from the meter to the appliance are open and the supply pipe has been properly purged;
- ensure the proper electrical checks have been carried out, particularly continuity, polarity and resistance to earth;
- ensure the 3 AMP fuse – supplied with the appliance – has been fitted;
- ensure the system has been filled, vented and the pressure set to 1 BAR;
- ensure the flue system has been fitted properly and in accordance with the instructions;
- ensure all appliance service valves are open.

6.7 Initial Lighting

Ensure the electrical supply to the appliance is switched on. Move the selector switch to the Heating & Hot Water position, ensure the time clock is switched to an 'ON' position and ensure any other external controls (room thermostat for example) are also calling for heat.
The appliance will now operate in the mode as described in 1.2. Should the appliance fail to ignite, refer to 6.6 and/or section 8 (faultfinding).

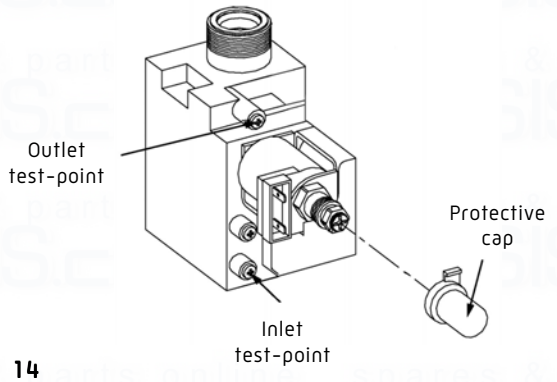


Fig. 14

6.8 Checking the burner pressure

Although the burner pressure is factory set, it is necessary to check it during commissioning. Isolate the appliance from the electrical supply and attach a suitable manometer to the gas valve outlet test-point (see fig. 14). Light the boiler as described in 6.7, turn the Hot Water temperature selector to maximum, and open fully a DHW outlet (preferably the bath), allowing the appliance to stabilise. Compare the reading on the manometer with the value described in 3.3. If adjustment is required, follow the detailed instructions in section 8 (8.3).
Once the burner pressure has been checked, close the DHW outlet, isolate the appliance from the electrical supply, remove the manometer and tighten the gas valve outlet test nipple.

6.9 Final Flushing of the heating system

The system shall be flushed in accordance with BS 7593. Should a cleanser be used, it must be suitable for Aluminium heat exchangers. It shall be from a reputable manufacturer and shall be administered in strict accordance with the manufacturers' instructions and the DWTA code of practice.

NOTE

Chemicals used to cleanse the system and/or inhibit corrosion must be pH neutral, i.e. they should ensure that the level of the pH in the system water remains neutral. Premature failure of certain components can occur if the level of pH in the system water is out-with normal levels.

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6.9.1 Inhibitors

See Section 3 "General Requirements".

6.10 Setting the flow outlet temperature

The flow outlet temperature can be adjusted between 40 ºC - 80 ºC via the Heating thermostat knob (see fig.1).

6.10.1 Setting the DHW outlet temperature

The DHW outlet temperature can be adjusted between 40 ºC - 65 ºC via the Hot Water thermostat knob (see fig.1).

6.11 Setting the system design pressure

The design pressure should be a minimum of 0.5 BAR and a maximum of 1.5 BAR. The actual reading should ideally be 1 BAR plus the equivalent height in metres (0.1 BAR = 1 metre) to the highest point in the system above the base of the appliance (up to the maximum of 1.5 BAR total).
N.B. The safety valve is set to lift at 3 BAR/30 metres/ 45 psig. To lower the system pressure to the required value, water can be drained from the heating system drain cock or from the boiler drain cock.

6.12 Regulating the central heating system

Fully open all radiator and circuit valves and run the appliance for both heating and hot water until heated water is circulating. If conditions are warm remove any thermostatic heads. Adjust radiator return valves and any branch circuit return valves until the individual return temperatures are correct and are approximately equal.

6.12.1 Regutating the DHW flow-rate

The appliance is fitted with a flow rate restrictor that limits the maximum flow rate that can be drawn through the appliance.
The restrictor eliminates the need to manually adjust the DHW flow rate. However if it is felt necessary to further increase or decrease the available flow rate, spare restrictors are included in the accessory pack.
The spare flow rate restrictors can be fitted to either increase or decrease the maximum flow rate. The tables above denote the size of restrictor fitted and the spare restrictors supplied in the accessory pack. Each restrictor is colour-coded to enable identification.

6.12.2 Changing the flow-rate restricotr

Refer to 7.19 for detailed instruction on changing the flow restrictor.

iHeat 24c

8-litre (White)	9-litre (Orange)	10-litre (Blue)
Fitted	Spare	Spare

iHeat 29c

9-litre (Orange)	10-litre (Blue)	11-litre (Beige)
Spare	**Fitted**	Spare

6.0 Commissioning

6.13 Final checks

- ENSURE ALL TEST NIPPLES ON THE APPLIANCE GAS VALVE ARE TIGHT AND CHECKED FOR SOUNDNESS.
- ENSURE THE APPLIANCE FLUE SYSTEM IS FITTED CORRECTLY AND IS PROPERLY SECURED.
- ENSURE ALL PIPE WORK IS RE-CHECKED FOR SOUNDNESS.
- RE-FIT APPLIANCE CASING.
- COMPLETE BENCHMARK CHECKLIST.

Complete details of the boiler, controls, installation and commissioning in the Benchmark checklist at the back of this book. It is important that the Benchmark checklist is correctly completed and handed to the user. Failure to install and commission the appliance to the manufacturers instructions may invalidate the warranty.

6.14 Instructing the user

Hand over all documentation supplied with this appliance – including these instructions – and explain the importance of keeping them in a safe place.

Explain to the user how to isolate the appliance from the gas, water and electricity supplies and the locations of all drain points. Show the user how to operate the appliance and any associated controls correctly.

Show the user the location of the filling valve and how to top-up the system pressure correctly and show the location of all manual air release points.

Explain to the user how to turn off the appliance for both long and short periods and advise on the necessary precautions to prevent frost damage.

Explain to the user that for continued safe and efficient operation, the appliance must be serviced annually by a competent person.

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7.0 Servicing instructions

7.1 General

To ensure the continued safe and efficient operation of the appliance, it is recommended that it is checked and serviced at regular intervals.

To ensure correct and safe operation of the appliance, it is essential that any worn or failed component be replaced only with a genuine spare part.

The frequency of servicing will depend upon the particular installation conditions, but in general, once per year should be adequate.

It is the law that any servicing work is carried out by competent person such as an engineer, an approved service agent, British Gas, CORGI registered personnel or other suitably qualified personnel.

The following instructions apply to the appliance and its controls, but it should be remembered that the central heating and the domestic hot water systems would also require attention from time to time.

7.2 Routine annual servicing

Check the operation of the appliance and ensure it functions as described in section 7. Compare the performance of the appliance with its design specification. The cause of any noticeable deterioration should be identified and rectified without delay.

Thoroughly inspect the appliance for signs of damage or deterioration especially the flue system and the electrical apparatus.

Check and adjust - if necessary - all burner pressure settings (see section 8.3).

Check and adjust - if necessary - the system design pressure (see section 6.10).

Carry out an analysis of the flue gases (see 8.4) and visually check the condition of the entire flue assembly. Compare the results with the appliance design specification. Any deterioration in performance must be identified and rectified without delay.

Ensure both flue venturis are clean and free from any debris or obstruction.

Ensure the burner, main heat exchanger and latent heat collector are clean and free from any debris or obstruction.

7.3 Replacement of components

Although it is anticipated that this appliance will give years of reliable, trouble free service, the life span of components will be determined by factors such as operating conditions and usage. Should the appliance develop a fault, the fault finding section will assist in determining which component is malfunctioning.

7.4 Component removal procedure

To remove a component, access to the interior of the appliance is essential. Isolate the appliance from the electrical supply and remove the fuse. And when necessary, close all service valves on the appliance, remove the appliance casing as described in section 5.23.1 and drain the water content from the appliance via the drain valve located at the front of the hydraulic section using the tube provided. Ensure some water absorbent cloths are

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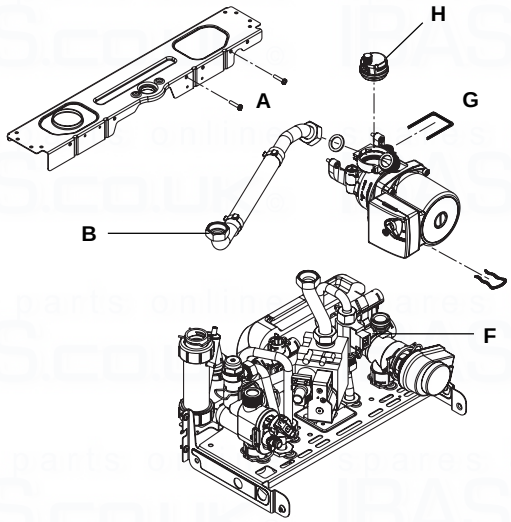


Fig. 15

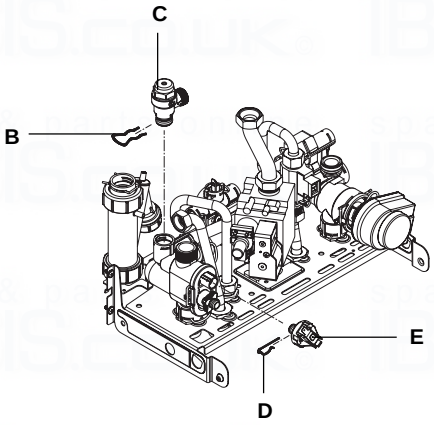


Fig. 16

7.0 Servicing instructions

available to catch any residual water that may drip from the appliance or removed component. Undertake a complete commissioning check as detailed in section 5, after replacing any component. **ALWAYS TEST FOR GAS SOUNDNESS IF ANY GAS CARRYING COMPONENTS HAVE BEEN REMOVED OR DISTURBED.**

7.5 Pump assembly (fig. 15)

Carry out component removal procedure as described in 7.4. The pump head can be replaced by disconnecting the electrical connection at the pump and removing the 4-Allen screws that secure the head to the pump base. Alternatively, the complete pump assembly can be removed as follows:

- disconnect the electrical connection from the pump control box
- locate and remove the pressure gauge securing pin and disconnect the pressure gauge from the pump assembly
- refer to fig. 15 and remove items A & B
- locate and remove the pump locking pin 'F' (it may be necessary to remove the valve actuator to facilitate this) and lift the pump assembly clear of the hydraulic manifold.
- Locate and remove the expansion pipe locking pin, and disconnect the expansion pipe from the pump assembly.

Replace in the reverse order.

7.6 Lower automatic air release valve (fig. 15)

Carry out component removal procedure as described in 7.4. Locate and remove the pressure gauge pipe securing pin and disconnect the pipe from the pump assembly. Locate and remove the AAV securing pin (G) and lift the AAV (H) free from the pump assembly.
Replace in the reverse order.

7.7 Safety valve (fig. 16)

Carry out component removal procedure as described in 7.4. Disconnect and remove the safety valve outlet pipe. Locate and remove the safety valve securing pin (B). The safety valve (C) can now be removed. Replace in the reverse order.
Check and clean (if necessary) the condense trap (see 7.29).

7.8 Water pressure switch (fig.16)

Carry out component removal procedure as described in 7.4. Disconnect the 2-wires from the water pressure switch, taking note of their locations. Locate and remove the pin (D) that secures the water pressure switch to the hidraulic assembly. Remove the water pressure switch (E) from the hidraulic assembly. Replace in the reverse order.

