

Installation and Servicing

To be left with the user

British Gas **330+**

G.C. No. 41-019-11

**High Efficiency
Condensing Boiler**



14370

British Gas  **Scottish Gas** 

British Gas Service Tel: 0845 9500400

www.house.co.uk

These instructions consist of, Installation, Servicing, Fault Finding, Replacement of Parts and Spares. The instructions are an integral part of the appliance and must, to comply with the current issue of the Gas Safety (Installation and Use) Regulations, be handed to the user on completion of the installation.

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WARNINGS

Gas Leak or Fault

Turn off the gas emergency control valve immediately. Eliminate all sources of ignition, i.e. smoking, blowlamps, hot air guns etc. Do not operate electrical lights or switches either on or off. Open all doors and windows, ventilate the area. Call the British Gas Emergency Service telephone number: **0800 111 999**.

Sheet Metal Parts

This boiler contains metal parts (components) and care should be taken when handling and cleaning, with particular regard to edges.

Sealed Components

Under no circumstances must the User interfere with or adjust sealed parts.

Important Information

Gas Category

This boiler is for use only on G20 natural gas.

Gas Safety (Installation and Use) Regulations

In your own interests and that of safety, it is the Law that ALL gas appliances are installed by a competent person in accordance with the current issue of these regulations.

Control of Substances Hazardous to Health

Under Section 6 of The Health and Safety at Work Act 1974, we are required to provide information on substances hazardous to health.

The adhesives and sealants used in this appliance are cured and give no known hazard in this state.

Manual Handling

With regards to the "Manual Handling Operations, 1992 Regulations", the appliance exceeds the recommended weight for a one man lift, refer to section 17 for more information.

The handling of the boiler may involve lifting, pushing and pulling, the use of a sack truck may be required.

The following handling techniques and precautions should be considered:

- Grip the boiler at its base
- Be physically capable
- Use safety clothing where appropriate, e.g. gloves, safety footwear.

Ensure safe lifting techniques are used

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

Electrical Supply

The boiler MUST be earthed.

All system components shall be of an approved type and all wiring to current I.E.E. wiring regulations.

External wiring must be correctly earthed, polarised and in accordance with the relevant standards.

In GB, this is BS 7671.

In IE, this is the current edition of ETCI rules.

The boiler MUST be connected to a permanent 230V ac, 50Hz supply.

Connection of the whole electrical system of the boiler, including any heating controls, to the electrical supply MUST be through one common isolator and must be fused 3 Amp maximum.

Isolation should be by a double pole switched fused spur box, with a minimum gap of 3mm for both poles. The fused spur box should be readily accessible and preferably adjacent to the appliance. It should be identified as to its use.

Alternatively connection can be made through an unswitched shuttered socket and 3A fused 3-pin plug both to the current issue of BS 1363, provided they are not used in a room containing a bath or shower.

Wiring to the boiler must be PVC 85°C insulated cable, not less than 0.75mm² (24/0.20mm).

Testing and Certification

This boiler is tested and certificated for safety and performance. It is, therefore, important that no alteration is made to the boiler, without permission, in writing, by British Gas.

Any alteration not approved by British Gas, could invalidate the certification, boiler warranty and may also infringe the current issue of the statutory requirements.

Statutory Requirements

CE Mark

This boiler meets the requirements of Statutory Instrument, No. 3083 The Boiler (Efficiency) Regulations, and therefore is deemed to meet the requirements of Directive 92/42/EEC on the efficiency requirements for new hot water boilers fired with liquid or gaseous fuels.

Type test for purposes of Regulation 5 certified by: Notified body 0087.

Product/production certified by: Notified body 0086.

The CE mark on this appliance shows compliance with:

1. Directive 90/396/EEC on the approximation of the laws of the Member States relating to appliances burning gaseous fuels.
2. Directive 73/23/EEC on the harmonisation of the Laws of the Member States relating to electrical equipment designed for use within certain voltage limits.
3. Directive 89/336/EEC on the approximation of the Laws of the Member States relating to electromagnetic compatibility.

IMPORTANT

Where no British Standards exists, materials and equipment should be fit for their purpose and of suitable quality and workmanship.

The installation of this boiler must be carried out by a **competent person** in accordance the rules in force in the countries of destination.

Manufacturer's instructions must not be taken as overriding statutory requirements.

Statutory Requirements

In GB, the installation of the boiler must comply with the requirements of the current issue of BS6798 and be carried out by a competent person as described in the following regulations:

The manufacturer's instructions supplied.

The Gas Safety (Installation and Use) Regulations.

The appropriate Buildings Regulations either The Building Regulations, The Building Regulations (Scotland), The Building Regulations (Northern Ireland).

The Water Fittings Regulations or Water byelaws in Scotland. The Health and Safety at Work Act, Control of Substances Hazardous to Health (COSHH).

The Current I.E.E. Wiring Regulations.

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

In IE, the installation must be carried out by a **competent person** and installed in accordance with the current edition of I.S.813 "Domestic Gas Installations", the current Building Regulations and reference should be made to the current ETCI rules for Electrical Installation.

GB: the following Codes of Practice apply:

BS4814, BS6798, BS5440 Part 1 and 2, BS5546 Part 1, BS5449, BS6891, BS6700, BS7074 Part 1 and 2, BS7593, BS7671.

IE: I.S.813, BS5546, BS 5449, BS 7074, BS 7593.

NOTE: For further information, see the current issue of the Building Regulations, approved document L1 (in the UK) and the following current issues of:

- 1) Central heating system specification (CheSS) and
- 2) Controls for domestic central heating system and hot water. BRECSU.

Gas Supply

The gas installation must be in accordance with the relevant standards.

In GB, this is BS6891.

In IE, this is the current edition of I.S.813 "Domestic Gas Installations".

The supply from the governed meter must be of adequate size to provide a steady inlet working pressure of 20mbar (8in wg) at the boiler.

On completion, test the gas installation for tightness using the pressure drop method and suitable leak detection fluid, purge in accordance with the above standard.

Domestic Hot Water

All domestic hot water circuits, connections, fittings must be in accordance with the relevant standards and water supply regulations.

GB: Guidance G17 to G24 and recommendation R17 to R24 of the Water Regulations Guide (for Scotland, the Water Byelaws 2000, Scotland).

IE: The current edition of I.S.813 "Domestic Gas Installations".

Heating System

In GB, it is necessary to comply with the Water Supply (Water Fittings) Regulations 1999 (for Scotland, the Water Byelaws 2000, Scotland).

To comply with the Water regulations your attention is drawn to: The Water Regulations guide published by the Water Regulations Advisory Service (WRAS) gives full details of the requirements.

In IE, the requirements given in the current edition of I.S.813 "Domestic Gas Installations" and the current Building Regulations must be followed.

Boiler Design

Boiler Design

These boilers are designed to provide central heating from a fully pumped open vented or sealed water system and domestic hot water using a fully indirect cylinder.

Once the controls are set the boiler operates automatically.

Range Rating

The boilers are fully modulating for central heating, and it is therefore not necessary to range rate the boiler. However, if desired, it is possible to range rate the boiler between 10 and 30kW in 1kW increments, refer to section 12.

Sealed Systems

An integral kit can be provided for models rated up to 18kW.

Boiler Design

Condensate Drain

A plastic drain pipe must be fitted to allow discharge of condensate to a drain. Condensate should, if possible, be discharged into the internal household draining system. If this is not practical, discharge can be made externally into the household drainage system or a purpose designed soak away, see section 8 for more details.

Plumbing from flue terminal

Like all condensing boilers this appliance will produce a plume of condensation from the flue terminal in cool weather. This is due to the high efficiency and hence low flue gas temperature of the boiler.

This is normal and not an indication of a fault.

Safety Devices

Electrical Supply Failure

The boiler will not work without an electrical supply. Normal operation of the boiler should resume when the electrical supply is restored.

Reset any external controls, to resume normal operation of the central heating.

If the boiler does not resume normal operation press the reset button. If the boiler does not resume normal operation after this call your Installation/Service company.

Overheating Safety

The boiler software is designed to recognise the potential for an overheat lockout and will shutdown before this happens. To restart the boiler, press the reset button on the controls fascia.

If the boiler fails to resume normal operation and all external controls are calling for heat, then call your Installation/Service company.

Frost protection

The appliance has a built in frost protection device that protects the boiler from freezing. With the gas and electric supplies ON and irrespective of any room thermostat setting, the frost protection device will operate the pump when the temperature of the boiler water falls below 8°C.

A timer is used so that the temperature can be checked periodically. After 10 minutes the pump will be stopped if the temperature is higher than 10°C or has already reached 35°C. The burner will activate if the boiler temperature does not reach 10°C after 30 minutes or at any time if the temperature drops to 5°C.

The burner will switch off when the temperature reaches 35°C.

Condensate Drain Blockage

As a safety feature the boiler will stop working if the condensate drain becomes blocked. During freezing conditions this may be due to the forming of ice in the condensate drain external to the house. Release an ice blockage by the use of warm cloths on the pipe. The boiler should then restart.

Servicing, Maintenance and Spare Parts

Servicing and Maintenance

To ensure the continued efficient and safe operation of the boiler it is recommended that it is checked and serviced as necessary at regular intervals. The frequency of servicing will depend upon the particular installation conditions and usage. If this appliance is installed in a rented property there is a duty of care imposed on the owner of the property by the current issue of the Gas Safety (Installation and Use) Regulations, Section 35.

Servicing/maintenance should be carried out by a **competent person** in accordance with the rules in force in the countries of destination.

To obtain service, please contact British Gas's own service organisation using the telephone number on the front cover of this booklet.

Please be advised that the installation engineer on completion of commissioning and servicing should complete the British Gas logbook.

All CORGI registered installers carry a CORGI ID card and have a registration number. Both should be recorded in your boiler logbook. You can check your installer is CORGI registered by calling CORGI direct on: 01256 372300.

Spare Parts

Remember, when replacing a part on this appliance, use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by British Gas.

If a part is required contact British Gas's own service organisation using the telephone number on the front cover of this booklet.

Please quote the name of the appliance, this information will be on the name badge on the front of the appliance.

If in doubt seek advice from British Gas's own service organisation using the telephone number on the front cover of this booklet.

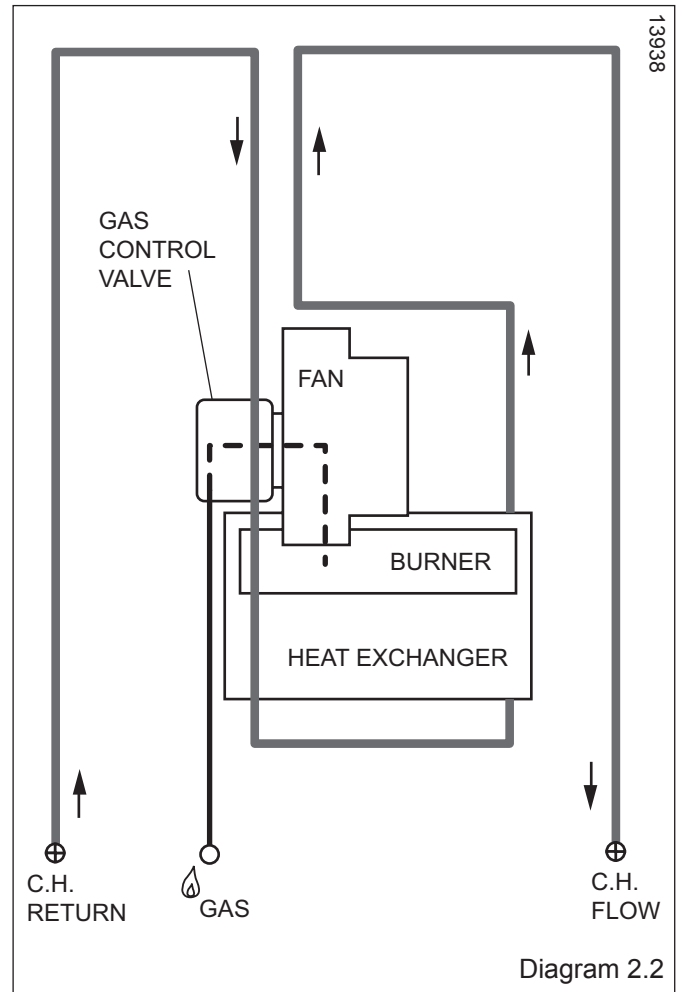
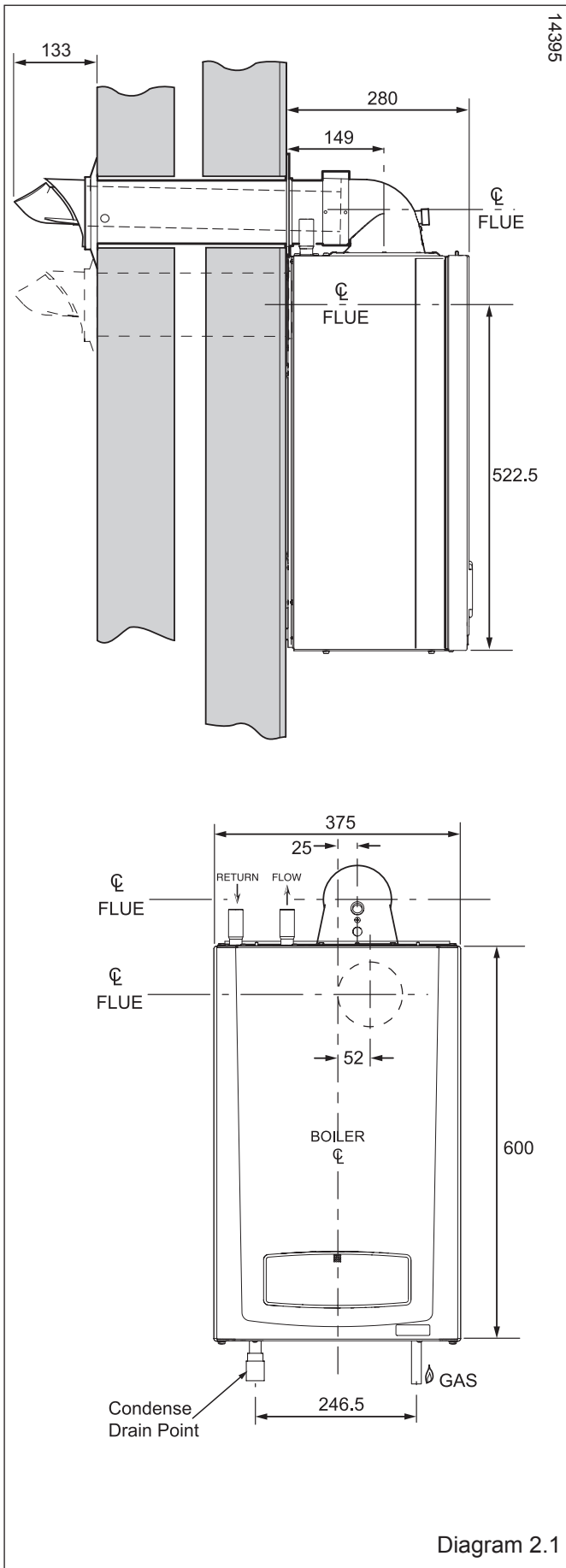
1 Boiler Specification

