

Installation and Servicing Instructions

Models covered by these instructions

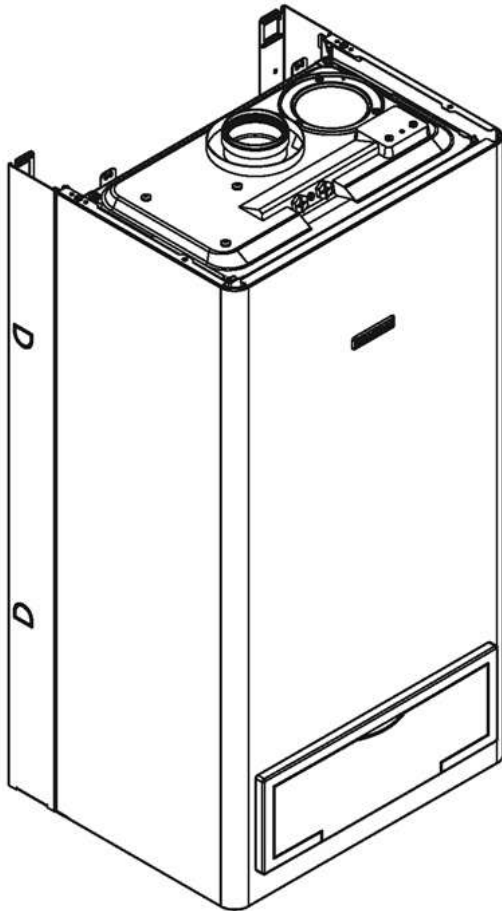
24c (47-260-19) iHeat 24c
29c (47-260-20) iHeat 29c

Heat 24c

iHeat 29c



Combination Condensing Boilers



These instructions should be left with the user

Contents

Introduction

[1.1](#) Description

Design principles & operating sequence

[2.1](#) Principle components

[2.2](#) Mode of operation (at rest)

[2.3](#) Mode of operation (heating)

[2.4](#) Mode of operation (Hot water)

[2.5](#) Safety devices

Technical data

[3.1](#) Central heating

[3.2](#) Domestic hot water

[3.3](#) Gas pressures

[3.4](#) Expansion vessel

[3.5](#) Dimensions

[3.6](#) Clearances

[3.7](#) Connections

[3.8](#) Electrical

[3.9](#) Flue details (concentric)

[3.9A](#) Flue details (twin pipes)

[3.10](#) Efficiency

3.11	Emissions
3.12	Pump duty
General requirements (UK)	
4.1	Related documents
4.2	Location of appliance
4.3	Gas supply
4.4	Flue system
4.5	Air supply
4.6	Water circulation
4.7	Electrical supply
4.8	Mounting on a combustible surface
4.9	Timber framed buildings
4.10	Inhibitors
4.11	Showers
General requirements (EIRE)	
4A.1	Related documents
4A.2	Location of appliance
4A.3	Gas supply
4A.4	Flue system
4A.5	Air supply
4A.6	Water circulation
4A.7	Electrical supply
4A.8	Mounting on a combustible surface
4A.9	Timber framed buildings
4A.10	Inhibitors
4A.11	Showers
4A.12	Declaration of conformity
Installation	
5.1	Boiler dimensions
5.2	Tap rail
5.3	Clearances
5.4	Boiler flue ring
5.5	Delivery
5.6	Contents
5.7	Unpacking
5.8	Preparation for mounting the appliance
5.9	Fitting the flue
5.10	Concentric air/flue duct specifications
5.11	Flue template
5.12	Kit A + Telescopic Horizontal Wall Terminal
5.13	Kit B Vertical Concentric Flue Terminal
5.14	Total equivalent lengths
5.15	Kit C Horizontal Anti-Plume Flue Kit
5.16	Plume Diverter Terminal Kit
5.17	Kit D External Vertical Flue
5.18	Kit E Chimney Flue Liner Kit
5.19	Kit F: Twin Flue System
5.20	Flue lengths
5.21	Connecting the gas and water kit
5.22	Electrical connections
Commissioning	
6.1	Gas supply installation
6.2	The heating system
6.3	Initial filling of the system
6.4	Initial flushing of the system
6.5	Filling the hot water system
6.6	Pre-operation checks
6.7	Initial lighting
6.8	Checking the burner pressure
6.9	Final flushing of the heating system
6.10	Setting the flow outlet temperature
6.11	Setting the system design pressure
6.12	Regulating the central heating system
6.13	Final checks
6.14	Instructing the user
Servicing	
7.1	General
7.2	Routine annual servicing
7.3	Replacement of components
7.4	Component removal procedure
7.5	Pump assembly
7.6	Lower automatic air release valves
7.7	Safety valve
7.8	Water pressure switch
7.9	Pressure/temperature gauge
7.10	Flow thermistor
7.11	High limit thermostat
7.12	Printed circuit board

7.13	Gas valve
7.14	Integral time switch
7.15	Electrode, burner & injectors
7.16	Flue fan
7.17	Main heat exchanger
7.18	Air pressure switch
7.19	Flow restrictor
7.20	DHW flow switch
7.21	DHW heat exchanger
7.22	Valve actuator
7.23	Diverter valve cartridge
7.24	DHW thermistor
7.25	Automatic by-pass valve
7.26	DHW non-return valve
7.27	Expansion vessel
7.28	Latent heat collector
7.29	Condense trap removal
Checks, adjustments and fault finding	
8.1	Checking appliance operation
8.2	Appliance modes of operation
8.3	Checking & adjusting the burner pressure
8.4	Combustion analysis test
8.5	Checking the expansion vessel
8.6	External faults
8.7	Electrical checks
8.8	Fault finding
8.9	Fault codes
Wiring diagrams	
9.1	External wiring
9.2	Typical control applications
9.3	Room thermostat
9.4	Other controls
9.5	Functional diagram
Exploded diagrams	
10.1	Table 1
10.2	Table 2
10.3	Table 3
10.4	Table 4
10.5	Table 5
L.P.G. instructions	
11.1	Related documents
11.2	Technical data
11.3	Converting the appliance gas type
11.4	Gas supply
11.5	Gas supply installation
11.6	Adjusting the burner pressure

Benchmark

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

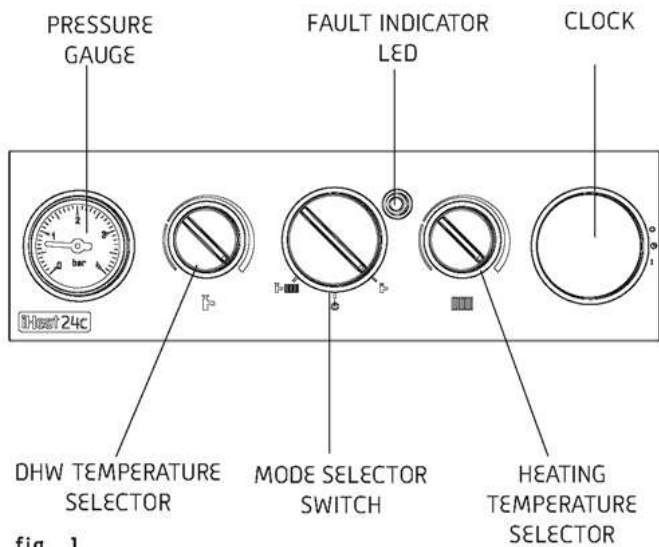
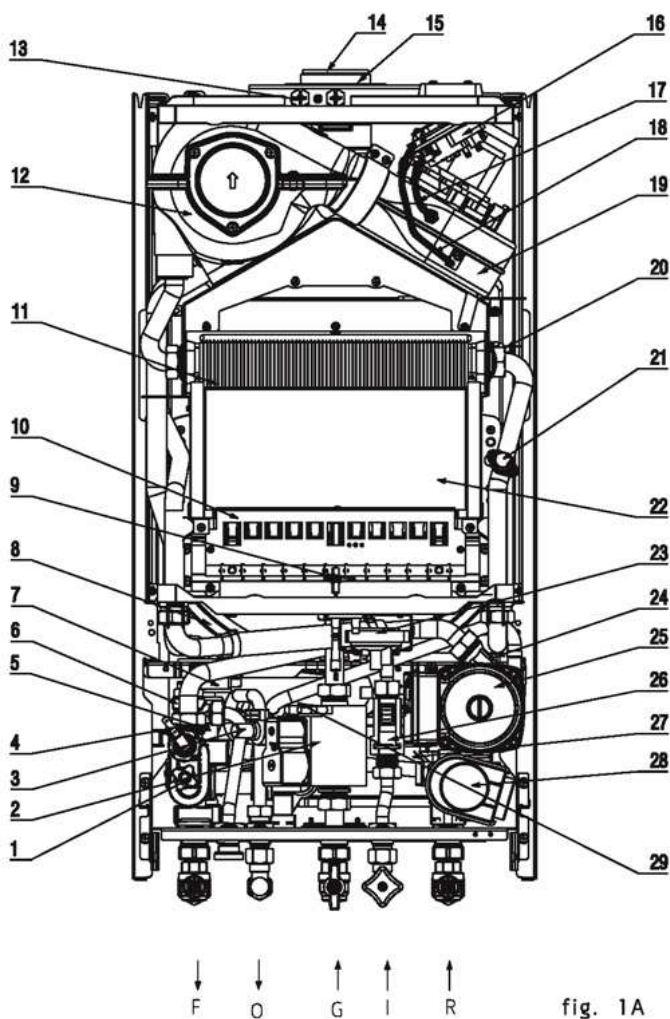


fig. 1

fig. 1A



- 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 Flow thermistor
- 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
- F Heating flow connection
- O Hot water outlet
- G Gas connection
- R Heating return connection
- I Cold water inlet

fig. 1A

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

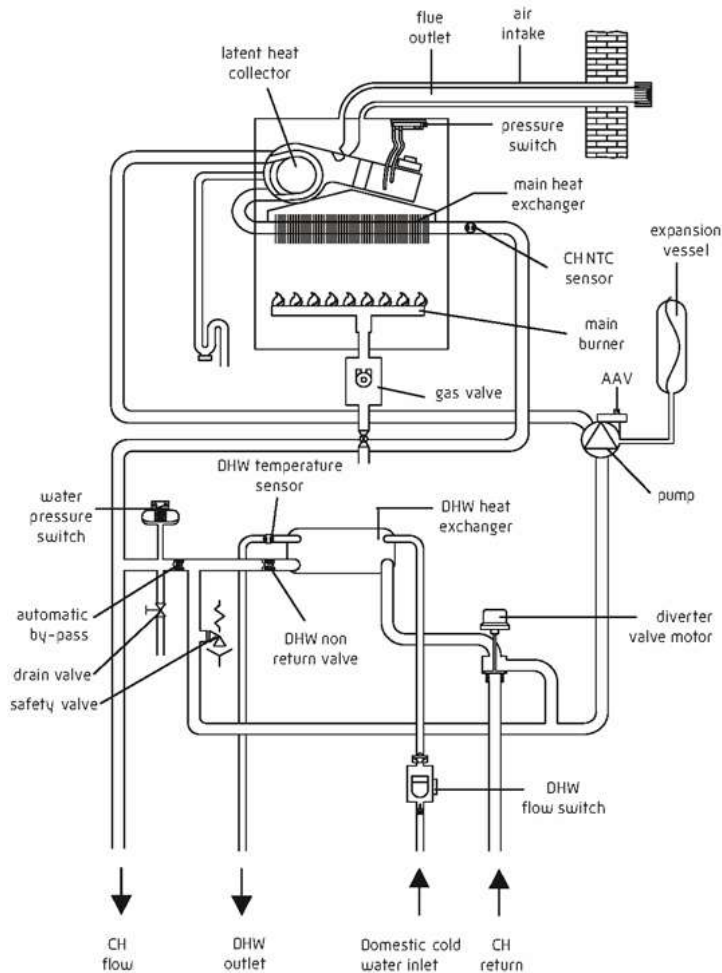


fig. 2

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 diverter 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 increased 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.