7.9 Pressure/temperature gauge (fig. 1)

Carry out component removal procedure as described in 7.4. Locate and remove the pressure gauge securing pin and disconnect the pressure gauge from the pump assembly. Locate the spring tabs on the pressure gauge body, push and hold tabs in, to enable extraction of the gauge from its location on the control panel.
Replace in the reverse order.

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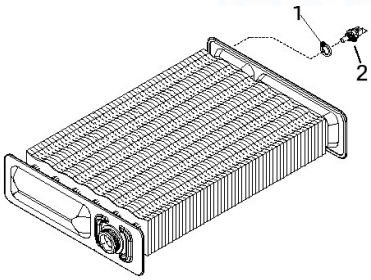


Fig. 17

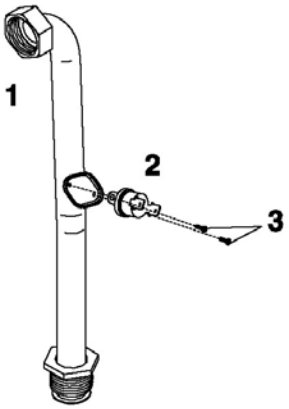


Fig. 18

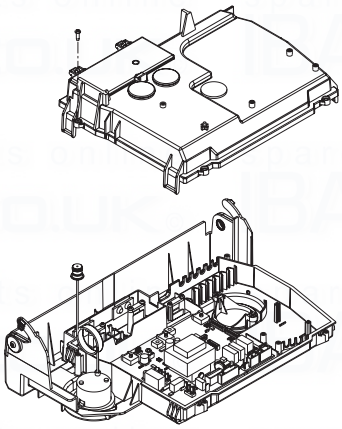


Fig. 19

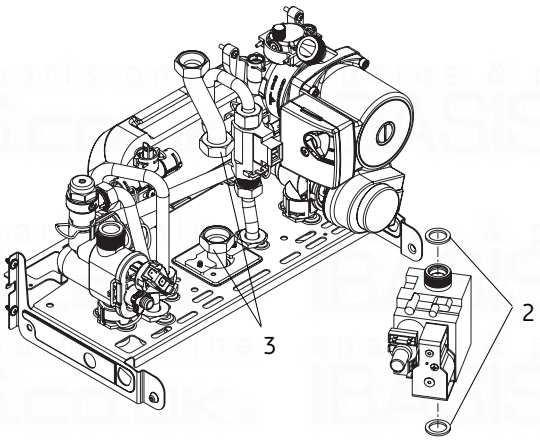


Fig. 20

7.0 Servicing instructions

7.10 Primary thermistor (fig. 17)

Carry out component removal procedure as described in 7.4.

Unclip and remove the air chamber cover and remove the right side air baffle.

Disconnect thermistor electrical plug.

Using a 13mm spanner slacken and remove the thermistor and sealing washer (1,2) from the main heat exchanger.

NB, it may be necessary to disconnect or remove the flow pipe from the heat exchanger to facilitate this.

Replace in the reverse order.

7.11 High limit thermostat (fig. 18)

Carry out component removal procedure as described in 7.4.

Unclip and remove the air chamber cover.

Pull off electrical connections from the high limit thermostat (2), slacken and remove retaining screws (3).

Replace in reverse order.

7.12 Printed circuit board (fig. 19)

Carry out component removal procedure as described in 7.4.

Locate and remove the screws that secure the PCB cover, then remove cover. After carefully taking note of all wiring connections, disconnect all wiring from the PCB, locate and remove the PCB securing screws, remove the required PCB. Replace in the reverse order.

NOTE

Ensure that any replacement PCB has the correct jumper tag configuration, and that the relevant gas pressures are correctly set/adjusted (see 8.8.1).

7.13 Gas valve (fig. 20)

Carry out component removal procedure as described in 7.4. The gas valve must be changed as complete unit. Disconnect the electrical plug and leads from the gas valve.

Slacken and unscrew gas valve inlet and outlet connections (3). **Please note,** the sealing washers (2) must be discarded and replaced with new sealing washers (2). Locate and remove gas valve retaining screws on the underside of the boiler if required. The gas valve can now be removed. Replace in the reverse order. Check and adjust burner pressure settings. **WARNING, A GAS SOUNDNESS CHECK MUST BE CARRIED OUT.**

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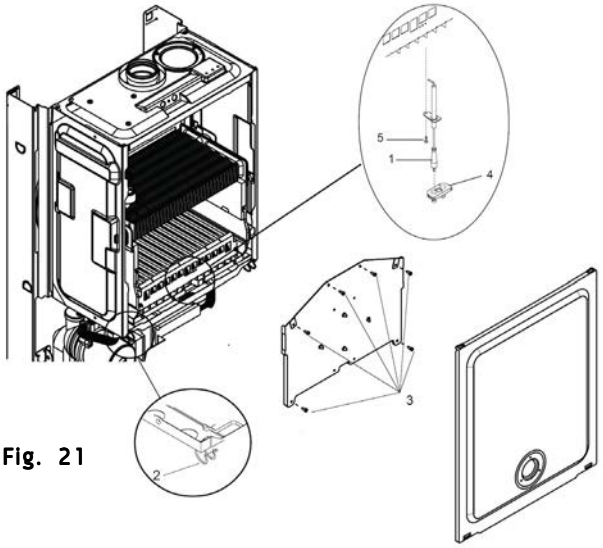


Fig. 21

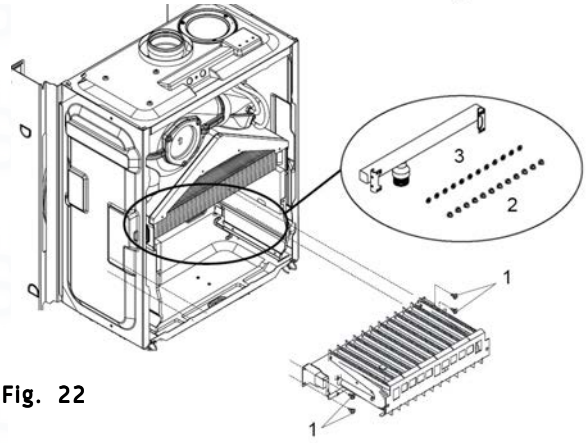


Fig. 22

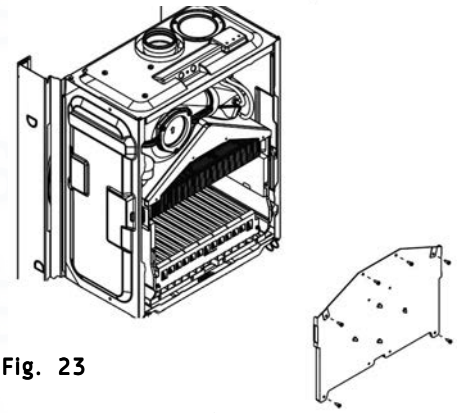


Fig. 23

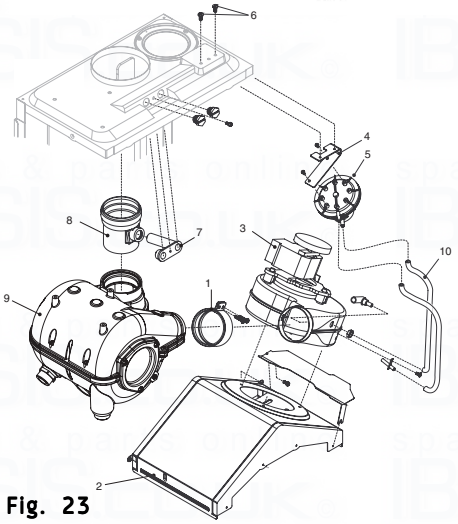


Fig. 23

7.0 Servicing instructions

7.14 Integral time switch (if fitted)

Carry out component removal procedure as described in 7.4.
Locate and remove the PCB cover and securing screws (fig. 19), locate and remove the time clock retaining screws, remove time clock. Disconnect wiring after carefully taking note of all electrical connections. Replace in the reverse order.

7.15 Electrode, burner & injectors (fig. 21)

Carry out component removal procedure as described in 7.4.
Unclip and remove the air chamber cover (2). Locate and remove the 6 screws securing the front combustion cover (3), pull the cover towards you before lifting and disengaging. Disconnect the electrode lead. Ease the electrode sealing grommet from its seating (4).

FIG. 22: locate and remove the four screws which secure the burner in position (1), gently ease the burner out of its location. Once the burner has been removed, the electrode retaining screw can be removed. Locate the burner injectors (2) and remove (if necessary). Replace in the reverse order. **Please note,** the injector sealing washers (3) must be replaced if the injectors have been removed, ensure all seals are in good condition, taking care to ensure they are replaced correctly. Replace in the reverse order.

7.16 Flue fan (fig. 23)

Carry out component removal procedure as described in 7.4. Unclip and remove the air chamber cover, gently pull the cover towards you before lifting and disengaging. Locate and remove the six screws that secure the front combustion cover, then remove the cover. Disconnect the electrical connections and silicone tubes attached to the fan, noting their positions. Locate and remove the screws (6) that secure the air pressure switch assembly (4 & 5). Locate and remove the screws that secure the flue hood and air baffle, disconnect the flue clip (1) from the fan-flue elbow, and gently ease the fan (3) & flue hood assembly (2) from its location. Locate and remove the four screws that secure the fan to the flue hood. Remove the fan to flue elbow. Replace in the reverse order. Ensure all seals are in good condition, taking care to ensure they are replaced correctly.

7.17 Main heat exchanger (fig. 23-24)

Carry out component removal procedure as described in 7.4.
Unclip and remove the air chamber cover, gently pull the cover towards you before lifting and disengaging. Locate and remove the six screws that secure the front combustion cover, then remove the cover. Remove the air chamber side panels if necessary by unscrewing the securing screws. Disconnect the flow and return connections (4-5 fig. 24) on the heat exchanger. The heat exchanger can now be withdrawn from the appliance. Replace in the reverse order. Ensure all seals are in good condition, taking care to ensure they are replaced correctly.

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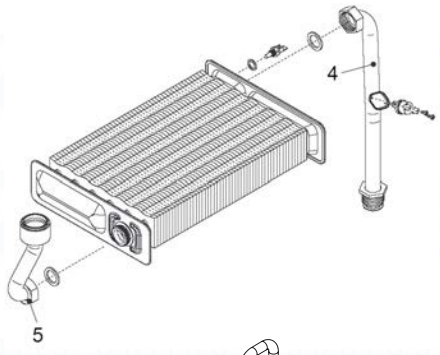


Fig. 24

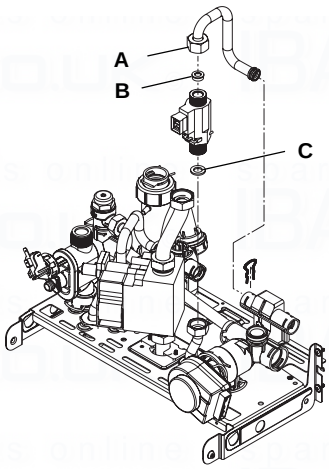


Fig. 25

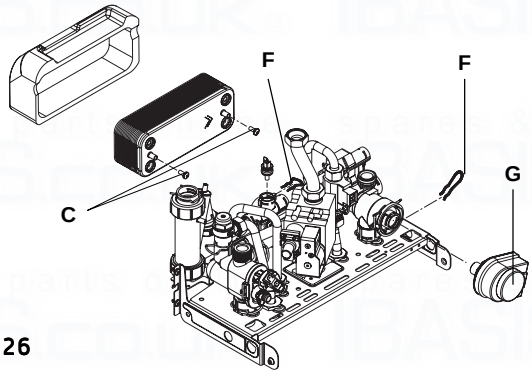


Fig. 26

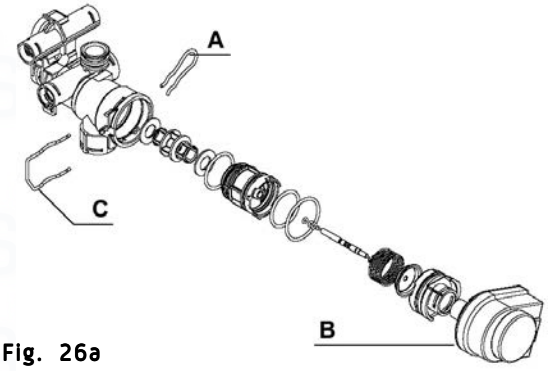


Fig. 26a

7.0 Servicing instructions

7.18 Air pressure switch (fig. 23)

Carry out component removal procedure as described in 7.4.
Unclip and remove the air chamber cover, gently pull the cover towards you before lifting and disengaging. Locate and remove the two screws (6) holding the air pressure switch to the air chamber. Disconnect the electrical connections and silicone tubes (10) attached to the air pressure switch, noting their connections/positions. Replace in the reverse order. Ensure all seals are in good condition, taking care to ensure they are replaced correctly.