14454

BOILER SPECIFICATION	BG 330+					
Lift weight	25kg (55lb)					
Total weight (installed)	28kg (62lb)					
Gas connection Ø O.D.	15mm. copper					
Heating Flow and Return connection Ø O.D.	22mm. copper					
Condensate connection Ø I.D.	21.5mm. plastic					
Electrical supply	230V~50Hz					
Electrical rating	60W fused 3A					
IP classification	IPX4D					
Internal fuse rating on main PCB	2A					
Gas supply (governed meter only) and cat.	G20 natural gas					
Gas Category	I2H natural gas					
Inlet gas working pressure	20mbar					
Burner % CO ₂ case on	9.3 nominal					
Burner % CO ₂ case off	9.3 nominal					
Approximate max. gas rate after 10 mins. from cold	3.30 m ³ /h					
	116.5 ft ³ /h					
Heat input NETT Q = kW	30.8 max.		9.4 min.			
Heat output NETT Q = kW	30.0 max.		9.3 min.			
SEDBUK rating	Band A					
Flue type (all models)	C13, C33, C53					
NOx	Class 5					
Range rating - Approximate gas rates at part load	kW	m3/hr	ft3/hr	kW	m3/hr	ft3/hr
	30	3.3	117	19	2.0	69.9
	29	3.2	113	18	1.9	66.4
	28	3.0	106	17	1.8	62.9
	27	2.9	102.4	16	1.7	58.9
	26	2.8	98.9	15	1.6	55.4
	25	2.7	95.3	14	1.5	51.5
	24	2.5	88.6	13	1.4	48.0
	23	2.4	84.7	12	1.3	44.1
	22	2.3	81.2	11	1.2	40.6
	21	2.2	77.3	10	1.0	36.7
20	2.1	73.8	-	-	-	

Diagram 1.2

2 Boiler Dimensions and Hydraulic Schematic



2.1 Boiler Dimensions and Hydraulic Schematic

All dimensions are given in millimetres (except as noted). The general arrangement of the boiler is shown in diagram 2.1, and the hydraulic and gas schematic, diagram 2.2. The data label is positioned on the front of the inner casing panel.

3 Boiler Location, Clearances and Ventilation

3.1 Location

This boiler is not suitable for outdoor installation. This boiler may be installed in any room, although particular attention is drawn to the installation of a boiler in a room containing a bath or shower where reference must be made to the relevant requirements.

This boiler is suitable for installation in bathroom zones 2 and 3.

In GB this is the current I.E.E. WIRING REGULATIONS and BUILDING REGULATIONS.

In IE reference should be made to the current edition of I.S.813 "Domestic Gas Installations" and the current ETCI rules.

3.2 Clearances

The boiler should be positioned so that at least the minimum operational and servicing clearances are provided, see diagram 3.1.

Increased clearances would be beneficial for the installation. Where external access is not practicable, for flue installations consideration should be given for the space required to insert the flue internally, which may necessitate the clearance to be greater than those specified in diagram 3.1.

3.3 Timber Frame Buildings

If the boiler is to be installed in a timber frame building it should be fitted in accordance with the Institute of Gas Engineers document IGE/UP/7/1998 and BG Operational Procedures, Part 19 Building and Kitchen Work, Section 7 - Timber Frame Constructions.

3.4 Combustible Material

The boiler and flue are suitable for installation onto and through combustible materials provided that:-

- 1) Minimum 5mm clearance is maintained around the circumference of the flue (air intake).
- 2) The combustible surface and fixings are suitable for supporting the load.
- 3) The minimum clearances from the boiler case are maintained.

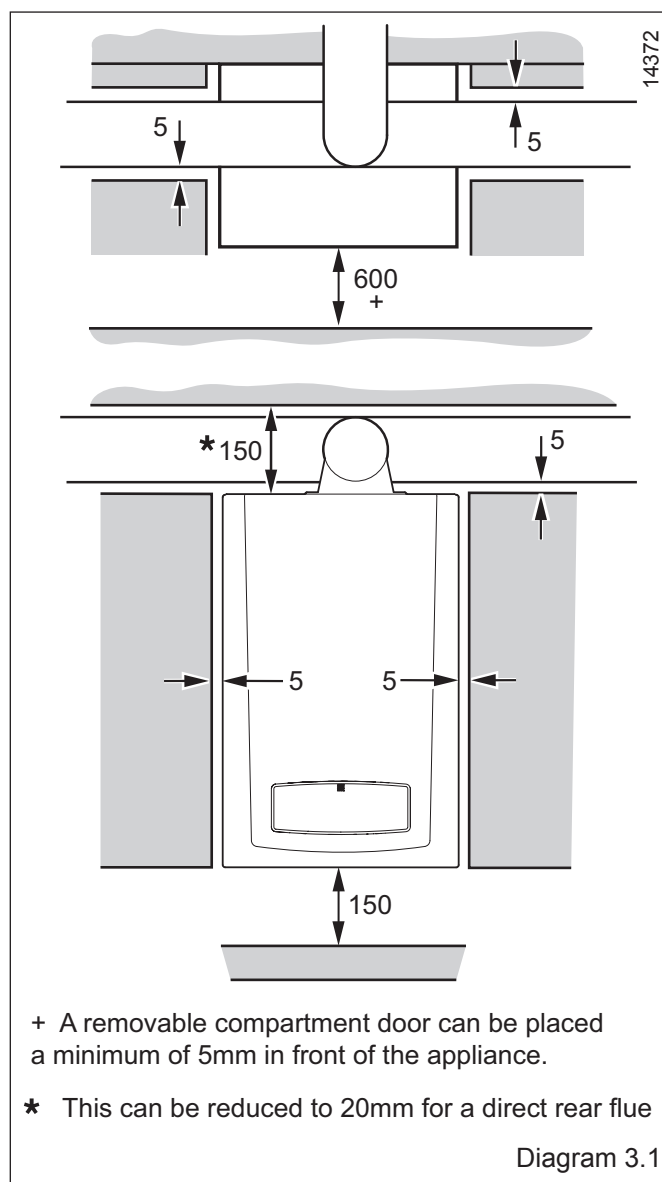
3.5 Room Ventilation

The boiler is room sealed so a permanent air vent is not required.

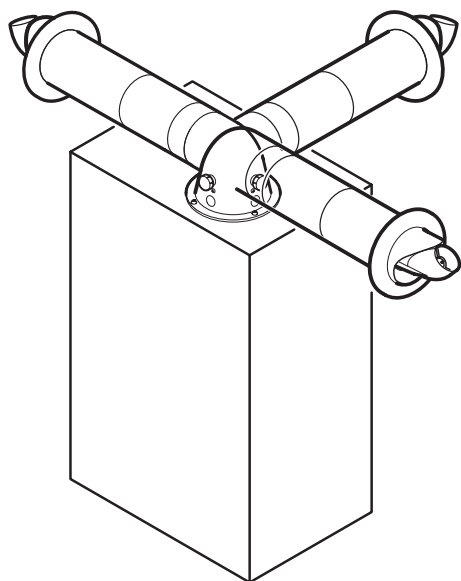
3.6 Cupboard or Compartment Ventilation

Due to the high efficiency and hence low casing temperature of this boiler, cupboard or compartment ventilation is not necessary.

Leave existing air vents.



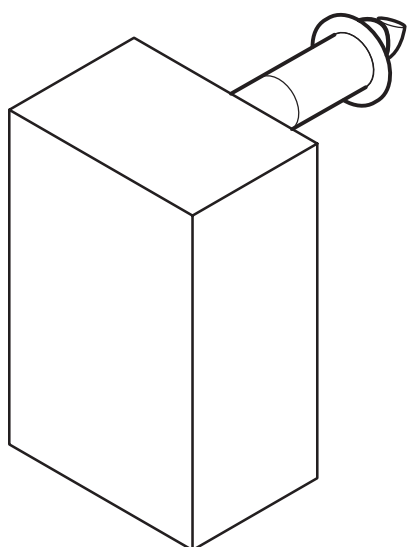
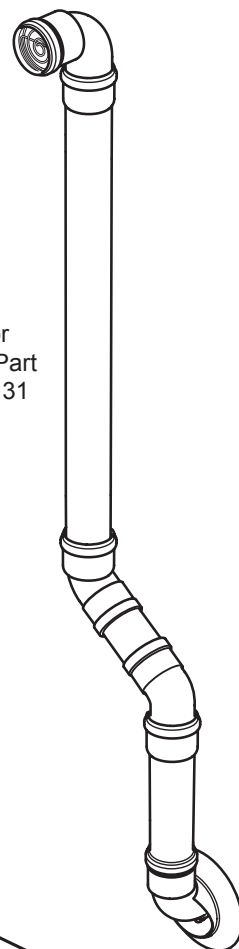
4 Flue Options and Terminal Clearances



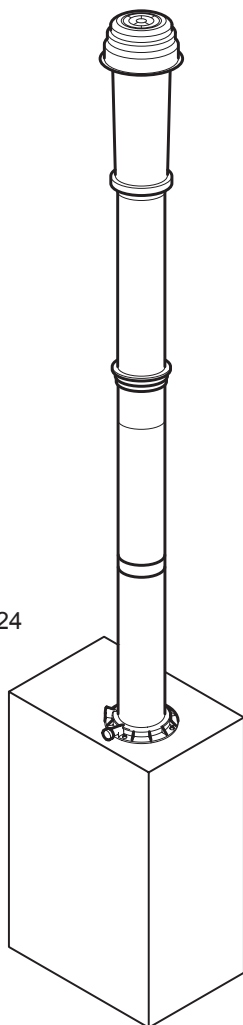
Top horizontal telescopic flue (Ø60/100)
Part No. 0020057735 - Section 10, page 20

Plume Management Kit

basic set, white, concentric flue (Ø60/100) - Part No. A2044100 for use with Part No. A2043400 and Part No. A2043600 - Section 10, page 31

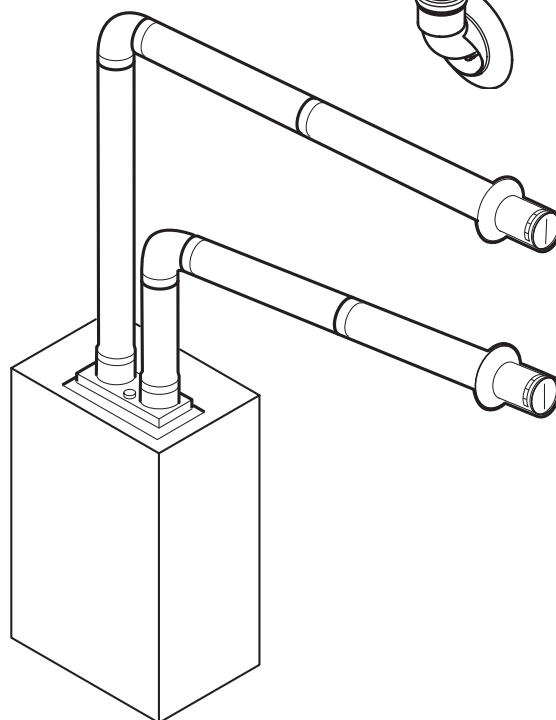


Direct rear telescopic flue (Ø60/100)
Part No. 0020057734 - Section 10, page 24



Vertical Flue

Vertical Flue Adapter, concentric flue (Ø60/100)
Part. No. A2024600 - Section 10, page 25
Vertical flue terminal kit, concentric flue (Ø60/100)
Part. No. 2000460480 - Section 10, page 25



Twin Flue

Twin Flue Adapter, concentric flue (Ø80)
Part No. A2011000 - Section 10, page 28

Diagram 4.1

4 Flue Options and Terminal Clearances

4.1 Flue Options

There are various flue options to choose from as illustrated in diagram 4.1. The flue lengths and installation are described in section 10.