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 max temperature 105°C.
- 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.

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 heating, max - min)	2.64 - 1.59 m ³ /h	3.07 - 1.59 m ³ /h
Injectors size (mm)	12 × 1.35	14 × 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	12mm LH Side/50mm RH side
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
NO _x @ maximum output (mg/kWh)	317.52	317.52
NO _x @ minimum output (mg/kWh)	229.32	194.04
NO _x rating	class 2	class 2
IP rating (for C-type boilers)	X5D	X5D
IP rating (for B-type boilers)	X4D	X4D

* p.p.m. = parts per million

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.

Fig. 3

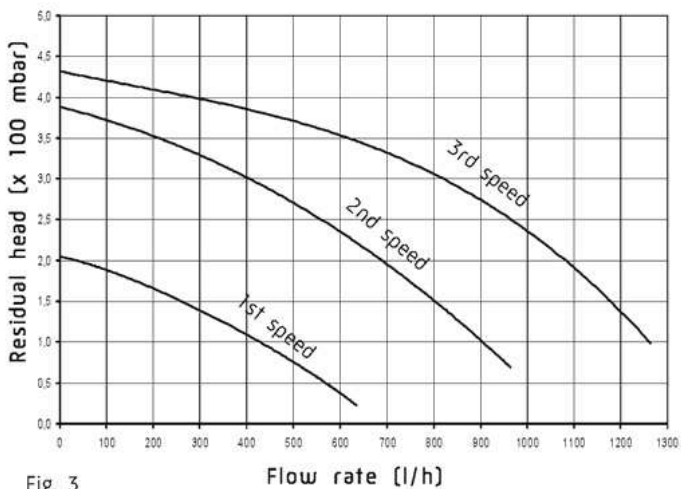
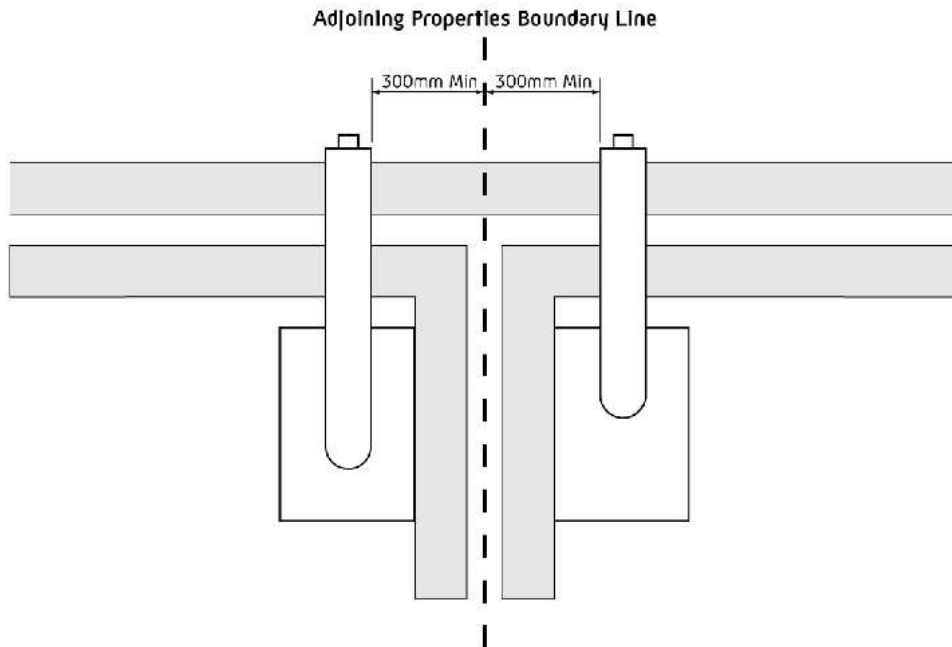


Fig. 3



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.

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

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.

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 tightness 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 plumbing must be considered.

Fig. 4

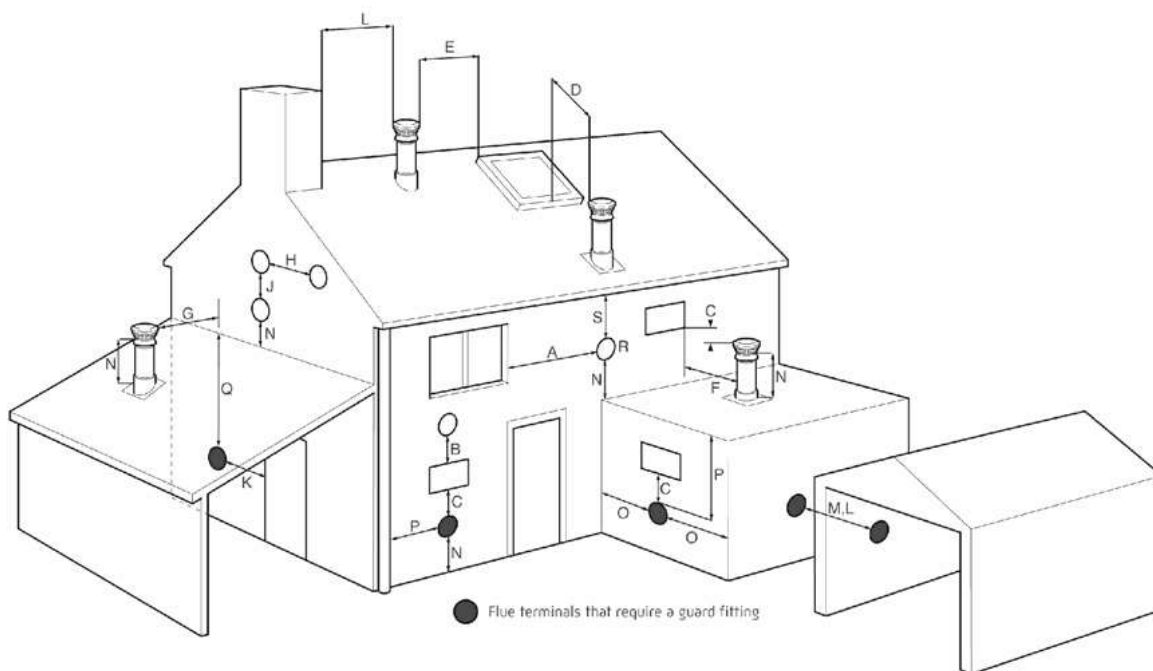


Fig. 4

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

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. The appliance is a room sealed, fan flued boiler. Consequently when a C13, C33 or C53 flue system is fitted the boiler does not require a permanent air vent for combustion air supply nor does it require cupboard or compartment ventilation for cooling purposes.

However where an open flued system is used

- Flue kit E (B23 Classification) an air vent communicating directly with the outside air must be provided in the same room or internal space as the flue duct air inlet. If the boiler is fitted in a compartment then high and low level ventilation is required, BS 5440

- Parts 1 & 2 give further guidance on compartment ventilation.

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.

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

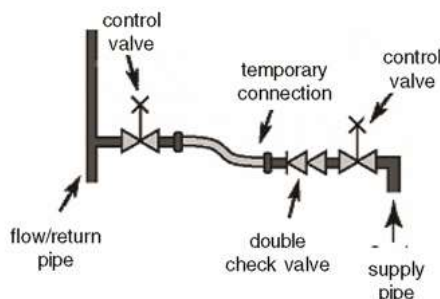
The appliance has an integral expansion vessel to accommodate the increased volume of water when the system is heated. It can accept up to 8 (24c) or 10 (29c) litres of expansion from within the system, generally this is sufficient, however if the system has an unusually high water content, it may be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

fig. 5

fig. 5



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](#)).

fig. 5A

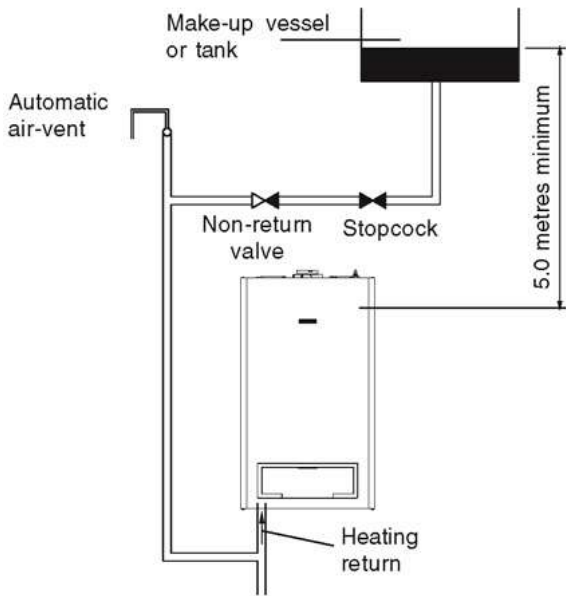


fig.5A

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.

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 recommended 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.

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).

4.0 General requirements (EIRE)

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 tightness 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 plumbing 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 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. The appliance is a room sealed, fan flued boiler. Consequently when a C13, C33 or C53 flue system is fitted the boiler does not require a permanent air vent for combustion air supply nor does it require cupboard or compartment ventilation for cooling purposes.

However where an open flued system is used

- Flue kit E (B23 Classification) an air vent communicating directly with the outside air must be provided in the same room or internal space as the flue duct air inlet. If the boiler is fitted in a compartment then high and low level ventilation is required. BS 5440

- Parts 1 & 2 give further guidance on compartment ventilation.

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.

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.

