

# Installation and Servicing Instructions

Models covered by these instructions

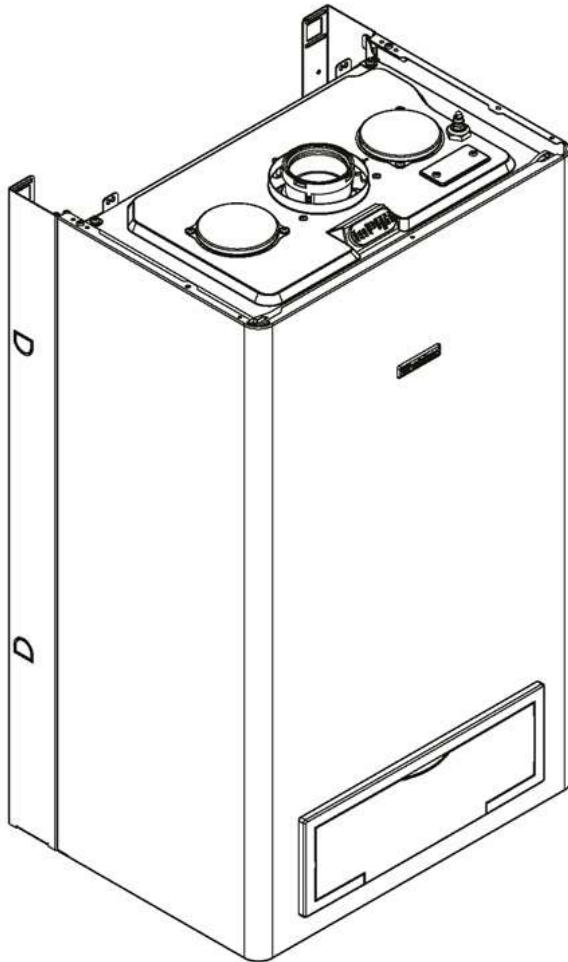
25s

(41-260-24) iHeat 25s



iHeat 25s

System Condensing Boiler



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 [Safety devices](#)

### Technical data

3.1 [Central heating](#)

3.2 [Gas pressures](#)

3.3 [Expansion vessel](#)

3.4 [Dimensions](#)

3.5 [Clearances](#)

3.6 [Connections](#)

3.7 [Electrical](#)

3.8 [Flue details \(concentric\)](#)

3.9 [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](#)

## [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 [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 [Offset Vertical Flue Terminal](#)
- 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 length](#)
- 5.21 [Additional Concentric Flue Kits](#)
- 5.22 [Connecting the gas and water kit](#)
- 5.23 [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 [Pre-operation checks](#)
- 6.6 [Initial lighting](#)
- 6.7 [Checking gas pressure & combustion analysis](#)
- 6.8 [Final flushing of the heating system](#)
- 6.9 [Setting the flow outlet temperature](#)
- 6.10 [Setting the system design pressure](#)
- 6.11 [Regulating the central heating system](#)
- 6.12 [Inlet pressure and gas rate checks](#)
- 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 [Safety valve](#)
- 7.7 [Lower automatic air release valves](#)
- 7.8 [Water pressure switch](#)
- 7.9 [Flow thermistor](#)
- 7.10 [Return thermistor](#)
- 7.11 [Printed circuit board](#)
- 7.12 [Gas valve](#)
- 7.13 [Electrodes and condense sensor](#)
- 7.14 [Flue fan & mixer](#)
- 7.15 [Burner](#)

7.16	<a href="#">Main heat exchanger</a>
7.17	<a href="#">Automatic by-pass</a>
7.18	<a href="#">Expansion vessel</a>
7.19	<a href="#">Condense trap removal</a>
7.20	<a href="#">Flue collector removal</a>
7.21	<a href="#">Integral time switch</a>
<a href="#">Checks, adjustments and fault finding</a>	
8.1	<a href="#">Checking appliance operation</a>
8.2	<a href="#">Appliance modes of operation</a>
8.3	<a href="#">Appliance fan speed</a>
8.4	<a href="#">Checking the CO2 &amp; adjusting the valve</a>
8.5	<a href="#">Combustion analysis test</a>
8.6	<a href="#">Checking the expansion vessel</a>
8.7	<a href="#">External faults</a>
8.8	<a href="#">Electrical checks</a>
8.9	<a href="#">Fault finding</a>
8.10	<a href="#">Boiler configuration</a>
8.11	<a href="#">Fault codes</a>
8.12	<a href="#">Component values and characteristics</a>
<a href="#">Wiring diagrams</a>	
9.1	<a href="#">External wiring</a>
9.2	<a href="#">External wiring limitations</a>
9.3	<a href="#">Typical control applications</a>
9.4	<a href="#">Other devices</a>
9.5	<a href="#">Mechanical clock</a>
9.6	<a href="#">Wiring diagram</a>
<a href="#">Exploded diagrams</a>	
10.1	<a href="#">Table 1</a>
10.2	<a href="#">Table 2</a>
10.3	<a href="#">Table 3</a>
10.4	<a href="#">Table 4</a>
10.5	<a href="#">Table 5</a>
<a href="#">L.P.G. instructions</a>	
11.1	<a href="#">Related documents</a>
11.2	<a href="#">Technical data</a>
11.3	<a href="#">Converting the appliance gas type</a>
11.4	<a href="#">Gas supply</a>
11.5	<a href="#">Gas supply installation</a>
11.6	<a href="#">Checking the CO and CO2 flue gas level</a>
11.7	<a href="#">Appliance fan speed</a>

## **Benchmark**

# **1.0 Introduction**

## **1.1 Description**

The iHeat is approved for use with B23-C13-C33-C53-C63 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.

This booklet is an integral part of the appliance. It is therefore necessary to ensure that the booklet is handed to the person responsible for the property in which the appliance is located/installed. A replacement copy can be obtained from customer services.

fig. 1

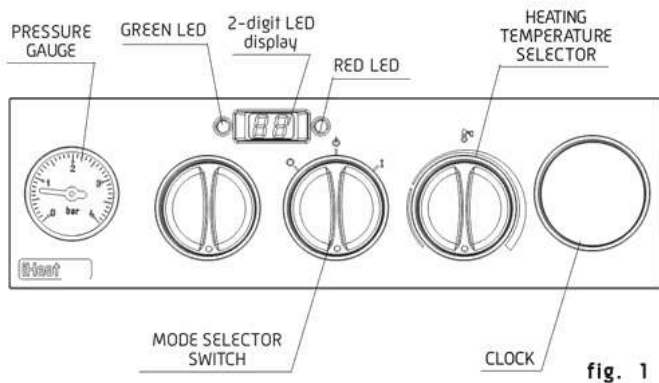










fig. 1

- 
Boiler at reset/standby Select this position if/when the boiler requires to be reset
- 
Boiler switched OFF Select this position if you want the boiler to remain OFF (this will over-ride any heating/hot water request from the time-clock/programmer)
- 
Boiler switched ON Select this position when you want the boiler to respond to a heating/hot water request from the time-clock/programmer
- 
Temperature selector Move the temperature selector clockwise to increase the boiler outlet temperature, or counter-clockwise to reduce the outlet flow temperature
- 
2-digit LED display Displays the current outlet temperature of the boiler. During a fault condition, the appropriate fault code will be displayed (refer to the users handbook for instructions regarding fault codes)
- 
Green LED lit Boiler is working/responding to a heating/hot water request
- 
Red LED lit Boiler has identified a fault and has failed-safe. Refer to users handbook for instructions on how to reset
- 
Pressure gauge Ensure the system pressure is set correctly (minimum 0.5-bar)

The **iHeat** comprises a high-efficiency system boiler with output of 25kW. These appliances – by design – incorporate 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. Each appliance is provided with a fan powered flue outlet with an annular co-axial combustion air intake that can be rotated – horizontally – through 360 degrees for various horizontal or vertical applications.

fig. 1A

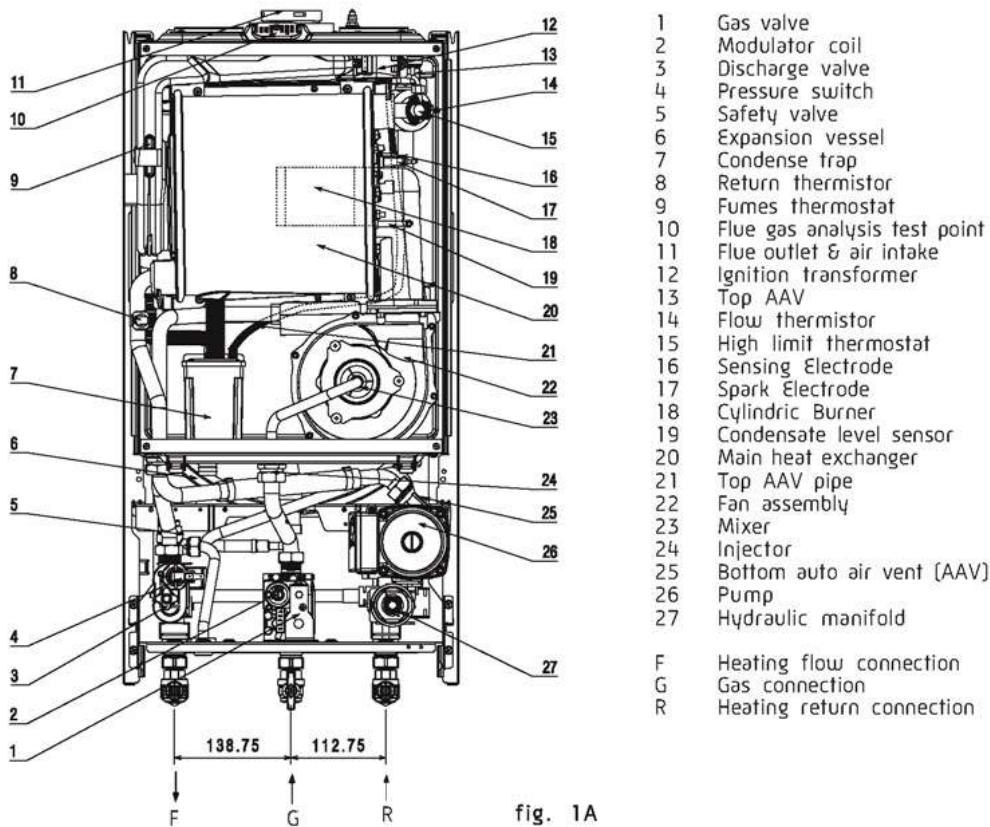


fig. 1A

## 2.0 Design principles and operating sequence

fig. 2

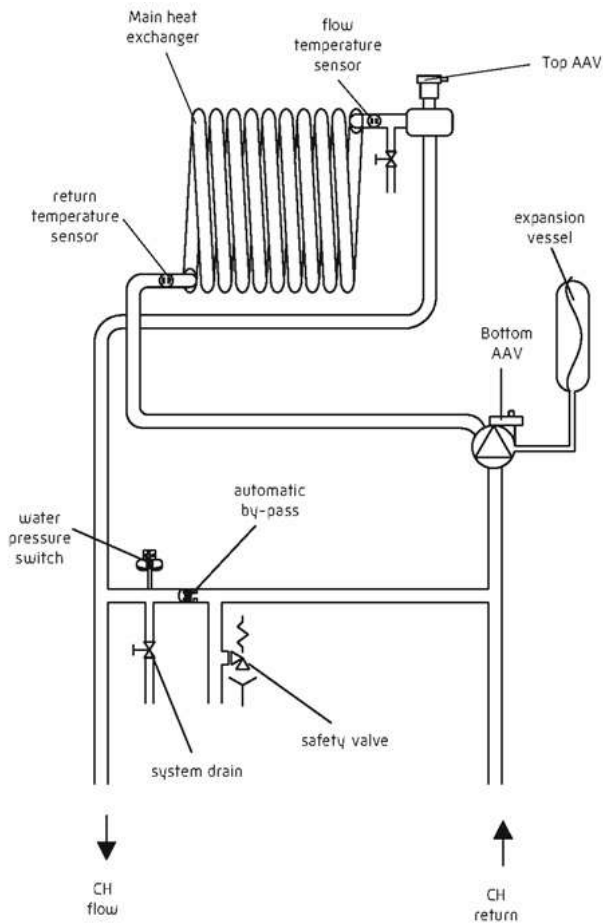


fig. 2

### 2.1 Principle Components

- A fully integrated electronic control board featuring electronic temperature control, anti-cycle control, pump over-run, self-diagnostic fault indicator, full air/gas modulation.

- Radial aluminium heat exchanger.
- Electronic ignition with flame supervision
- Integral high-head pump
- Fan
- Expansion vessel
- Water pressure switch
- Condensate level sensor
- Pressure gauge

## 2.2 Mode of operation (at rest)

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

- Frost-protection system – the frost-protection system protects the appliance against the risk of frost damage both for CH and DHW. For CH line, if the main temperature falls to 6°C, the appliance will function on minimum power until the primary flow temperature reaches 35°C.

Moreover if the DHW temperature falls to 4°C, the appliance will function on minimum power until the primary flow temperature reaches 55°C.

- Anti-block function – the anti-block function enables the pump and divertor valve actuator to be energised for short periods, when the appliance has been inactive for more than 24-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 speed will modulate until the correct signal voltage is received at the control PCB. At this point an ignition sequence is enabled.

Ignition is sensed by the electronic circuit 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 Safety Devices

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

- A water pressure switch that monitors system water pressure and will de-activate the pump, fan, and burner should the system water pressure drop below the rated tolerance.
- Fan speed sensor to ensure safe operation of the burner.
- A high limit thermostat that over-rides the temperature control circuit to prevent or interrupt the operation of the burner. Max temperature 105°C.
- Flame sensor that will shut down the burner when no flame signal is detected.
- A sensor that interrupts the operation of the appliance if the condensate pipe becomes blocked.
- A safety valve which releases excess pressure from the primary circuit.