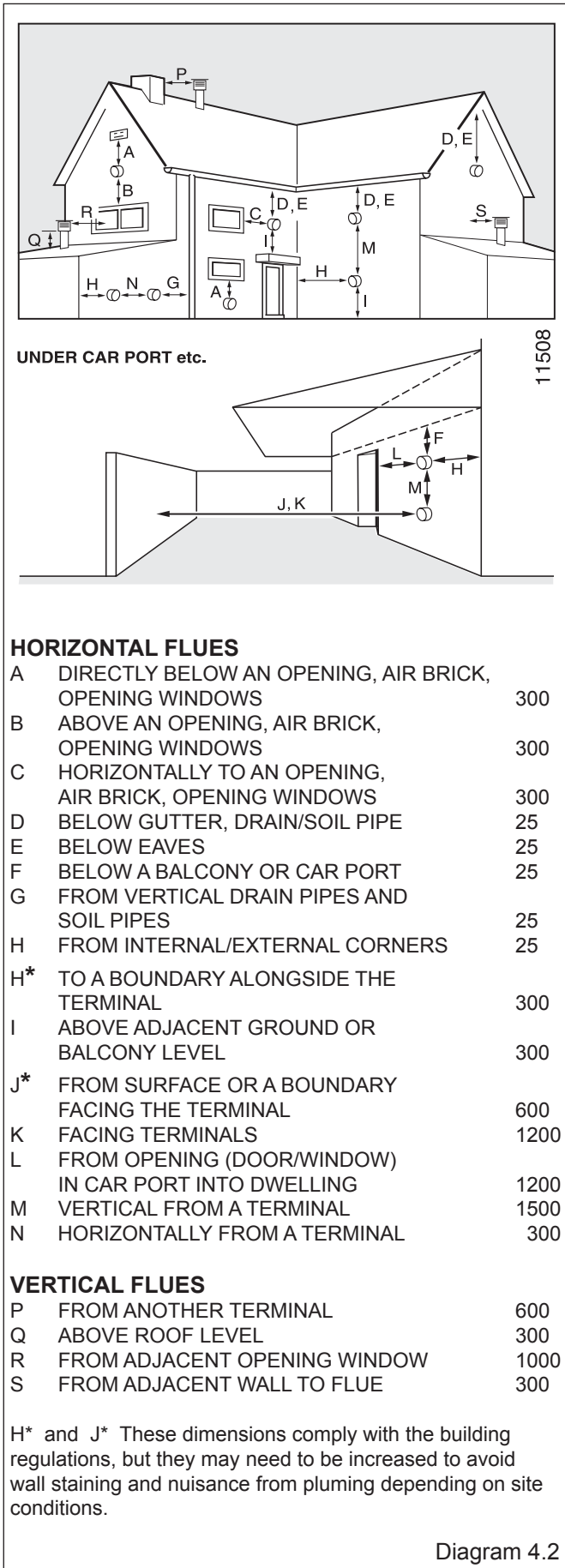


Diagram 4.2

4 Flue Options and Terminal Clearances

4.2 Flue Terminal Position

In GB the minimum acceptable siting dimensions for the terminal from obstructions, other terminals and ventilation openings are shown in diagram 4.2.

In IE the minimum distances for flue terminal positioning must be those detailed in I.S.813 "Domestic Gas Installations".

The terminal must be exposed to the external air, allowing free passage of air across it at all times.

Being a condensing boiler some pluming may occur from the flue outlet. This should be taken into consideration when selecting the position for the terminal.

The terminal rotates up to a maximum of 45° to left or right to allow pluming away from openings, people, cars, windows etc., see diagrams 4.3 and 4.4.

Carports or similar extensions of a roof only, or a roof and one wall, require special consideration with respect to any openings, doors, vents or windows under the roof. Care is required to protect the roof if made of plastic sheeting. If the carport comprises of a roof and two or more walls, seek advice from the local gas supply company before installing the boiler.

4.3 Terminal Guard

A terminal guard is required if persons could come into contact with the terminal or the terminal could be subject to damage.

If a terminal guard is required, it must be positioned to provide minimum of 50mm clearance from any part of the terminal and be central over the terminal.

The guard should be similar to that shown in diagram 4.5.

A suitable guard is manufactured by: -

Tower Flue Components

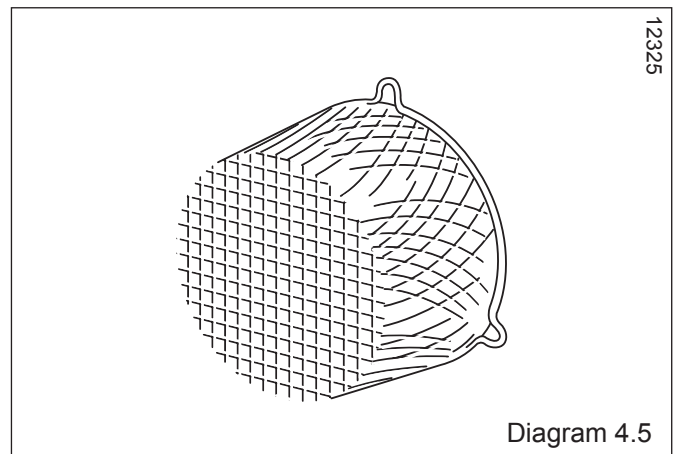
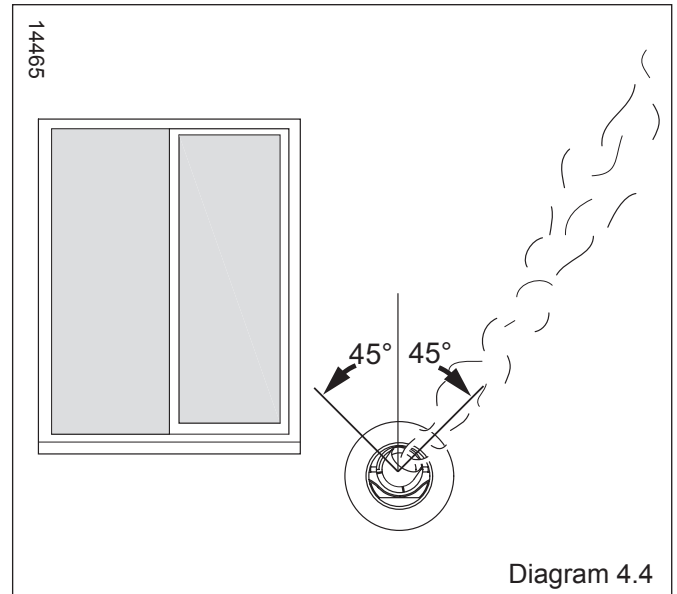
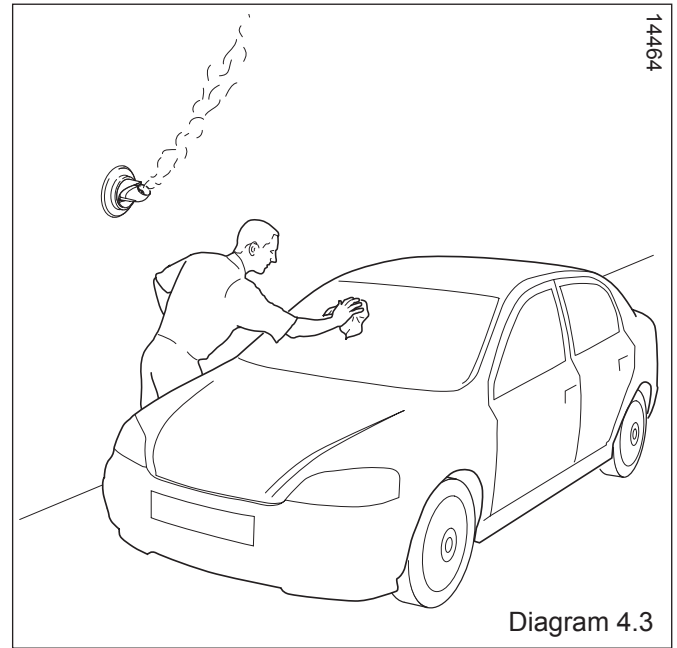
Morley Rd.

Tonbridge

Kent

TN9 1RA.

Size: 280mm x 280mm x 270mm.



5 Water Systems - General

5.1 Safety Valve

This boiler is designed to provide central heating from a fully pumped open vented or sealed water system and domestic hot water using a fully indirect cylinder.

5.2 Draining Points

Draining taps must be provided at all low points of the system, which will allow the entire system to be drained. Draining taps shall be to the current issue of BS2879.

5.3 Pump

The pump should be fitted on the flow pipe from the boiler and have isolating valves each side.

A variable duty pump should be set to give a temperature difference of no greater than 20°C between the flow and return, with the thermostat set at "MAX", which is about 80°C, to give a flow rate as given in the table.

See chart for pressure loss of the boiler, diagram 5.1.

High resistance microbore systems may require a higher duty pump.

5.4 Flow Rate

If it is necessary to alter the flow rate, the system can be fitted with a lockable balancing valve in the main flow or return pipes shown in diagram 5.2. The flow rate through the boiler must not be allowed to fall below that given in diagram 5.1.

5.5 Bypass

A system bypass will be required fitted at least 1.5 metres away from the boiler, refer to the current issue of the central heating system specifications (CHeSS).

5.6 Water Treatment

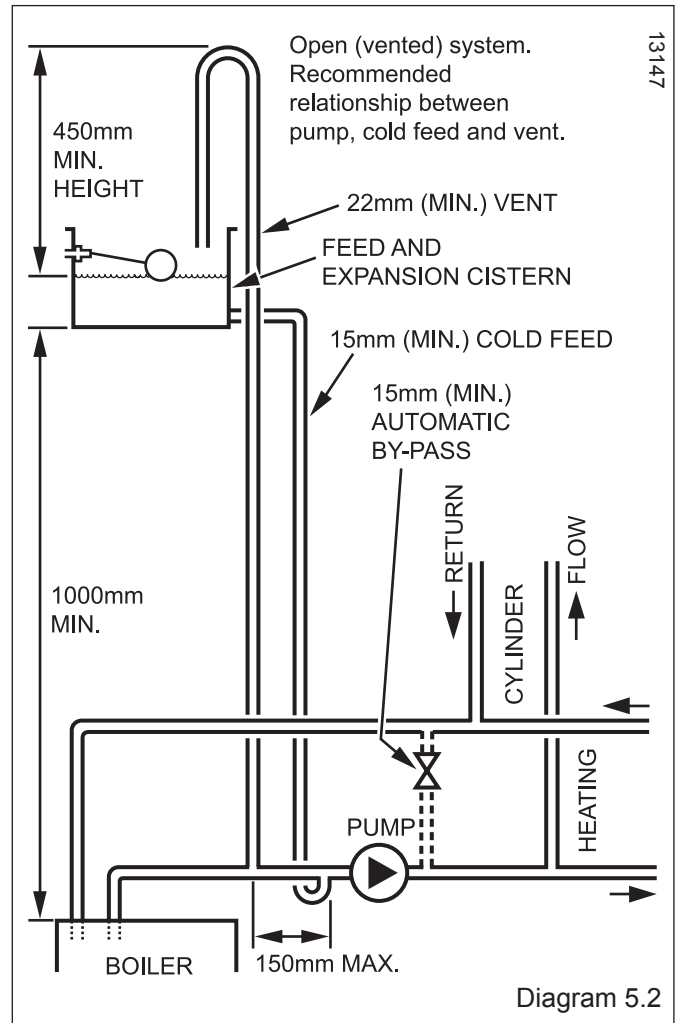
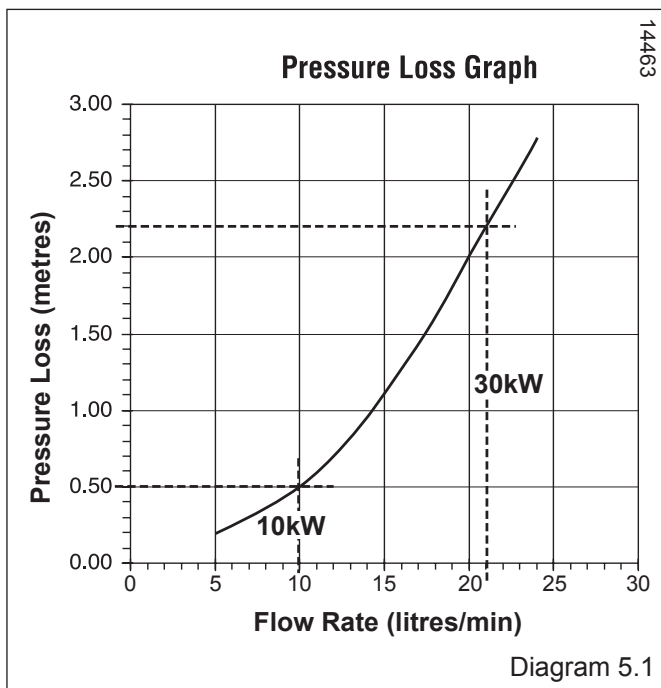
Existing system- It is ESSENTIAL that prior to installing the new boiler the system is thoroughly flushed.