fig. 6

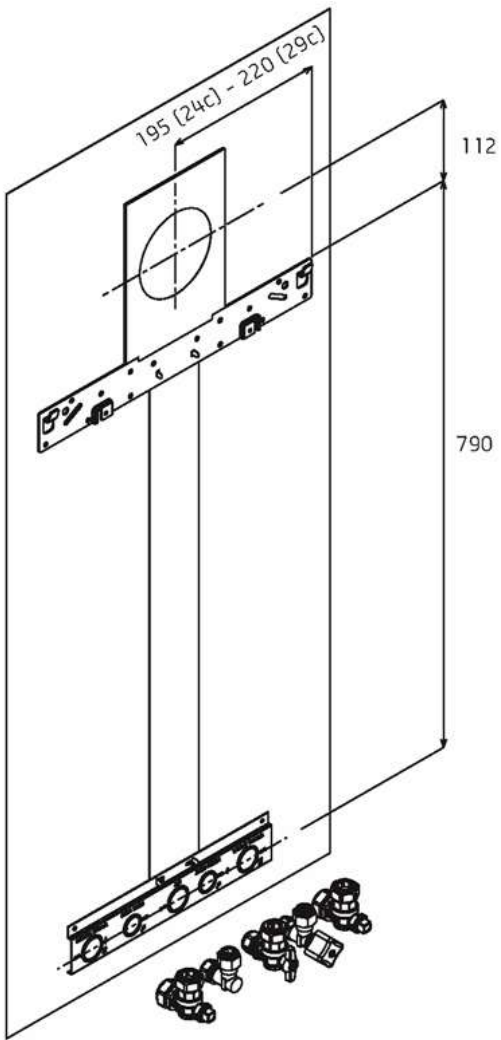


fig. 6

5.0 Installation

5.1 Boiler dimensions (fig. 7)

fig. 7

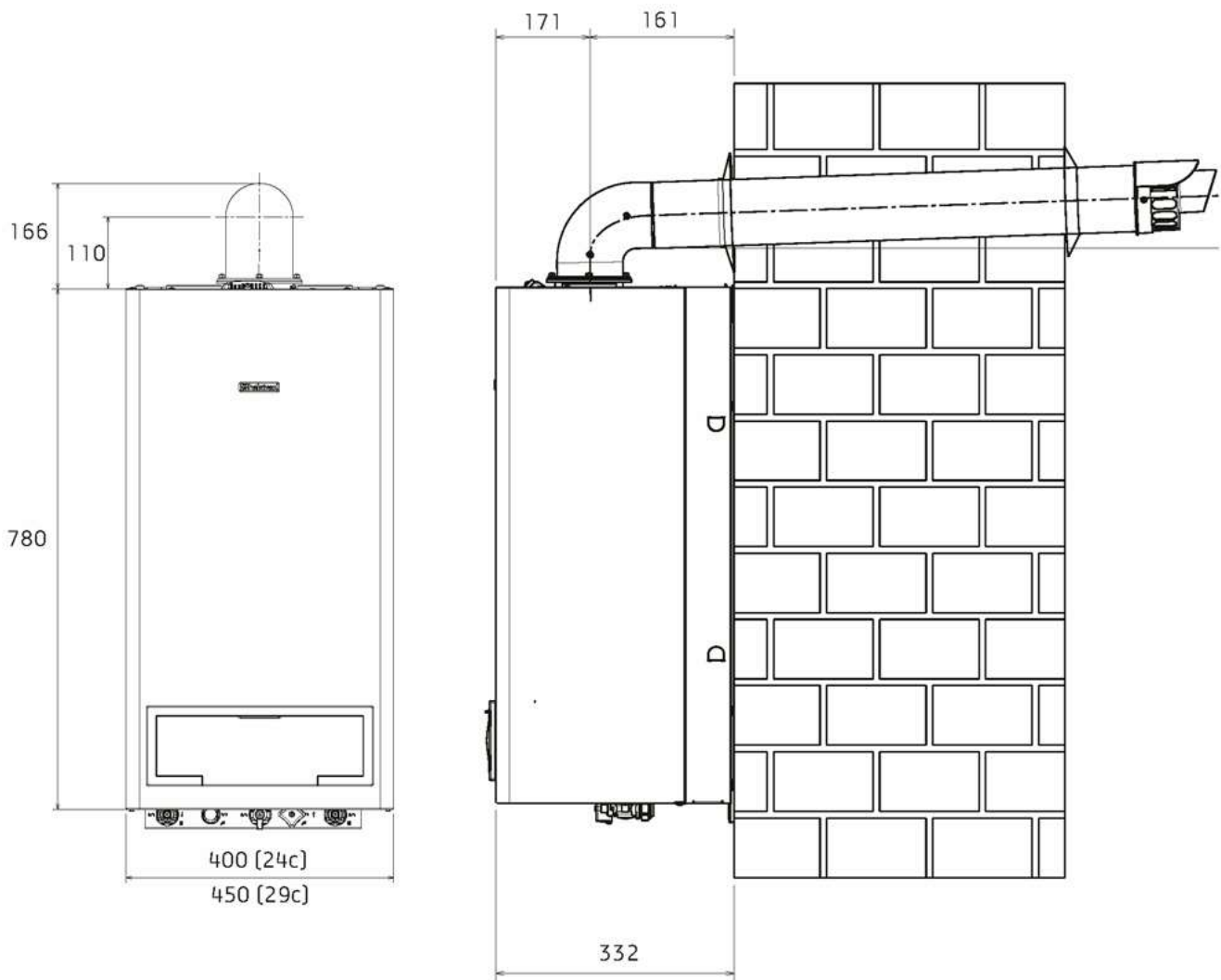


fig. 7

5.2 Tap rail (fig. 8)

fig. 8

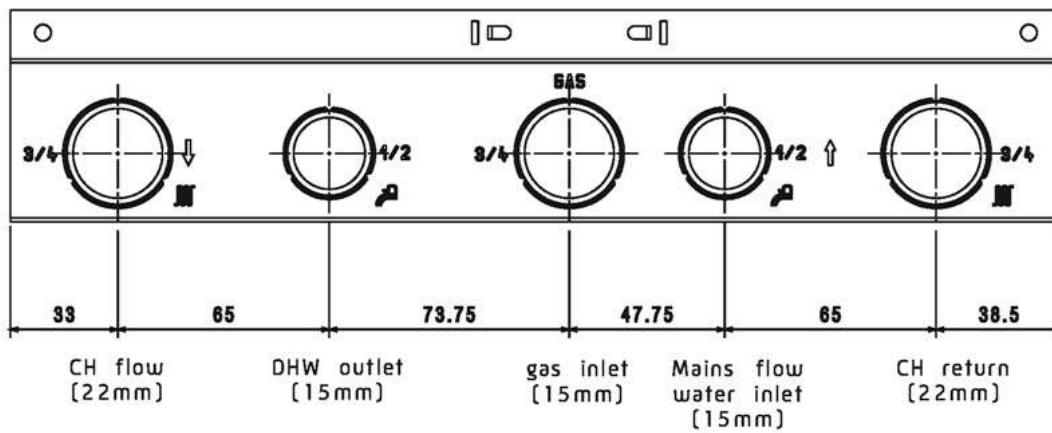
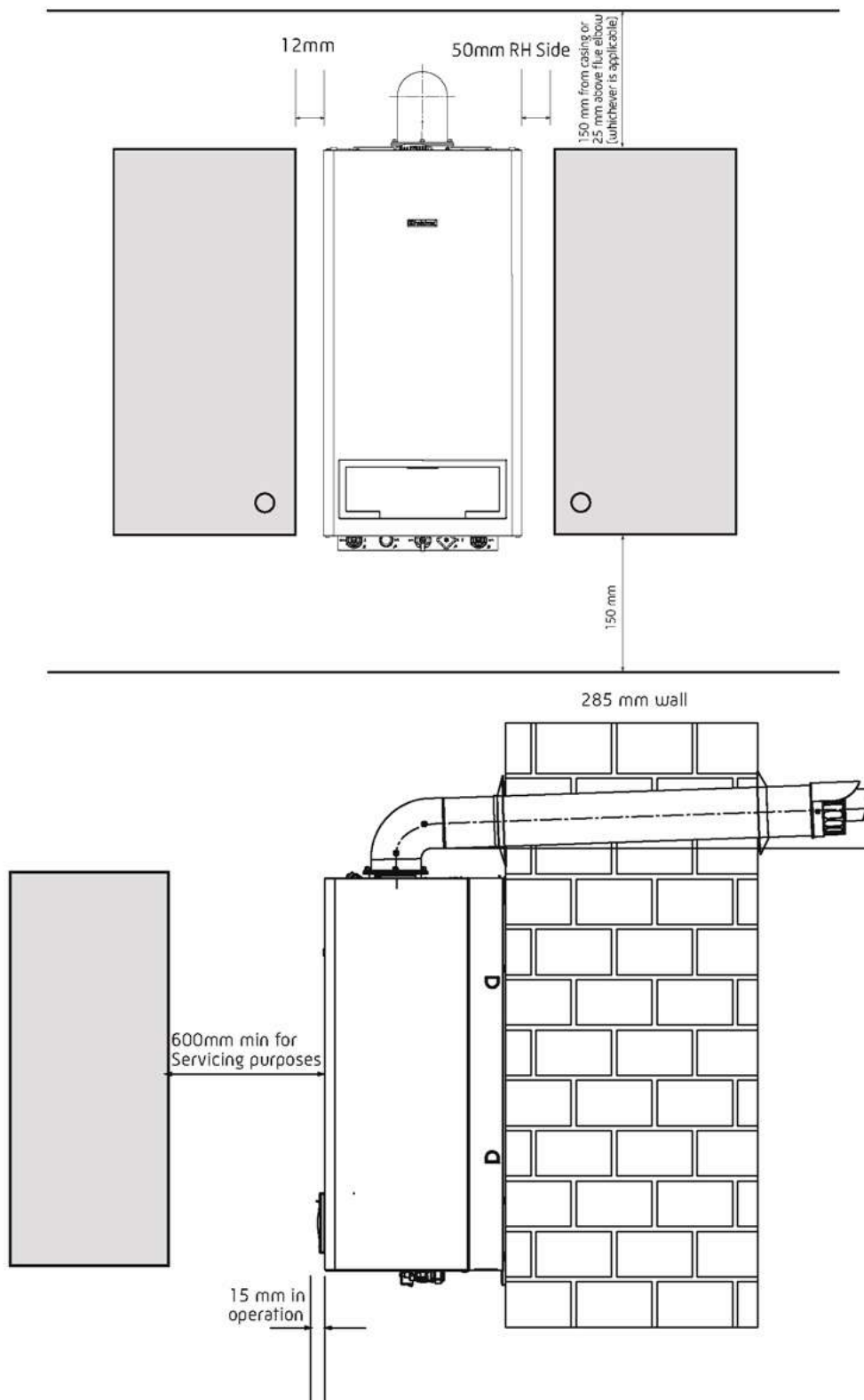


fig. 8

5.3 Clearances (fig. 9)

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.

5.4 Boiler flue ring

CAUTION:

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

The boiler flue spigot adaptor is fitted 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 envelope

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.

- Remove the self adhesive backing paper from the gasket and apply to the flue Elbow/Turret.
- Insert the Elbow or Turret into the appliance flue outlet.
- Secure in position using the No8 self tapping screws provided in the flue kit.

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.

5.4.1 Boiler flue restrictor ring

The boiler is supplied with a flue restrictor ring factory fitted (as shown in [figure 10B](#)). An alternative restrictor ring is also provided in the boiler fittings kit.

fig. 10A

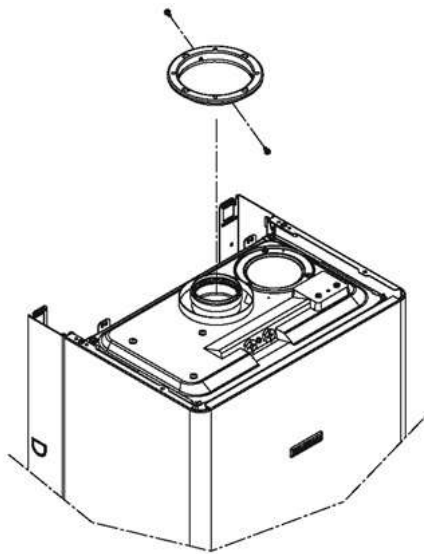


fig. 10A

fig. 10B

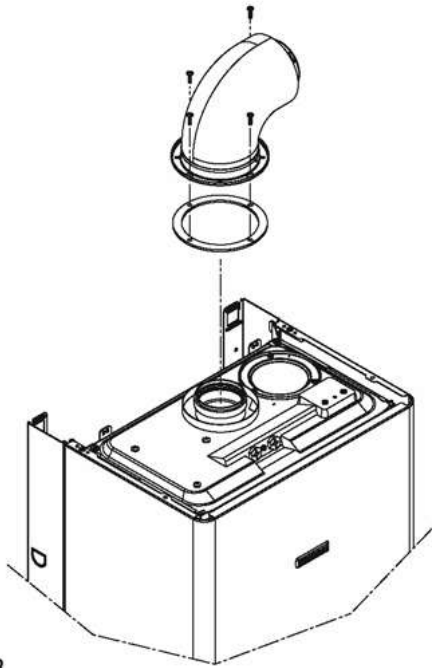


fig. 10B

To ensure maximum efficiency of the appliance, it may be necessary to change the restrictor ring or to remove it all together. Use the charts below to determine the requirements for your specific boiler and flue configuration.

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 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 cardboard 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.