## 3.0 Technical Data

### 3.1 Central Heating

	25s
Heat input (kW)	25
Maximum heat output (kW) 60/80°C	24.53
Minimum heat output (kW) 60/80°C	6
Maximum heat output (kW) 30/50°C	26.30
Minimum heat output (kW) 30/50°C	6.37
Minimum working pressure	0.5 bar
Maximum working pressure	2.7 bar
Minimum flow rate	350 l/h

### 3.2 Gas Pressures

	25s
Inlet pressure (G20)	20.0 mbar
Heating maximum gas rate (m <sup>3</sup> /hr)	2.64
Minimum gas rate (m <sup>3</sup> /hr)	0.63
Injector size (mm)	6.7

### 3.3 Expansion Vessel

	25s
Capacity	8-litres
Maximum system volume	76-litres
Pre-charge pressure	1.0 bar

### 3.4 Dimensions

	25s
Height (mm)	780
Width (mm)	400

Depth (mm)	358
Dry weight (kg)	37

### 3.5 Clearances

	<b>iHeat Range</b>
Sides	12mm LH SIDE/50mm RH SIDE
Top	150mm from casing or 25mm above flue elbow (whichever is applicable)
Bottom	150mm
Front	600mm

### 3.6 Connections

	<b>iHeat Range</b>
Flow & return	22mm
Gas	15mm
DHW hot & cold	15mm
Safety valve	15mm
Condense	21mm

### 3.7 Electrical

	<b>25s</b>
Power consumption (Watts)	150W
Voltage (V/Hz)	230/50
Internal fuse	3.15A T (for PCB) - 3.15A F (for connections block)
External fuse	3A

### 3.8 Flue Details (concentric)

	<b>25s</b>
Maximum horizontal flue length (60/100mm)	7.8m
Maximum vertical flue length (60/100mm)	8.8m
Maximum horizontal flue length (80/125mm)	20m
Maximum vertical flue length (80/125mm)	25m

### 3.9 Flue Details (twin pipes)

	<b>25s</b>
Maximum horizontal flue length (80mm/80mm)	40m/40m
Maximum vertical flue length (80mm/80mm)	40m/40m

### 3.10 Efficiency

	<b>25s</b>
SEDBUK (%)	90.4

### 3.11 Emissions

	<b>25s</b>
CO <sub>2</sub> @ maximum output (%)	8.8-9.2
CO <sub>2</sub> @ minimum output (%)	8.8-9.2
CO/CO <sub>2</sub> ratio @ maximum output	0.002 to 1
CO/CO <sub>2</sub> ratio @ minimum output	0.0003 to 1
CO @ maximum output (p.p.m.*)	less than 190
CO @ minimum output (p.p.m.*)	less than 30
NOx @ maximum output (mg/kWh)	88.2
NOx @ minimum output (mg/kWh)	61.7
NOx rating	class 5
IP rating (for C-type boilers)	X5D
IP rating (for B-type boilers)	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

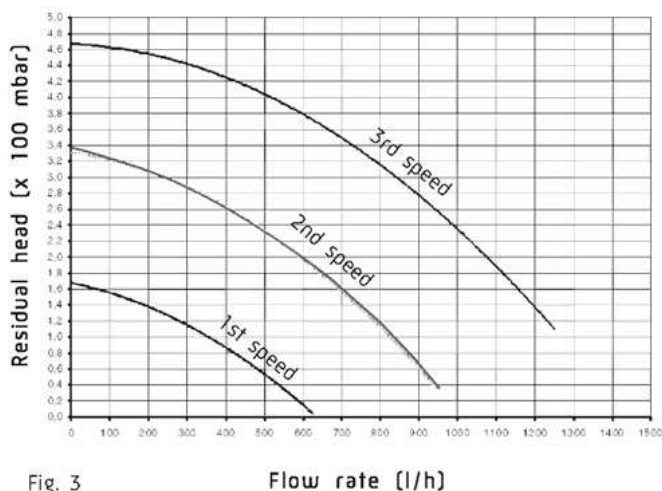
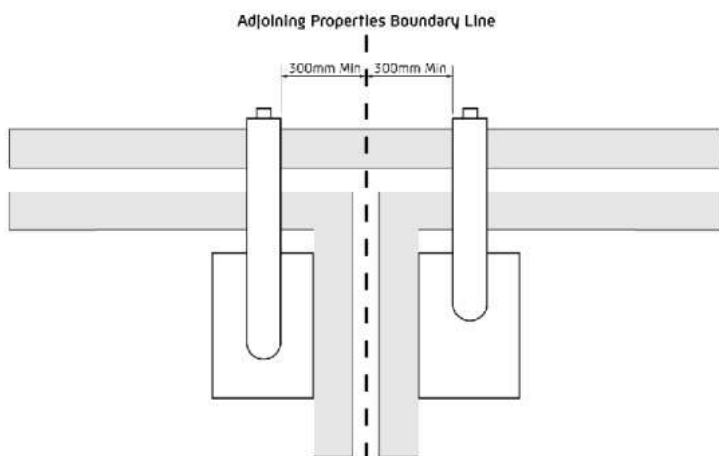


Fig. 3



**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 (In-stallation & 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 gas 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](#)).

fig. 4

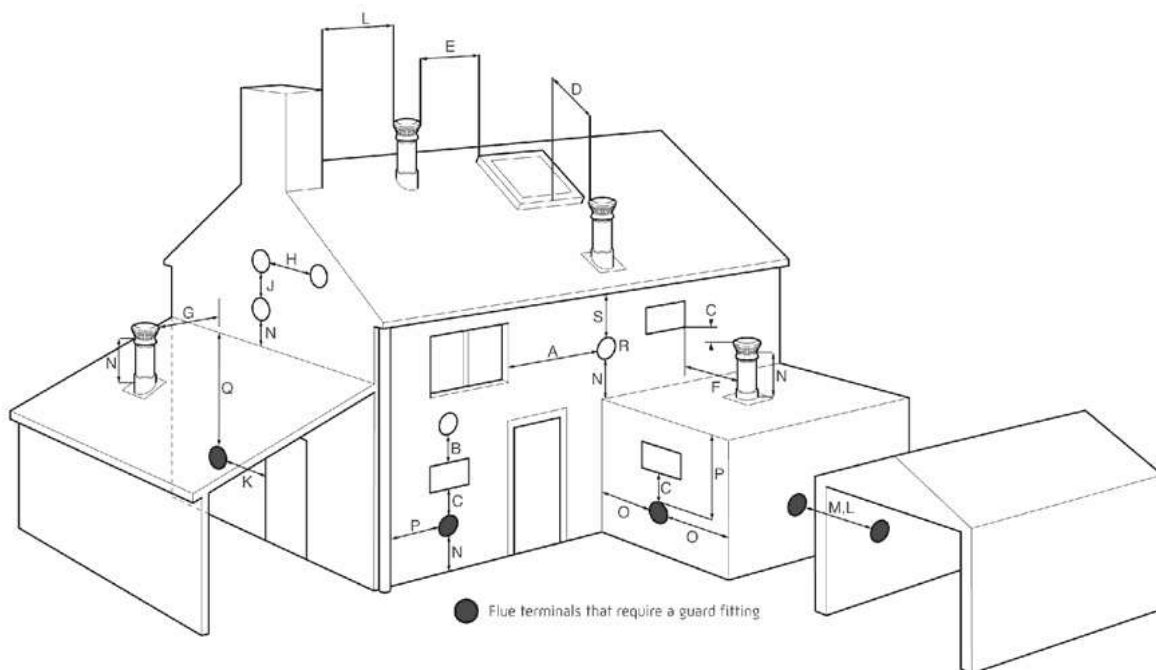


Fig. 4

### 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

Position	Description	Minimum Distance (mm)
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

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 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 litres (25s) 10 litres (30s) 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 [7.18](#)).

##### 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 must comply with the local water authority regulations.

fig. 5

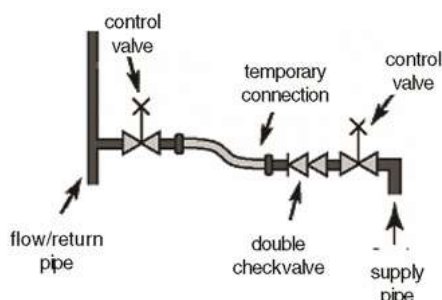


fig. 5

#### 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](#)). 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.

fig. 5A

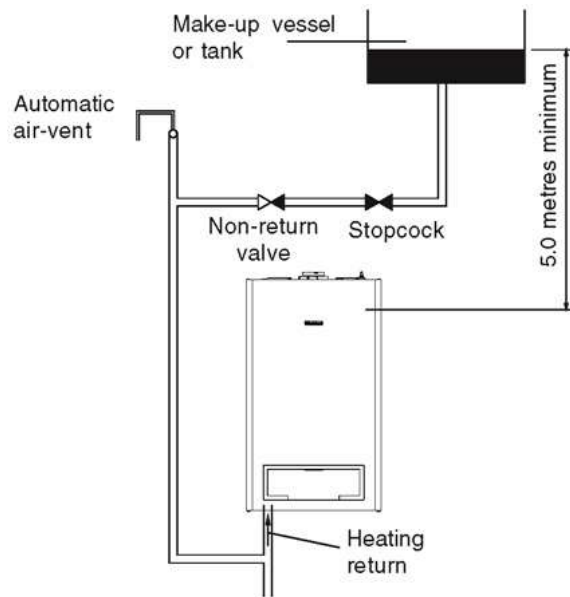


fig. 5A

#### 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 3,5mm (3° high-voltage category). 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.

For installation with DHW tank, refer to page 42 - "Y" plane and "S" plane installations.

#### 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.

### 4A.0 General requirements (EIRE)

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

#### 4A.1 Related documents

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

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

#### 4A.2 Location of appliance

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

When an appliance is installed in a room or internal space containing a bath or shower, the appliance or any control pertaining to it must not be within reach of a person using the bath or shower. The location chosen for the appliance must permit the provision of a safe and satisfactory flue and termination. The location must also permit an adequate air supply for combustion purposes and an adequate space for servicing and air circulation around the appliance. Where the installation of the appliance will be in an unusual location special procedures may be necessary, refer to I.S. 813 for detailed guidance on this aspect. A compartment used to enclose the appliance must be designed and constructed specifically for this purpose. An existing compartment/cupboard may be utilised provided that it is modified to suit.

**This appliance is not suitable for external installation.**

### **4A.3 Gas supply**

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

Pipe work from the meter to the appliance must be of adequate size. Pipes of a smaller size than the appliance gas inlet connection must not be used. The installation must be tested for gas 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 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 [7.18](#)).

#### **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 must comply 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 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