7.19 Flow restrictor (fig. 25)

Carry out the component removal procedure as described in 7.4.
Slacken the cold water inlet pipe (A) at the DHW flow switch and disconnect. Ease the flow restrictor (B) from its seating. Replace in the reverse order. Ensure all seals are in good condition, taking care to ensure they are replaced correctly.

7.20 DHW flow switch (fig. 25)

Carry out component removal procedure as described in 7.4.
Disconnect the cold water inlet pipe (A) from the DHW flow switch. Disconnect the wiring to the DHW flow switch. Life the DHW flow switch from its location. Replace in the reverse order. Ensure all seals are in good condition, taking care to ensure they are replaced correctly.

7.21 DHW heat exchanger (fig. 26)

Carry out component removal procedure as described in 7.4.
Before removing the DHW heat exchanger, it will be necessary to remove the gas valve (see 7.13).
Locate and remove the DHW outlet pipe from the LH (left hand) DHW manifold and DHW outlet connection.
Locate and remove the locking pins that secure the flexible pipe that connects both hydraulic manifolds and then remove the pipe.
Locate and remove the 2-screws (C) that secure the DHW heat exchanger to the LH and RH DHW manifolds and gently ease the DHW heat exchanger from its location.
Locate and remove the locking pin that secures the LH DHW manifold to the LH hydraulic manifold and then remove the manifold.
Gently ease the LH DHW manifold away from the LH hydraulic manifold and disconnect the wiring to the secondary (DHW) thermistor.
Replace in the reverse order ensuring all seals are correctly positioned and in good condition.
Replace the gas valve in accordance with the instructions detailed in 7.13

7.22 Valve actuator (fig. 26a)

Carry out component removal procedure as described in 7.4.
Remove the locking pin (A) that secures the actuator (B) to the hydraulic manifold. Disconnect the electrical plug from the actuator. Replace in the reverse order.

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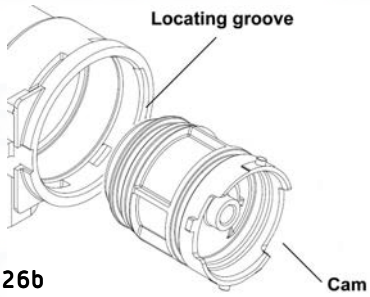


Fig. 26b

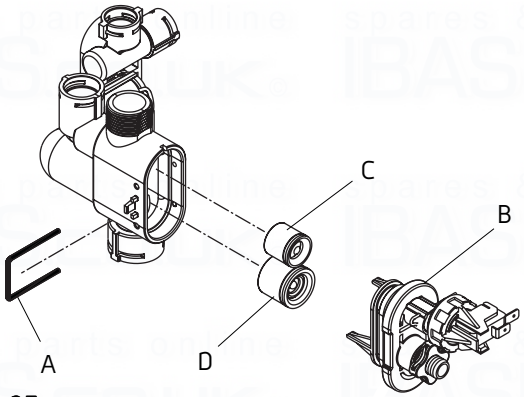


Fig. 27

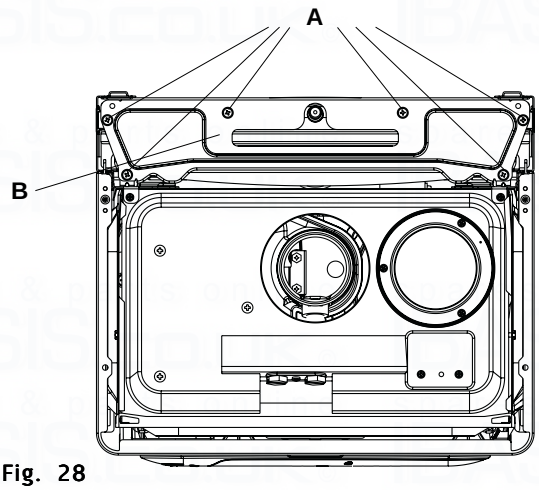


Fig. 28

7.0 Servicing instructions

7.23 Divertor valve cartridge (fig. 26a)

Carry out component removal procedure as described in 7.4.
Remove the valve actuator as described in 7.22. Remove the cartridge locking pin (C) and - using a suitable pair of pliers - withdraw the cartridge assembly. The cartridge assembly is a non-serviceable item and therefore needs to be replaced if it's suspected as being damaged or worn. Replace in the reverse order ensuring that the seating cam inserts into the locating groove correctly (see fig. 26b). Ensure all seals are in good condition, taking care to ensure they are replaced correctly.

7.24 DHW thermistor (fig. 26)

Carry out component removal procedure as described in 7.4.
Disconnect the electrical plug. Using a suitable pair of pliers, remove the thermistor locking pin (E) and ease the thermistor (F) from its seating. Replace in the reverse order ensuring the sealing ring is in good condition.

7.25 Automatic by-pass valve (fig. 27)

Carry out component removal procedure as described in 7.4.
Locate and remove the hydraulic cover locking pin (A) and remove the cover. Using a suitable hooked wire or screwdriver, gently ease the valve (C) from its seating. Ensure all seals are in good condition, taking care to ensure they are replaced correctly. Replace in the reverse order ensuring the cartridge is facing the correct way.

7.26 DHW non-return valve (fig. 27)

Carry out component removal procedure as described in 7.4.
Locate and remove the hydraulic cover locking pin (A) and remove the cover. Using a suitable hooked wire or screwdriver, gently ease the non-return valve (D) from its seating. Ensure all seals are in good condition, taking care to ensure they are replaced correctly. Replace in the reverse order ensuring the cartridge is facing the correct way.

7.27 Expansion vessel (fig. 1)

Should the removal and replacement of the expansion vessel be deemed impractical, an external expansion vessel may be fitted to the return pipe as close to the appliance as possible.

7.27.1 Expansion vessel removal (with sufficient clearance above)

Carry out component removal procedure as described in 6.4.
Disconnect the flue from the appliance.
Disconnect the flexible expansion pipe from the vessel. Locate and remove the four screws (A) that secure the vessel top holding plate (B), remove the plate (fig. 28). The expansion vessel can now be removed. Replace in the reverse order. Ensure all seals are in good condition, taking care to ensure they are replaced correctly.

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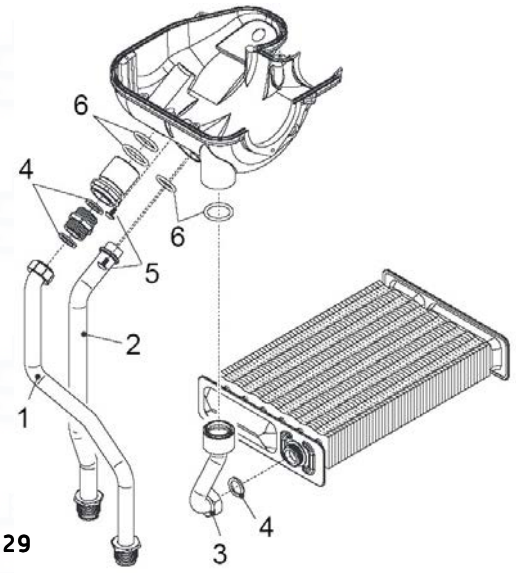


Fig. 29

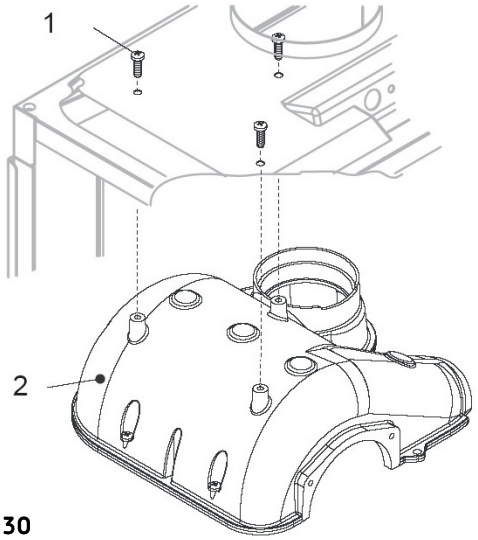


Fig. 30

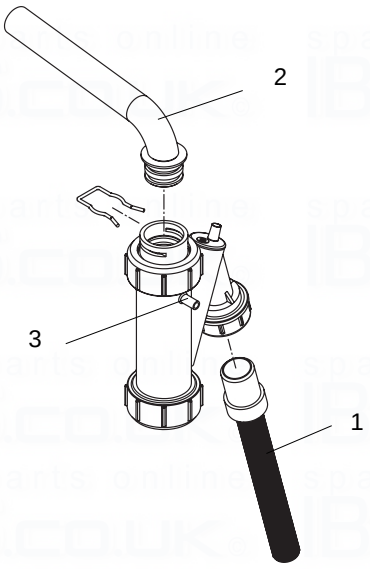


Fig. 31

7.0 Servicing instructions

7.27.2 Expansion vessel removal (with insufficient clearance above)

Carry out component removal procedure as described in 6.4.
Disconnect the flexible expansion pipe from the vessel.
Disconnect the flue elbow or pipe from the appliance flue outlet. Unclip and remove the air chamber cover, gently pull the cover towards you before lifting and disengaging.
Remove the RH side panel of the air chamber. Disconnect the wiring to the fan, pressure switch, primary thermistor, overheat thermostat, condense switch & spark electrode, taking note of their locations. Carefully unclip the wires from the air chamber and withdraw the wiring & grommet from the air chamber.
Disconnect the outlet gas pipe, the flow & return pipes and the condense pipe from the air chamber.
Locate and remove the 2-screws that secure the lower section of the air chamber. Locate and remove the 2-screws that secure the upper section of the air chamber. The complete air chamber assembly can now be lifted clear from the appliance.
Locate and remove the 4-screws that secure the vessel (see fig. 28). The expansion vessel can now be removed.
Replace in the reverse order. Take extreme care when refitting the wiring to the air chamber. Ensure all seals are in good condition, taking care to ensure they are replaced correctly.

7.28 Latent heat colleator (fig. 29/30)

Carry out component removal procedure as described in 7.4.
Remove the flue hood and fan assembly as detailed in 7.16. Disconnect and remove the inlet, outlet and condense pipes from the collector. Unscrew and remove the 3 screws that secure the collector (1-fig. 30) to the air chamber and disconnect the collector from the flue connection.

Replace in the reverse order ensuring all seals are intact and located correctly.