5.10 Concentric air/flue duct specifications

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.

fig. 10C

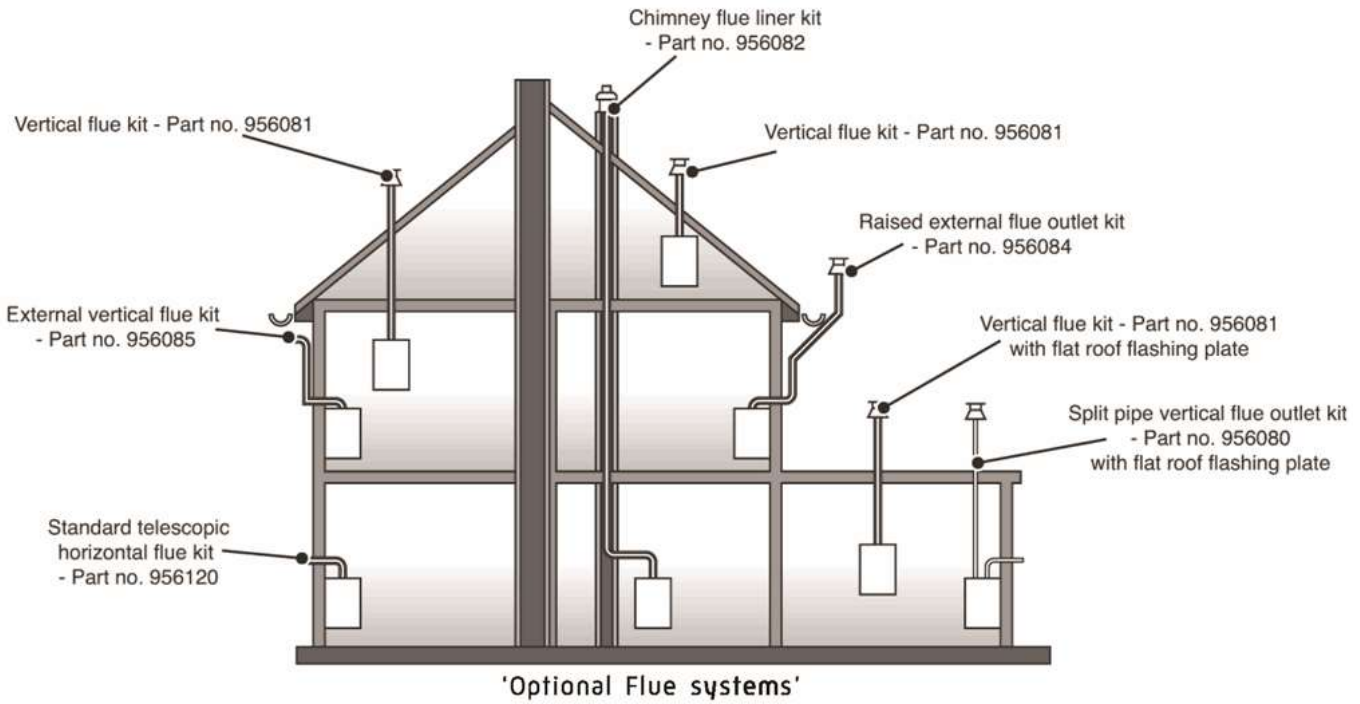


fig. 10C

5.11 Flue template (fig. 6)

A cardboard 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

60/100mm concentric flue system, [Fig. 10D](#), with a maximum length of 4500mm (24c) - 4000mm (29c). 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.

fig. 10D

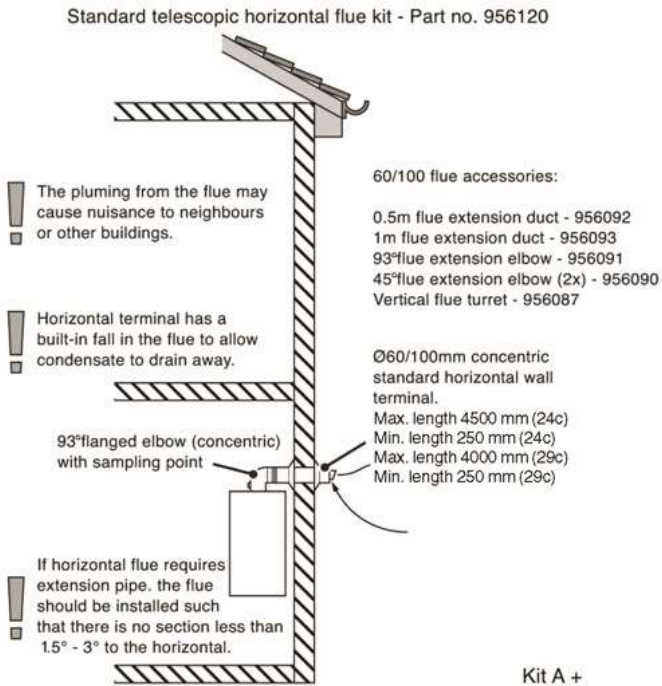


fig. 10D

5.13 Kit B Vertical Concentric Flue Terminal

(C33) - HBL Part 956081

60/100mm Concentric vertical flue system, [Fig. 10E-10F](#), through roof attics with a maximum length of 5500mm (24c) - 5000mm (29c).

fig. 10E

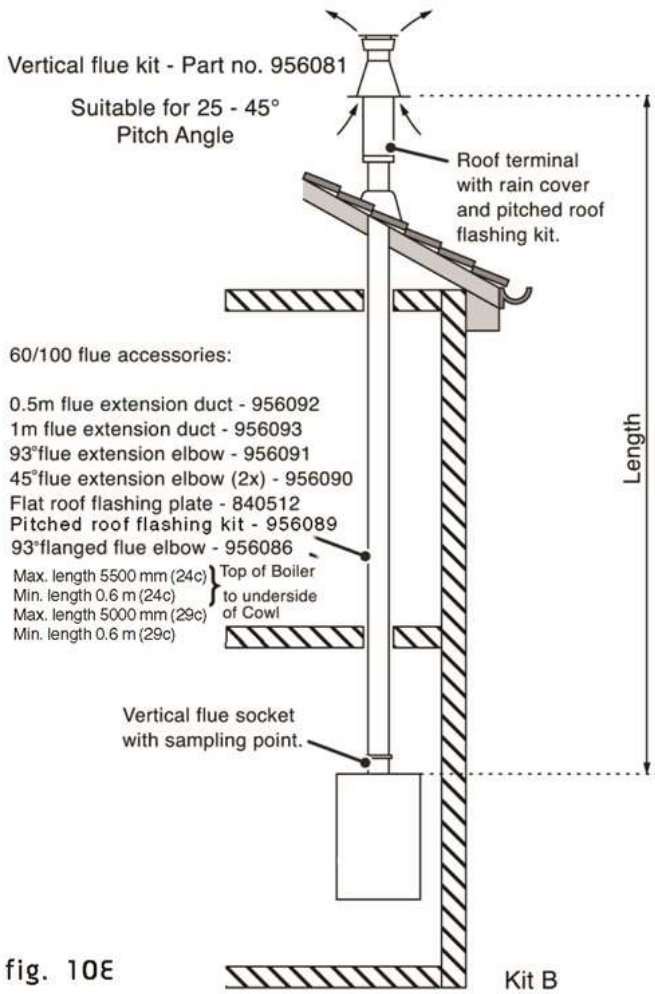


fig. 10E

fig. 10F

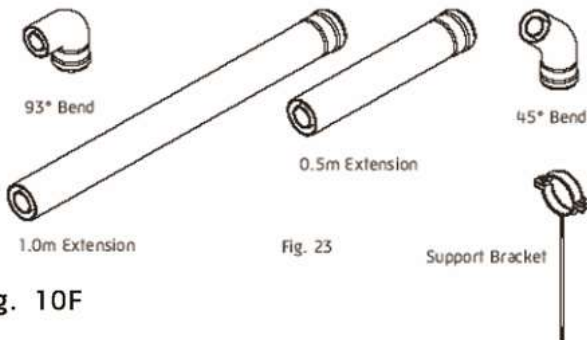


fig. 10F

The kit comprises of the roof terminal, 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.

NOTE:

the roof flashing kit should be ordered as a separate kit. There is a different kit for flat roof or pitched roof. Part numbers are:-

Flat roof flashing – 840512

Pitched roof flashing - 956089

Horizontal flue installations – 60/100 Concentric

Total Flue length	Diameter of restrictor ring	
	iHEAT 24C	iHEAT 29C
Upto 2 Mtrs	82.5mm (Factory Fitted)	84mm (Factory Fitted)
2 to 3 Mtrs	88mm (To be fitted)	None required (Remove factory fitted ring)
Greater than 3 Mtrs	None required (Remove factory fitted ring)	

Vertical flue installations – 60/100 Concentric

Total Flue length	Diameter of restrictor ring	
	iHEAT 24C	iHEAT 29C
Upto 2 Mtrs	82.5mm (Factory Fitted)	84mm (Factory Fitted)
2 to 2.8 Mtrs	88mm (To be fitted)	84mm (Factory Fitted)
2.8 to 4 Mtrs	88mm (To be fitted)	None required (Remove factory fitted ring)
Greater than 4 Mtrs	None required (Remove factory fitted ring)	

Twin flue installations (Horizontal or Vertical) – 80mm

Total Flue length	Diameter of restrictor ring	
	iHEAT 24C	iHEAT 29C
Upto 5 Mtrs	40mm (To be fitted)	45mm (To be fitted)
5 to 7 Mtrs	40mm (To be fitted)	None required (Remove factory fitted ring)
7 to 13.5 Mtrs	45mm (To be fitted)	None required (Remove factory fitted ring)
Greater than 13.5 Mtrs	None required (Remove factory fitted ring)	

5.14 Total Equivalent lengths for Concentric (60/100mm) flue systems (fig. 10F)

Component	Equivalent length in Metres	Part Number
45° Bend	0.5m	956090-2 off
93° Bend	1.0m	956091
0.5m extension	0.5m	956092
1.0m extension	1.0m	956093
Support Bracket	N/A	840517

5.15 Kit C Horizontal Anti-Plume Flue Kit (fig.10G) (C13) - Part No. 956084

fig. 10G

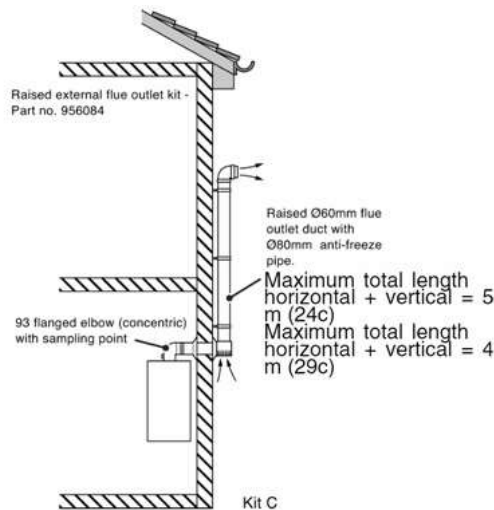


fig. 10G

This kit is recommended if the condensate plume from the flue may cause a nuisance or affect the surroundings. The air inlet remains outside and the flue duct is routed separately using a 60mm duct enclosed by a protective 80mm tube.

To calculate the maximum lengths of 60/100 concentric flue and 60mm flue ducts use the table below.

For installation details refer to the flue kit instructions.

Dimensions from vertical terminals to opening windows should be in line with [Fig.4](#).

Kit C: Flue length calculator

Concentric (60/100mm) flue length (Metres)		0.3	0.5	1.0	1.5	2.0	2.5	3.0
Maximum (80/60) flue length allowed (Metres)	iHEAT24C	4.7	4.5	4.0	3.5	3	2.5	2
Maximum (80/60) flue length allowed (Metres)	iHEAT29C	3.7	3.5	3	2.5	2	1.5	1

Example: If required length of 60/100mm concentric= 1m then maximum 80/60 length =4.0m for the iHEAT 24C and 3.0m for the iHEAT 29C

5.16 Plume Diverter Terminal Kit (fig. 10H)

Part No. 956103

fig. 10H

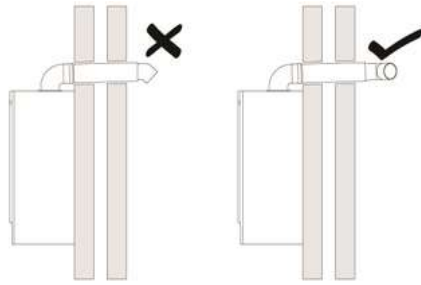


fig. 10H

(For use with Standard horizontal telescopic flue kit - Part no. 956120 - only).

This kit is useful for deflecting the condensate plume away from walls or boundaries. It should only be used to deflect the condensate plume left or right.