New system- For optimum performance after installation, the boiler and its associated central heating system should also be flushed.

Flushing should be carried out in accordance with BS7593: 1992 using a cleanser such as Sentinel X300 or X400, Fernox Restorer or Salamander corrosion guard cleaner.

IMPORTANT: Ensure all cleanser is removed from the whole system before adding an inhibitor.

For long-term corrosion protection, after flushing, an inhibitor suitable for aluminium heat exchangers should be used, refer to the current issue of BS 5449 and BS 7593 on the use of inhibitors in central heating systems. Examples are Sentinel X100 Fernox Copal or Salamander corrosion guard inhibitor.



5 Water Systems - Open Vented

5.7 Open (Vented) Water System

The boiler must be supplied from an unrestricted water supply taken from a feed and expansion cistern situated at a maximum height of 27 metres (90ft) above the boiler. The cold feed must be 15mm minimum size, copper or equivalent.

The vent must rise continuously and be unrestricted.

It is important that the relative positions of the pump, cold feed and open vent are as shown in diagram 5.2.

5.8 Combined Feed and Vent

For combined feed and vent, a 22mm pipe must be fitted in accordance with BS 5449.

5.9 Domestic Hot Water Cylinder

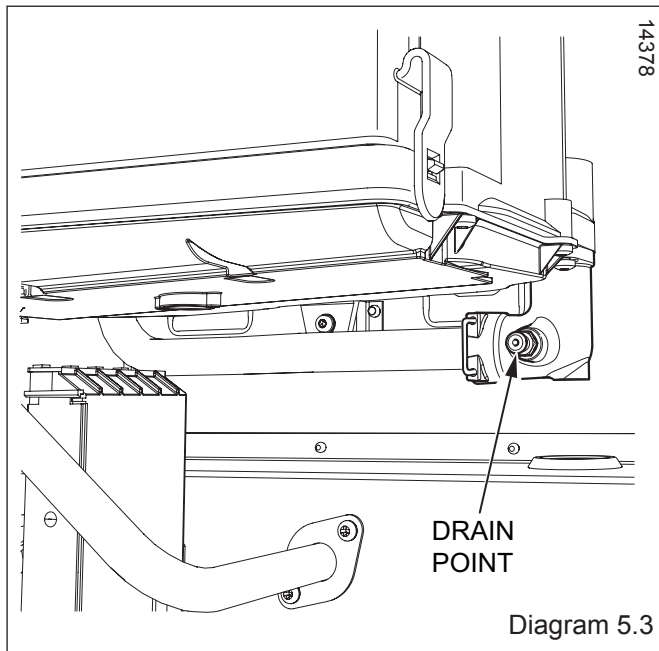
SINGLE FEED INDIRECT CYLINDERS ARE NOT SUITABLE

The domestic hot water cylinder must be of the double feed fully indirect coil type.

5.10 Draining Points

Draining taps must be provided at the lowest points of the system, which will allow the entire system to be drained.

A draining point for the appliance is provided at the position shown in diagram 5.3.



5.11 DHW System - unvented

General - All domestic hot water circuits, connections, fittings must be in accordance with the relevant standards and water supply regulations.

For GB: Guidance G17 to G24 and recommendation R17 to R24 of the Water Regulations Guide (for Scotland, the Water Byelaws 2000, Scotland).

Document G Hygiene, section 3 of the building regulations.

For IE: The current edition of I.S.813 "Domestic Gas Installations".

Where a storage system will not have a vent to atmosphere the installation must comply with the building regulations and local Water Company bylaws, see also the current issue of BS5546 and BS6700.

If fitting to an existing system the local authority should be informed.

5 Water Systems - Sealed

5.12 Sealed Water Systems

An integral sealed system kit, part no.0020051474 is available for models rated up to 18kW.

The installation must comply with the appropriate requirements of the current issue of BS4814, BS5449, BS6759, BS6798 and BS7074 Part 1 and 2.
See diagram 5.4 for a suggested layout.

5.13 Safety Valve

A safety valve must be fitted to a sealed system. It shall be preset, non-adjustable with a lift pressure of 3 bar, incorporating seating of a resilient material, a test device and a connection for drain.

The drain from the safety valve must be routed outside the building it must not discharge above an entrance or window or any type of public access area. It must be clear of any electrical fittings and routed in a continually downward direction and positioned so that any discharge can be seen.

5.14 Expansion Vessel

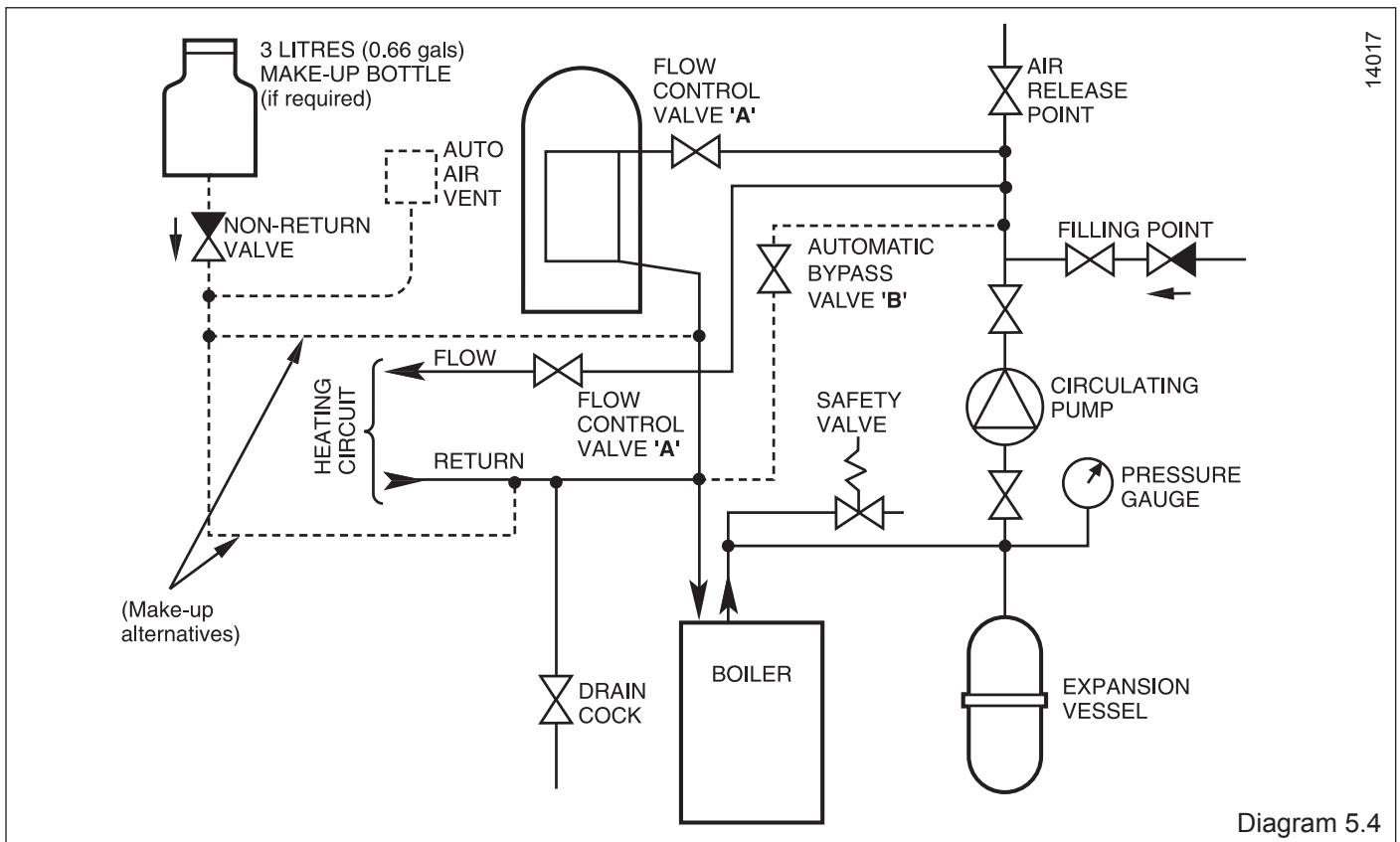
A diaphragm type expansion vessel, conforming to the current issue of BS4814 (see also BS7074 Part 1 and 2) must be connected at a point close to the inlet side of the circulating pump, see the diagrammatic layout, diagram 5.4.

The expansion vessel volume depends on the total water system volume and the initial system design pressure. For any system an accurate calculation of vessel size is given in the current issue of BS5449 and BS7074 Part 1.
Example: For an initial design pressure of 0.7 bar, the minimum total vessel volume required is $0.063 \times \text{Total System Volume}$.

NOTE: A higher initial design pressure requires a larger volume expansion vessel.

Guidance on vessel sizing is also given in the current issue of BS5449 and BS7074 Part 1, for IE refer to the current edition of I.S.813 "Domestic Gas Installations".

The charge pressure must not be less than the static head of the system, that is, the height of the highest point of the system above the expansion vessel.



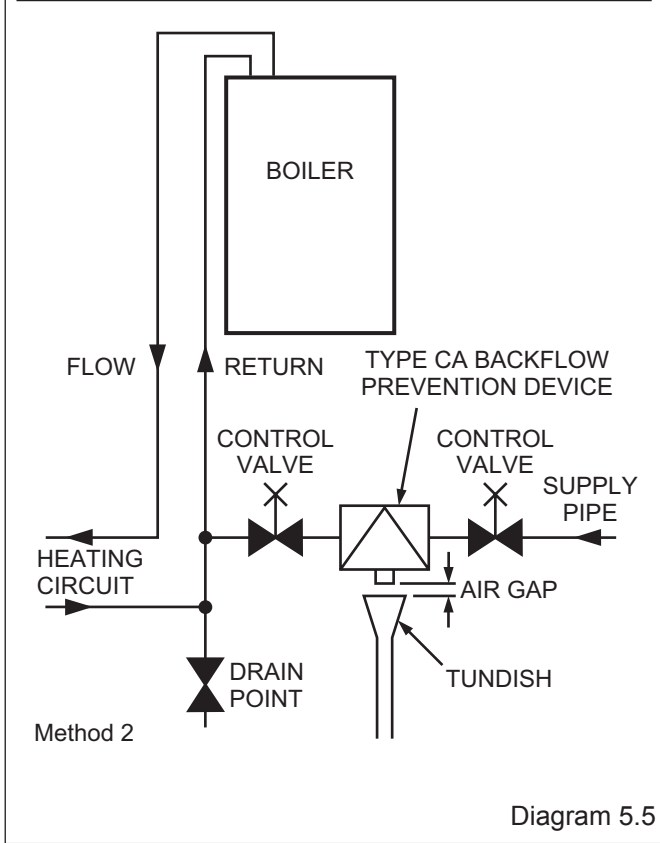
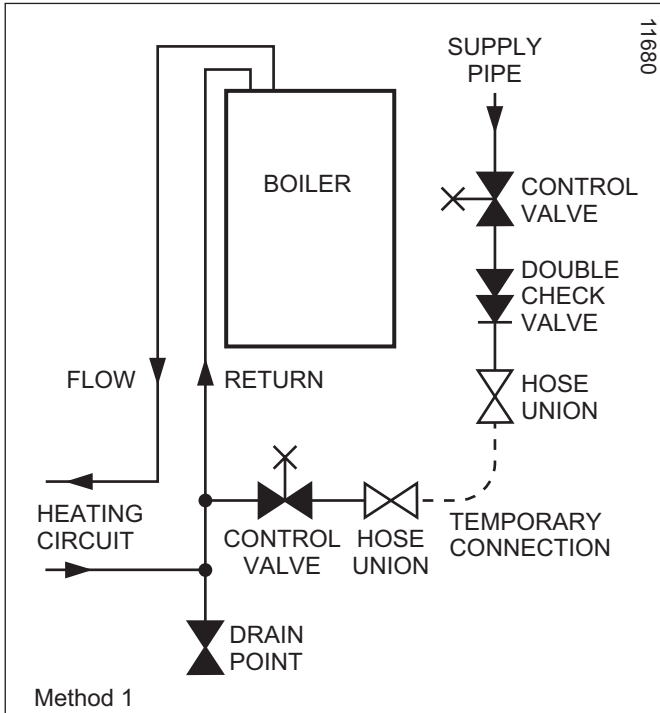
5 Water Systems - Sealed

5.15 Pressure Gauge

A pressure gauge with a set pointer and covering at least 0 to 4 bar (0 to 60 lb/in²) shall be fitted permanently to the system in a position where it can be seen when filling the system.