7.28.1 Dismantling the latent heat collector

Apart from routine servicing or maintenance of the coil, the latent heat collector is a non-serviceable component, therefore, there is no requirement to disassemble the collector.

7.29 Condense trap removal (fig. 31)

Carry out component removal procedure as described in 6.4.
Disconnect the flexible condense pipe (1) from the condense trap. Locate and remove the condense pipe locking pin and disconnect the condense pipe (2) from the condense trap. Locate and disconnect the condense pressure switch pipe from the condense trap (3). Carefully remove the condense trap. Replace in the reverse order.

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8.0 Checks, Adjustments and fault finding

8.1 Checking appliance operation

When carrying out any repairs or servicing to the appliance, the relevant commissioning procedure must be undertaken to ensure the continued safe operation of the appliance. Particular attention should be made to ensure gas soundness, water soundness and the electrical integrity of the appliance.

8.2 Appliance mode of operation

NOTE

There must be sufficient system water pressure (min. 0.5 bar) to ensure the water pressure switch is activated. If there is insufficient system pressure the pump and fan will be prevented from operating.

8.2.1 Selector switch in the OFF position

When the selector switch is in the OFF position, the Green LED status indicator will flash every 6-seconds to confirm the appliance is in standby mode. The divertor valve is in the DHW position. The appliance will not respond to any DHW or heating requests.

Active functions:

- frost-protection system
- pump anti-block
- valve actuator anti-block
- fan over-run.

8.2.2 Selector switch in the hot water only position

When the selector switch is in the HW only position, the Green LED is illuminated:

- flashing every 6-seconds if no DHW request is active
- constant during a DHW request.

The divertor valve is in the DHW position. The appliance will respond to any DHW requests.

Active functions:

- frost-protection system
- pump anti-block
- valve actuator anti-block
- fan over-run.

8.2.3 Selector switch in the heating & hot water position

When the selector switch is in the heating & HW position, the Green LED is illuminated:

- flashing every 6-seconds if no Heat or DHW request is active
- constant during a heat or DHW request.

The divertor valve remains in the DHW position if no heat request is active. The appliance will respond to any heating or DHW requests.

Active functions:

- frost-protection system
- pump anti-block
- valve actuator anti-block
- fan/pump over-run.

8.2.4 Appliance functions

- **Frost-protection:** this function is only active when there are no requests for heating or HW. When the temperature of the primary thermistor drops below 5 °C, the valve actuator will motor to the heating position, whereupon the boiler will operate on minimum power until the temperature of the primary thermistor reaches 35 °C. Thereafter the pump will over-run for 30-seconds.
- **Anti-block cycle:** when there has been no heating or HW request for 19-hours, the anti-block cycle is activated. The valve actuator will motor from the DHW position to the heating position and then motor back to the DHW position. Thereafter the pump will be activated for a period of 30-seconds.
- **Fan over-run:** should the temperature of the primary thermistor exceed 78 °C after a heating or DHW request, the pump and/or fan will run for a period of 30-seconds.
- **AUTO function:** the AUTO function permits the boiler (when the set-point is within the AUTO range) to automatically adjust (raise) the heating flow outlet temperature should the room thermostat contacts remain closed for more that 20-minutes.

8.2.5 DHW mode (fig. 32)

With the selector switch in the Heating & HW position, or HW only position and a DHW outlet is opened, the appliance will operate in the HW mode. The valve actuator will motor to the HW position (if a heating request was active) and the pump and fan will be active. The operation of the fan causes the air pressure switch (APS) to deliver a signal voltage to the control PCB. A slow ignition sequence is enabled, whereby the current supplied to the gas valve modulating coil is progressively increased from minimum to maximum over a period of 8-seconds. During this period the ignition electrode sparks continuously even if the burner has ignited.

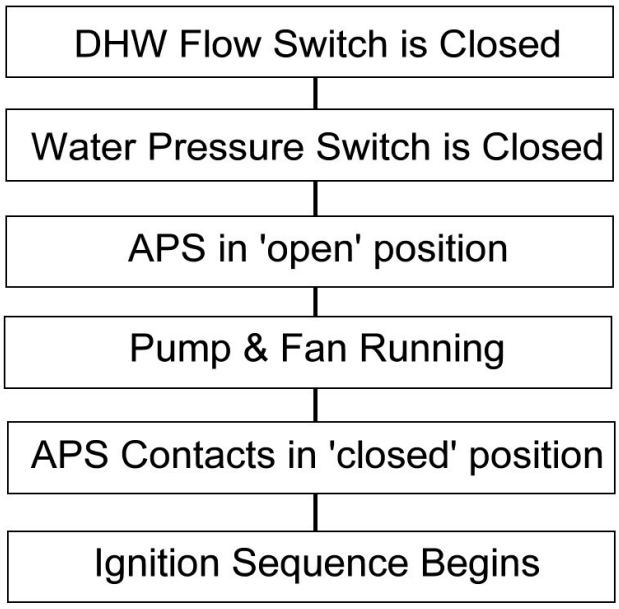


Fig. 32

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8.2.5.1 DHW Parameters

RANGE	MINIMUM	MAXIMUM
Temperature (°C)	37.5	60
DHW NTC fault	ON at 50 °C	OFF at 55 °C

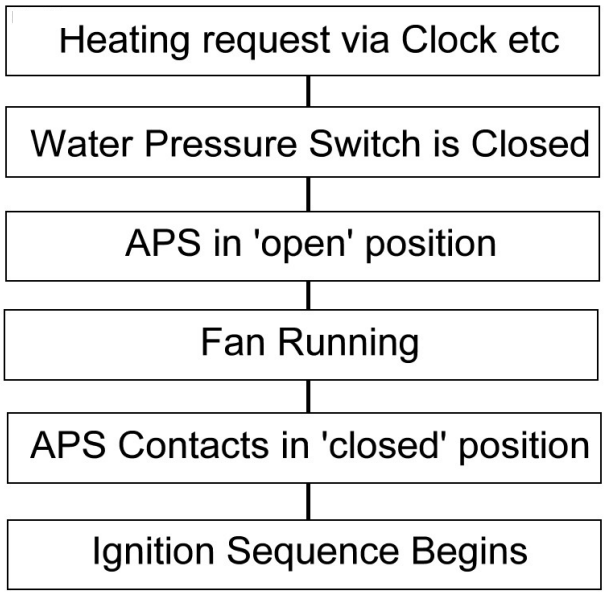


Fig. 33

NOTE

If the spark/sensing electrode does not sense ignition the appliance will then go to lockout.

Ignition is sensed by the electronic circuitry to ensure flame stability at the burner. Once successful ignition has been achieved, the electronic circuitry modulates the appliance output in order to achieve the DHW set-point (the position of the DHW temperature selector) as measured at the secondary thermistor.

When the set-point has been reached, the appliance will begin the modulation phase whereby the fan and gas valve will continuously modulate to maintain the set-point.

If the temperature continues to rise and exceeds the set-point by 5 °C, the burner will shut down until the temperature drops to set-point + 4 °C, whereby a new ignition sequence will be enabled.

When the request for DHW has been satisfied, the appliance fan may continue to operate to dissipate any residual heat from within the appliance.

8.2.6 Heating mode (fig. 33)

With the selector switch in the Heating & HW position and the relevant controls (time clock, room thermostat, etc,) are calling for heat, the appliance will operate in the heating mode. The valve actuator will motor to the heating position and the pump and fan will be active. The operation of the fan causes the air pressure switch (APS) to deliver a signal voltage to the control PCB. A slow ignition sequence is enabled, whereby the current supplied to the gas valve modulating coil is progressively increased from minimum to maximum over a period of 8-seconds. During this period the ignition electrode sparks continuously even if the burner has ignited.

NOTE

If the spark/sensing electrode does not sense ignition the appliance will then go to lockout.

Ignition is sensed by the electronic circuitry to ensure flame stability at the burner. Once successful ignition has been achieved, the electronic circuitry allows 75% of the full gas rate through the appliance. After 15 minutes the gas rate is increased to maximum (100%).

When the set-point has been reached (the position of the heating temperature selector) as measured at the primary thermistor, the appliance will begin the modulation phase whereby the fan and gas valve will continuously modulate to maintain the set-point.

If the temperature continues to rise and exceeds the set-point by 6 °C, the burner will shut down and the boiler will perform a three-minute anti-cycle (timer delay).

A new ignition sequence will be enabled when the 3-minute anti-cycle has been performed and the temperature at the primary thermistor has dropped 6 °C below the set-point.

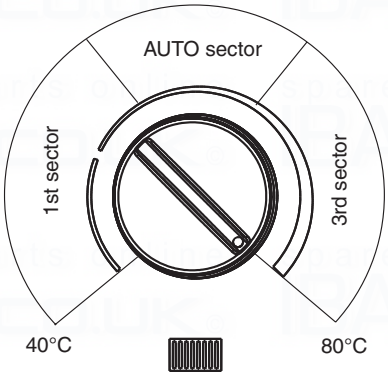
NOTES

The timer delay can be de-activated by the insertion of a 'jumper' on the PCB at JP1 or by isolating the appliance from the electrical supply for 30 seconds.

Any DHW requests will always have priority over a heating request.

When the request for heating has been satisfied, the appliance pump and fan may continue to circulate to dissipate any residual heat within the appliance.

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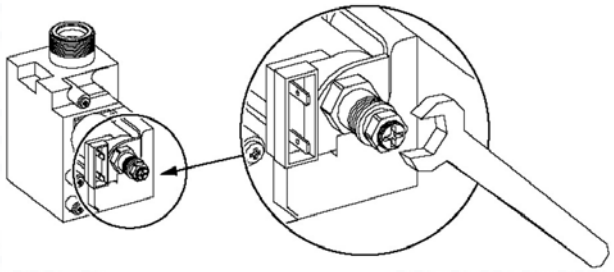


Fig. 34

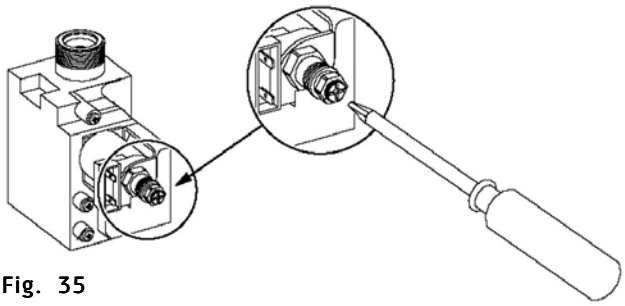


Fig. 35

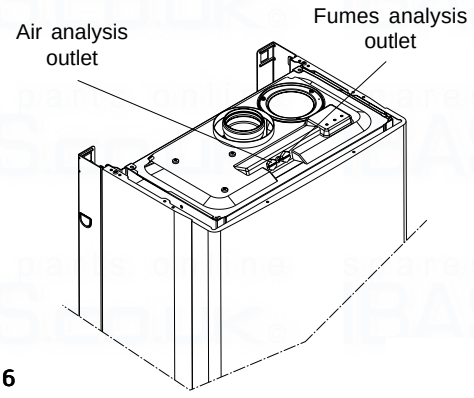


Fig. 36

8.2.6.1 Heating parameters

RANGE	MINIMUM	MAXIMUM
Temperature (°C)	40	80
1ST sector	40	55
SARA sector	55	65
2ND sector	65	80

When the boiler is operating in the AUTO range, the Green LED flashes rapidly to signify the AUTO function is active.

AUTO FUNCTION

When the heating temperature selector is set within the AUTO range (AUTO sector) the boiler will automatically raise the heating flow outlet temperature by 5 °C every 20-minutes that the room thermostat contacts remain in the closed position or until the boiler reaches the maximum operating temperature.