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

(C33) - Part no. 956085

fig. 10I

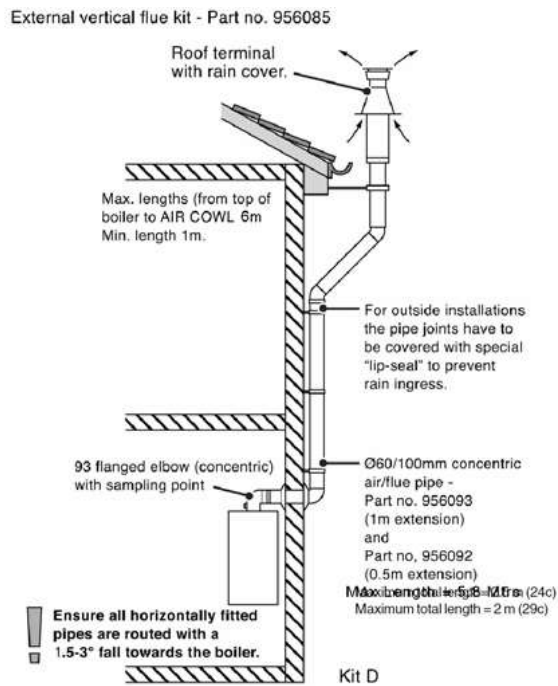


fig. 10I

60/100mm Concentric Vertical Flue system. The flue kit contains 2 additional 45° elbows and 2.5 Mtrs of 60/100 Concentric 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.

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

(B23) - Part no. 956082

fig. 10J

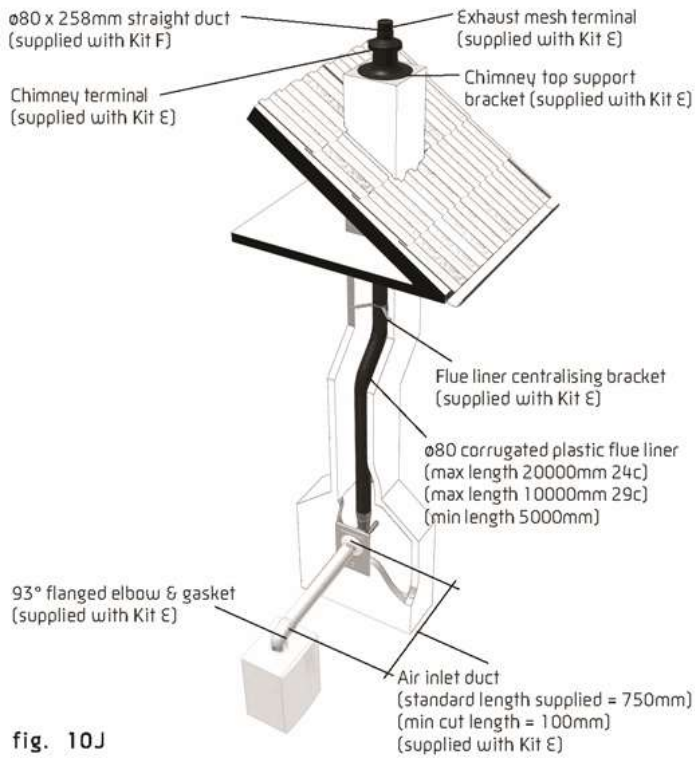


fig. 10J

This kit is suitable for open flue application in accordance with BS5440 Parts 1&2 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](#)). Further guidance on ventilation requirements is given in [section 4.5](#).

For installation details refer to the flue kit instructions. See Chart [5.20](#) for maximum and minimum lengths. A flue system can be built up from the components detailed in this chart, but the total flue resistance must not exceed the maximum stated. See the Halstead boilers flue guide for additional chimney flue configurations.

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

fig. 10K

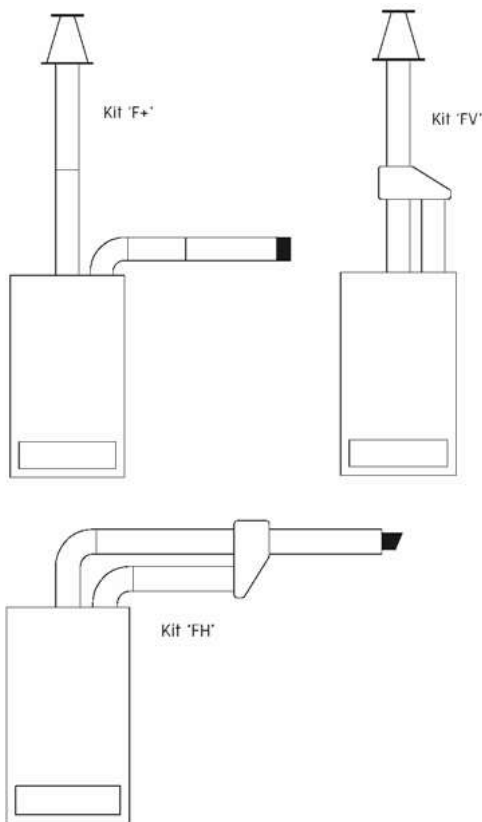


fig. 10K

Kit 'F+' (C53) Part no. 988698 - This flue 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 and the flue duct is routed vertically through the roof. For C53 flue systems the terminals for the supply of combustion air and for the evacuation of combustion products must not be installed on opposite walls of the building.

Kit 'FV' (C33) Part no. 988699 - This flue kit is designed for installations where the air intake and flue duct are brought together into a concentric terminal for a single vertical exit. The kit comprises of a boiler adaptor kit which must be fitted to the boilers' flue outlet, the twin to concentric adaptor and the vertical flue terminal.

Kit 'FH' (C13) Part no. 988700 - This flue kit is designed for installations where the air intake and flue duct are brought together into a concentric terminal for a single horizontal exit. The kit comprises of a boiler adaptor kit which must be fitted to the boilers' flue outlet, the twin to concentric adaptor and the horizontal flue terminal.

NOTE:

The flue duct is under pressure when the appliance is in operation and 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 flue kit. Maximum flue equivalent length permitted for a twin flue system = 40m+40m

If the flue pipes are boxed in then access must be provided to inspect the flue ducts during installation and subsequent service visits. The access panels and flue boxing should be sealed from the room

Maximum flue length resistance permitted for a twin flued system = 20m+20m (24c) - 12m+12m (29c)

Kit F: Total equivalent lengths for 80mm twin flue systems

Component	Equivalent length (Metres)		Part Number
	Air Duct	Flue Duct	
90° Bend	4m	8m	956100
45° Bend	2m	4m	956099
1 metre extension	1m	2m	956101
2 metre extension	2m	4m	956102

5.20 Flue lengths

Kit E: Chimney flue key dimensions + Accessories

Minimum length 60/100mm horizontal flue	100mm	From boiler to chimney
Maximum length 60/100mm horizontal flue	2m	From boiler to chimney
Minimum length 60/100 vertical flue	200mm	From boiler to chimney
Maximum length 60/100 vertical flue	2m	From boiler to chimney
Minimum length 80mm flue liner	5m	From adaptor to chimney terminal
Maximum length 80mm flue liner iHEAT 24C	20m	From adaptor to chimney terminal
Maximum length 80mm flue liner iHEAT 29C	10m	From adaptor to chimney terminal

Accessory	Length	Part Number
80mm Flexitube flue liner	10m	956110
80mm Flexitube flue liner	20m	956111
Boiler vertical flue adaptor/Turret socket	N/A	956087

Kit F: Total equivalent lengths for 80mm twin flue systems

Component	Equivalent length (Metres)		Part Number
	Air Duct	Flue Duct	
90° Bend	4m	8m	956100
45° Bend	2m	4m	956099
1 metre extension	1m	2m	956101
2 metre extension	2m	4m	956102

5.21 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.

5.21.1 GAS (fig. 10L)

fig. 10L

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

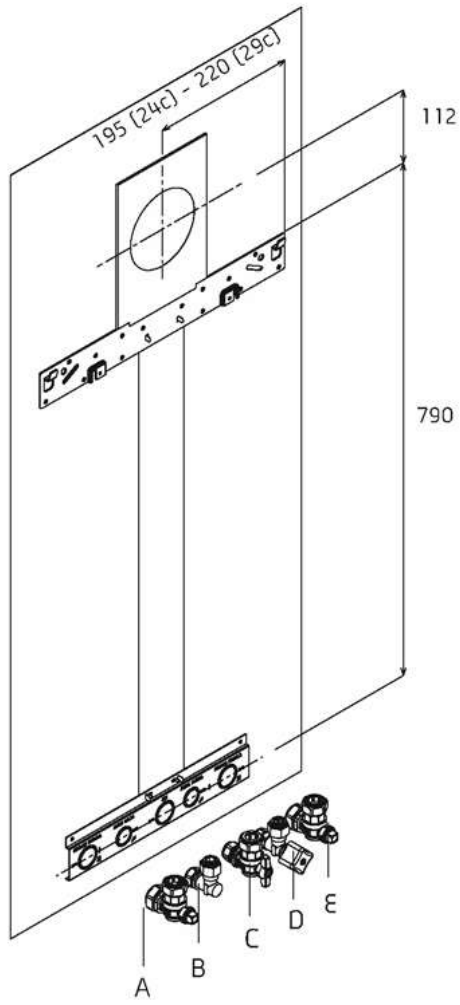
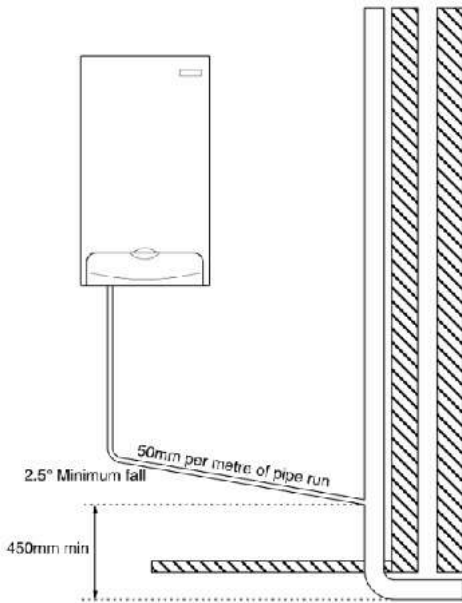
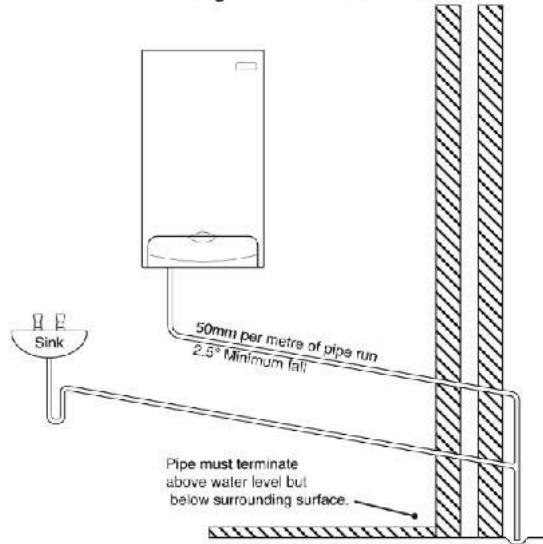


fig. 10L

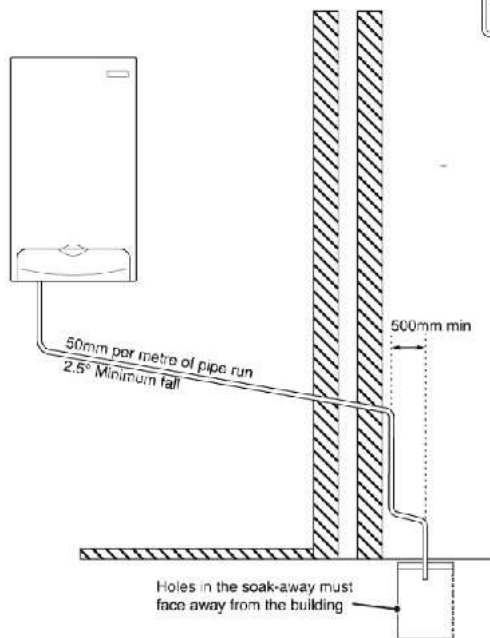
Termination to an internal soil and vent pipe



External termination via internal discharge branch e.g sink waste - downstream



Termination to a purpose made soak-away



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.