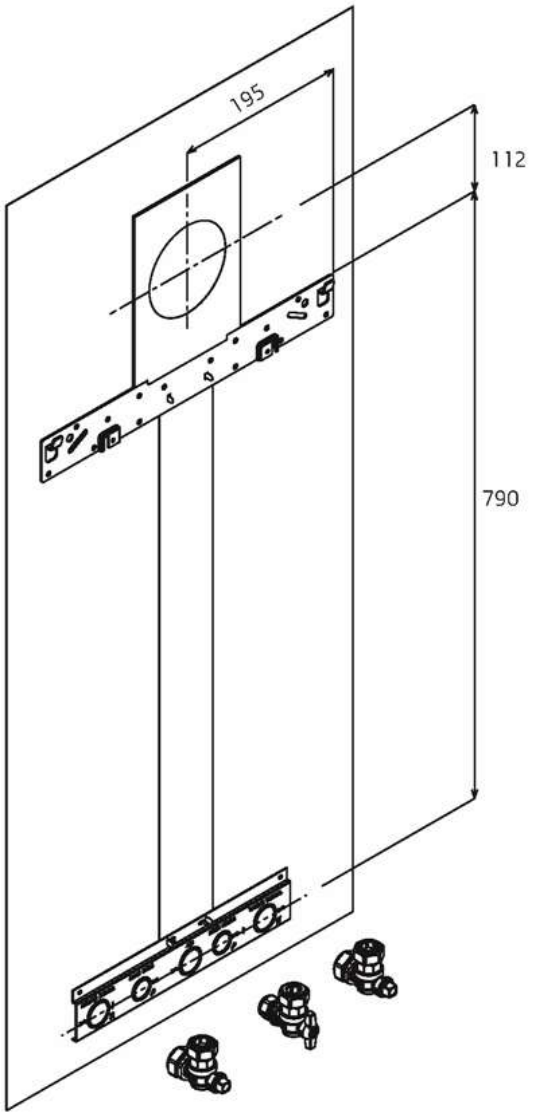


fig. 6

## 5.0 Installation

### 5.1 Boiler dimensions (fig. 7)

fig. 7

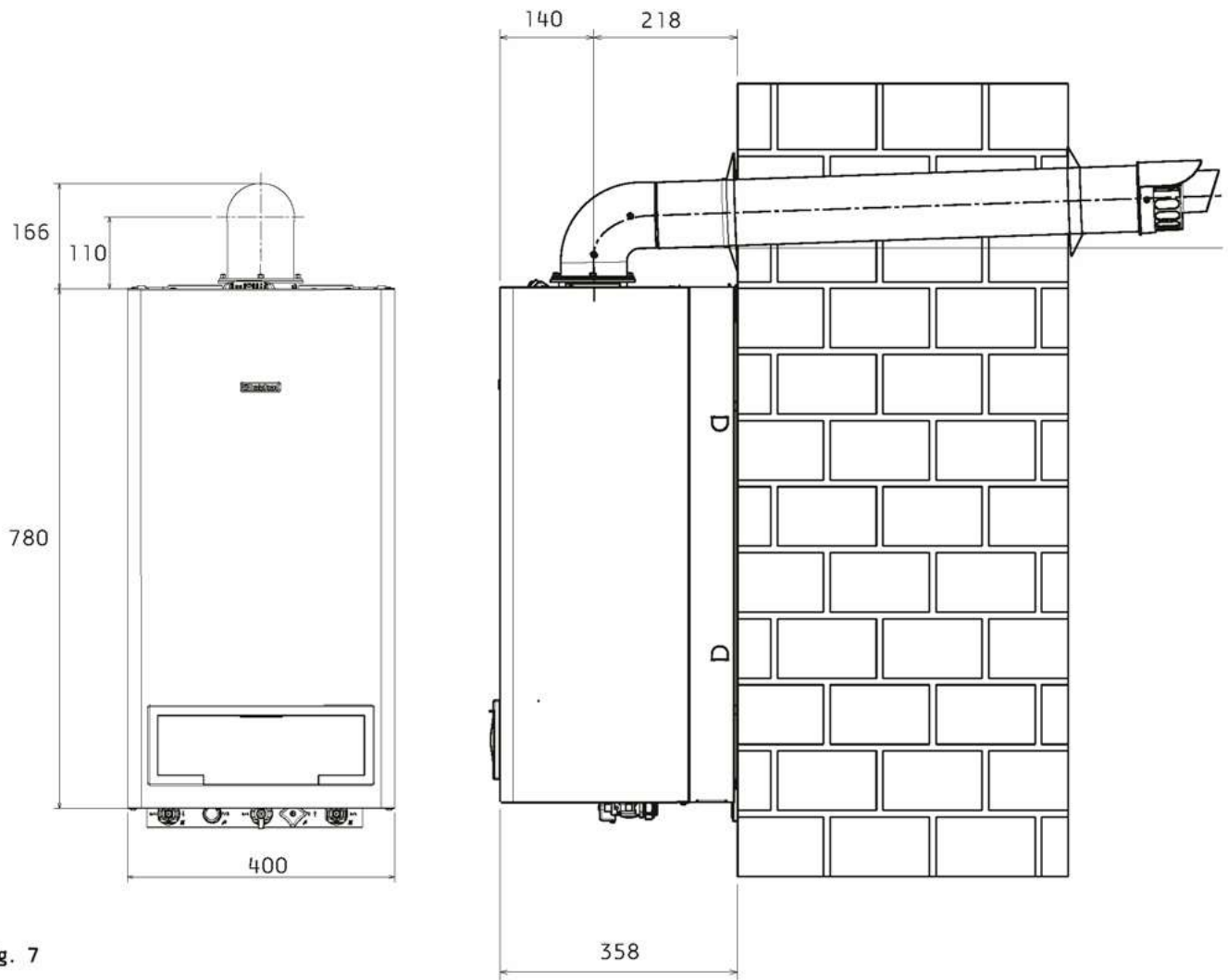


fig. 7

### 5.2 Tap rail (fig. 8)

fig. 8

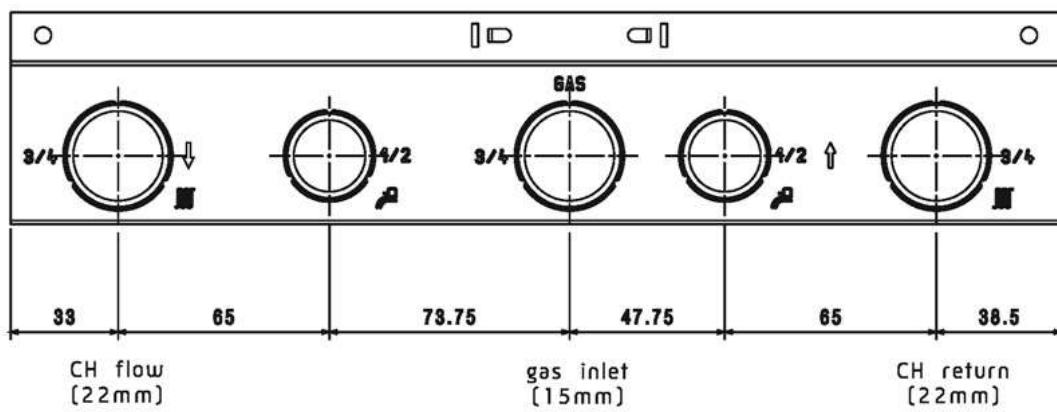


fig. 8

### 5.3 Clearances (fig. 9)

fig. 9

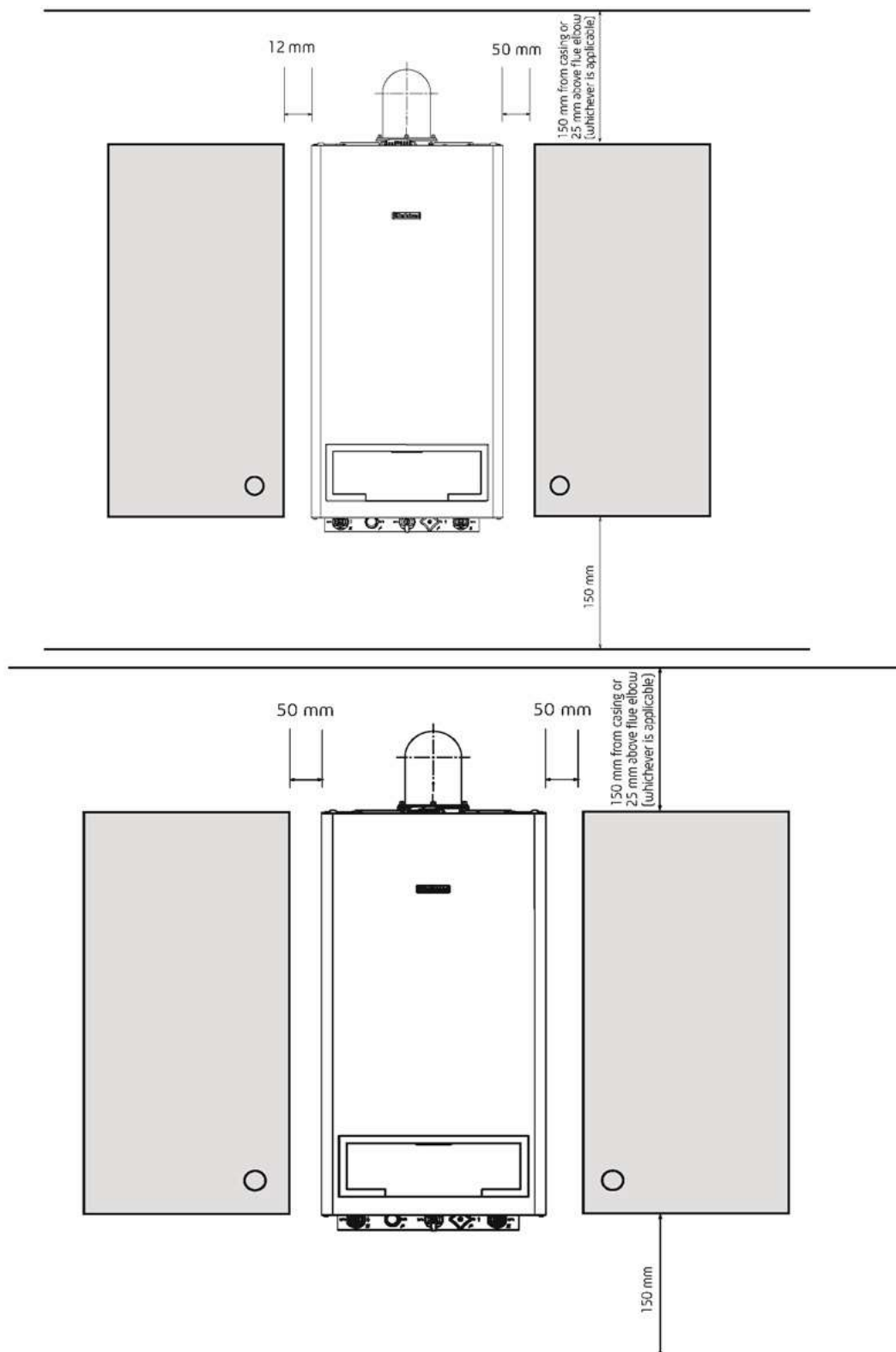


fig. 9

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.

Gasket and screws are supplied with the flue kit.

**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.

fig. 10A

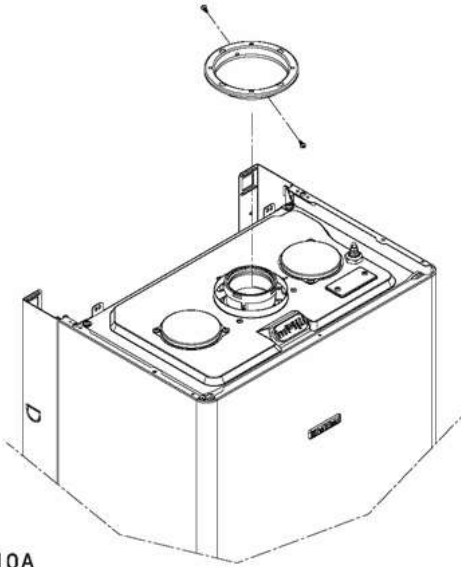


fig. 10A

fig. 10B

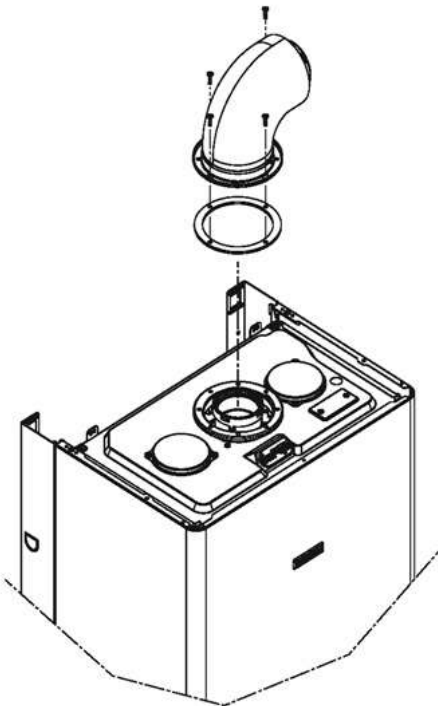


fig. 10B

### 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

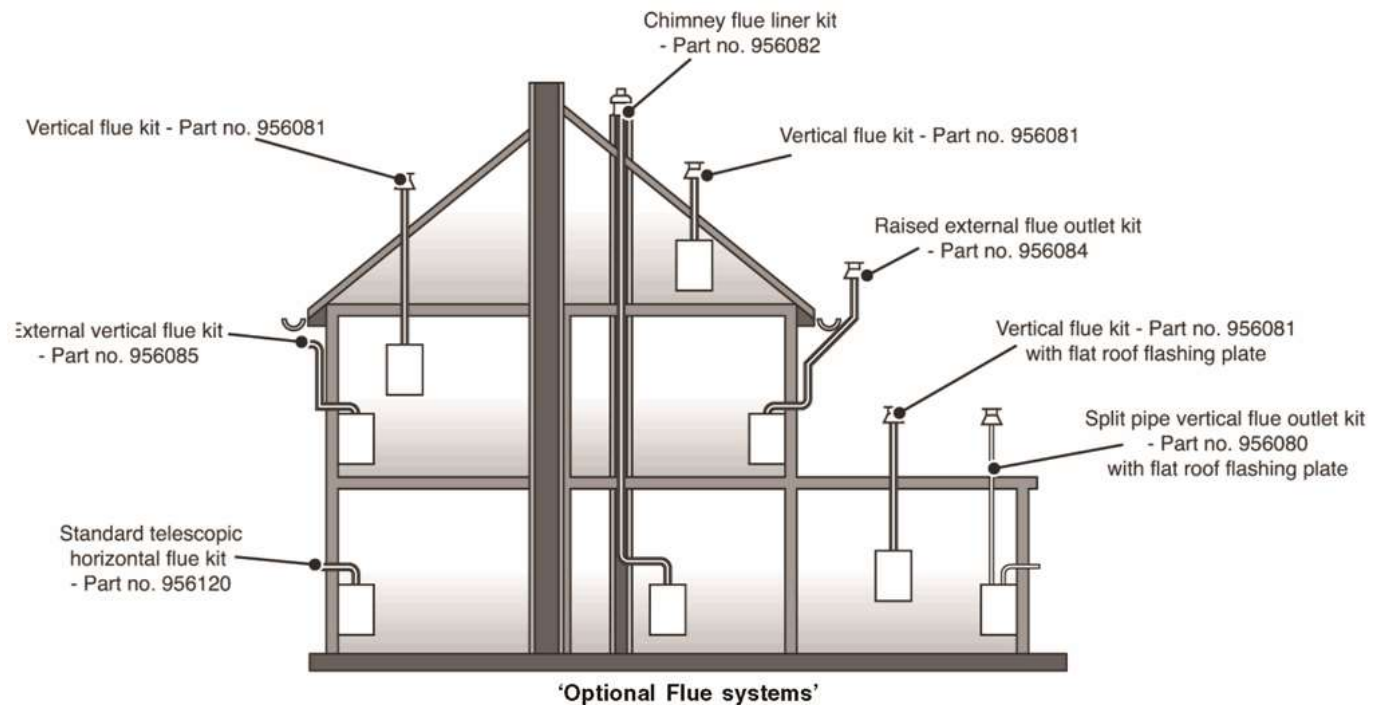


fig. 10C

## 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

60-100 concentric flue system, Fig. 10D, with a maximum length of 7800mm.

fig. 10D

Standard telescopic horizontal flue kit - Part no. 956120

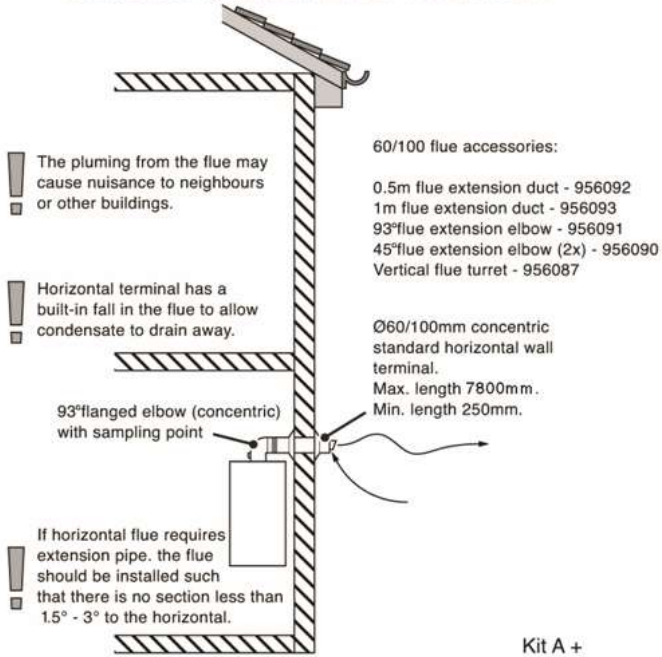


fig. 100

The standard telescopic terminal is 615mm max length and 430mm min length, but can be cut to a minimum flue length of 250mm, which is suitable for single, 100mm (4"), brick walls.

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

60/100mm Concentric vertical flue system [Fig. 10E-10F](#), through roof attics with a maximum length of 8800mm.

fig. 10E

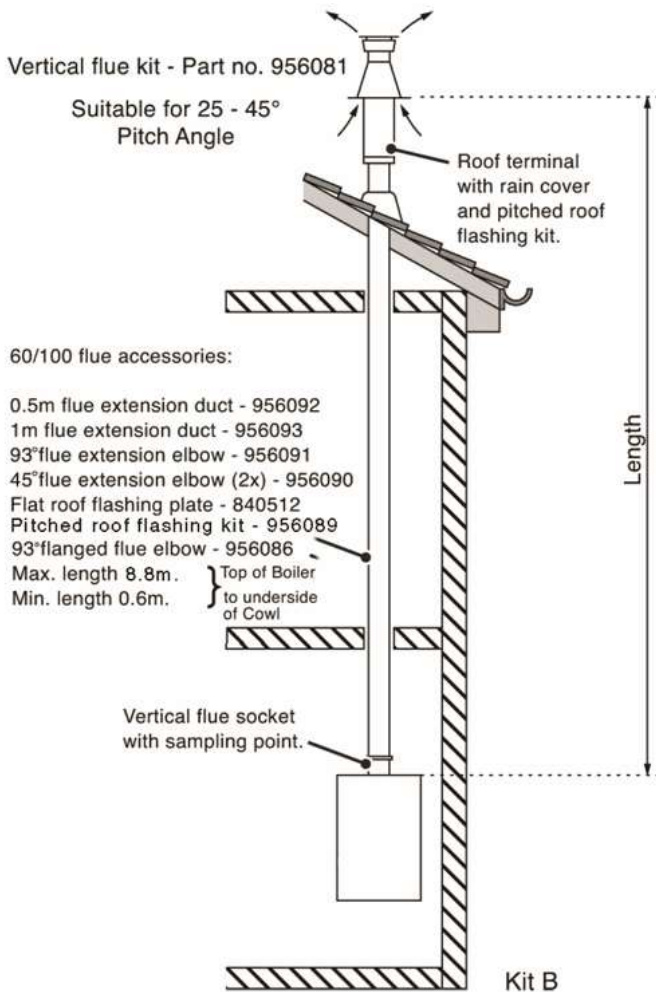


fig. 10E

fig. 10F

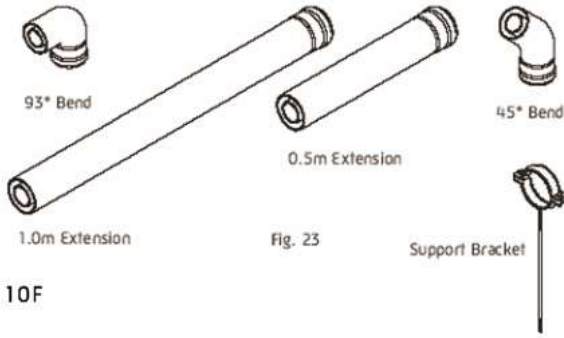


fig. 10F

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*

**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

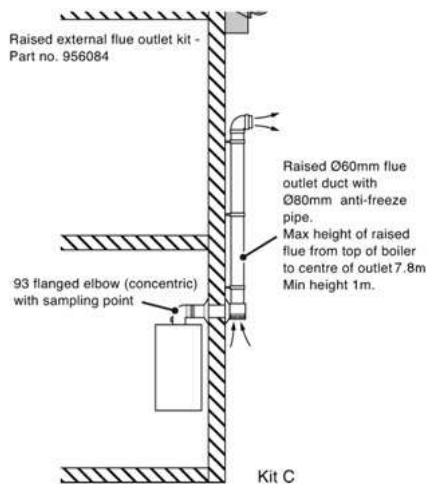


fig. 10G

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. 3](#).