8.3 Checking and adjusting burner pressure (fig. 14)

Although the burner pressure is factory set, it is necessary to check it during servicing or if the gas valve has been removed.

Isolate the appliance from the electrical supply and attach a suitable manometer to the gas valve outlet test nipple.

8.3.1 Setting the maximum burner pressure (fig. 34)

Light the boiler as described in 6.7 and compare the reading on the manometer with the value described in 3.3. If adjustment is required, remove the protective cap from the gas valve modulating coil assembly and turn the outer (10mm) nut clockwise to increase, or counter-clockwise to decrease the burner pressure.

NOTE

Always check and/or adjust the minimum and maximum gas pressures whilst the appliance is in the HW only mode. Ensure a DHW outlet (preferably the bath) is fully open, and that the HW temperature selector is at maximum.

8.3.2 Setting the minimum burner pressure (fig. 35)

Once the maximum burner pressure has been checked and/or adjusted, remove one of the grey wires from the modulating coil. Compare the reading on the manometer with the value described in 3.3. If adjustment is required, turn the inner (red) crosshead screw clockwise to increase, or counter-clockwise to decrease the burner pressure, whilst ensuring that the outer (10mm) nut does not move. When checking and/or adjustment has been completed, isolate the appliance from the electrical supply, replace the protective cap, refit the grey wire to the modulating coil, remove the manometer and tighten the outlet test nipple.

IMPORTANT, A GAS SOUNDNESS CHECK MUST BE CARRIED OUT.

8.3.3 Setting the minimum central heating output

THIS CAN ONLY BE CARRIED OUT AFTER THE MAXIMUM AND MINIMUM GAS PRESSURES HAVE BEEN SET.

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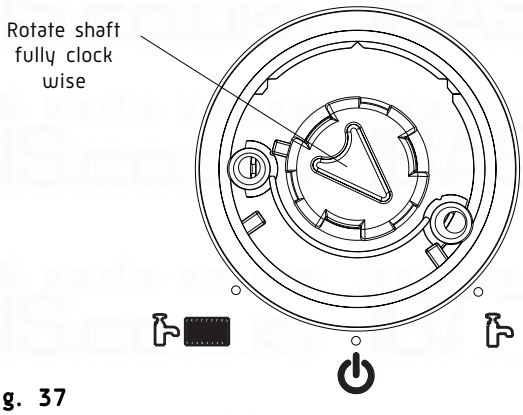


Fig. 37

8.6.1 Installation faults

8.7 Electrical checks

Any electrical checks must be carried out by a suitably qualified person.

Symptom	Possible causes
No ignition	Check wiring Check electrical supply
No hot water	Check hot/cold pipe work is not reversed
No central heating	Check wiring of room thermostat and/or other external controls

GREEN LED

Frequency	Faults/Status
ON every 6-secs	At stand-by with no faults
Flashing 8-times a second	AUTO function active
ON every 0.5-secs	Temporary fault, e.g.: ● APS fault ● low water pressure
Solid	Active for heat/DHW request

YELLOW LED

Frequency	Faults/Status
ON every 0.5-secs	CO function active
Solid	DHW thermistor fault (see 8.2.5.1)

RED LED

Frequency	Faults/Status
ON every 0.5-secs	Final fault, e.g.: ● water pressure switch ● condense pressure switch ● fan/flue problem ● limit thermostat
Solid	● primary NTC open/short circuit

- Isolate the appliance from the electrical supply.
- Attach a manometer to the gas valve outlet test nipple.
- Insert a jumper tag at JP2.
- Switch the appliance ON in the heating mode.
- Turn potentiometer P5 to the minimum position
- Adjust potentiometer P4 to the required value shown in section 3.3 (section 11.2 for LPG), i.e. minimum burner pressure (central heating).
- Turn potentiometer P5 back to the maximum position.
- Isolate the appliance from the electrical supply.
- Remove the manometer, tighten the outlet test nipple, and check for soundness.

8.4 Combustion analysis test

A combustion analysis check (see 3.11. Nat. Gas or 11.2 LPG) can easily be carried out on the appliance via the test points located on the top of the appliance, however you must check that the burner pressures are set correctly (see 8.3).

- Isolate the appliance from the electrical supply and turn the mode selector switch to the **OFF/RESET** position.
- Locate and remove the CO test point sealing screw (see fig. 36).
- Insert the flue gas analyser probe into the test point.
- Restore the electrical supply to the appliance
- Remove the mode selector knob and turn the shaft fully clockwise (see fig. 37).
- The boiler will now enter the combustion analysis mode (CO mode) for a period of 15 minutes, signified by the LED flashing Yellow. During this time, the boiler will remain on full gas.
- Once the flue gas analysis has been made, turn the shaft back to the required position and replace the mode selector knob.
- Remove the probe and replace the sealing screw.

8.5 Checking the expansion vessel

Carry out the component removal procedure as described in 7.4. You must ensure that the boiler is completely drained of water.

Using a suitable pressure gauge, remove dust cap on expansion vessel and check the charge pressure. The correct charge pressure should be 1.0 bar ± 0.1 bar.
If the charge pressure is less, use a suitable pump to increase the charge.

NOTE
You must ensure the drain valve is in the open position whilst re-charging takes place. Replace the dust cap and carry out the relevant commissioning procedure (section 5).

8.6 External faults

Before carrying out any faultfinding or component replacement, ensure the fault is not attributable to any aspect of the installation.

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8.0 Checks, Adjustments and fault finding

8.7.1 Earth continuity test

Isolate the appliance from the electrical supply, and using a suitable multi-meter carry out a resistance test. Connect test leads between an appliance earth point and the earth wire of the appliance supply cable. The resistance should be less than 1 OHM. If the resistance is greater than 1 OHM check all earth wires and connectors for continuity and integrity.

8.7.2 Short circuit check

Isolate the appliance from the electrical supply, and using a suitable multi-meter carry out a short circuit test between the Live & Neutral connections at the appliance terminal strip (fig.12).

Repeat above test on the Live & Earth connections at the appliance terminal strip (fig.12).

NOTE

Should it be found that the fuse has failed but no fault is indicated, a detailed continuity. Check will be required to trace the fault. A visual inspection of components may also assist in locating the fault.

8.7.3 Polarity check

With the appliance connected to the electrical supply and using a suitable multimeter, carry out the following voltage tests:

- Connect test leads between the Live & Neutral connections at the appliance terminal strip (fig.12). The meter should read approximately 230V ac. If so proceed to next stage. If not, see 8.7.4.
- Connect test leads between the Live & Earth connections at the appliance terminal strip (fig.12). The meter should read approximately 230V ac. If so proceed to next stage. If not, see 8.7.4.
- Connect test leads between the Neutral & Earth connections at the appliance terminal strip (fig.12). The meter should read approximately 0 - 15Vac. If so polarity is correct. If not, see 8.7.4.

8.7.4 Reversed polarity or supply fault

Repeat the above tests at the appliance isolator, if testing reveals correct polarity and/or supply at the isolator, re-check wiring and connections between the isolator and the appliance. If tests on the isolator also reveal reversed polarity or a supply fault, consult the local electricity supplier for advice.

8.7.5 Resistance to earth check

Isolate the appliance from the electrical supply and using a suitable multi-meter carry out a resistance test. Connect test leads between the Live & Earth connections at the appliance terminal strip (fig.12). If the meter reads other than infinity there is a fault that must be isolated, carry out a detailed continuity check to identify the location of the fault.

IMPORTANT

These series of checks must be carried out before attempting any faultfinding procedures on the appliance. On completion of any task that required the disconnection and re-connection of any electrical wiring or component, these checks must be repeated.

8.8 Fault finding

Before attempting any faultfinding, the electrical checks as detailed in 8.7 must be carried out. Isolate the appliance from the electrical supply. Disconnect any external controls such as room thermostats etc. from the boiler.

8.8.1 Replacing the main PCB

When replacing the main PCB it's essential that the potentiometers are set as follows:

- It's essential that the minimum - central heating - gas pressure is checked/adjusted as described in 8.3.3
- **P4** - to be used to set/adjust the minimum heating output
- **P5** - set at maximum.

EFFECT OF JUMPER TAGS (part code 7232) FITTED TO THE MAIN PCB AT:

- **JP1** - disables DHW function
- **JP2** - cancels anti-cycle function and initial heating output (75% of maximum at start up)
- **JP3** - for LPG boilers only
- **JP4** - enables DHW temperature stabiliser function (boiler modulates at set point and remains on minimum power, even if the set point is exceeded).

Restore the electrical supply to the boiler and turn the selector switch to the on position. The boiler should now function as described in section 8.2. Should the boiler fail to respond, the internal fuses and connectors should be checked to ensure integrity and continuity. If the boiler still fails to respond, refer to the detailed faultfinding flowcharts overleaf.

8.9 Fault codes

When the boiler is in a fault condition, the LED is displayed in a colour and/or frequency that is relevant to the fault. To reset the boiler, turn the mode selector switch to the reset position (0) for 2-minutes' then back to the relevant mode of operation.

If the boiler does not reset, refer to the following section and the detailed faultfinding flowcharts overleaf.

YELLOW LED

Frequency	Faults/Status
ON every 0.5-secs	CO function active
Solid	DHW* thermistor fault (see 7.2.5.2)

** When there is a fault condition with the DHW thermistor, the appliance will still operate and produce limited hot water. The Primary thermistor will control the temperature of the DHW during this period and the outlet temperature is fixed at 50-55°C.*

RED LED

Frequency	Faults/Status
ON every 0.5-secs	Final fault, e.g.: • water pressure switch • condense pressure switch • fan/flue problem • limit thermostat
Solid	• primary NTC open/short circuit

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9.0 Wiring diagrams

9.1 External wiring

The appliance comes with a factory fitted (TA) link to allow basic operation of the boiler via the mode selector switch. If external controls are to be added to the system, they must be connected to the appliance as shown in the following diagrams. For advice on controls that are not featured in this book, please contact the Service & Technical Helpline on 0844 371 1111.

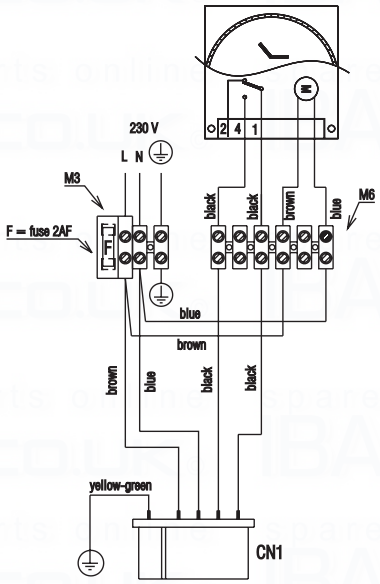


Fig. 38

9.2 Typical control applications

The appliance can be used with the following controls:

- external single-channel, voltage-free time clocks
- programmable room thermostats.

In addition, the appliance can be used in conjunction with a typical 'S'-Plan system, please contact the technical help line (0870 264 1220) for further detailed instruction.

NOTE
This appliance is not suitable for use with 'Y'-Plan systems.

9.3 Room thermostat

Should a room thermostat be required, it must be of the 'voltage-free' type, and should be connected to the appliance as shown in fig. 39.

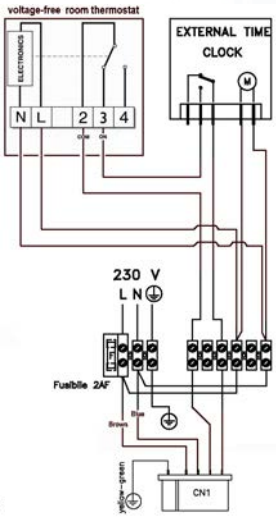


Fig. 39

9.4 Other controls

Contact the controls manufacturer and/or the technical help line should you require more specific information on the suitability of a particular control.
Further guidance on the recommended practice for the installation of external controls, can be found in CHeSS - HC5/HC6 (www.energy-efficiency.gov.uk).