5.21.2 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 be necessary to increase the size of the flow & return pipe work after the service valve connections.

5.21.3 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.

5.21.4 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.

5.21.5 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.

5.21.6 Condense pipe

During normal operation the boiler produces condensate which is collected in a trap located in the lower part of the boiler. A flexible pipe (condensate 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 and if greater than 3m the pipe should be at least 32mm diameter.

CONNECTING THE CONDENSATE OUTLET

Gently pull the condensate 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.

5.22 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 & 9](#) 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.

5.22.1 Casing removal (fig. 11)

fig. 11

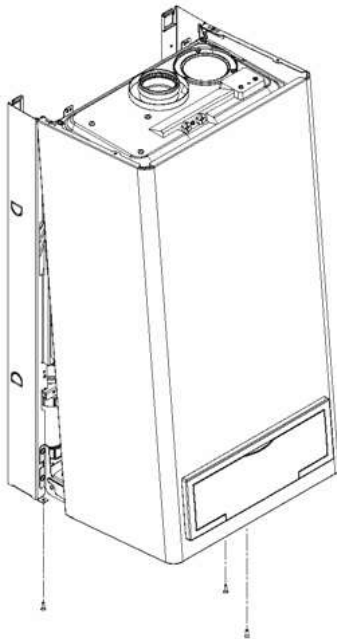


fig. 11

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. Re-fit in the reverse order
- gently lower the control fascia until it rests.

5.22.2 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 appliance 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 9](#) for more detailed information.

Connecting the mains (230V) input ([fig. 13](#))

fig. 12

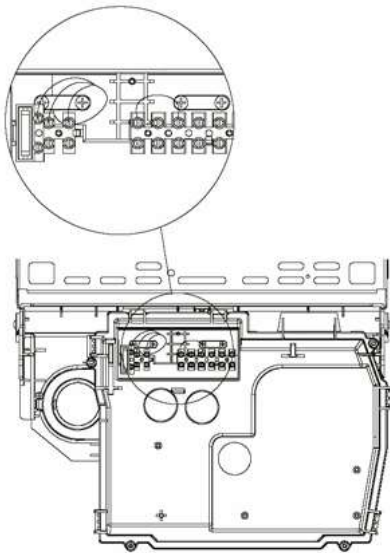


fig. 12

fig. 13

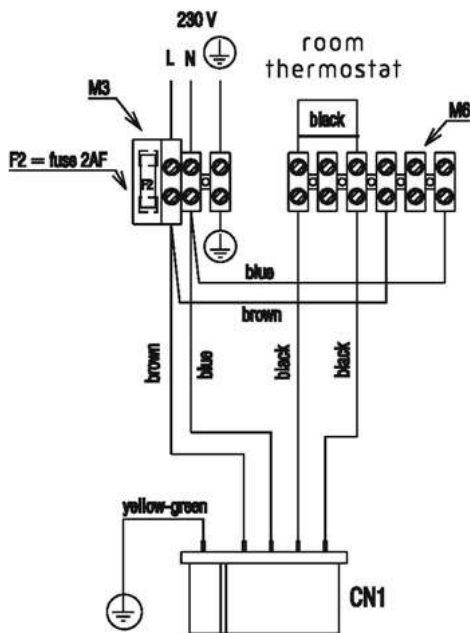


fig. 13

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.

6.0 Commissioning

6.1 Gas Supply Installation

Inspect the entire installation including the gas meter, test for tightness 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 tightness, 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 tightness.

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).

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 \(8.3\)](#).

Fig. 14

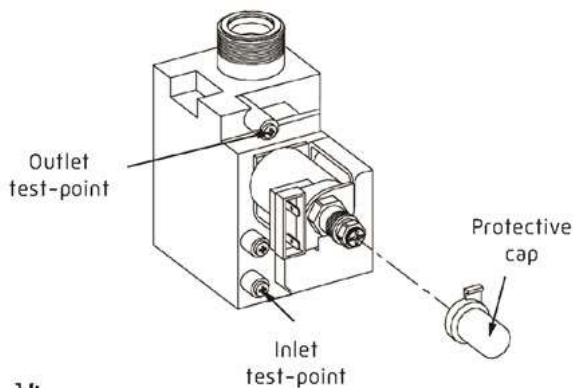


Fig. 14

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.

6.9.1 Inhibitors

See [Section 4](#) "General Requirements".

6.10 Setting the flow outlet temperature

The flow outlet temperature can be adjusted between 40°C - 80°C 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°C - 65°C 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 psi. 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 Regulating 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 restrictor

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

6.13 Final checks

- ENSURE ALL TEST NIPPLES ON THE APPLIANCE GAS VALVE ARE TIGHT AND CHECKED FOR TIGHTNESS.
- ENSURE THE APPLIANCE FLUE SYSTEM IS FITTED CORRECTLY AND IS PROPERLY SECURED.
- ENSURE ALL PIPE WORK IS RE-CHECKED FOR TIGHTNESS.
- 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.

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 6.11](#)).

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. Check and if necessary clean the spark and detection electrodes.

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 <page 27>at the front of the hydraulic section using the tube provided. Ensure some water absorbent cloths are 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 TIGHTNESS IF ANY GAS CARRYING COMPONENTS HAVE BEEN REMOVED OR DISTURBED.**

7.5 Pump assembly (fig. 15)

Fig. 15

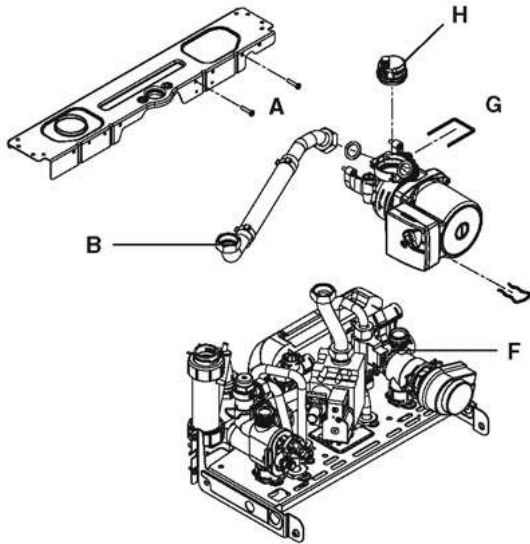


Fig. 15

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)

Fig. 16

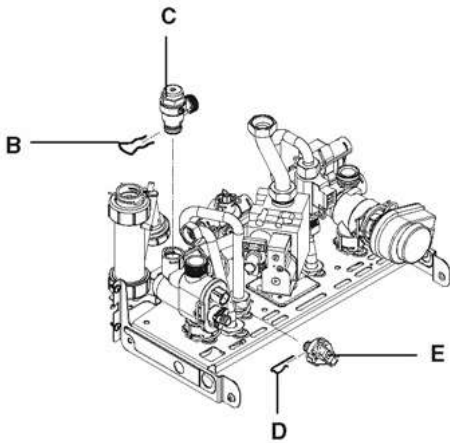


Fig. 16

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 hydraulic assembly. Remove the water pressure switch (E) from the hydraulic 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.

7.10 Flow thermistor (fig. 17)

Fig. 17

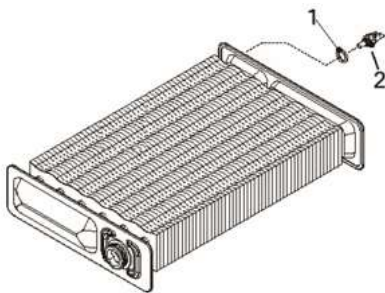


Fig. 17

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)

Fig. 18

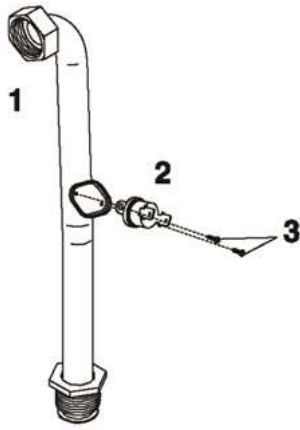


Fig. 18

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)

Fig. 19

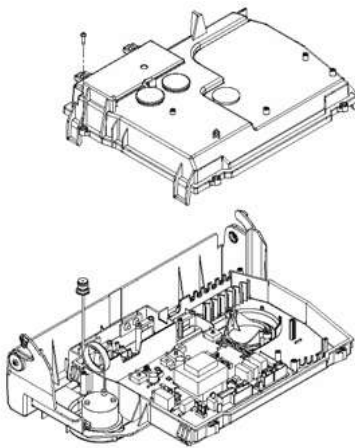


Fig. 19

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)

Fig. 20

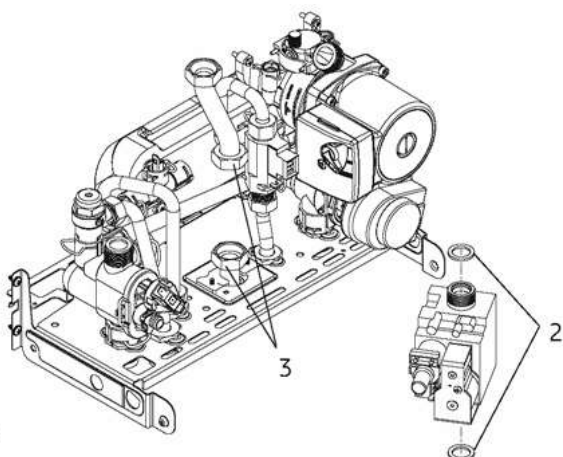


Fig. 20

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 TIGHTNESS CHECK MUST BE CARRIED OUT.**

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)

Fig. 21

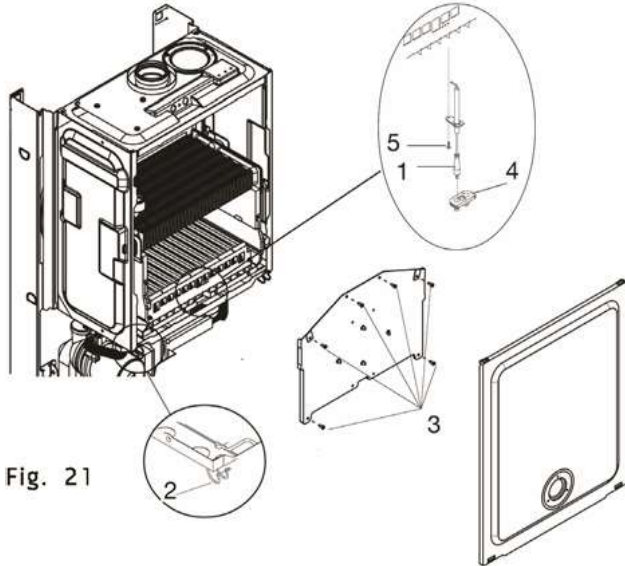


Fig. 21

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.

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. Check that the spark electrode gap with the burner is 10.3 mm and the flame detection spark gap with the burner is 8.9 mm. Replace in the reverse order.