5.16 Domestic Hot Water Cylinder

SINGLE FEED INDIRECT CYLINDERS ARE NOT SUITABLE
The domestic hot water cylinder must be of the double feed fully indirect coil type. It must be suitable for working at a gauge pressure of 0.35 bar above the safety valve setting.



5.17 Water Makeup

Provision should be made for replacing water loss from the system using a make up bottle mounted in a position higher than the top point of the system, connected through a non-return valve to the return side of either the heating circuit or the hot water cylinder.

Alternatively, provision for make up can be made using a filling loop.

5.18 Filling a Sealed Water System

Provision for filling the system at low level must be made, see diagram 5.5. There must be no permanent connection to the mains water supply, even through a non-return valve.

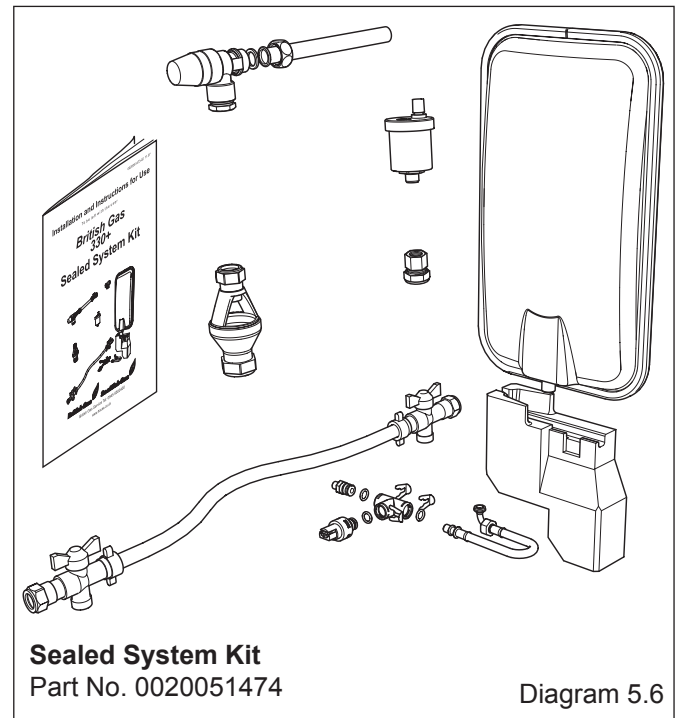
5.19 Sealed Systems

A sealed system kit is available to fit inside the case of the boiler. The kit is designed to operate up to a maximum output of 18kW.

The kit contains an expansion vessel, electronic water pressure gauge and flexible pipe to be fitted in the boiler case. A pressure relief valve and auto air vent to be fitted to the system pipework.

The accessory is available as part no 0020051474, see diagram 5.6.

NOTE: For systems greater than 18kW range rated an additional expansion vessel may be fitted or a proprietary kit installed matched to the size of the installed system. Ensure that the range rating of the appliance is indicated, see section 12.5 for details.



6 Installation Preparation

6.1 Appliance Pack

Please check the contents of packs as shown in diagram 6.1. The packs are located in the top polystyrene packing. Remove the carton sleeve and top pack then lift the boiler and its polystyrene base support out of the lower pack.

6.2 Site Requirements

The boiler mounting wall should be suitable for the weight of the appliance and be true and flat.

NOTE: Due to the varied site conditions we do not supply fixings and advise that the installer should supply those which are suitable.

6.3 Wall Template

Take the wall template from the document pack located within the top polystyrene packing and place in the desired position on the wall, giving due consideration to the required boiler clearances, see section 3, and the flue you are fitting. Mark the position of the flue centre, if fitting a side flue, extend the flue centre line into the corner then 149mm along the adjacent wall, see diagram 6.2.

For extended side flues, the flue hole centre should be determined by extending the dashed inclined line on the template to the side wall, then 149mm along the adjacent wall, see diagram 6.2. This dashed line is drawn at 44mm/metre (2.5°) rise from the boiler.

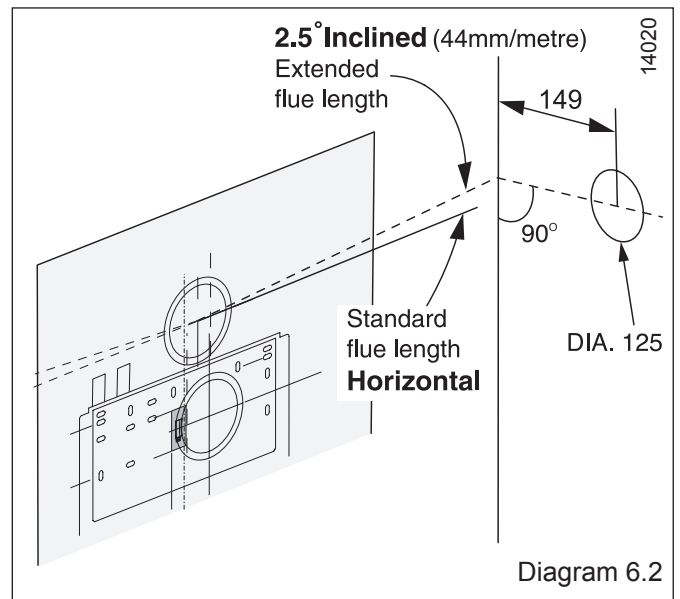
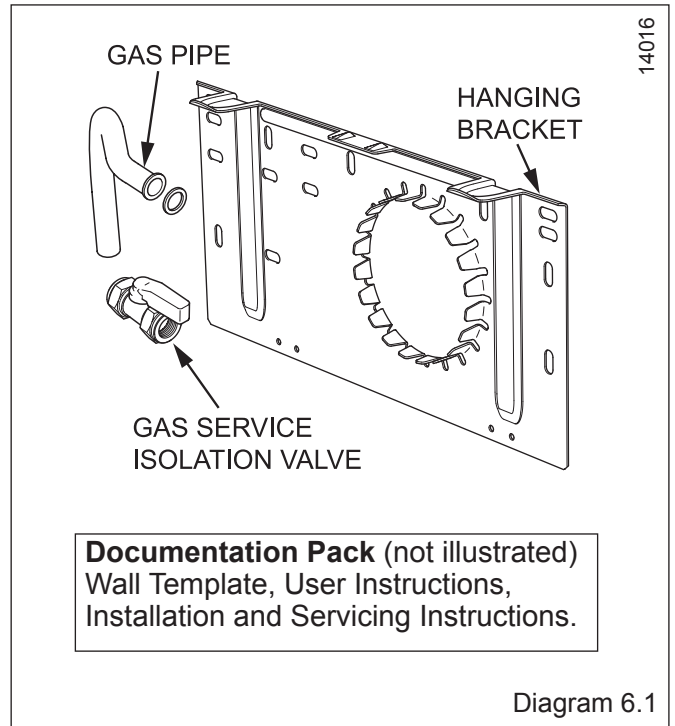
To allow for the flue passing through the wall at this angle a 125mm hole should be drilled to allow the flue to sit within the hole correctly, irrespective of internal or external installation. Remove the wall template whilst drilling the flue hole.

6.4 Flue Hole Cutting

External access flue installation can use a 105mm diameter core drill.

Internal access only flue installation will need a 125mm diameter core drill.

NOTE: The flue is designed with an internal fall of 44mm/metre (2.5°), therefore the hole can be drilled horizontally. If flue extension pipes are to be used then a core drill size of 125mm is required. This will allow the extension pieces to slope at 44mm/metre (2.5°) towards the boiler.



7 Boiler Fixing

7.1 Wall Hanging Bracket

The Wall Hanging Bracket is supplied in the main boiler packaging.

Reposition the wall template over the flue hole and mark the position of the fixing holes for the hanging bracket, see diagram 7.1.

NOTE: Due to the varied site conditions we do not supply fixings and advise that the installer should supply those which are suitable.

Drill fixing holes and insert suitable wall plugs.

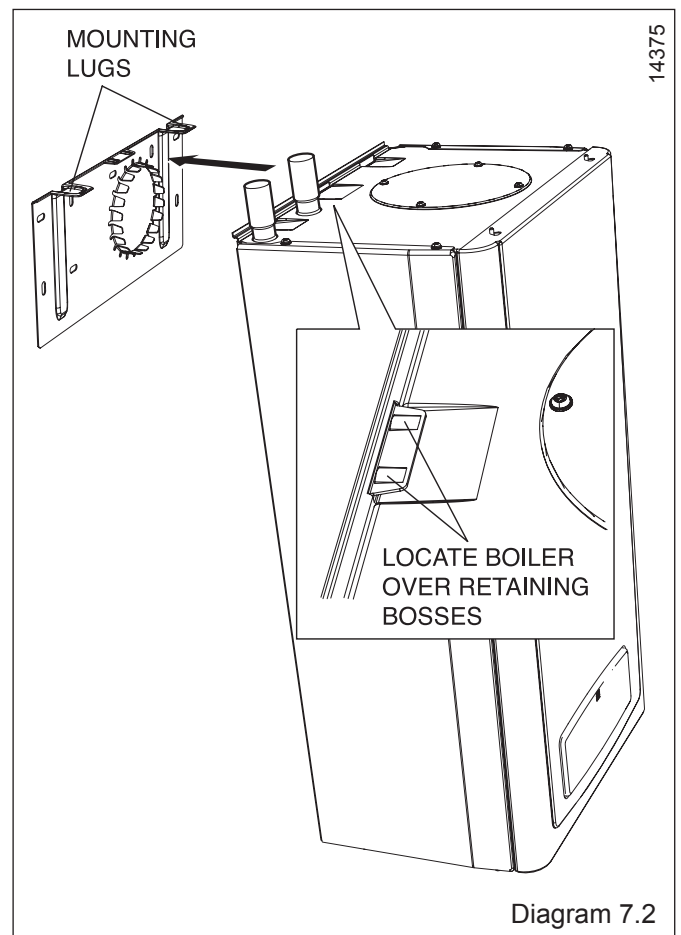
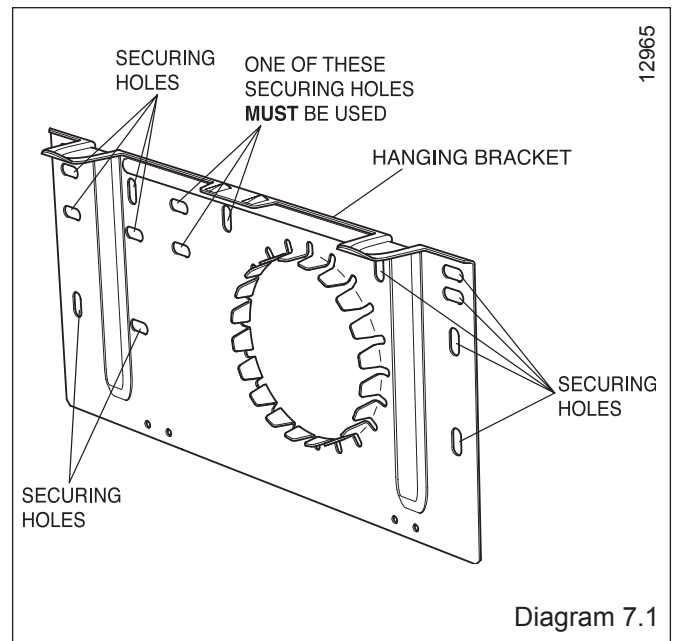
Direct Rear Flue only - If external access is not available the flue to be used should be assembled as described in sections 10.11 to 10.13 and inserted through the hole in the wall before fitting the wall hanging bracket.

7.2 Boiler Hanging

IMPORTANT: With regards to the Manual Handling Operations, 1992 Regulations, the following lift operation is deemed to be a one man lift, refer to section 17 Manual Handling.

IMPORTANT: Direct Rear Flue only - The direct rear flue must be fitted before hanging the boiler, refer to sections 10.11 to 10.13, and the rear outlet cover plate should be removed.