**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	3.5	4.0	4.5	5.0
Maximum (80/60) flue length allowed (Metres)	9.7	9.5	9	8.5	8	7.5	7	6.5	6	5.5	5

Example: If required length of 60/100mm concentric= 1m then maximum 80/60length=9m

**5.16 Plume Diverter Terminal Kit (fig. 10H) Part No. 956103**

fig. 10H

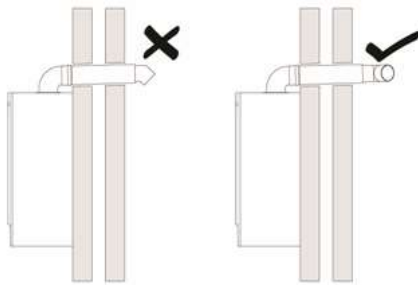


fig. 10H

(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

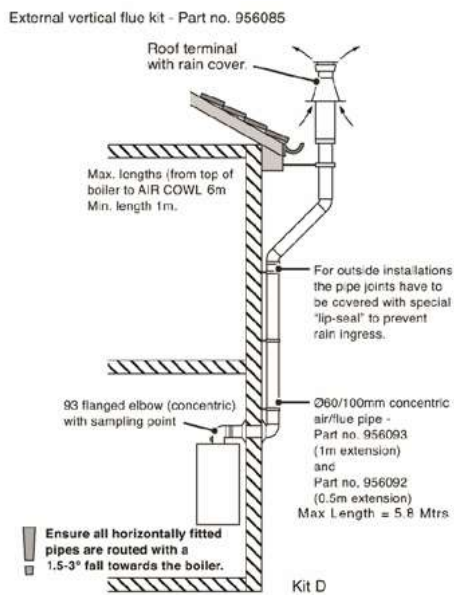


fig. 10I

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

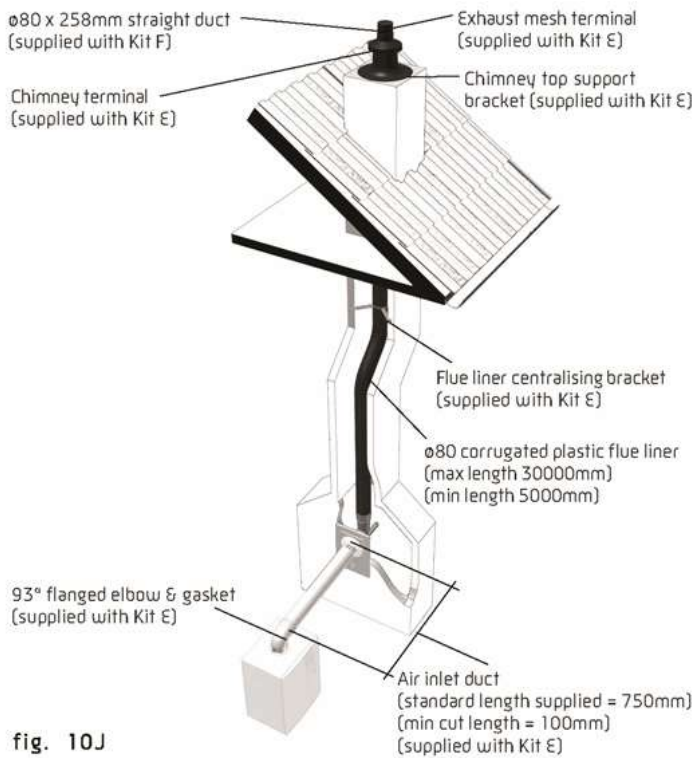


fig. 10J

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

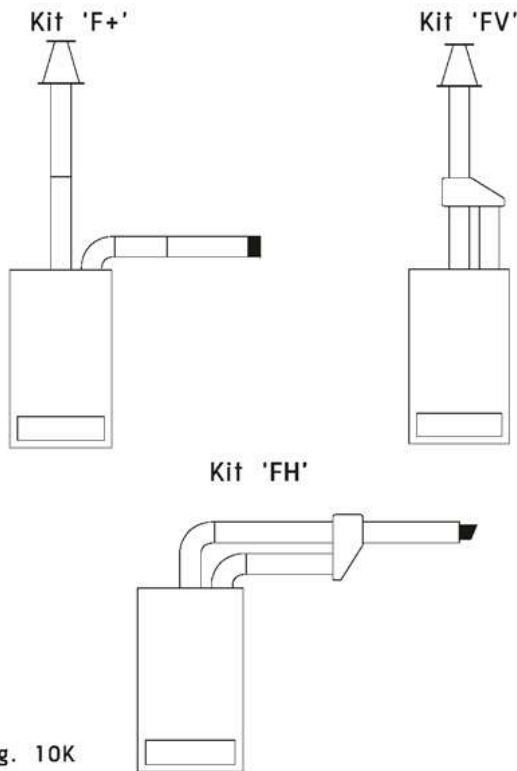


fig. 10K

**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 = 40m+40m

**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: Key flue 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	30m	From adaptor to chimney terminal
<b>Accessory</b>	<b>Length</b>	<b>Part Number</b>
80mm Flexitube flue liner	10m	956110
80mm Flexitube flue liner	20m	956111
80mm Flexitube flue liner	30m	956112
Boiler vertical flue adaptor/Turret socket	N/A	956087

**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. 11)**

fig. 11

A - flow  
 B - gas  
 C - return

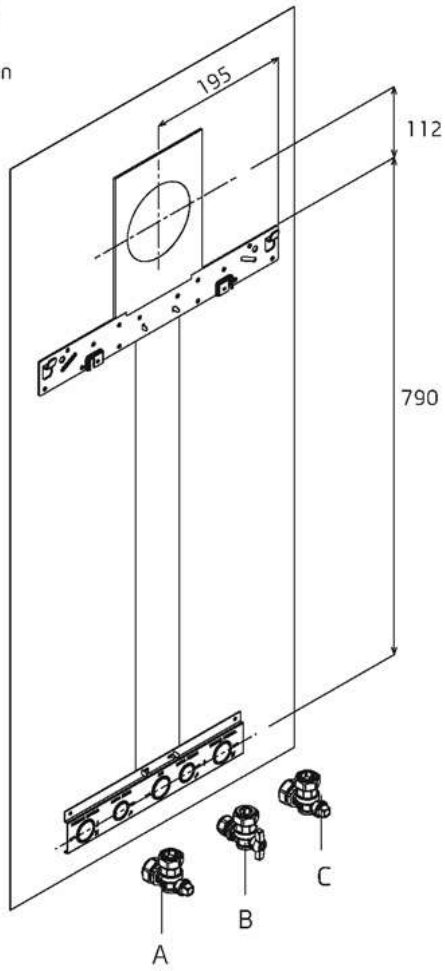


fig. 11

fig. 11A

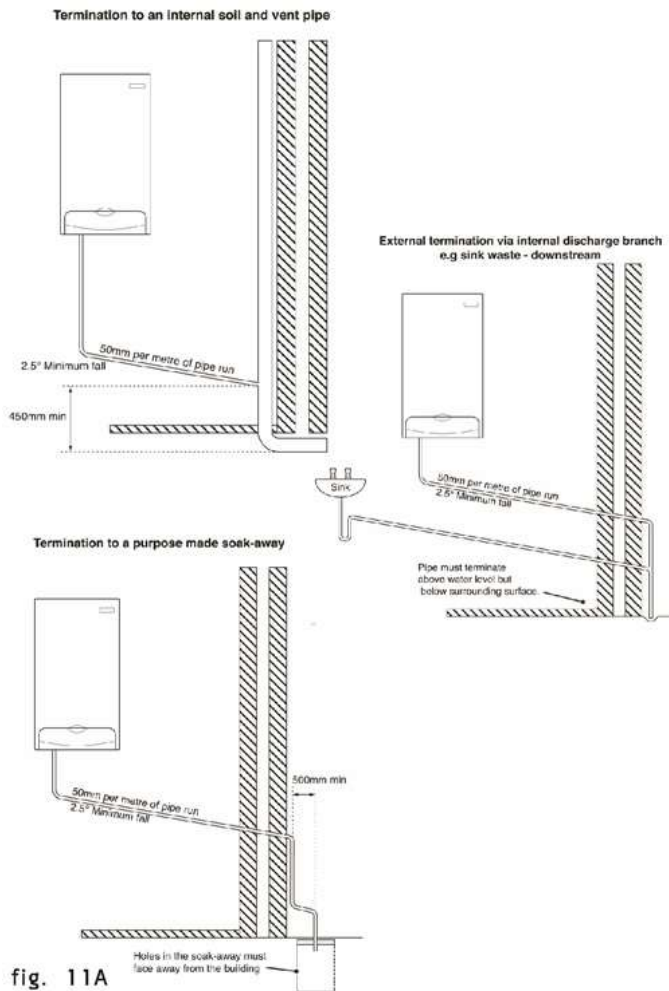


fig. 11A



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. 11)**

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

**NOTE:**

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

**5.21.3 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.

**5.21.4 Condense pipe**

During normal operation the boiler produces condense which is collected in a trap located in the lower part of the boiler. A flexible pipe (condense outlet pipe) is connected to the outlet of the trap. The flexible pipe must be connected to a plastic waste pipe only. The plastic waste pipe must have a minimum of a 3° fall towards the drain. Any external run of pipe should be insulated to prevent the risk of freezing and if greater than 3m the pipe should be at least 32mm diameter.

**CONNECTING THE CONDENSATE OUTLET**

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

**5.22 Electrical connections**

The electrical supply must be as specified in [section 4.7/4A.7](#). A qualified electrician should connect the electrical supply to the appliance. 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. 12)**

fig. 12

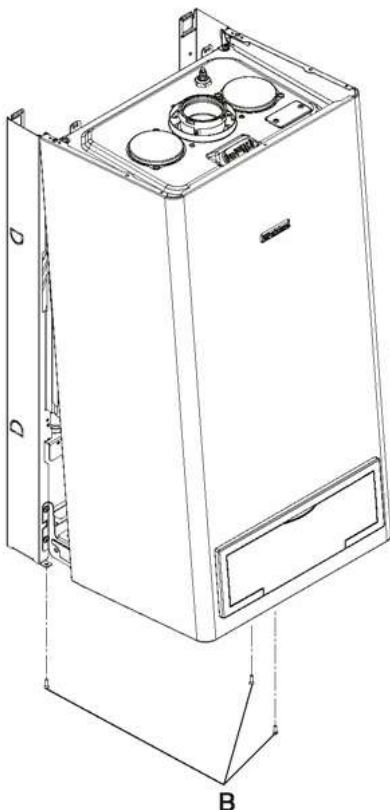


fig. 12

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

- remove the screws (B) located on the underside of the casing.
- lift the casing upward to disengage it from the top locating hooks and then remove.
- store the casing and screws (B) safely until required. Re-fit in the reverse order.

### 5.22.2 Appliance terminal block

The appliance terminal block is located on the rear of the control fascia. Remove the casing as described in [5.23.1](#). Gently pull the control panel forwards and down. Locate the terminal block cover ([fig.13](#)).

fig. 13

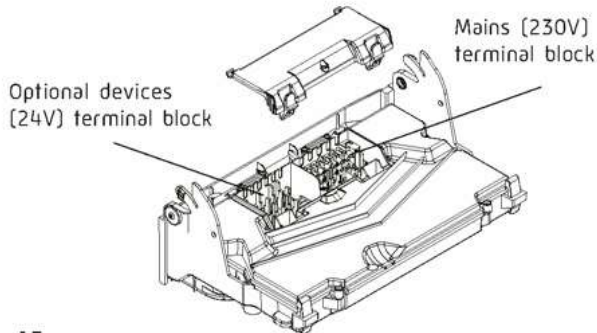


fig. 13

#### NOTE:

*The appliance comes with a factory fitted link ('TA') to allow basic operation of the boiler via the mode selector switch. If it is anticipated that external controls will be required please refer to the wiring diagrams in [section 9](#) for more detailed information*

### 5.22.3 Connecting the mains (230V) input (fig. 14)

fig. 14

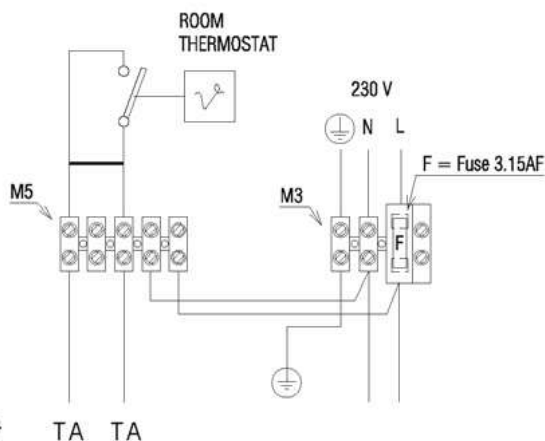


fig. 14

Unhook and remove the terminal block cover (230V). Pass the cable through the cable anchorage point. Connect the supply cable wires (LIVE, NEUTRAL, & EARTH) to their corresponding terminals (L,N, & E) on the appliance – high voltage – terminal block. When connecting the EARTH wire, ensure that it's left slightly longer than the others, this will prevent strain on the EARTH wire should the cable become taut. Do not remove the link wire unless additional external controls are to be fitted (see [section 9](#)). The securing screw on the cable anchorage should now be tightened. This must be done before the terminal block cover is re-fitted in its position.

#### NOTE:

*It is the installer's responsibility to ensure that the appliance is properly Earthed. the manufacturer cannot be held responsible for any damage or injuries caused as a result of incorrect Earth wiring.*

## 6.0 Commissioning

### 6.1 Gas Supply Installation

Inspect the entire installation including the gas meter, test for gas 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 valves (AAV) and loosen the dust cap/s by turning the cap anti-clockwise one full turn.

Ensure all manual air release valves located on the heating system are closed. Connect the filling loop as shown in [fig. 5](#), slowly proceed to fill the system by firstly opening the inlet valve connected to the flow pipe, and then turning the lever on the fill valve, to the open position. As water enters the system the pressure gauge will begin to rise. Once the gauge has reached 1 BAR close both valves 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.

### 6.3.1 Manual air release (fig. 15)

fig. 15

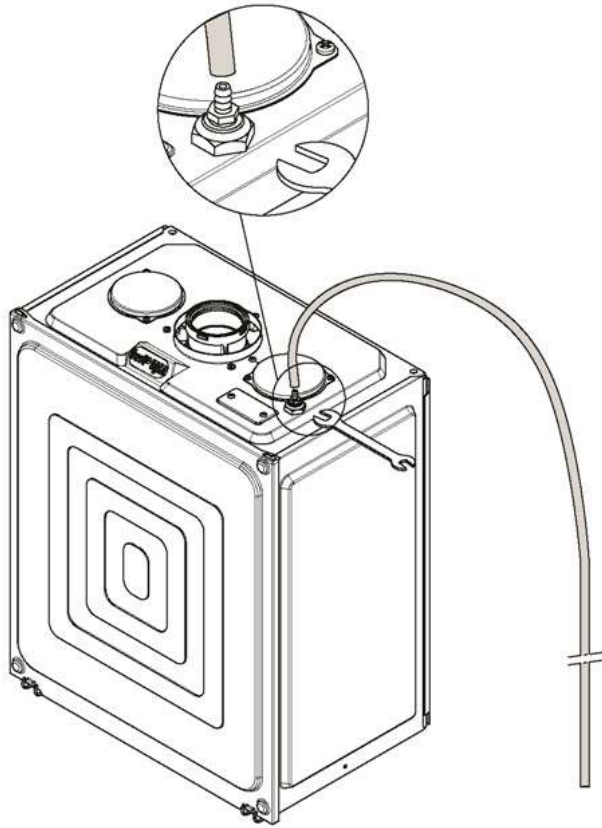


fig. 15

When the boiler has been filled for the first time or the system has been drained and refilled, it will be necessary to release any air that may have become trapped within the appliance heat exchanger. Slacken the bleed screw until water is released and then close.

#### **IMPORTANT:**

**THERE ARE NO OTHER MANUAL AIR RELEASE VALVES LOCATED ON THE APPLIANCE.**

### 6.4 Initial flushing of the system

The whole of the heating system must be flushed both cold and hot as detailed in [6.8](#). Open all radiator or heating valves and the appliance flow & return service valve. 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 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, (see [8.8](#)) 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.