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9.0 Wiring diagrams

9.5 Functional diagram

NOTE: L-N-E CONNECTION IS ADVISABLE

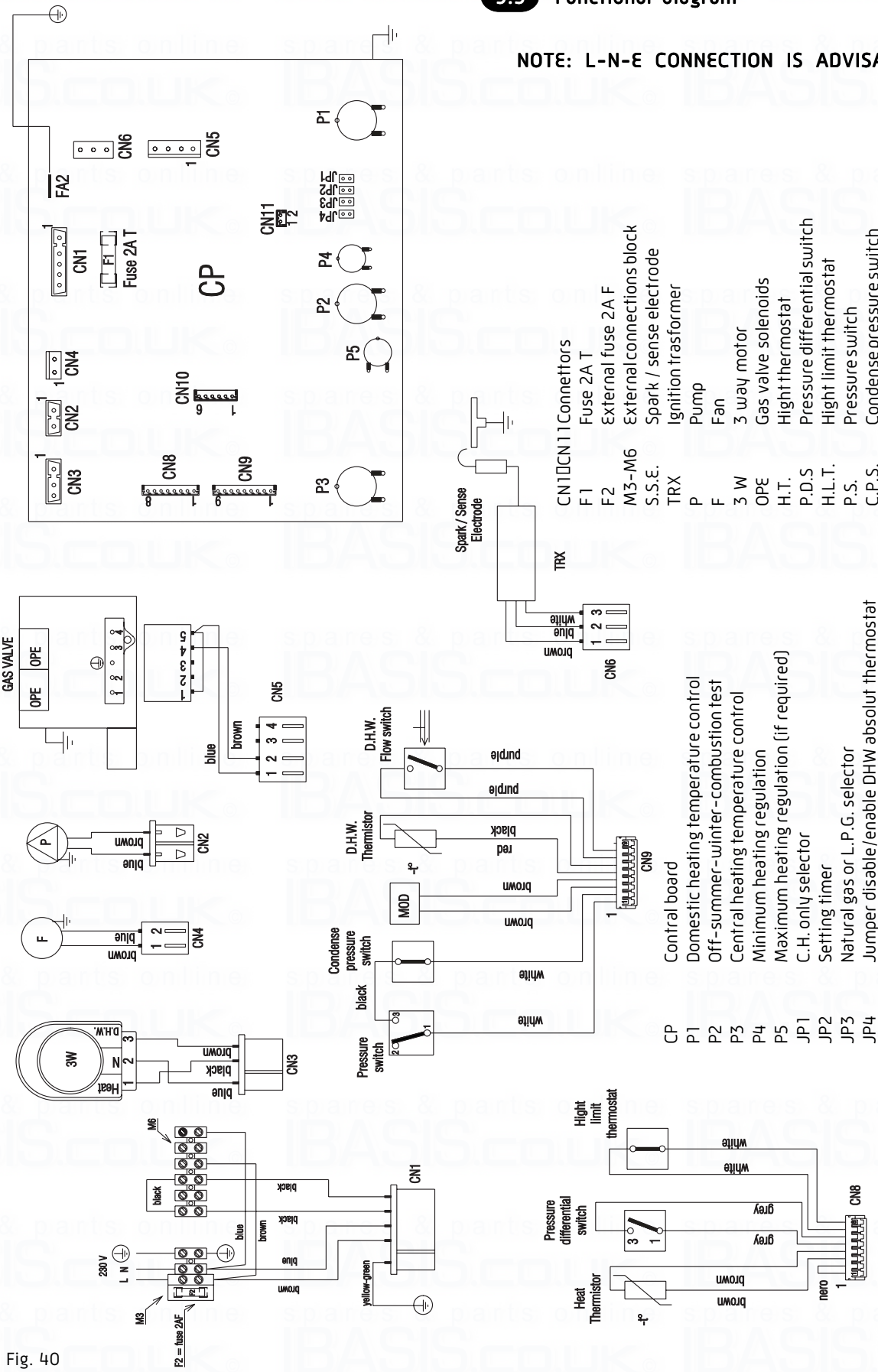
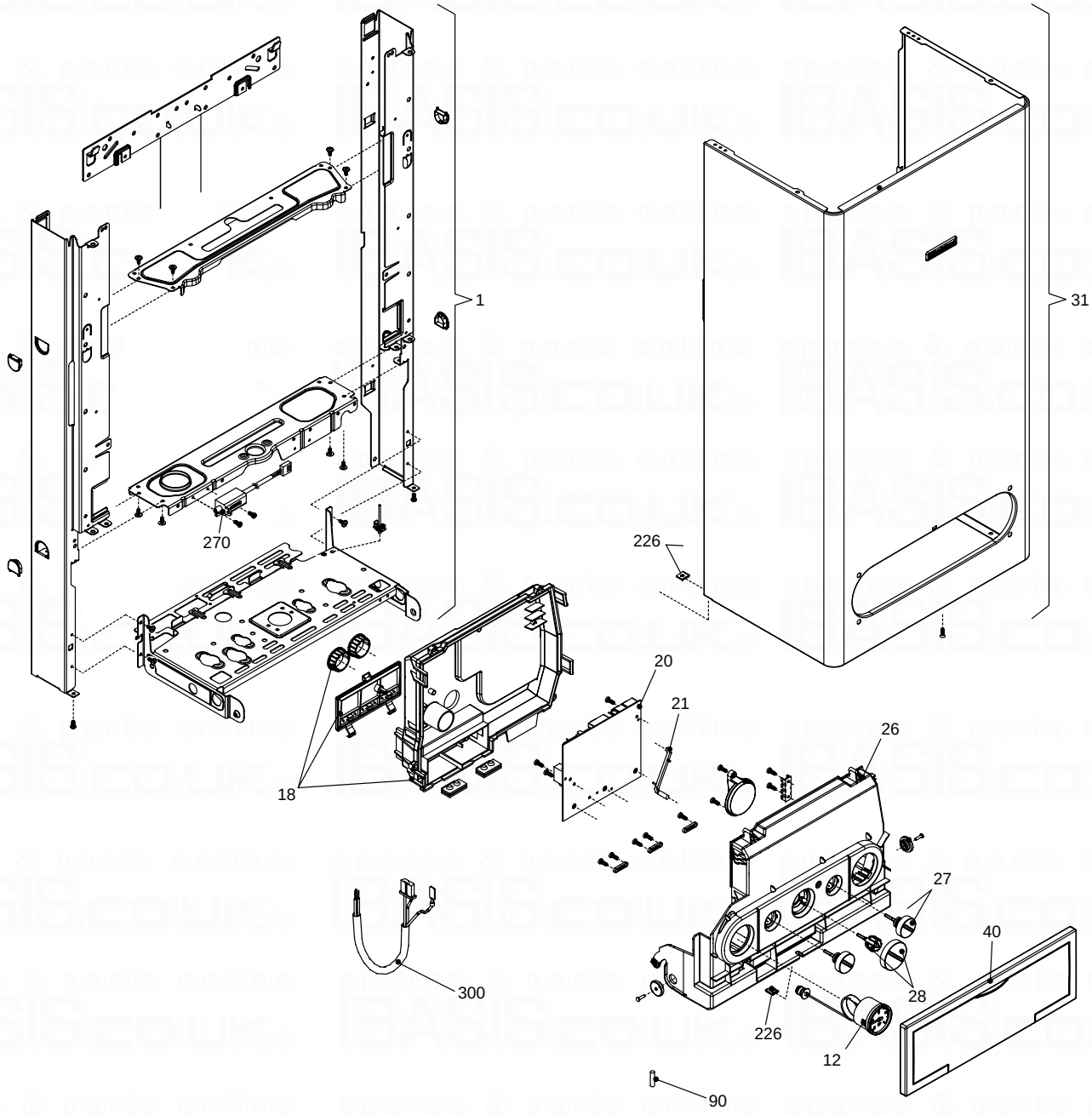


Fig. 40

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Table 1

10.0 Exploded diagrams

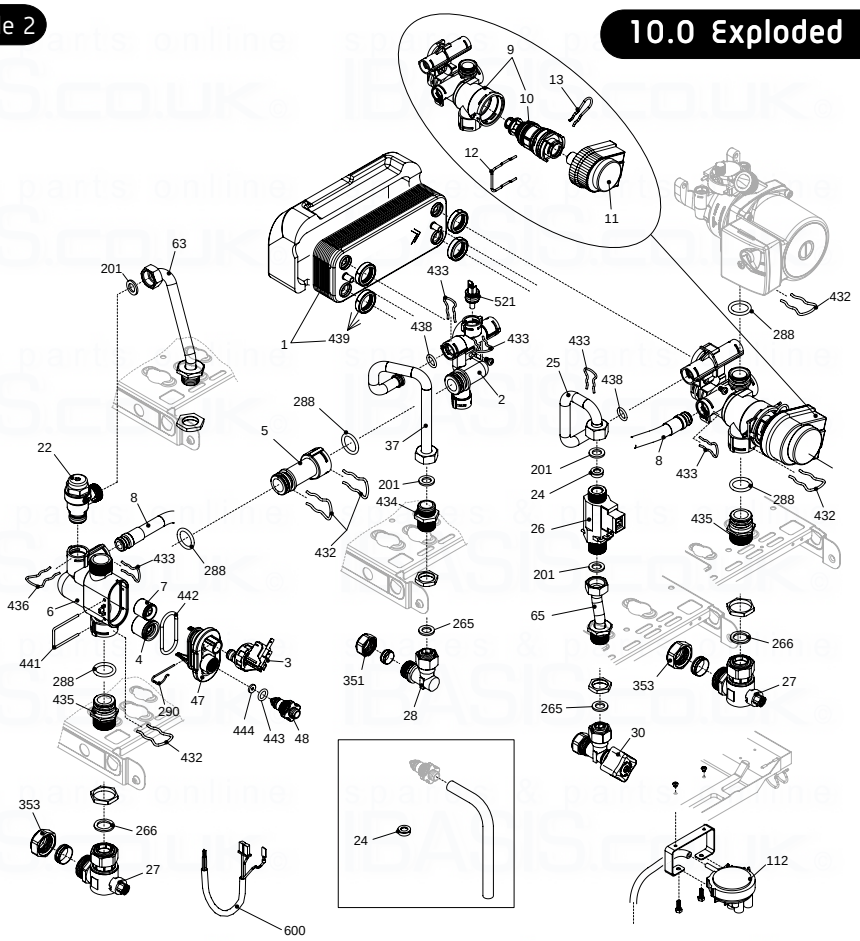


POS.	DESCRIPTION	24c	29c
1	Frame assembly	20006407	20006429
12	Pressure gauge	R2564	R2564
18	Cover assembly	20003757	20003757
20	Printed circuit board CPBTR04	R10030505	R10030505
21	Led light guide	R10023816	R10023816
26	Instrumental plate	20006418	20006418
27	Knob	R10028476	R10028476
28	Knob	R10028475	R10028475
31	Case Assembly	20006423	20006430
40	Fixing door	20006420	20006425
90	Fuse	R3478	R3478
226	Clip	R5128	R5128
270	Ignition transformer TR2	R10021272	R10021272
300	Wiring harness	R10023840	R10023840