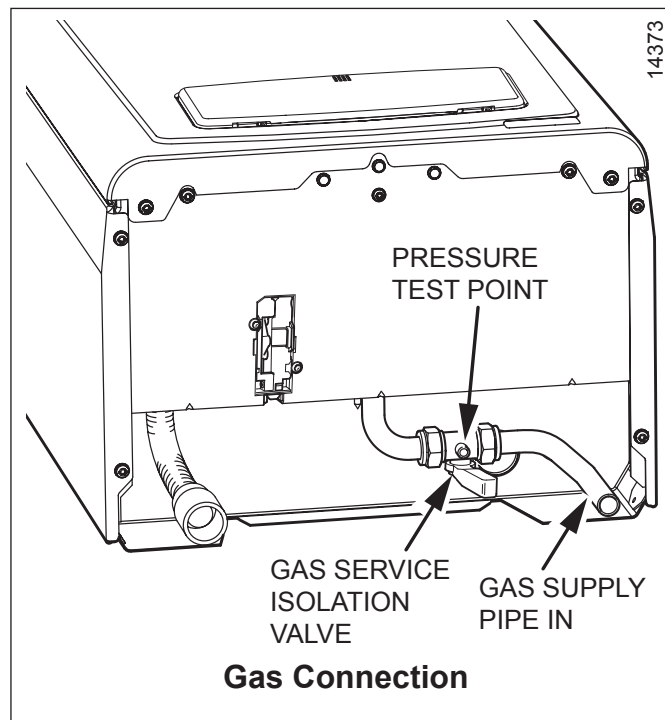
Lifting the boiler into position, lean the top of the boiler slightly to the wall and position just above the hanging bracket. Lower the boiler slowly push back and engage onto the hanging bracket making sure the boiler is located over the retaining bosses, see diagram 7.2.



8 Gas / Water and Appliance Connection

8.1 Gas Connection

Before connection check the supply of local gas. The gas supply connection is below the boiler, see diagram 8.1. The whole of the gas installation, including the meter, should be inspected, tested for tightness and purged in accordance with the current issue of BS6891 and in IE the current edition of I.S.813 "Domestic Gas Installations".



8.2 Water Connections

Provision is made for the water connections to be made from above the boiler, see diagram 8.1. The position is shown on the wall template. Flush out the domestic hot water and the heating systems before connecting to the boiler.

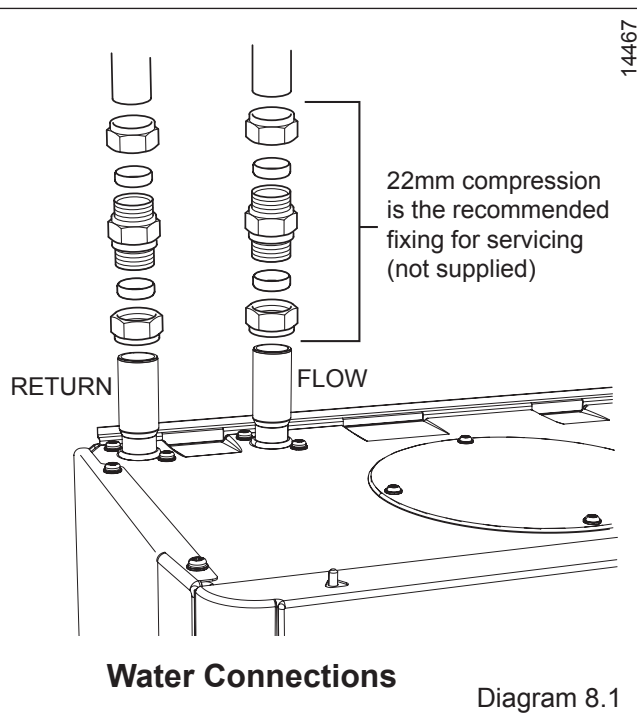


Diagram 8.1

9 Condensate Connections

9.1 Condensate Trap and Siphonic Drain Connection

A flexible condensate outlet pipe is fitted and should be used to couple the condensate trap and siphonic drain to a 22mm to 25mm O.D. non corrosive plastic pipe (overflow pipe), see diagram 9.2.

IMPORTANT: Please remove the bung from the flexible pipe before fitting to a drain outlet pipe.

NOTE: the pipe should have a fall of at least 2.5° 44mm/metre away from the boiler.

Condensate should, if possible be discharged into the household internal drainage system. If this is not practicable, discharge can be allowed into the external household drains or a purpose designed soak away, refer to diagram 9.3.

It is recommended that any external condensate drain pipe is insulated and also preferably of 32mm diameter, to prevent freezing in adverse weather conditions.

The condensate is discharged periodically in 'slugs' by siphonic action.

It is not necessary to provide air breaks or extra traps in the discharge pipe as there is already a 75mm high trap inside the boiler. Fitting an extra trap may cause the boiler siphon to work incorrectly.

Refer to BS5546 or BS6798 for advice on disposal of boiler condensate.

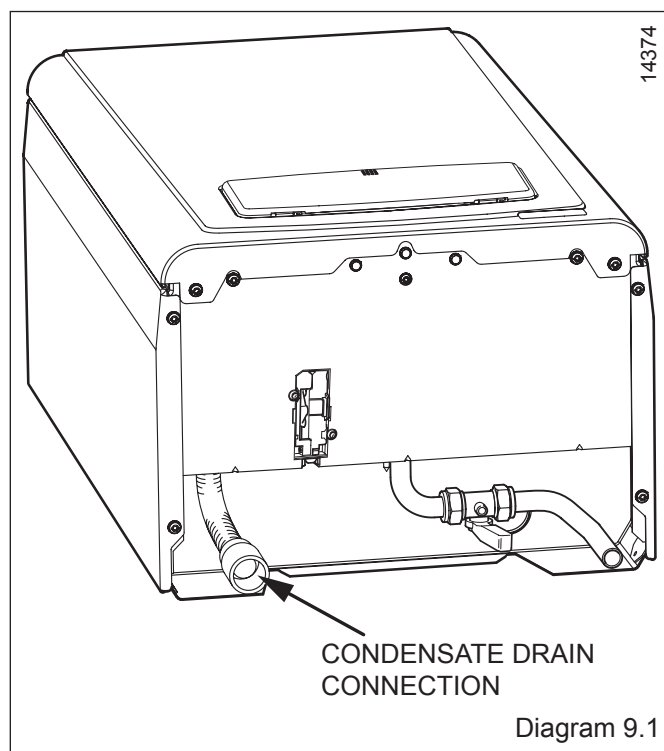
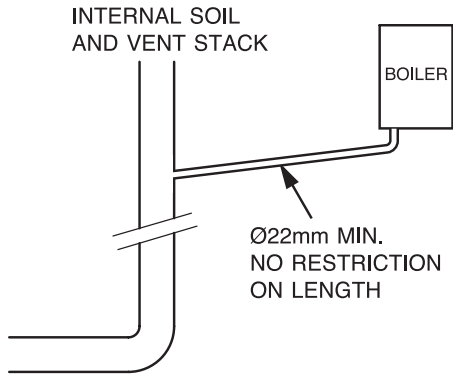


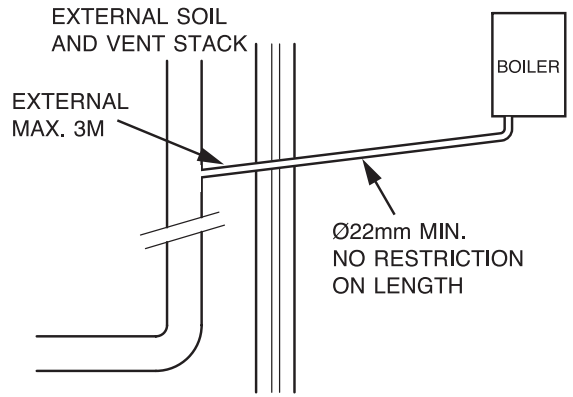
Diagram 9.1

9 Condensate Connections

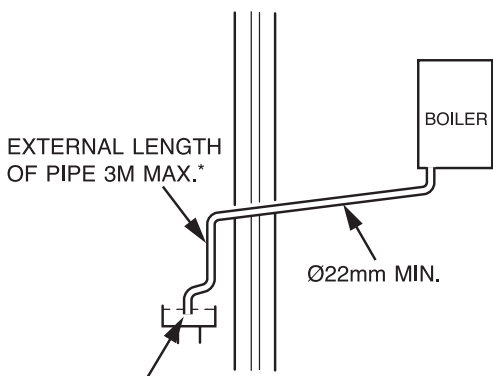
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Internal Soil and Vent Pipe



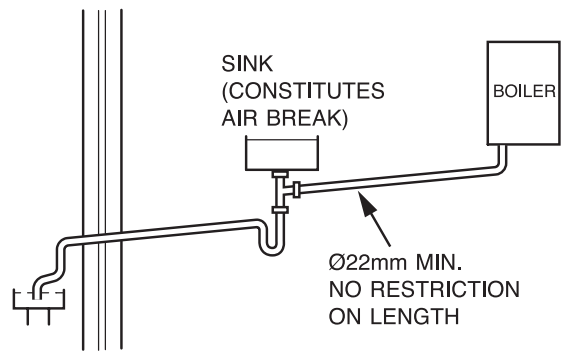
External Soil and Vent Pipe or Rainwater Pipe



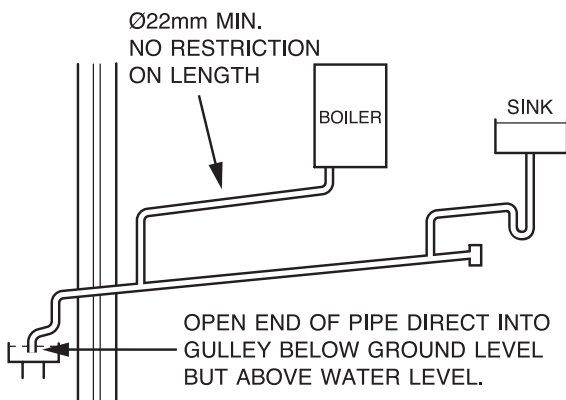
OPEN END OF PIPE DIRECT INTO GULLEY BELOW GROUND BUT ABOVE WATER LEVEL

*NOTE: FOR EXTENDED PIPE RUNS 32mm DIA. PIPE SHOULD BE USED.

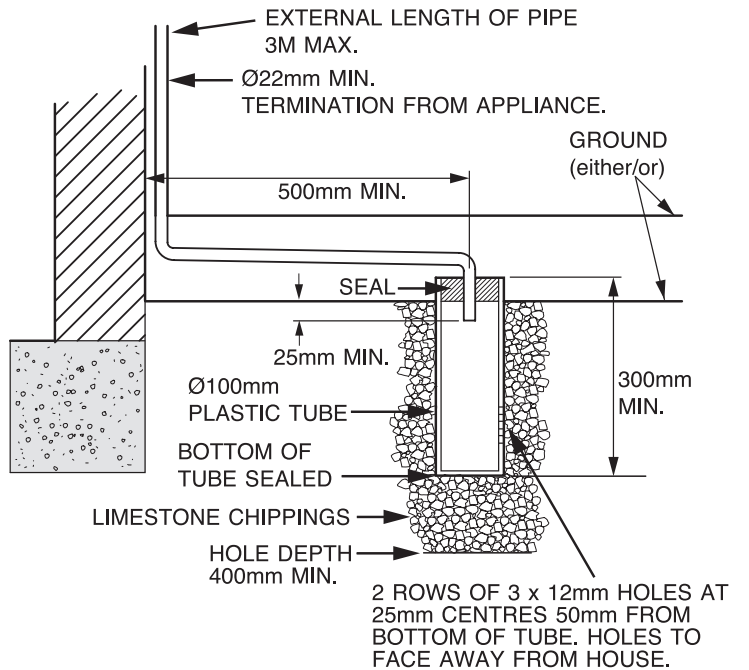
External Termination to a Gully or Hopper



Internal Termination into Combined Sink Waste



Internal Termination Downstream of Sink Waste



External Termination into Soakaway

NOTE: PIPEWORK SHOULD ALWAYS FALL AWAY FROM BOILER BY AT LEAST 2.5° 44mm FOR EVERY 1M.