### 6.6 Initial Lighting

Ensure the electrical supply to the appliance is switched on. Ensure any external controls are switched to an 'ON' position and are calling for heat.

Move the selector switch to the ON position, the appliance will now operate as described in [2.2](#) & [2.3](#). Should the appliance fail to ignite, refer to [6.6](#) and/or [section 8](#) (Checks, Adjustments & faultfinding).

### 6.7 Checking Gas Pressure and Combustion Analysis

The appliance is factory set and requires no additional adjustment once installed. However to satisfy the requirements of GSIUR 26/9, it will be necessary to gas rate the appliance using the gas meter that serves the appliance.

If the installation does not include a gas meter (for example LPG) and there are no means by which to calculate the gas rate, then a combustion analysis test must be carried out in accordance with BS 7967 (UK) to ensure the appliance is left working safely and correctly.

Additionally, if the gas valve has been adjusted, replaced, or the appliance has been converted for use with another gas type, then it becomes necessary to carry out a combustion analysis/check to ensure that correct combustion is occurring.

If there are no means to gas rate the appliance and/or carry out a combustion analysis check, then it will not be possible to complete the commissioning procedure.

Details on how to carry out the combustion analysis can be found in [section 8](#).

**IMPORTANT:**

*It's imperative that a sufficient dynamic – gas – pressure is maintained at all times. Should the dynamic gas pressure fall below an acceptable level, the appliance may malfunction or sustain damage.*

## 6.8 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.*

### 6.8.1 Inhibitors

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

## 6.9 Setting the flow outlet temperature

The flow outlet temperature can be adjusted between 40°C - 80°C for standard CH system and between 20°C - 45°C for under-floor systems by using the Heating thermostat knob (see [fig.1](#)).

## 6.10 Setting the system design pressure

The design pressure should be a minimum of 0.5 BAR and a maximum of 1.5 BAR. The actual reading should ideally be 1 BAR plus the equivalent height in metres (0.1 BAR = 1 metre) to the highest point in the system above the base of the appliance (up to the maximum of 1.5 BAR total).

**N.B.** The safety valve is set to lift at 3 BAR/30 metres/45 psig. To lower the system pressure to the required value, drain off some water from the appliance drain valve until the required figure registers on the pressure gauge (see [fig.1](#)).

## 6.11 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 Inlet pressure and Gas rate checks

With the boiler firing at maximum gas rate check that the inlet pressure at the appliance is 19mbar +/- 1mbar when measured at the inlet pressure test point.

Check the maximum and minimum gas rate at the gas meter according to [section 3.2](#) using a stopwatch.

## 6.13 Final checks

- ENSURE ALL TEST NIPPLES ON THE APPLIANCE GAS VALVE ARE TIGHT AND CHECKED FOR GAS 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.

It should be remembered that although certain generic components may look similar, they will be specific to an individual appliance or product range. Use of non-genuine spare parts could invalidate your warranty and may pose a potential safety hazard. The frequency of servicing will depend upon the particular installation conditions, but in general, once per year should be sufficient. It is the law that any servicing work is carried out by competent person such as a 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 8](#).
- 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 [8.3](#)).
- Check and adjust – if necessary – the system design pressure (see [6.10](#)).
- Carry out an analysis of the flue gases (see [8.5](#)), 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.
- Check that the burner and main heat exchanger are clean and free from any debris or obstruction.
- Check and clean – if necessary – the condense trap to ensure correct operation.
- 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.

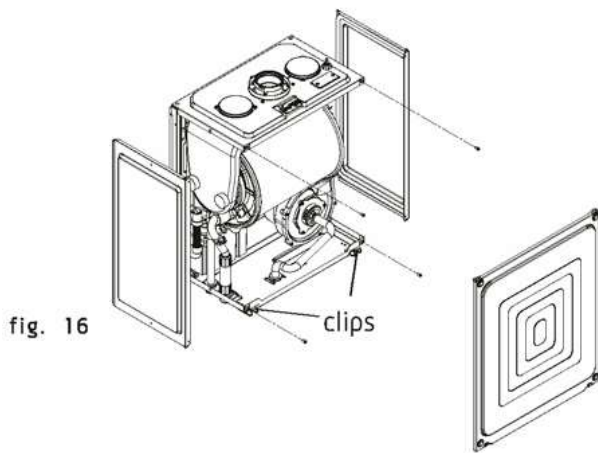
## 7.4 Component removal procedure

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. Ensure some water absorbent cloths are available to catch any residual water that may drip from the appliance or removed components. Undertake a complete commissioning check as detailed in [section 6](#), after replacing any component.

**ALWAYS TEST FOR GAS TIGHTNESS IF ANY GAS CARRYING COMPONENTS HAVE BEEN REMOVED OR DISTURBED.**

### 7.4.1 Air box front cover removal (fig. 16)

fig. 16



Locate the two clips and remove air box front cover. If it's necessary to remove the air box side cover, locate and remove the 4 securing screws.

## 7.5 Pump assembly (fig. 17)

fig. 17

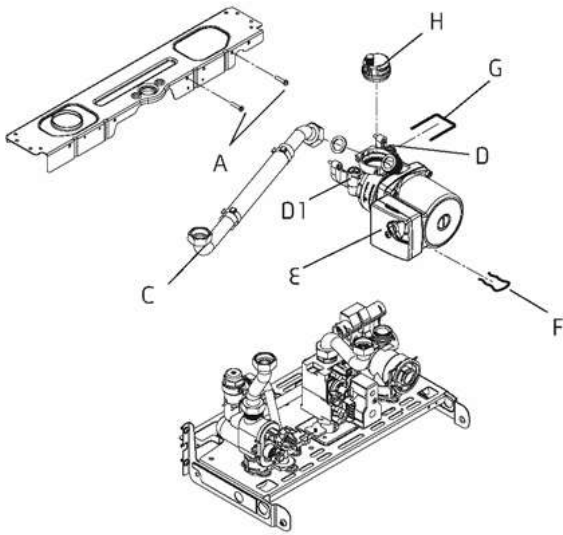


fig. 17

Carry out component removal procedure as described in 7.4. Disconnect the flow pipe from the combustion chamber connection, slacken the pipe at the hydraulic assembly and swing/rotate clear of the pump assembly (C).

Disconnect and remove the pump outlet pipe from the pump assembly/combustion chamber connection.

Remove the expansion pipe locking pin from the top of the pump assembly and withdraw the flexible pipe. Locate and remove the pressure gauge securing pin (D1) and disconnect the pressure gauge from the pump assembly. Disconnect the electrical wiring from the pump's electrical connection point (E). Locate and remove the 2 securing screws (A) at the rear of the pump assembly. Remove locking pin (F) from pump base and lift pump assembly clear of the hydraulic manifold. The pump assembly can now be removed from the appliance. Replace carefully in the reverse order.

### 7.6 Safety valve (fig. 18)

fig. 18

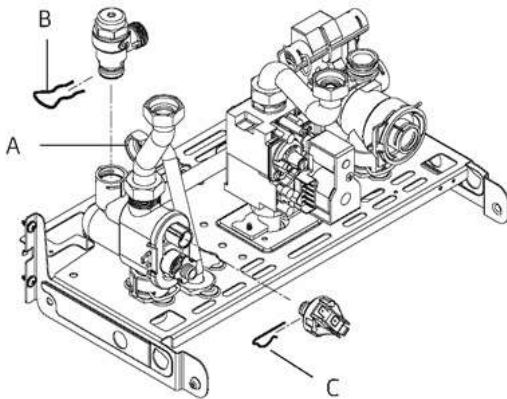


fig. 18

Carry out component removal procedure as described in 7.4. Disconnect the outlet pipe (A) from the safety valve, remove safety valve locking pin (B) from the hydraulic manifold. Replace in the reverse order.

### 7.7 Lower automatic air release valve (fig. 17)

Carry out component removal procedure as described in 7.4. Remove the expansion pipe locking pin (D) from the pump assembly and remove the expansion pipe. Locate and remove the AAV locking pin (G) from the pump assembly and remove the AAV assembly (H). Replace in the reverse order.

#### 7.7.1 Top automatic air release valve (fig. 19)

fig. 19

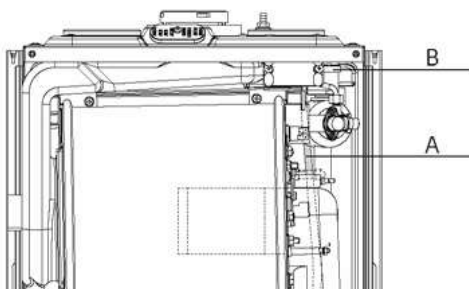


fig. 19

Carry out component removal procedure as described in [7.4](#). Remove the drain pipe. Unscrew the top AAV. Replace in the reverse order. Loctite or similar should be used as a thread sealant for the AAV.

### 7.8 Water pressure switch (fig. 18)

Carry out component removal procedure as described in [7.4](#). Locate and remove the locking pin (C) from the water pressure switch. Remove the wiring. Carefully withdraw the switch. Replace in the reverse order.

### 7.9 Flow thermistor (fig. 1A)

Carry out component removal procedure as described in [7.4](#). Unclip and remove the air chamber front cover. Unclip the flow thermistor from the flow outlet pipe. Disconnect thermistor electrical plug. Replace in the reverse order.

### 7.10 Return thermistor (fig. 1A)

Carry out component removal procedure as described in [7.4](#). Unclip and remove the air chamber front cover. Unclip the return thermistor from the return inlet pipe. Disconnect thermistor electrical plug. Replace in the reverse order.

### 7.11 Printed circuit board (fig. 20)

fig. 20

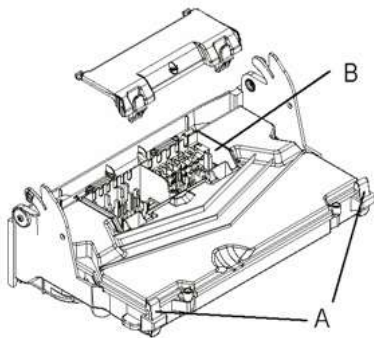


fig. 20

Carry out component removal procedure as described in [7.4](#). Pull the control fascia forward and lower it. Push the clips (A) which secure the PCB cover, remove cover, after carefully taking note of all wiring connections and jumper tag configuration see [section 8.10](#). Unhook and remove connection block (B). Disconnect all wiring from the PCB, locate and remove the PCB securing screws, remove the PCB. Replace in the reverse order ensuring that the 3 control knobs are correctly aligned with the respective potentiometers on the PCB.

Ensure that the correct jumper tag configuration has been reinstated, see [section 8.10](#). It will be necessary to check the function of the PCB is set for the correct boiler type/application.

### 7.12 Gas Valve (fig. 21)

fig. 21

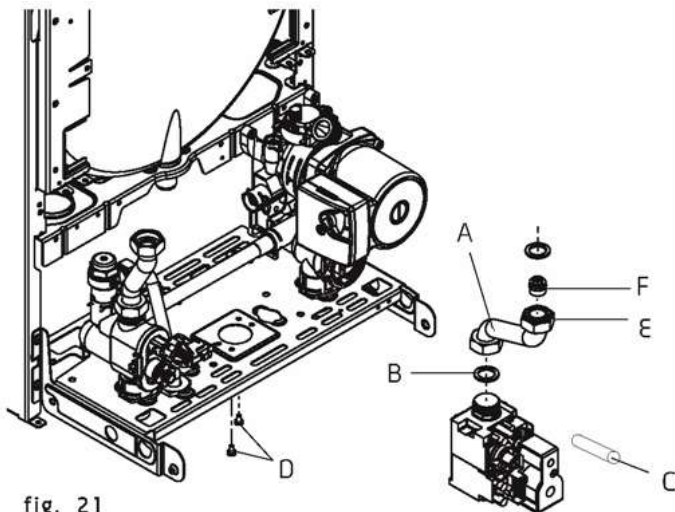


fig. 21

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 outlet connections. **Please note**, the sealing washers (B) must be discarded and replaced with new sealing washers. Disconnect the compensation pipe (C). Locate and remove gas valve retaining screws (D) 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.**

#### 7.12.1 Injector (fig. 21)

Carry out component removal procedure as described in [7.4](#). Unscrew and remove gas pipe connections (A&E). Locate and remove the injector (F) inside the pipe. Replace in the reverse order. Check and adjust burner pressure settings.

**WARNING:**

**A GAS TIGHTNESS CHECK MUST BE CARRIED OUT.**

### 7.13 Electrodes & Condense sensor (fig. 22)

fig. 22

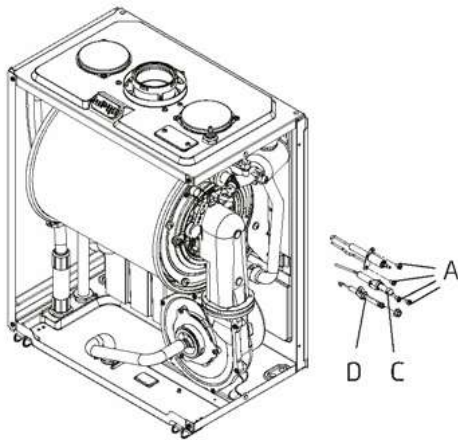


fig. 22

Carry out component removal procedure as described in [7.4](#). Unclip and remove the air chamber front and RH side covers. Disconnect the electrode leads and ancillary wiring from their respective connectors. Remove the retaining screws (A) for electrode and remove. Remove the retaining nut (C) for condense sensor (D) and remove. 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.

### 7.14 Flue fan & mixer (fig. 23)

fig. 23

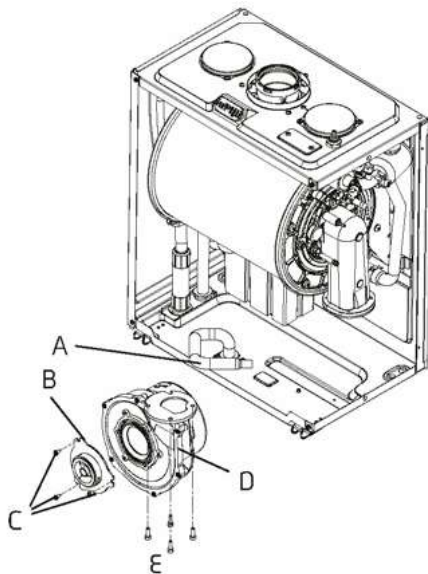


fig. 23

Carry out component removal procedure as described in [6.4](#). Unclip and remove the air chamber front and the RH side covers. Slacken the gas pipe (A) at the air box connection and swing/rotate away from the fan assembly. Locate and remove the sense electrode. To remove the mixer (B) locate and remove the three screws (C). To remove the fan (D), disconnect the electrical connections attached to the fan, locate and remove the four screws (E). Gently ease the fan from its location. Replace in the reverse order. Ensure all seals are in good condition, taking care to ensure they are replaced correctly.