Fig. 22

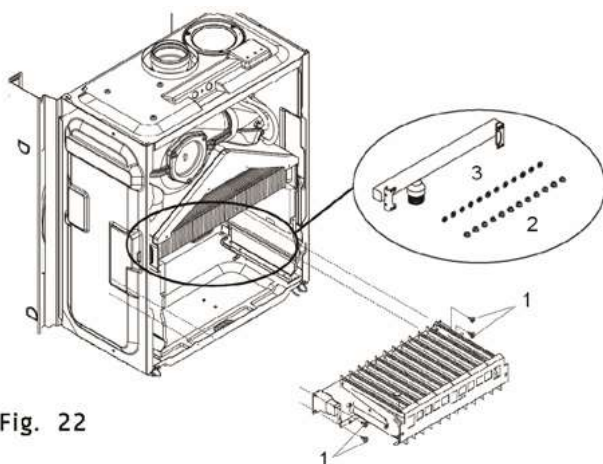


Fig. 22

7.16 Flue fan (fig. 23)

Fig. 23

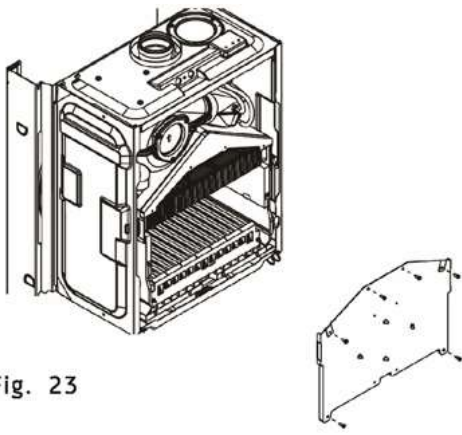


Fig. 23

Fig. 23

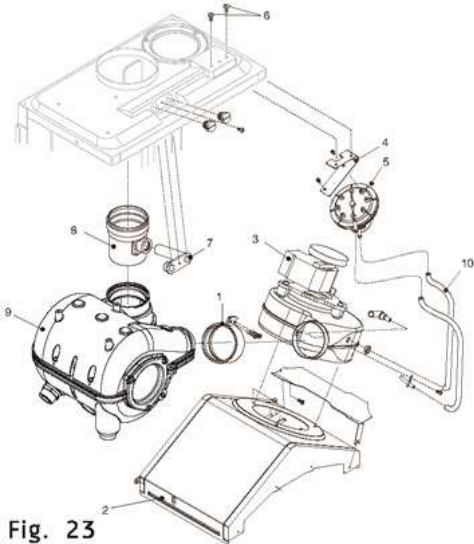


Fig. 23

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)

Fig. 24

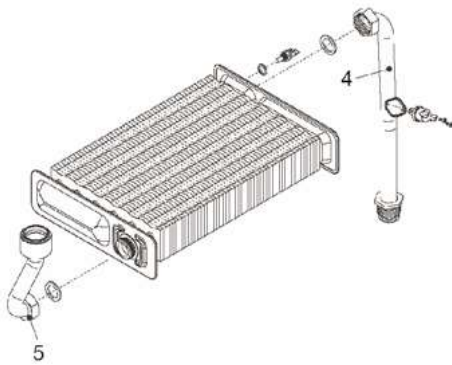


Fig. 24

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.

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)

Fig. 25

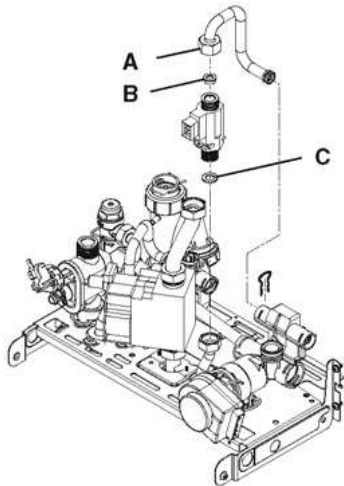


Fig. 25

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. Lift 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)

Fig. 26

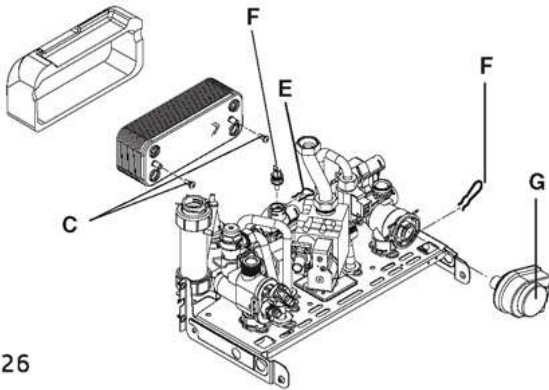


Fig. 26

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 Divertor valve actuator (fig. 26a)

Fig. 26a

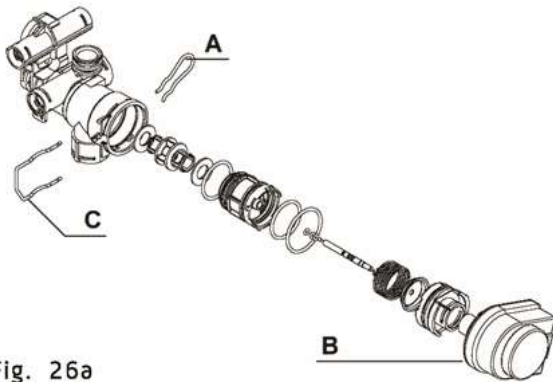


Fig. 26a

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.

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](#)).

Fig. 26b

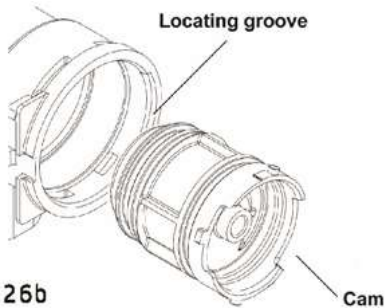


Fig. 26b

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)

Fig. 27

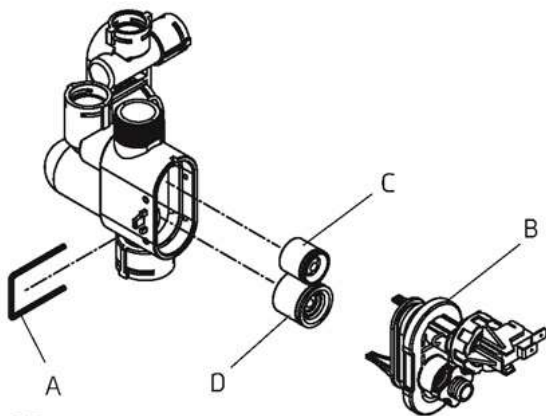


Fig. 27

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 expansion vessel lose its pre-charge pressure it may be possible for it to be recharged to 1.0 Bar, using a standard foot pump connected to the valve (C) as shown in [fig 28](#). 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.

Fig. 28

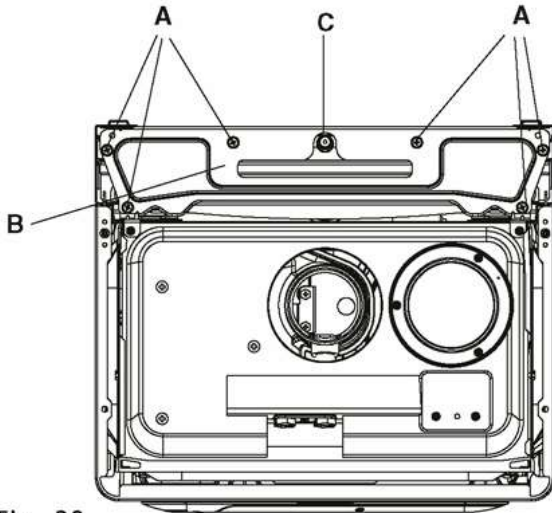


Fig. 28

7.27.1 Expansion vessel removal (with sufficient clearance above)

Carry out component removal procedure as described in 7.4.

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.

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, flow 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)

Fig. 29

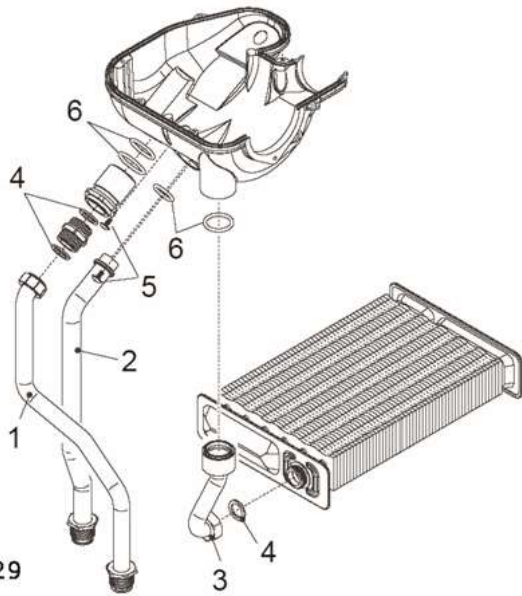


Fig. 29

Fig. 30

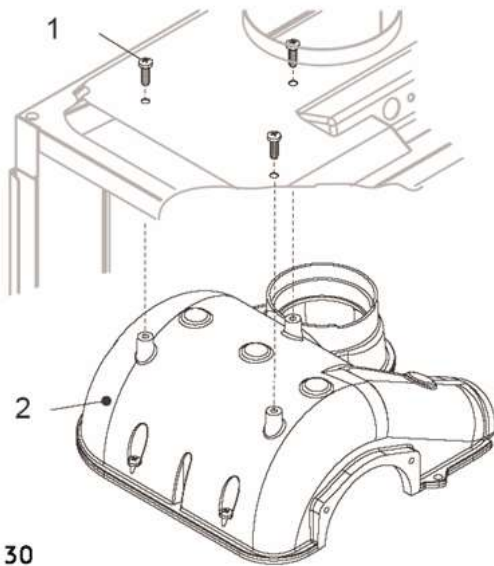


Fig. 30

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 and cleaning (fig. 31)

Fig. 31

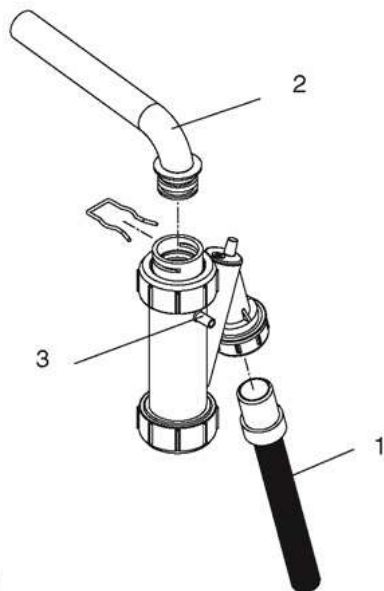


Fig. 31

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.

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 tightness, water tightness 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 diverter 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 diverter 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 diverter 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 flow 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 flow 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 flow 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)

Fig. 32

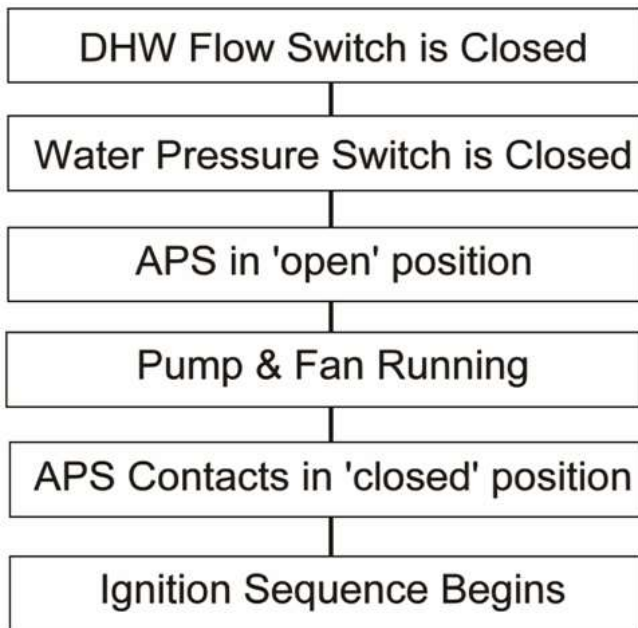


Fig. 32

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.