Diagram 9.2

10 Telescopic Flue - Length, Preparation and Installation

10.1 Flue Length

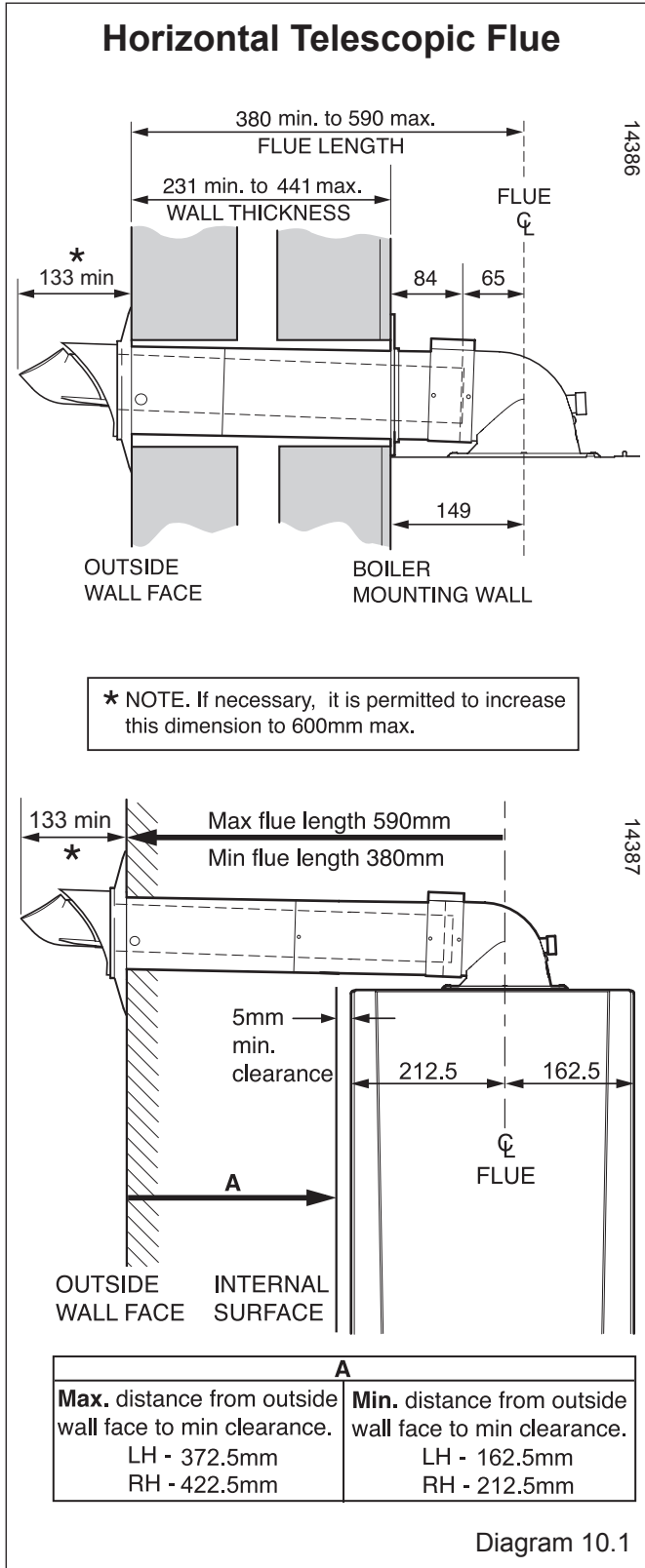
The maximum permissible horizontal flue length is 8 metres plus the flue terminal assembly, this can be achieved by use of the accessories, see diagram 10.3.

However should an additional 90° or 2 x 45° elbows be used then the length **MUST** be reduced by 1metre.

The diagram 10.1 shows the length achievable by using the kit 0020057735.

When extension pipes are used the flue system must be designed to have a continuous fall to the boiler of at least 2.5° 44mm/metre to allow condensate to run back into the boiler and out via the condensate drain.

The flue can be installed from inside the building, when access to the outside wall face is not practicable.



10 Telescopic Flue - Length, Preparation and Installation

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Top Outlet Horizontal Concentric Flue Packs:
0020057735 Horizontal telescopic flue pack (white).

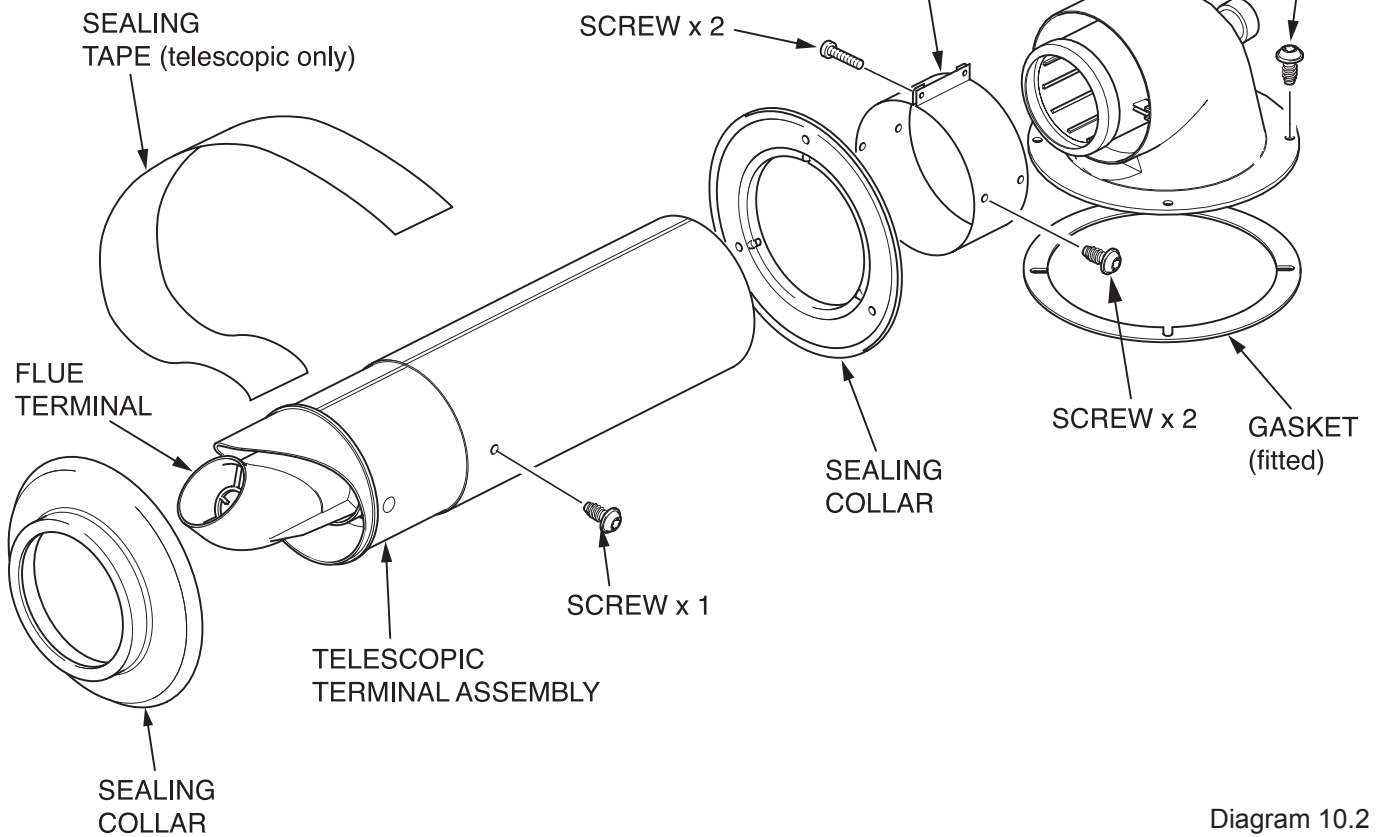


Diagram 10.2

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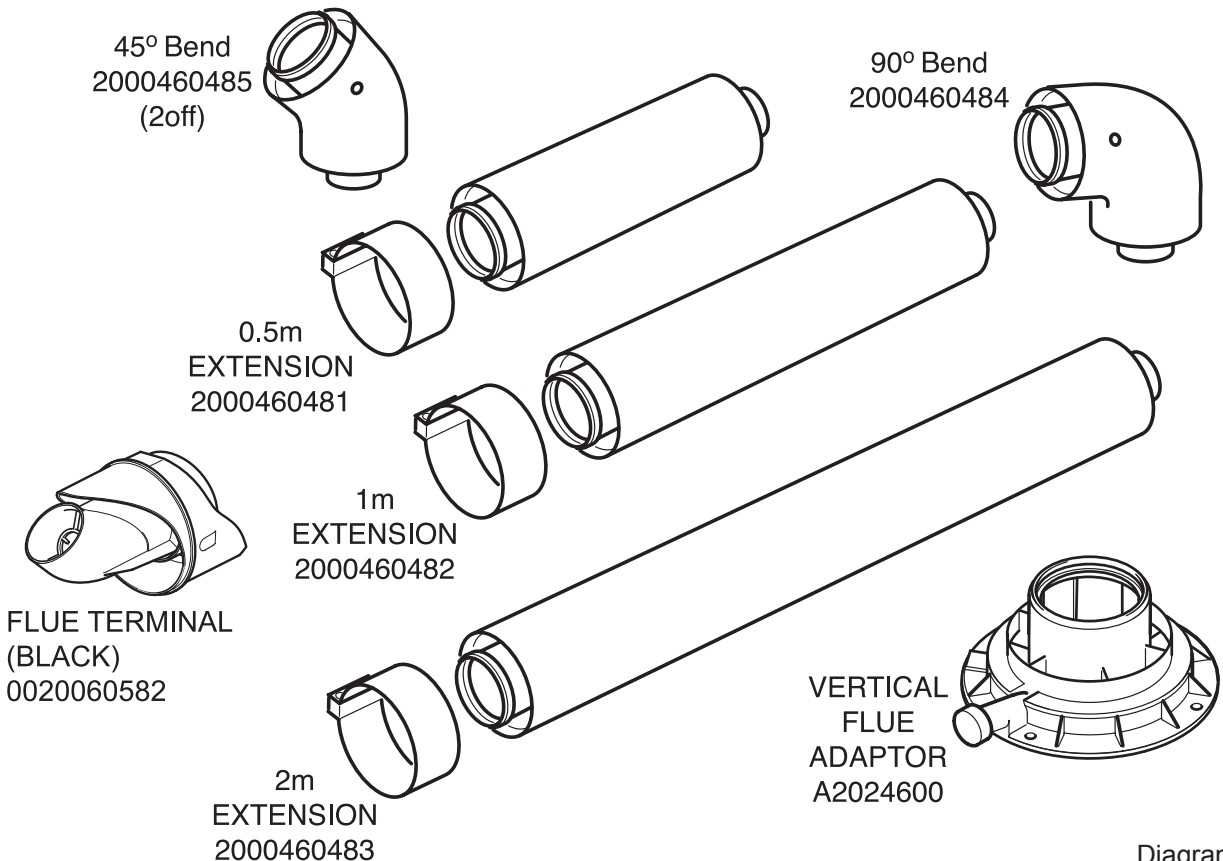


Diagram 10.3

10 Telescopic Flue - Length, Preparation and Installation

10.2 Horizontal Telescopic Flue - 0020057735

Refer to diagram 10.2 for kit contents.

10.3 REAR Flue

If a wall thickness is between 231mm min. to 441mm max. then the flue can be used without extensions.

Remove the top flue outlet cover complete with resonator and discard, see diagram 10.4.

Using these screws inserted into the same holes on the boiler, temporarily secure the flue elbow, measure the distance from the outside wall to the butt joint, see diagram 10.5. If the measurement 'Y' exceeds 525mm, then the appropriate length of extension pipe is required.

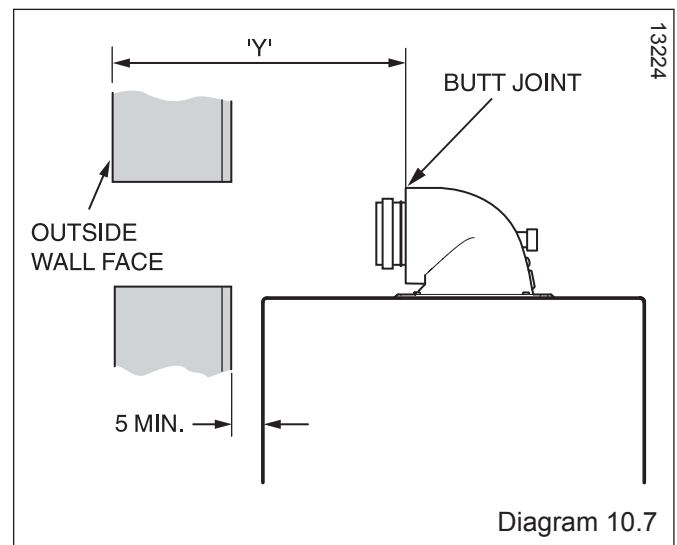
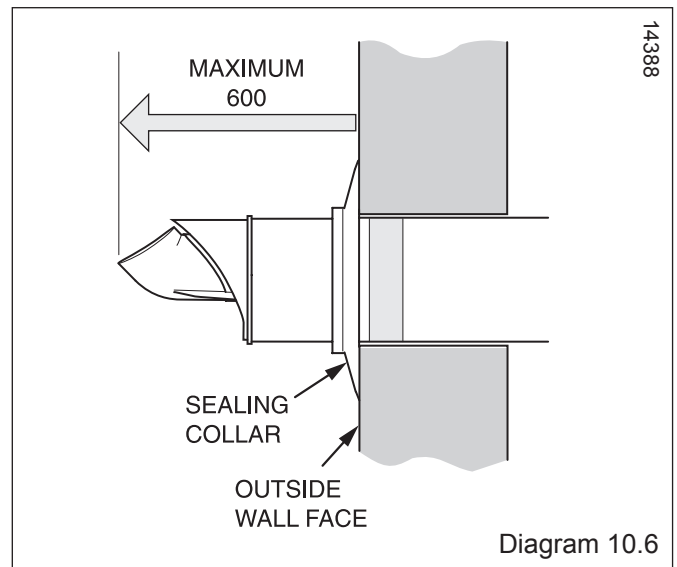
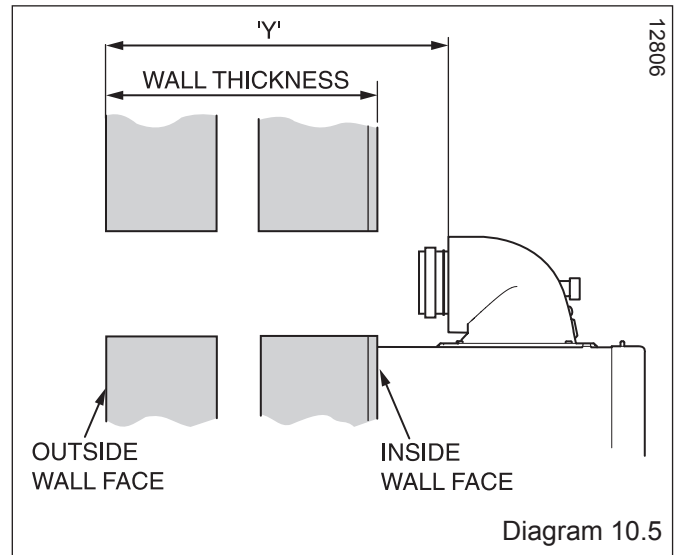
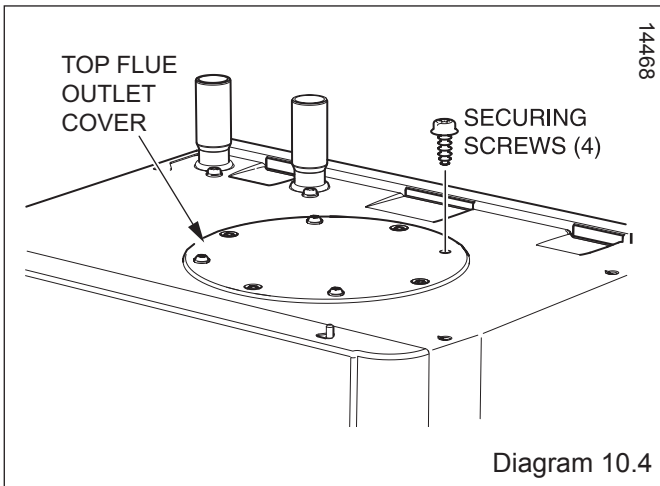
If the dimension is less than 315mm DO NOT cut the flue, it can project to a maximum of 600mm, refer to diagram 10.6. If this is not desirable then a Standard flue MUST be used and cut to length.