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Table 2

10.0 Exploded diagrams

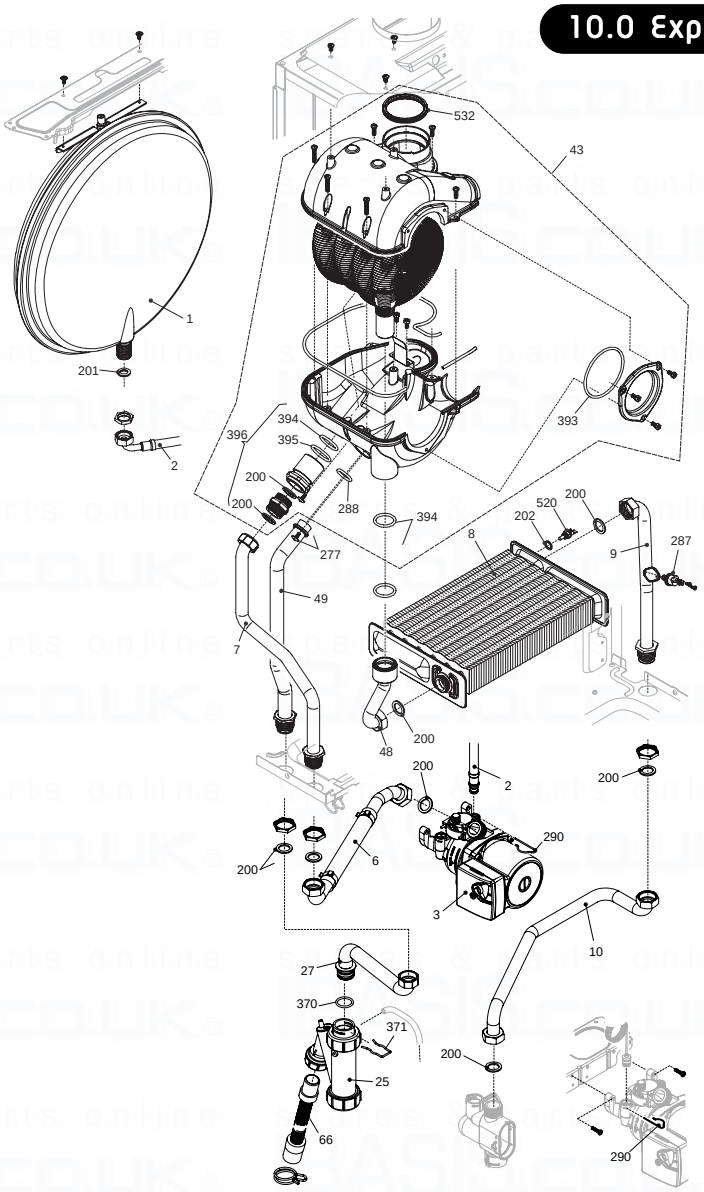


POS.	DESCRIPTION	24c	29c
1	Exchanger	R8036	R8037
2	Fitting/union	R10026194	R10026194
3	Pressure water switch	R10028141	R10028141
4	Non return valve	R10025056	R10025056
5	Connection	R10024647	R10024647
6	By-pass casing	R10024642	R10024642
7	Heating by-pass valve	R2047	R2047
8	Pipe	R10025057	R10025057
9	3-way heating manifold and cartridge	R10026507	R10026507
10	3 way valve cartridge	R10025305	R10025305
11	Actuator	R10025304	R10025304
12	Clip	R10025450	R10025450
13	Clip	R10025449	R10025449
22	Safety valve	R10025055	R10025055
24	Flow governor	R10026043	R10024987
24	Flow governor	R10024987	R10026044
24	Flow governor	R10026044	R10026045
25	Pipe	R10024982	R10024982
26	Dhw actuator	R10022349	R10022349
27	Heating cock	R1789	R1789
28	Connection	R1790	R1790
30	Water supply stop cock	R10025733	R10025733
37	Pipe	R10024984	R10024984
47	Cover for by-pass assembly	R10024643	R10024643
48	Cock	R10024646	R10024646
63	Pipe	20006396	20006396
65	Pipe	R10024983	R10024983
112	Pressure differential switch	R10027535	R10027535
201	Washer	R5026	R5026
265	Washer	R5236	R5236
266	Washer	R5237	R5237
288	Ring	R6898	R6898
290	Clip	R2165	R2165
351	Nut	R1823	R1823
353	Nut	R1824	R1824
432	Clip	R10024958	R10024958
433	Clip	R10024986	R10024986
434	Nipple	R10024985	R10024985
435	Fitting/union	R10025059	R10025059
436	Clip	R10025062	R10025062
438	O ring	R10024988	R10024988
439	Washer	R10025067	R10025067
441	Clip	R10025063	R10025063
442	O ring	R10025065	R10025065
443	O ring	R10025064	R10025064
444	Washer	R10025066	R10025066
521	NTC sensor	R10027351	R10027351
600	Hydraulic control cable	R10028531	R10028531

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Table 3

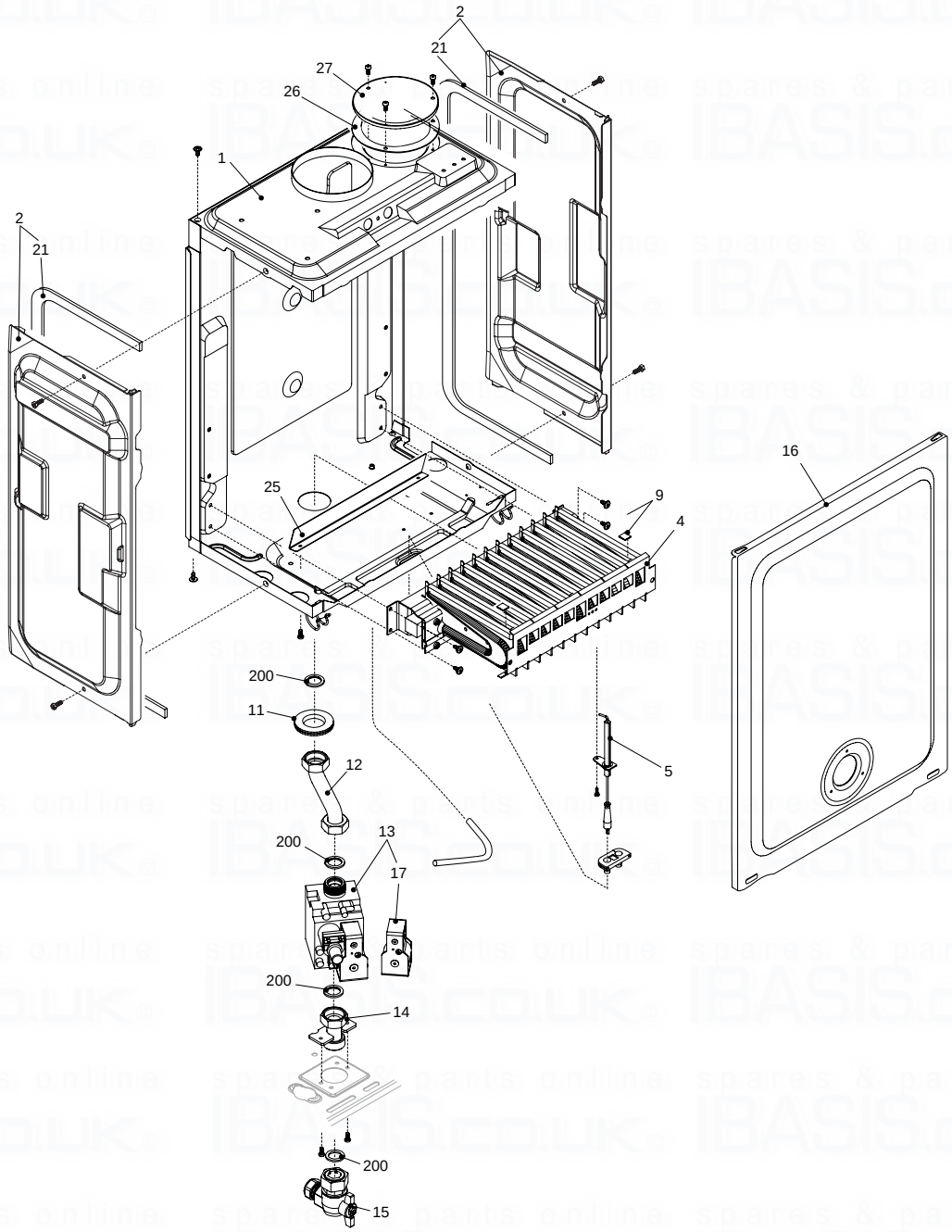
10.0 Exploded diagrams



POS.	DESCRIPTION	24c	29c
1	Expansion vessel	R2204	R2573
2	Pipe	R10025188	R10025188
3	Pump	R10027571	R10027571
6	Pipe 2	0006421	20006427
7	Pipe	R10024312	R10024130
8	Exchanger	R2381	R2378
9	Pipe	R10021041	R10021041
10	Pipe	20006419	20006426
25	Siphon	R10027546	R10027546
27	Pipe	20006422	20006428
43	Condensing unit assembly	R01005411	R01005411
48	Pipe	R10024311	R10024129
49	Pipe	R10024313	R10024131
66	Flexible pipe	R10027545	R10027545
200	Washer	R5023	R5023
201	Washer	R5026	R5026
202	Washer	R5041	R5041
277	Screw	R6903	R6903
287	High limit thermostat	R2258	R2258
288	Ring	R6898	R6898
290	Clip	R2165	R2165
370	O ring	R10023533	R10023533
371	Clip	R10023532	R10023532
393	O ring	R10024141	R10024141
394	O ring	R10024142	R10024142
395	O ring	R10024143	R10024143
396	Connections kit	R01005292	R01005292
520	NTC-sensor	20004832	20004832
532	Washer	R10027540	R10027540

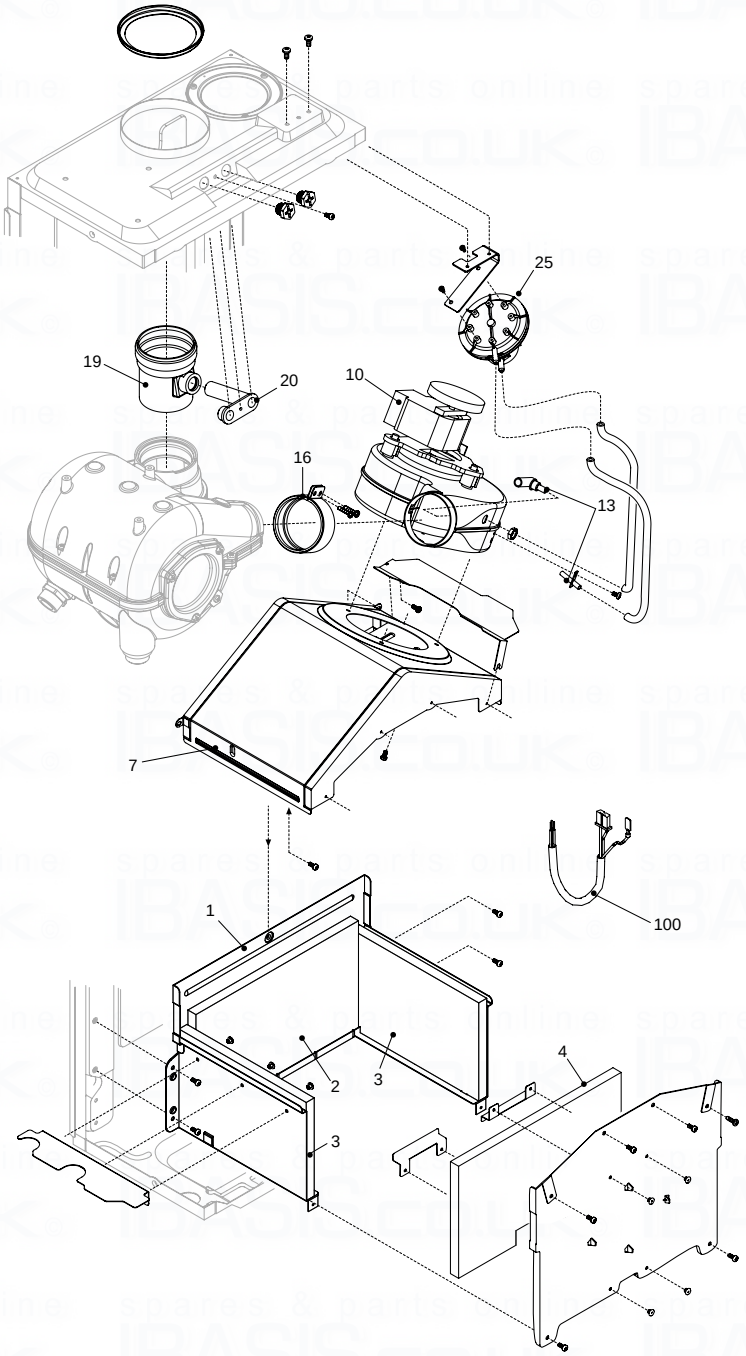
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10.0 Exploded diagrams