### 7.15 Burner (fig. 24)

fig. 24



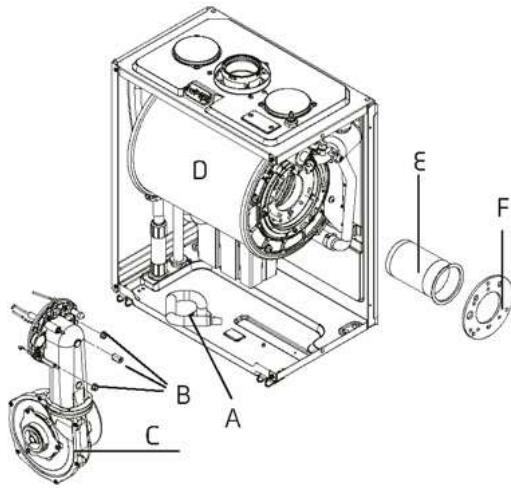


fig. 24

Carry out component removal procedure as described in 7.4. Unclip and remove the air chamber front and the RH side covers. Slacken the gas pipe (A) at the air box connection and swing/rotate of the fan assembly. Locate and remove the 3 internal nuts (B) which secure the fan assembly in position (C) to the heat exchanger (D). Disconnect the electrode leads and ancillary wiring from their respective connectors. Remove the retaining screws (A, fig. 21) for sensing electrode and remove. Remove the retaining nut (C, fig. 21) for condense sensor (D, fig. 21) and remove. Gently ease the fan assembly out of its location. Once the assembly has been removed, the burner (E) can be withdrawn from the heat engine. Ensure the seal (F) is in good condition, taking care to ensure it is replaced correctly. Replace in the reverse order.

### 7.16 Main heat exchanger (fig. 25 & 26)

fig. 25

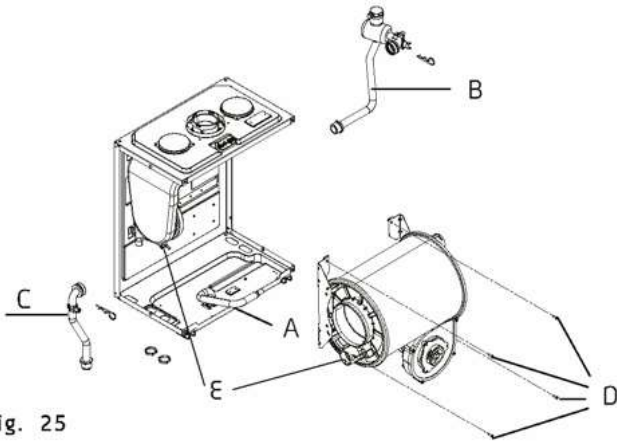


fig. 25

fig. 26

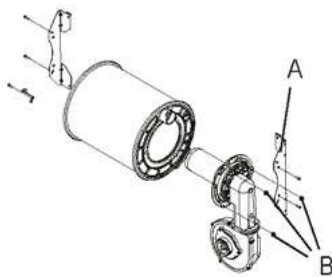


fig. 26

Carry out component removal procedure as described in 7.4. Unclip and remove the three air chamber covers (front, LH, RH sides). Disconnect all the wiring connections. Fig. 24: Slacken the gas pipe (A) at the air box connection and swing/rotate of the fan assembly. Disconnect the flow (B), return (C) and condense connections on the heat exchanger. Locate and remove the 4-screws that secure the heat exchanger to the combustion chamber (D). Move the heat exchanger to the right and disconnect it from the flue collector (E). The heat exchanger can now be lifted up and withdrawn from the appliance.

Fig. 26: To remove the fan burner assembly (A) locate B and remove the 3 external nuts (B). Replace in the reverse order. Ensure all seals are in good condition, taking care to ensure they are replaced correctly.

### 7.17 Automatic by-pass & DHW non-return valve (fig. 27)

fig. 27

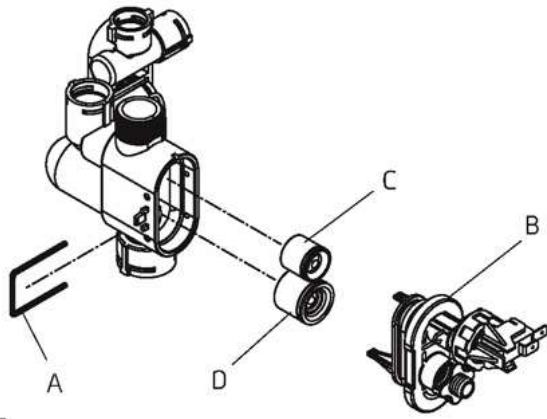


fig. 27

Carry out component removal procedure as described in [7.4](#).

Remove the locking pin (A) that secures the cover (B) to the hydraulic manifold. Using a hooked piece of wire, carefully withdraw the by-pass cartridge (C) and/or DHW non-return cartridge (D). 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.

### 7.18 Expansion vessel (fig. 1A)

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](#).

fig. 28

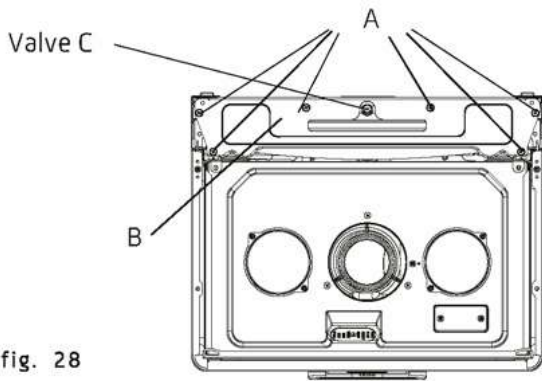


fig. 28

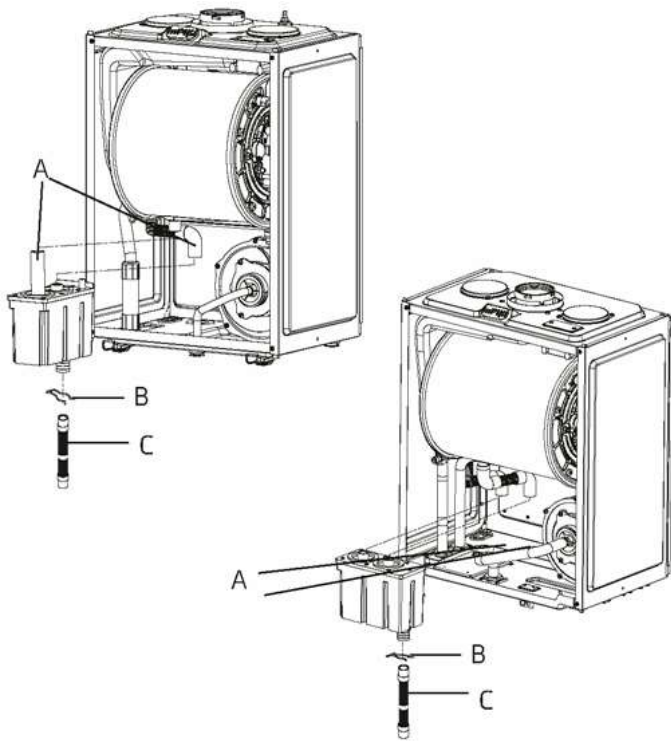
Should the removal and replacement of the expansion vessel be deemed impractical, an external expansion vessel may be fitted to the return pipe as close to the appliance as possible.

#### 7.18.1 Expansion vessel removal (with sufficient clearance above, fig. 28)

Carry out component removal procedure as described in [7.4](#). Disconnect the flue from the appliance. Disconnect the expansion vessel from the flexible expansion pipe. Disconnect the flexible expansion pipe from the vessel. Unscrew the nut that secures the vessel to the lower frame. Locate and remove the 6 screws (A) that secure the vessel top holding plate (B), remove the plate. 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.

### 7.19 Condense trap removal and cleaning (fig. 29)

fig. 29



Carry out component removal procedure as described in [7.4](#). Disconnect the 2 upper rubbers condense pipe (A).

Remove the pin (B) that secures the trap to the air box plate. Disconnect the lower rubber condense pipe (C) from the condense trap. Carefully remove the condense trap. Flush the trap with clean cold water to remove any debris. Replace in the reverse order.

### 7.20 Flue collector removal (fig. 30)

fig. 30

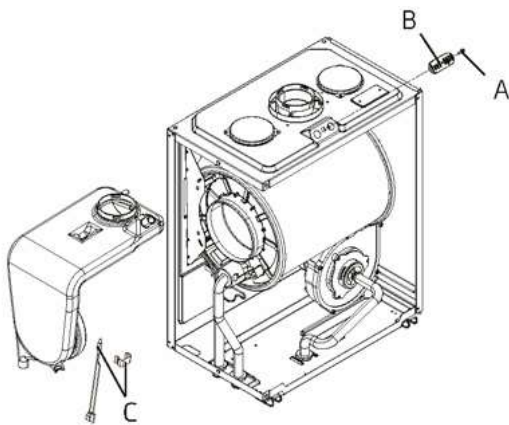


fig. 30

Carry out component removal procedure as described in [7.4](#). Unclip and remove the air chamber front and left side covers. Locate and remove the screw (A) that secures the flue gas analysis test point cover (B). Remove the clip and the fumes thermostat (C). Gently pull down and to the left and ease the flue collector from its location. Replace in the reverse order.

### 7.21 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. 31-32](#)), 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.

fig. 31

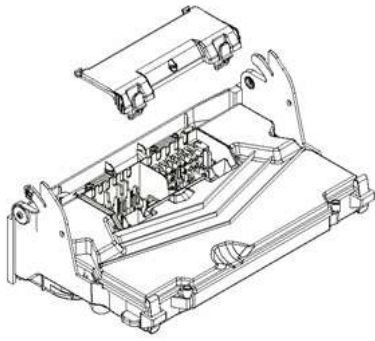


fig. 31

fig. 32

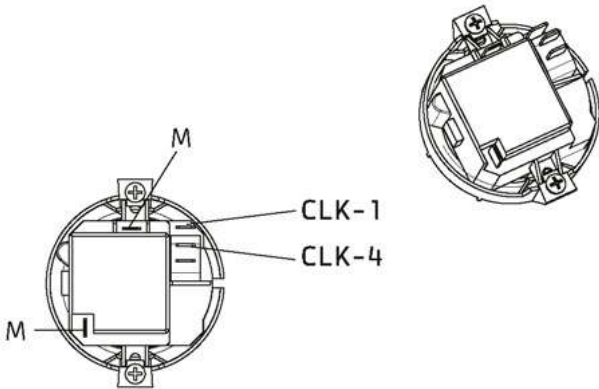
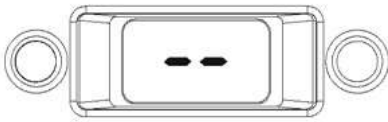


fig. 32

Refer to [section 9](#) for external control wiring diagrams

## 8.0 Checks, Adjustments and fault finding

Standby/OFF mode



Frost protection mode active



Combustion analysis mode active



Normal heating request (example 60°C).



Normal DHW request (example 60°C).



### 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 modes 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 and the low-pressure fault code will be displayed.*

The 2-digit display can show several different modes of operation:

### 8.2.1 Selector switch in the OFF/RESET position

When the selector switch is in the OFF/RESET position, the following functions are active.

#### Active functions:

- frost-protection system
- pump & fan anti-block

### 8.2.2 ON-BOARD Functions

- **THERMOREGULATION:** when an external sensor is connected to the appliance, the electronic circuitry will automatically adjust the flow outlet temperature to suit local weather conditions in order to maintain comfort and efficiency. A specific operating curve that is most suited to the system type and geographical area can also be selected.
- **OPENTHERM +:** OT+ is a communication protocol that enables the boiler to be linked or connected to other OT+ controls. These controls have been designed to further increase fuel economy by ensuring the boiler remains in the modulation phase during any heating requests. This reduces the amount of ON/OFF periods and therefore increases fuel efficiency.
- **CO FUNCTION:** the CO function when activated, will allow the appliance to run at maximum and minimum output whilst a combustion analysis check is being carried out. Whilst the CO function is active, all other functions are disabled (minimum power operating period, anti-cycle, set-point, etc). Once enabled, the CO function will remain active for a 15-minute period, or until the function is manually deactivated
- **FROST-PROTECTION:** this function is only active when there are no requests for heating or HW. If the temperature drops below 6°C, the boiler will operate on minimum power until the temperature of the flow thermistor reaches 35°C. Thereafter the pump & fan will over-run for 30-seconds.
- **ANTI-CYCLE FUNCTION:** the anti-cycle function ensures the burner remains switched off for at least 3-minutes after the set-point hysteresis (set-point + 5-deg).
- **PUMP ANTI-BLOCK FUNCTION:** when there has been no heating or HW request for 24-hours, the anti-block cycle is activated. The pump will be activated for a period of 30-seconds.

### 8.2.3 HEATING MODE

With the selector switch in the heating & hot water position and any additional controls (time clock, programmer, room thermostat, etc.) calling for heat, the appliance will operate in the heating mode. The pump and fan will be activated via the flow temperature sensor. When the fan is sensed to be operating correctly (tacho signal), the ignition sequence commences. Ignition is sensed by the electronic circuit 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.

The speed of the fan and therefore the output of the boiler is determined by the temperature of the water sensed by the flow temperature sensor, consequently a high temperature at the flow sensor results in a lower fan speed. As the water temperature increases, the temperature sensors – located on the flow pipe of the boiler – reduce the fan speed via the electronic circuitry. Depending on the load, either the water temperature will continue to rise until the set point is achieved or the water temperature will fall whereby fan speed will increase relative to the output required. When the boiler has reached the set point (+ hysteresis), the burner will switch off. The built-in anti-cycle device prevents the burner from re-lighting for approximately 3-minutes. When the temperature of the flow sensor falls below the set point (- hysteresis), the burner will re-light.

### NOTE:

*If the spark/sensing electrode does not sense ignition the appliance will re-attempt ignition a further 4-times then go to lockout. 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 5°C (hysteresis), the burner will shut down. 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 5°C (hysteresis) below the set-point.*

## 8.3 Appliance fan speeds

The appliance fan speeds must be checked and/or adjusted prior to making any adjustments to the gas valve or if the main PCB has been replaced.

### CAUTION:

*Gas type and appliance fan speed (output) must be set according to the specific appliance specification. The manufacturer accepts no responsibility if the gas type and/or fan speed is not correctly adjusted according to the respective appliance specification as detailed on the appliance data badge.*

### 8.3.1 Checking/adjusting the appliance fan speeds

Move the selector switch to the OFF position and remove the 3-selector knobs.

### 8.3.2 Absolute max fan speed

Locate the MAX trimmer ([fig. 33](#)) and using a small flat bladed screw driver gently adjust clockwise or counter clockwise to achieve the correct fan speed (see table [8.3.6](#)).

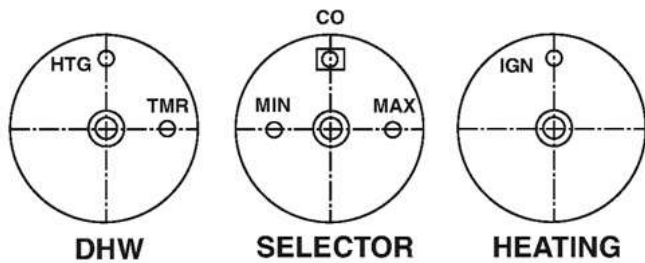


fig. 33

**NOTE:**

*the display shows the fan RPM in multiples of 1000, i.e. 2.5 = 2500RPM.*

**8.3.3 Absolute min fan speed**

Locate the MIN trimmer ([fig.33](#)) and gently adjust clockwise or counter clockwise to achieve the correct fan speed (see table [8.3.6](#)).

**NOTE:**

*the display shows the fan RPM in multiples of 1000, i.e. 2.5 = 2500RPM.*

**8.3.4 Ignition fan speed**

Locate the IGN trimmer ([fig.33](#)) and gently adjust clockwise or counter clockwise to achieve the correct fan speed (see table [8.3.6](#)).

**NOTE:**

*the display shows the fan RPM in multiples of 1000, i.e. 2.5 = 2500RPM.*

**8.3.5 Heating fan speed**

Locate the HTG trimmer ([fig.33](#)) and gently adjust clockwise or counter clockwise to achieve the correct fan speed (see table [8.3.6](#)).