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

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)

Fig. 33

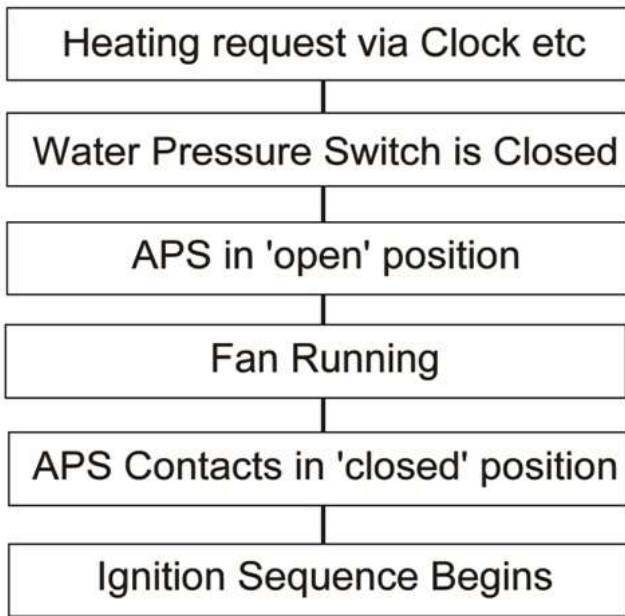


Fig. 33

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 flow 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 flow thermistor has dropped 6°C below the set-point.

NOTE:

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.

8.6.2.1 Heating parameters

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

Fig. 34

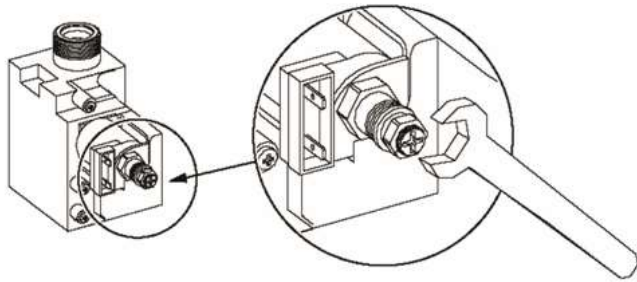
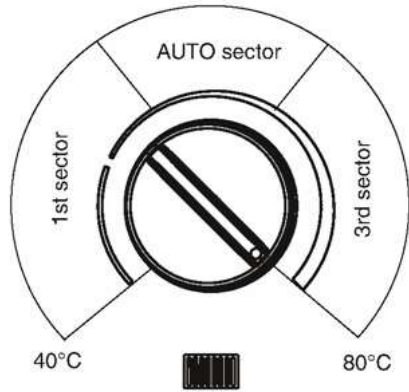


Fig. 34

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)

Fig. 35

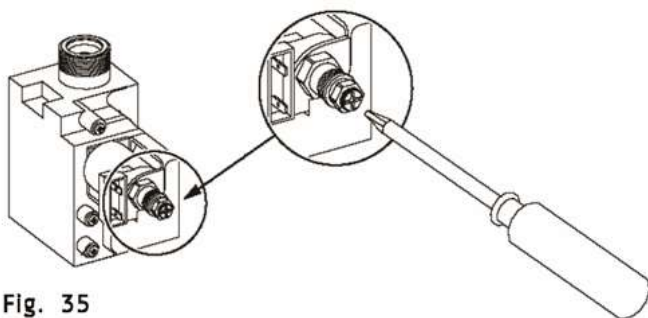


Fig. 35

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 TIGHTNESS 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.

- 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 tightness.

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.

Fig. 36

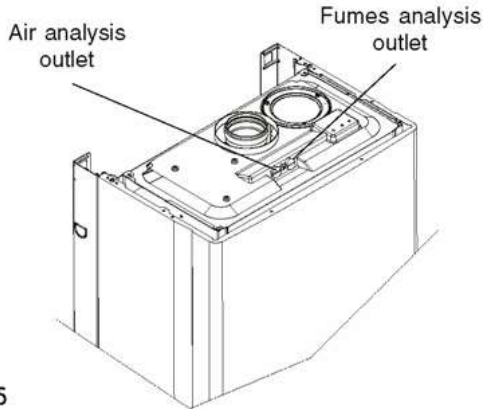


Fig. 36

Fig. 37

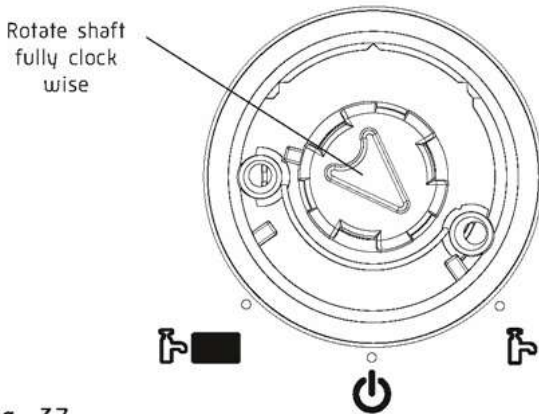


Fig. 37

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 \pm 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.

8.6.1 Installation faults

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	• Flow thermistor open/short circuit

8.7 Electrical checks

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

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 Flow 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
Solid	• limit thermostat
	• flow thermistor open/short circuit

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.

9.2 Typical control applications

The appliance can be used with the following controls:

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

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. 38

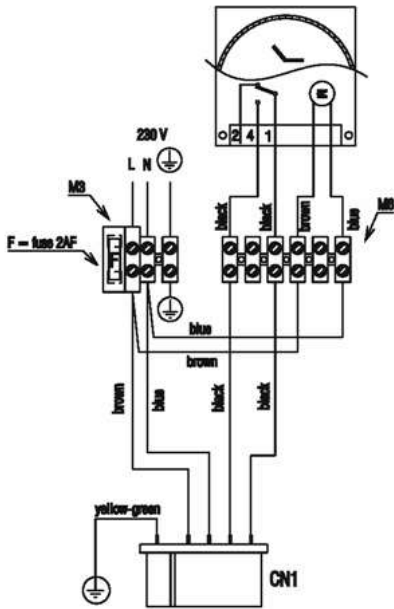


Fig. 38

Fig. 39

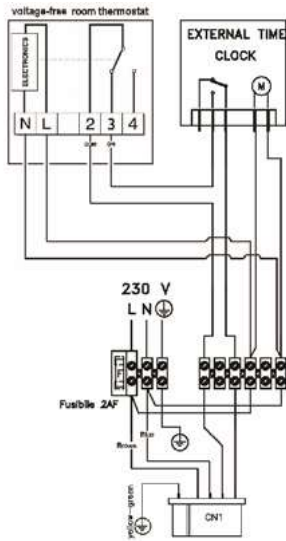


Fig. 39

9.4 Other controls

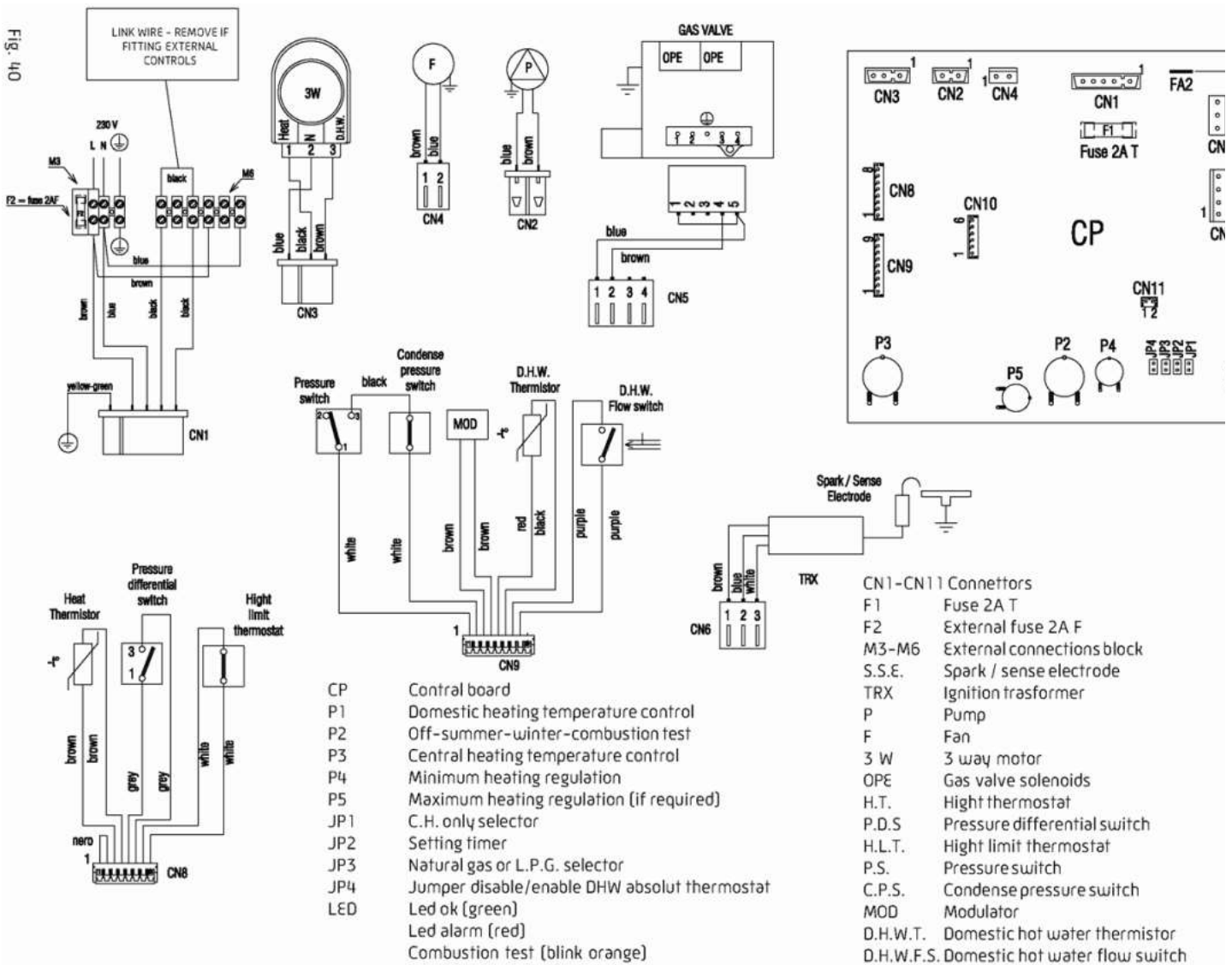
Contact the controls manufacturer and/or the technical help line should you require more specific information on the suitability of a particular control.

Further guidance on the recommended practice for the installation of external controls, can be found in CHeSS - HC5/HC6 (www.energy-efficiency.gov.uk).

9.5 Functional diagram

Fig. 40

Fig. 10



11.0 LPG Instructions

11.1 Related documents

BS 6798		INSTALLATION OF BOILERS OF RATED NOT EXCEEDING 60kW
BS 5449	PART 1	FORCED CIRCULATION HOT WATER SYSTEMS
BS 5546		INSTALLATION OF GAS HOT WATER SUPPLIES FOR DOMESTIC PURPOSES
BS 5440	PART 1	FLUES
BS 5482	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 × 0.76	14 × 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 tightness.

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 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 TIGHTNESS CHECK MUST BE CARRIED OUT.

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.

SERVICE 1 Date _____Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

CORGI ID Number _____

Comments _____

Signature _____

SERVICE 2 Date _____Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

CORGI ID Number _____

Comments _____

Signature _____

SERVICE 3 Date _____Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

CORGI ID Number _____

Comments _____

Signature _____

SERVICE 4 Date _____Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

CORGI ID Number _____

Comments _____

Signature _____

SERVICE 5 Date _____Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

CORGI ID Number _____

Comments _____

Signature _____

SERVICE 6 Date _____Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

CORGI ID Number _____

Comments _____

Signature _____

SERVICE 7 Date _____Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

CORGI ID Number _____

Comments _____

Signature _____

SERVICE 8 Date _____Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

CORGI ID Number _____

Comments _____

Signature _____

SERVICE 9 Date _____Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

CORGI ID Number _____

Comments _____

Signature _____

SERVICE 10 Date _____Energy Efficiency Checklist completed? Yes No

Engineer Name _____

Company Name _____

Telephone Number _____

CORGI ID Number _____

Comments _____

Signature _____







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

Website: www.halsteadboilers.co.uk

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The statutory rights of the consumer are not affected.

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