POS.	DESCRIPTION	24c	29c
1	Roomsealed chamber	R10027533	R10027562
2	Roomsealed chamber side	R10024166	R10024166
4	N.G. burner	R10027536	R10027564
5	Spark / ignition electrode	R10025985	R10025985
9	Plate	R5172	R5172
11	Fire leader	R5927	R5927
12	Pipe	R10028493	R10028493
13	Gas valve	R10025074	R10025074
14	Pipe	R10026703	R10026703
15	3/4" gas cock	R10020897	R10020897
16	Cover assembly	R10020216	R10020217
17	Gas valve solenoid	R10020838	R10020838
21	Washer	R5905	R5905
25	Air baffle	R2238	R2238
26	Washer	R8975	R8975
27	Plug	R8084	R8084
200	Washer	R5023	R5023

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POS.	DESCRIPTION	24c	29c
1	Combustion chamber	R10025935	R10026406
2	Protection	R5270	R5316
3	Protection	R5271	R5271
4	Protection	R5269	R5315
7	Flue draught diverter	R10024310	R10024125
10	Fan	R10024035	R10024035
13	Venturi and pressure tube kit	R01005405	R01005405
16	Clamp	R10024126	R10024126
19	Pipe	R10024137	R10024137
20	Block with combustion analysis check point	R10026933	R10026933
25	Pressure differential switch	R10020889	R10020889
100	Combustion cable	R10027559	R10027559

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11.0 LPG Instructions

11.1 Related documents

BS6798		INSTALLATION OF BOILERS OF RATED NOT EXCEEDING 60kW
BS5449	PART 1	FORCED CIRCULATION HOT WATER SYSTEMS
BS5546		INSTALLATION OF GAS HOT WATER SUPPLIES FOR DOMES TIC PURPOSES
BS5440	PART 1	FLUES
BS5482	PART 1	DOMESTIC BUTANE & PROPANE GAS BURNERS IN PERMAMENT DWELLINGS

11.2 Technical data

GAS PRESSURES	24c	29c
Inlet pressure	37 mbar	37 mbar
Burner pressure maximum	35.70 mbar	35.50 mbar
Burner pressure minimum (heating)	12.80 mbar	10.00 mbar
Burner pressure minimum (DHW)	4.90 mbar	4.50 mbar
Maximum gas rate (Kg/h)	1.94	2.25
Minimum gas rate (Kg/h)	1.16	1.16
Injectot size (quantity)	12 x 0.76	14 x 0.76
SEDBUK (%)	87.7 Band "B"	87.9 Band "B"
NOx max-min (mg/kWh)	352.8-211.68	441-317.52
CO max-min (PPM) less than	90 - 100	100 - 190
CO_2 max-min (%)	7.60 - 4.35	8.20 - 4.00
CO/CO_2 ratio @ max - min	0.001 to 1-0.002 to 1	0.001 to 1 - 0.005 to 1

11.3 Converting the appliance gas type

To convert the appliance to another gas type it is necessary to change the burner injectors and adjust the gas pressures. It is also necessary to ensure the jumper tag at JP3 is enabled or disabled according to the gas type used.

- To change the injectors see section 7.
- For correct jumper tag configuration see 8.8.
- Ensure you have the correct gas conversion kit, part code: 01005407.

11.4 Gas supply

The gas supply must be connected to the appliance by a competent LPG installer and must be of sufficient size to supply the appliance at its maximum output.
An existing supply must be checked to ensure that it is of adequate size to deal with the maximum rated input of this and any other appliances that it serves.

11.5 Gas supply installation

The entire installation including the meter must be purged and checked for gas soundness.

11.6 Checking and adjusting burner pressure (fig. 22)

Isolate the appliance from the electrical supply and attach a suitable manometer to the gas valve outlet test point.

11.6.1 Setting the maximum burner pressure (fig. 34)

Light the boiler as described in 6.7, fully open a DHW outlet (preferably the bath) and ensure the HW temperature selector is set at maximum. Allow the appliance to stabilise.
Compare the reading on the manometer with the value described in 11.2. If adjustment is required, remove the protective cap from the gas valve modulating coil assembly and turn the outer (10mm) nut clockwise to increase, or counter-clockwise to decrease the burner pressure.

11.6.2 Setting the minimum burner pressure (fig. 35)

Once the maximum burner pressure has been checked and/or adjusted, remove one of the grey wires from the modulating coil. Compare the reading on the manometer with the value described in 11.2.
If adjustment is required, turn the inner (red) crosshead screw clockwise to increase, or counter-clockwise to decrease the burner pressure, whilst ensuring that the outer (10mm) nut does not move. When checking and/or adjustment and/or adjustment has been completed, isolate the appliance from the electrical supply, close the DHW outlet, replace the protective cap, refit the grey wire to the modulating coil, remove the manometer, and tighten the outlet test point.
IMPORTANT, A GAS SOUNDNESS CHECK MUST BE CARRIED OUT.

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GAS BOILER SYSTEM COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the boiler as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission this equipment to the manufacturer's instructions may invalidate the warranty but does not affect statutory rights.

Customer Name _____ Telephone Number _____

Address _____

Boiler Make and Model _____

Boiler Serial Number

Commissioned by *(print name)* _____ CORGI ID Number _____

Company Name _____ Telephone Number _____

Company Address _____

_____ Commissioning Date _____

To be completed by the customer on receipt of a Building Regulations Compliance Certicate *:

Building Regulations Noti cation Number *(if applicable)* _____

CONTROLS Tick the appropriate boxes

Time and Temperature Control to Heating	Room Thermostat and Programmer/Timer ☐	Programmable Room Thermostat ☐	Load/Weather Compensation ☐	Optimum Start Control ☐
Time and Temperature Control to Hot Water	Cylinder Thermostat and Programmer/Timer ☐	Combination Boiler ☐
Heating Zone Valves	Fitted ☐	Not Required ☐
Hot Water Zone Valves	Fitted ☐	Not Required ☐
Thermostatic Radiator Valves	Fitted ☐	Not Required ☐
Automatic Bypass to System	Fitted ☐	Not Required ☐
Boiler Interlock	Provided ☐

ALL SYSTEMS

The system has been u shed and cleaned in accordance with BS7593 and boiler manufacturer's instructions Yes ☐

What system cleaner was used? _____

What inhibitor was used? Quantity _____ *litres*

CENTRAL HEATING MODE Measure and Record:

Gas Rate	_____ m^3/hr	OR		_____ ft^3/hr
Burner Operating Pressure (if applicable)	_____ mbar	OR	Gas Inlet Pressure	_____ mbar
Central Heating Flow Temperature				_____ ℃
Central Heating Return Temperature				_____ ℃

COMBINATION BOILERS ONLY

Is the installation in a hard water area (above 200ppm)? Yes ☐ No ☐

If yes, has a water scale reducer been tted? Yes ☐ No ☐

What type of scale reducer has been tted? _____

DOMESTIC HOT WATER MODE Measure and Record:

Gas Rate	_____ m^3/hr	OR		_____ ft^3/hr
Burner Operating Pressure (at maximum rate)	_____ mbar	OR	Gas Inlet Pressure (at maximum rate)	_____ mbar
Cold Water Inlet Temperature				_____ ℃
Hot water has been checked at all outlets	Yes ☐		Temperature	_____ ℃
Water Flow Rate				_____ *l/min*

CONDENSING BOILERS ONLY

The condensate drain has been installed in accordance with the manufacturer's instructions and/or BS5546/BS6798 Yes ☐

ALL INSTALLATIONS

If required by the manufacturer, record the following CO_2 _____ % OR CO _____ *ppm* OR CO/CO_2 Ratio _____

The heating and hot water system complies with the appropriate Building Regulations	Yes ☐
The boiler and associated products have been installed and commissioned in accordance with the manufacturer's instructions	Yes ☐
The operation of the boiler and system controls have been demonstrated to and understood by the customer	Yes ☐
The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer	Yes ☐

Commissioning Engineer's Signature _____

Customer's Signature _____

(To conr m satisfactory demonstration and receipt of manufacturer's literature)

*All installations in England and Wales must be noti ed to Local Authority Building Contr ol (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certi cate will then be issued to the customer.

benchmark COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

©Heating and Hotwater Industry Council (HHIC)

www.centralheating.co.uk

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SERVICE RECORD

It is recommended that your heating system is serviced regularly and that the appropriate Service Record is completed.

Service Provider

Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

Always use the manufacturer's speci ed spar e part when replacing controls.

SERVICE 1 Date

Energy Ef ciency Checkl ist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

CORGI ID Number

Comments

Signature

SERVICE 2 Date

Energy Ef ciency Checkl ist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

CORGI ID Number

Comments

Signature

SERVICE 3 Date

Energy Ef ciency Checkl ist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

CORGI ID Number

Comments

Signature

SERVICE 4 Date

Energy Ef ciency Checkl ist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

CORGI ID Number

Comments

Signature

SERVICE 5 Date

Energy Ef ciency Checkl ist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

CORGI ID Number

Comments

Signature

SERVICE 6 Date

Energy Ef ciency Checkl ist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

CORGI ID Number

Comments

Signature

SERVICE 7 Date

Energy Ef ciency Checkl ist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

CORGI ID Number

Comments

Signature

SERVICE 8 Date

Energy Ef ciency Checkl ist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

CORGI ID Number

Comments

Signature

SERVICE 9 Date

Energy Ef ciency Checkl ist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

CORGI ID Number

Comments

Signature

SERVICE 10 Date

Energy Ef ciency Checkl ist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

CORGI ID Number

Comments

Signature

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cod. 20005463 - ed. 1 - 09/08

TECHNICAL SERVICES, TRAINING AND MARKETING
Halstead Boilers Limited, 5 Titan Business Centre, Spartan Close, Tachbrook Park, Leamington Spa, Warwickshire CV34 6RR - Telephone: 0844 371 1111 Fax: 01926 834888

MANUFACTURING, ACCOUNTS AND SALES
Halstead Boilers Limited, 20/22 First Avenue, Bluebridge Industrial Estate, Halstead, Essex CO9 2EX
Telephone: 0844 371 1111 Fax: 01787 474588
Part of the Glen Dimplex Group

Email:sales@halsteadboilers.co.uk or service@halsteadboilers.co.uk or training@halsteadboilers.co.uk
Website:www.halsteadboilers.co.uk

Halstead Boilers is continuously improving its products and may therefore change specifications without prior notice.
The statutory rights of the consumer are not affected.08/07 751094