**NOTE:**

*the display shows the fan RPM in multiples of 1000, i.e. 2.5 = 2500RPM.*

**8.3.6 Fan speed table**

Use the following table to set the corresponding fan speeds that are relative to the appliance you are working on.

**FAN SPEED (rpm) TABLE**

MODEL	MAX	MIN	HTG	IGN
iHeat25s	5500	1700	5500	3700

**8.4 Checking the CO and CO2 flue gas levels and adjusting the gas valve**

**NOTE:**

*Checking the combustion values at Maximum and Minimum rate and/or adjustment of the gas valve must only be carried out using a suitably calibrated flue gas analyser.*

Isolate the appliance from the electrical supply and remove the appliance casing as described in [5.23.1](#). Insert the analyser probe into the flue gas test point (A,B [fig.30](#)). Restore the electrical supply to the boiler and switch the boiler to the OFF mode.

To adjust the valve you must first ensure that the fan speed potentiometers (trimmers) have been set correctly (see [8.3](#)).

Remove the 3-selector knobs, locate and press the CO button (see [fig.33](#)). The appliance will operate in CO mode for approximately 15 minutes (see [8.2.2](#)).

**8.4.1 Gas Valve Maximum Setting**

Locate and gently turn the HTG trimmer until the maximum value fan speed (see fan speed data table - max) is obtained and then check that the combustion readings correspond to the boiler model. (see [Section 3](#) – Technical data)

If the flue gas readings are incorrect the maximum gas rate must be adjusted as follows.

Using a 2.5mm Allen key, very slowly turn the maximum adjustment screw (see [fig.34](#)) – clockwise to decrease anti-clockwise to increase – until the correct values are achieved.

fig. 34

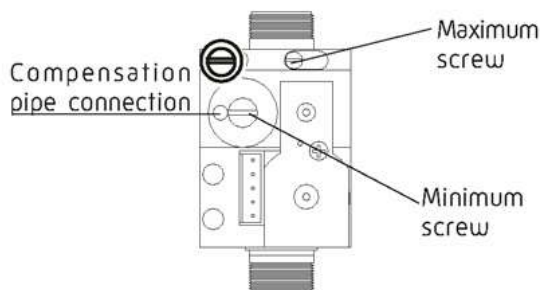


fig. 34

**NOTE:**

*Allow time for the analyser readings to stabilize When correct readings are obtained combustion levels must be carried out at Minimum gas rate.*

**8.4.2 Gas Valve minimum setting**

Locate and gently turn the HTG trimmer until the minimum value fan speed (see fan speed data table-min) is obtained and then check that the combustion readings correspond to the boiler model. (see [Section 3](#) – Technical data)

If the flue gas readings are incorrect the minimum gas rate must be adjusted as follows.

Using a suitable screwdriver, very slowly turn the minimum adjustment screw (see [fig 34](#)) – clockwise to increase, anti-clockwise to decrease – until the correct combustion values are achieved.

**NOTE:**

*Allow time for the analyser readings to stabilize.*

**IMPORTANT:**

*if after adjustment of the valve the carbon monoxide (CO) or carbon dioxide (CO<sub>2</sub>) levels are outside the range quoted, than call Halstead Boilers Ltd technical helpline on 0844-371 1111.*

*If in doubt ASK!*

**8.4.3 Completion**

On completion of the combustion analysis check and/or any gas valve adjustment, set the HTG trimmer to the corresponding value as detailed in the fan speed table. Refit the 3-selector knobs and move the mode selector to the OFF position. Remove the test probe from the test point and refit the sealing screw/s and/or cap.

**IMPORTANT:**

**A GAS TIGHTNESS CHECK MUST BE CARRIED OUT IF ANY GAS CARRYING COMPONENTS HAVE BEEN REMOVED, REPLACED OR DISTURBED.**

**8.5 Combustion analysis test**

A combustion analysis check can easily be carried out on the appliance via the test points located on the top of the appliance.

- Insert the flue gas analyser probe into the flue gas test point.
- Operate the boiler in CO mode and compare the values with those shown in [section 3](#) (Nat. Gas) or [section 10](#) (LPG). If different adjust the gas valve according to [8.4.1](#), [8.4.2](#), & [8.4.3](#).

**8.6 Checking the expansion vessel**

Carry out the component removal procedure as described in [7.4](#). You must ensure that the boiler is completely drained of water. Using a suitable pressure gauge, remove dust cap on expansion vessel and check the charge pressure. The correct charge pressure should be 1.0 bar ± 0.1 bar. If the charge pressure is less, use a suitable pump to increase the charge.

**NOTE:**

*You must ensure the drain valve is in the open position whilst re-charging takes place. Replace the dust cap and carry out the relevant commissioning procedure ([section 6](#)).*

**8.7 External faults**

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

**8.7.1 Installation faults**

Symptom	Possible cause
No display/ignition	Check wiring/check electrical supply
No hot water	Check pipe-work
No heating	Check external controls
Fault code	Possible cause
10	Check gas supply, check flue system, check polarity

## 8.8 Electrical checks

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

### 8.8.1 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.

### 8.8.2 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. 14](#)). Repeat above test on the Live & Earth connections at the appliance terminal strip.

#### 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.*

### 8.8.3 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. 14](#)). The meter should read approximately 230V ac. If so proceed to next stage. If not, see [8.8.4](#).
- connect test leads between the Live & Earth connections at the appliance terminal strip ([fig. 14](#)). The meter should read approximately 230V ac. If so proceed to next stage. If not, see [8.8.4](#).
- connect test leads between the Neutral & Earth connections at the appliance terminal strip ([fig. 14](#)). The meter should read approximately 0 – 15Vac. If so polarity is correct. If not, see [8.8.4](#).

### 8.8.4 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.

### 8.8.5 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. 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.

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.

## 8.9 Fault finding

Before attempting any faultfinding, the electrical checks as detailed in [8.8](#) must be carried out. Isolate the appliance from the electrical supply.

Disconnect any external controls from terminal plug M6, and insert a link-wire between the two wires at the 'TA' connections.

#### NOTE:

*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 located at the end of this section.*

## 8.10 Boiler configuration (fig. 35)

fig. 35

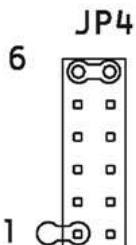


fig. 35

The boiler can be configured by means of the JUMPER Tag which configuration is shown below:

#### JP4 CONFIGURATION

- JUMPER ON POSITION 1: FLOOR HEATING (IF SET)/STANDARD HEATING (IF NOT USED)
- JUMPER ON POSITION 2: (UNUSED)
- JUMPER ON POSITION 3: (UNUSED)
- JUMPER ON POSITION 4: (UNUSED)
- JUMPER ON POSITION 5: (UNUSED)
- JUMPER ON POSITION 6: CH HEATING ONLY.



FOR CONFIGURATION SEE REFERENCE NUMBER (PIN1 ON PCB) AS SHOWN IN [FIG. 35](#).

## 8.11 Fault codes

When the boiler detects a temporary fault condition, the appropriate code is shown flashing on the display. If/when the fault code is final, the pump will perform a 60-second post circulation and the red LED will be illuminated.

CODE	CAUSE	ALARM TYPE	ACTION
AL10	Ignition failure, flame not sensed, condense sensor activated	Final	Reset, check appliance operation
AL20	Limit thermostat fault/fumes thermostat fault	Final	Reset, check appliance operation
AL21	External device fault (UHT/CPA)	Final	Reset, check appliance
AL26	Return temperature too high	Temporary then final	Reset, check appliance operation, check thermistor
AL28	Temperature differential inverted (return sensor temperature higher than thermistors flowsensor temperature)	Temporary then final	Reset, check pump, ensure there is sufficient circulation around heating circuit/s
AL34	Fan tachometer signal fault	Final	Reset check appliance operation, check fan
AL40	Insufficient system water pressure	Final	Check/refill system pressure, reset, check appliance operation
AL41	Insufficient system water pressure	Temporary	Check/refill system pressure, check appliance operation
AL52	Internal fault	Final	Reset, check appliance operation
AL55	Jumper tag fault	Final	Check jumper tag configuration
AL60	Jumper tag fault	Temporary	Check jumper tag configuration
AL71	Primary (flow) thermistor fault	Temporary	Check flow thermistor, check wiring
AL73	Return thermistor fault	Temporary	Check return thermistor, check wiring
AL74	Over temperature due to low H <sub>2</sub> O pressure	Final	Reset, check appliance operation, check pump, ensure there is sufficient circulation around heating circuit/s
AL79	Flow temperature too high, temperature differential too high	Temporary then final	Reset, check appliance operation, check thermistors

## 8.12 Component values & characteristics

COMPONENT	VALUE
Fan	230Vac
Pump	230Vac
Valve actuator (Combi only)	230Vac
Ignition transformer	230Vac
Gas valve	230Vac
Room thermostat connection	230Vac
NTC thermistor (dry contact)	10Kohm
NTC thermistor (wet contact)	10Kohm
Flues thermostat (dry contact) (°C)	87
<b>FUNCTION</b>	<b>VALUE</b>
Standard Heating temperature range (min – max °C)	40 - 80
Floor Heating temperature range (min – max °C)	20 - 45
75% maximum CH time	15 min
Heating OFF hysteresis (°C)	SP + 5
Heating ON hysteresis (°C)	SP – 5
Anti-cycle delay	3-min
Pump over-run	30-sec
Low output (min. output + %)	Min+25
CO function max temp. (°C)	95
CO re-light temp. (°C)	75
CO function time	15-min
Flow NTC max temp. (°C)	95
High limit thermostat (°C)	105
Maximum differential (°C)	35
<b>IGNITION CONTROL</b>	<b>VALUE</b>
Ignition attempts before L/O (lockout)	5
Re-ignition attempts after loss of flame signal	5

## 9.0 Wiring diagrams

CONNECTION	MAX. LENGTH
External sensor	30-metres
Room thermostat	30-metres
OT+ connection	30-metres

### 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 on this book, please contact the Halstead technical Service Helpline on 0844 371 1111.

### 9.2 External wiring limitations

Any external wiring must remain within the limits as detailed in the table.

### 9.3 Typical control applications

The appliance can be used with the following controls:

- programmable room thermostats ([fig. 37](#)).
- OT+ control, please contact the Halstead technical Service Helpline for detailed instruction on specific OT+ controls ([fig. 38](#)).
- external sensor.
- twin-channel programmers. The appliance can be used in conjunction with typical 'S'-Plan/'Y'-Plan systems (see pag. 42), please contact the Halstead technical Service Helpline should you require further detailed instruction.

### 9.4 Other devices

Contact the controls manufacturer and/or your technical department 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.energyefficiency.gov.uk](http://www.energyefficiency.gov.uk)).

### 9.5 Mechanical clock (Pt. No. 600540)

A mechanical clock is entirely available for the iHeat range and eliminates the need for an external time control.

The kit is comprises the following:

- mechanical clock
- wiring harness
- instructions

Isolate the appliance from the electrical supply and remove the clock blanking disc from the clock aperture on the boiler. Keep the screws safe, as they will be required to secure the programmer to the aperture.

Connect the spade connections of the wiring harness to the clock as shown in [figure 36-37](#). Connect the other end of the wiring harness as detailed in [figure 36-37](#).

fig. 36

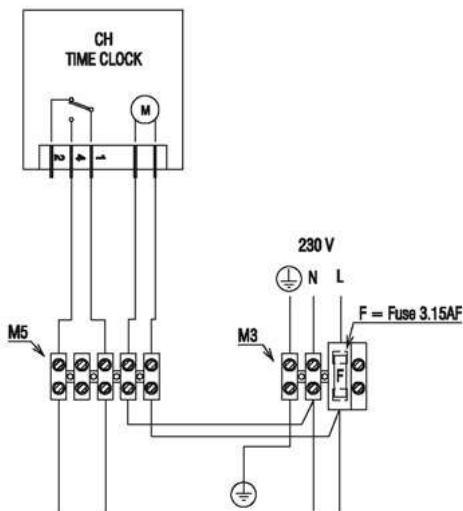


fig. 36

fig. 37

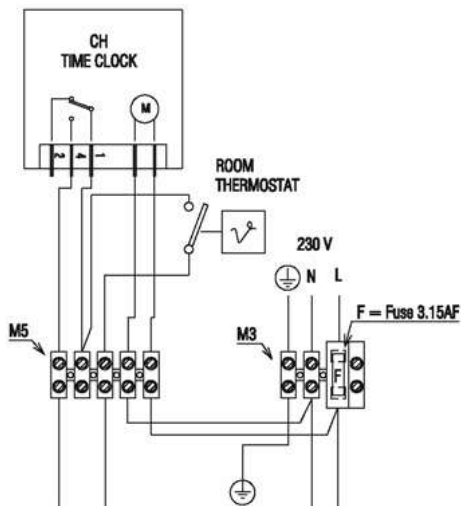


fig. 37

fig. 38

OPTIONAL DEVICE [24V] TERMINAL BLOCK

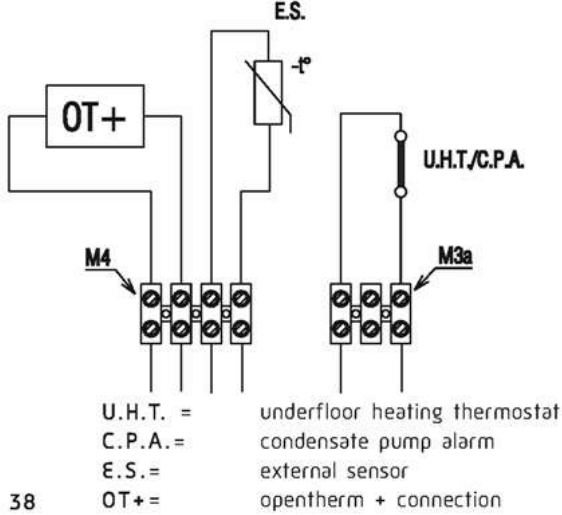


fig. 38

Secure the clock to the clock aperture using the screws previously removed from the blanking disc.

**IMPORTANT:**

- The boiler must always be supplied with a permanent 230V electrical supply.
- Always remove the link between TA & TA on the appliance high-voltage terminal strip whenever additional controls are connected to the appliance.
- Do not connect any controls or auxiliary equipment to the low-voltage terminal strip, other than that approved.

9.6 Functional diagram

fig. 39

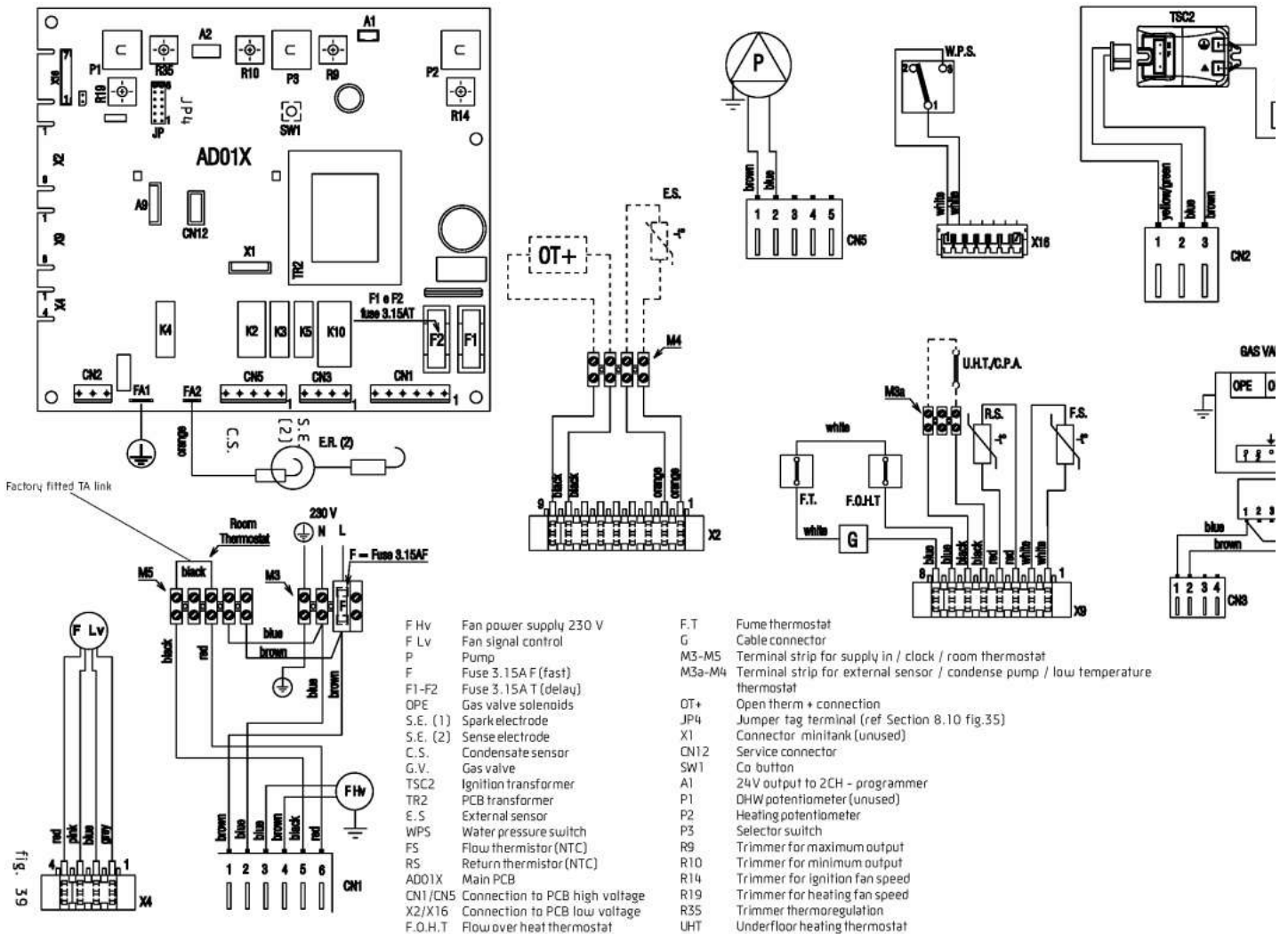
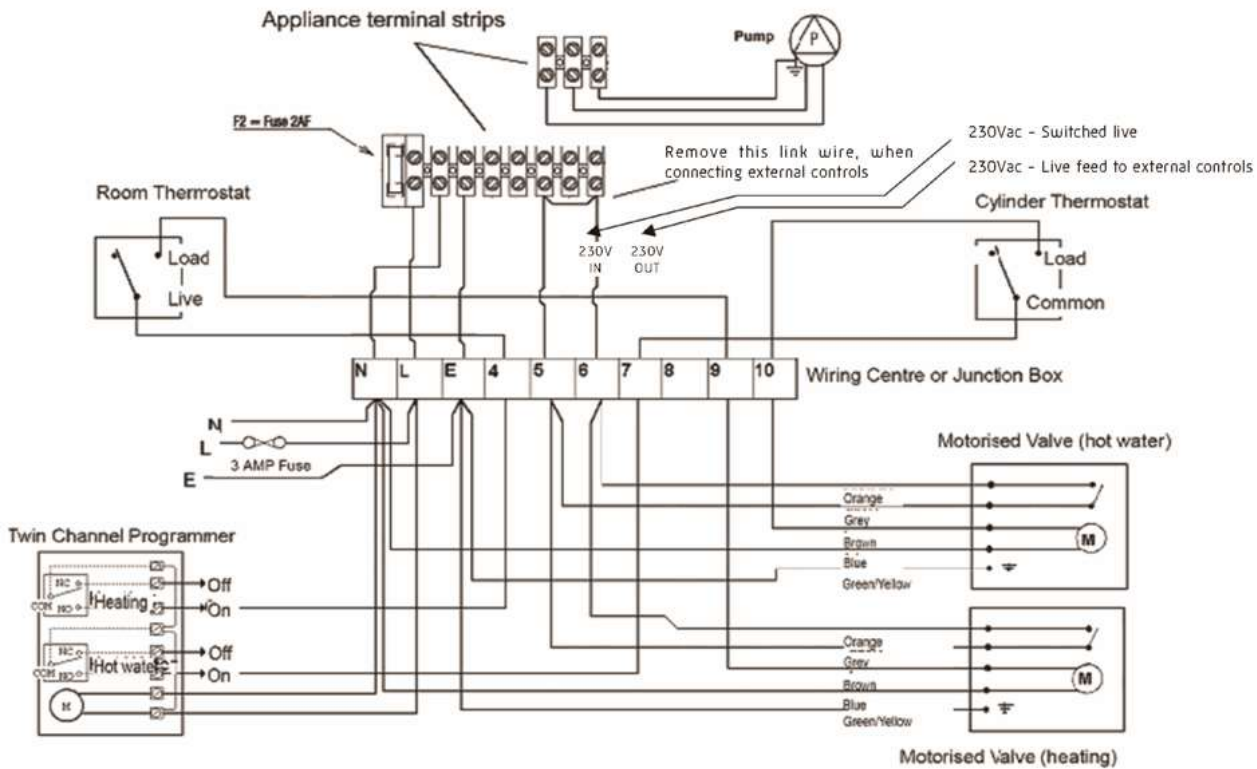
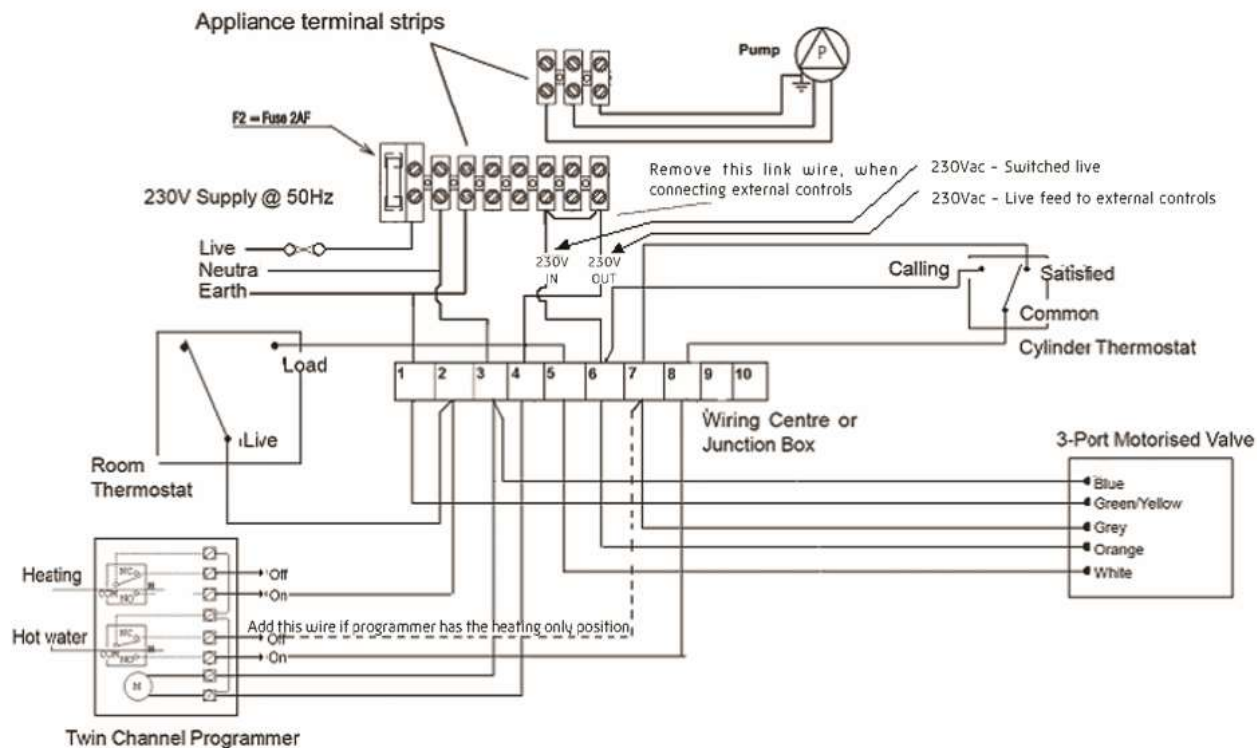


fig. 39

## "S" - Plan with 2-channel programmer



## "Y" - Plan with 2-channel programmer



## 11.0 LPG Instructions

### 11.1 Related documents

BS 5440	PARTS 1 & 2	FLUES & VENTILATION REQUIREMENTS
BS 5449	PART	1 FORCED CIRCULATION OF HOT WATER SYSTEMS
BS 5482	PART	1 DOMESTIC BUTANE & PROPANE GAS BURNERS IN PERMANENT DWELLINGS
BS 5546		INSTALLATION OF GAS HOT WATER SUPPLIES FOR DOMESTIC

	<b>PURPOSES</b>
<b>BS 6798</b>	<b>INSTALLATION OF BOILERS OF RATED NOT EXCEEDING 60 kW</b>

## 11.2 Technical data

Gas Pressures	IHeat 25s
Inlet pressure	37.0mbar
Maximum gas rate (kg/hr)	1.94
Minimum gas rate (kg/hr)	0.47
Injector size	4.7mm
CO <sub>2</sub> max (%)	10
CO <sub>2</sub> min (%)	10
CO max (PPM) less than	200
CO min (PPM) less than	15
NOx max (mg/kWh)	70.6
NOx min (mg/kWh)	53.0
CO/CO <sub>2</sub> ratio @ max	0.002 to 1
CO/CO <sub>2</sub> ratio @ min	0.0002 to 1
SEDBUK 'A' (%)	92.4

## 11.3 Converting the appliance gas type

To convert the appliance to another gas type it is necessary to change the gas injector, adjust the appliance fan speeds and adjust the gas valve (CO<sub>2</sub>).

- To change the injector see [7.12.1](#)
- To adjust the fan speeds see [8.3](#)
- To adjust CO<sub>2</sub> values see [8.4](#)

## 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 the CO and CO<sub>2</sub> flue gas levels and adjusting the gas valve

### NOTE:

*Checking the combustion values at Maximum and Minimum rate and/or adjustment of the gas valve must only be carried out using a suitably calibrated flue gas analyser.*

Isolate the appliance from the electrical supply and remove the appliance casing as described in [5.23.1](#). Insert the analyser probe into the flue gas test point (A,B [fig.30](#)). Restore the electrical supply to the boiler and switch the boiler to the OFF mode.

To adjust the valve you must first ensure that the fan speed potentiometers (trimmers) have been set correctly (see [8.3](#)).

Remove the 3-selector knobs, locate and press the CO button (see [fig.33](#)). The appliance will operate in CO mode for approximately 15 minutes (see [8.2.2](#)).

### 11.6.1 Gas Valve Maximum Setting

Locate and gently turn the HTG trimmer until the maximum value fan speed (see fan speed data table - max) is obtained and then check that the combustion readings correspond to the boiler model. (see [Section 3](#) – Technical data) If the flue gas readings are incorrect the maximum gas rate must be adjusted as follows.

Using a 2.5mm Allen key, very slowly turn the maximum adjustment screw (see [fig.34](#)) – clockwise to decrease anti-clockwise to increase – until the correct values are achieved.

### NOTE:

*Allow time for the analyser readings to stabilize When correct readings are obtained combustion levels must be carried out at Minimum gas rate.*

### 11.6.2 Gas Valve minimum setting

Locate and gently turn the HTG trimmer until the minimum value fan speed (see fan speed data table-min) is obtained and then check that the combustion readings correspond to the boiler model. (see [Section 3](#) – Technical data) If the flue gas readings are incorrect the minimum gas rate must be adjusted as follows.

Using a suitable screwdriver, very slowly turn the minimum adjustment screw (see [fig.34](#)) – clockwise to increase, anti-clockwise to decrease – until the correct combustion values are achieved.

### NOTE:

*Allow time for the analyser readings to stabilize. Important: if after adjustment of the valve the carbon monoxide (CO) or carbon dioxide (CO<sub>2</sub>) levels are outside the range quoted, than call Halstead Boilers Ltd technical helpline on 0844-3711111.*

If in doubt ASK!

### 11.6.3 Completion

On completion of the combustion analysis check and/or any gas valve adjustment, set the HTG trimmer to the corresponding value as detailed in the fan speed table. Refit the 3-selector knobs and move the mode selector to the OFF position.

Remove the test probe from the test point and refit.

**IMPORTANT:**

**A GAS TIGHTNESS CHECK MUST BE CARRIED OUT IF ANY GAS CARRYING COMPONENTS HAVE BEEN REMOVED, REPLACED, OR DISTURBED.**

#### FAN SPEED (rpm) TABLE - LPG

MODEL	MAX	MIN	HTG	IGN
iHeat25s	5400	1700	5400	3700

### 11.7 Appliance fan speeds

The appliance fan speeds require to be checked and/or adjusted prior to making any adjustments to the gas valve or if the main PCB has been replaced.

**CAUTION:**

*Gas type and appliance fan speed (output) must be set according to the specific appliance specification. The manufacturer accepts no responsibility if the gas type and/or fan speed is not correctly adjusted according to the respective appliance specification as detailed on the appliance data badge.*

#### 11.7.1 Checking/adjusting the appliance fan speeds

Move the selector switch to the OFF position and remove the 3-selector knobs.

#### 11.7.2 Absolute max fan speed

Locate the MAX trimmer ([fig. 33](#)) and gently adjust clockwise or counter clockwise to achieve the correct fan speed (see table above).

**NOTE:**

*the display shows the fan RPM in multiples of 1000, i.e. 2.5 = 2500RPM.*

#### 11.7.3 Absolute min fan speed

Locate the MIN trimmer ([fig. 33](#)) and gently adjust clockwise or counter clockwise to achieve the correct fan speed (see table above).

**NOTE:**

*the display shows the fan RPM in multiples of 1000, i.e. 2.5 = 2500RPM.*

#### 11.7.4 Ignition fan speed

Locate the IGN trimmer ([fig. 33](#)) and gently adjust clockwise or counter clockwise to achieve the correct fan speed (see table above).

**NOTE:**

*the display shows the fan RPM in multiples of 1000, i.e. 2.5 = 2500RPM.*

#### 11.7.5 Heating fan speed

Locate the HTG trimmer ([fig. 33](#)) and gently adjust clockwise or counter clockwise to achieve the correct fan speed (see table above).

**NOTE:**

*the display shows the fan RPM in multiples of 1000, i.e. 2.5 = 2500RPM.*

### 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 \_\_\_\_\_







**TECHNICAL SERVICES, TRAINING AND MARKETING**

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

**MANUFACTURING, ACCOUNTS AND SALES**

Halstead Boilers Limited, 20/22 First Avenue, Bluebridge Industrial Estate, Halstead, Essex C09 2EX

Telephone: 0844 371 1111 Fax: 01787 474588

Part of the Glen Dimplex Group

Email: [sales@halsteadboilers.co.uk](mailto:sales@halsteadboilers.co.uk) or [service@halsteadboilers.co.uk](mailto:service@halsteadboilers.co.uk) or [training@halsteadboilers.co.uk](mailto:training@halsteadboilers.co.uk)

Website: [www.halsteadboilers.co.uk](http://www.halsteadboilers.co.uk)

Halstead Boilers is continuously improving its products and may therefore change specifications without prior notice.

The statutory rights of the consumer are not affected.

**SERVICE HELPLINE & TRAINING: 0844 371 1111**