10.4 SIDE Flue

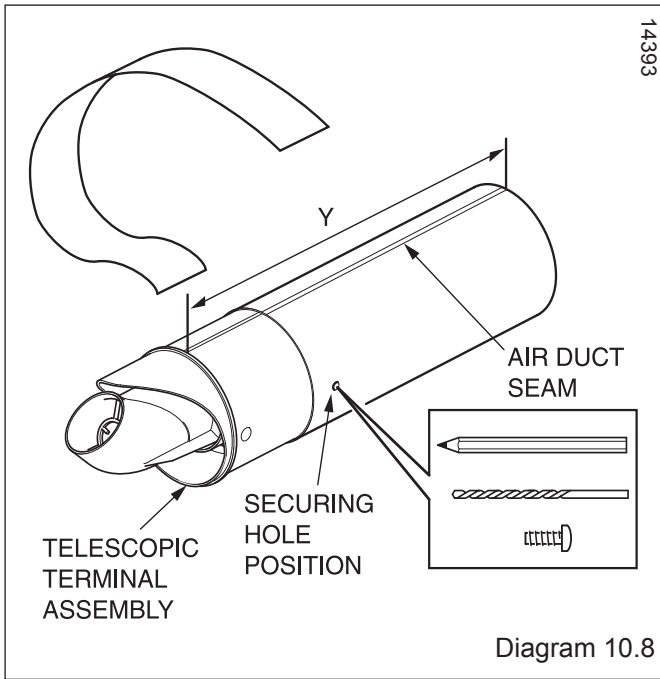
Remove the top flue outlet cover complete with resonator and discard, see diagram 10.4.

Using these screws inserted into the same holes on the boiler, temporarily secure the flue elbow, measure the distance from the outside wall to the butt joint, see diagram 10.7. If the measurement 'Y' exceeds 525mm, then the appropriate length of extension pipe is required.

If the dimension is less than 315mm DO NOT cut the flue, it can project to a maximum of 600mm, refer to diagram 10.6. If this is not desirable then a Standard flue MUST be used and cut to length.



10 Telescopic Flue - Length, Preparation and Installation



10.5 Flue Fitting

With the air duct seams aligned and the flue set to the required length 'Y', mark the securing hole position in the air duct. Drill a 3mm diameter hole at this position, take care not to pierce the inner flue duct. Secure with screw provided and tape the joint, see diagram 10.8.

Fit the sealing collar onto the locating ring on the flue terminal, see diagram 10.9.

With the flue elbow removed, push the flue assembly into the wall, externally or internally, until the end of the assembly protrudes a short way from the inside face of the wall. This will enable the internal trim ring (if required) to be positioned and allow the flue assembly to be drawn back up to the flue elbow.

Secure the flue elbow in position on top of the boiler with the four screws supplied.

Draw the flue assembly from wall and engage the flue duct into the elbow and butt fit between the air duct and flue elbow. Check the correct alignment of the flue.

Fit the securing collar in position, mark through two of the pre drilled holes in the securing collar. Remove securing collar and drill two 3mm diameter holes one in the elbow and one in the air duct, take care not to pierce the inner flue duct. Fit the securing collar and secure with screws provided, see diagram 10.10.

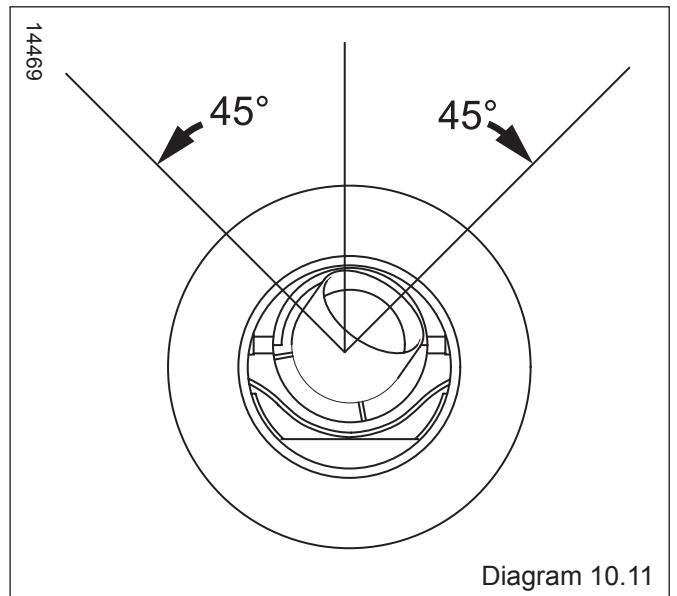
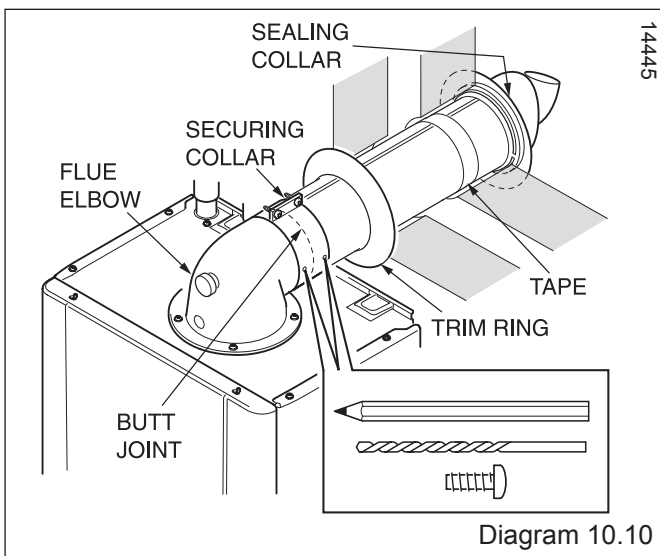
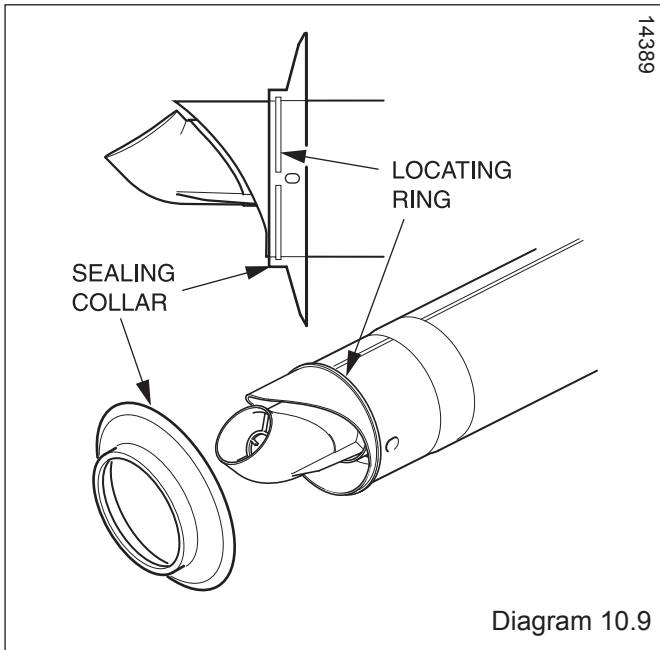
Slide the internal trim ring back against the wall, securing in place with a small amount of sealant if required.

The cut ducts must be de-burred and all filings and debris removed.

Insert the flue duct into the air duct terminal assembly, remembering to engage the catch within the terminal.

NOTE: If the seals require lubricant to ease installation, do not use mineral oils or grease, only silicon grease or water is recommended.

Once the flue is installed the adjustable flue terminal can be set to the required angle, up to 45° left or right, to allow plumbing away from openings, people, cars, windows etc., see diagram 10.11.



10 Direct Rear Flue - Length, Preparation and Installation

10.6 Direct Rear flue - Telescopic Part No. 0020057734.

Refer to diagram 10.12 for kit contents.

10.7 Flue Length

Measure the distance from the outside wall to the inside wall face. This measurement must not exceed 512mm (465mm if the upward piping kit is used). If the dimension is less than 291mm DO NOT cut the flue, it can project to a maximum of 600mm, see diagram 10.6.

10.8 Flue Fitting

Set the flue to the required length 'Y' plus 24mm min to 28mm max, see diagram 10.13, ensure the air duct seams line up. Mark the securing hole position in the air duct. Drill a 3mm diameter hole at this position, take care not to pierce the inner flue duct. Secure with screw provided and tape the joint, see diagrams 10.12.

Fit the sealing collar onto the locating ring on the flue terminal, see diagram 10.12.

Push the telescopic terminal assembly into the wall, externally or internally, initially.

Draw the telescopic flue through the wall and engage the telescopic terminal assembly into the clamping band grips. The telescopic terminal assembly must be pulled forward of the clamping band grips by the dimension shown in diagram 10.14 to ensure a good seal when the boiler is located onto the fixing plate.

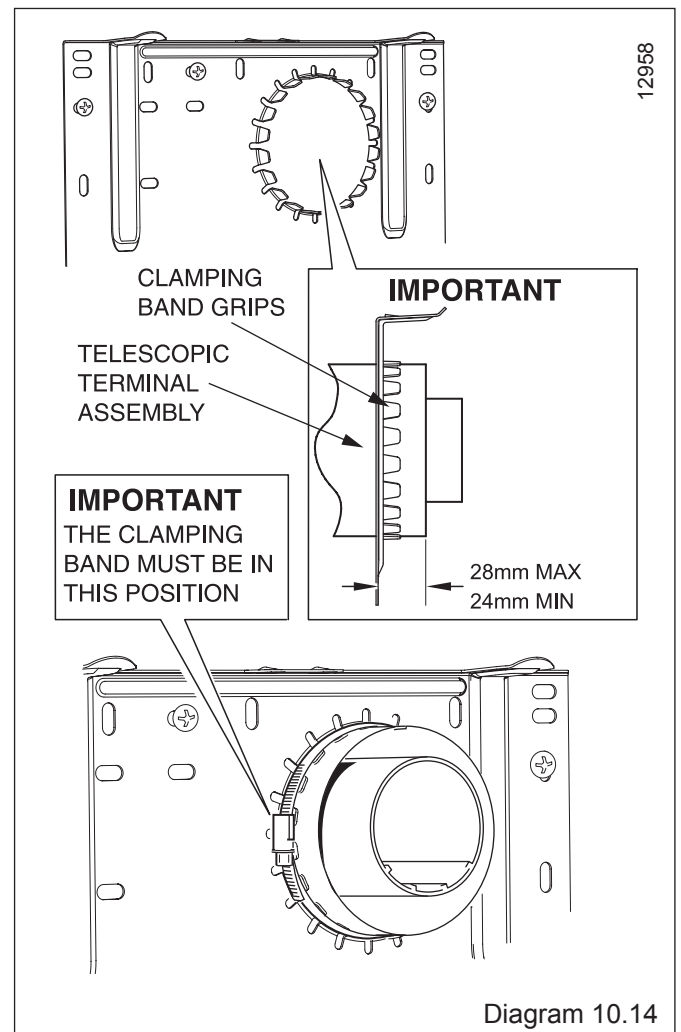
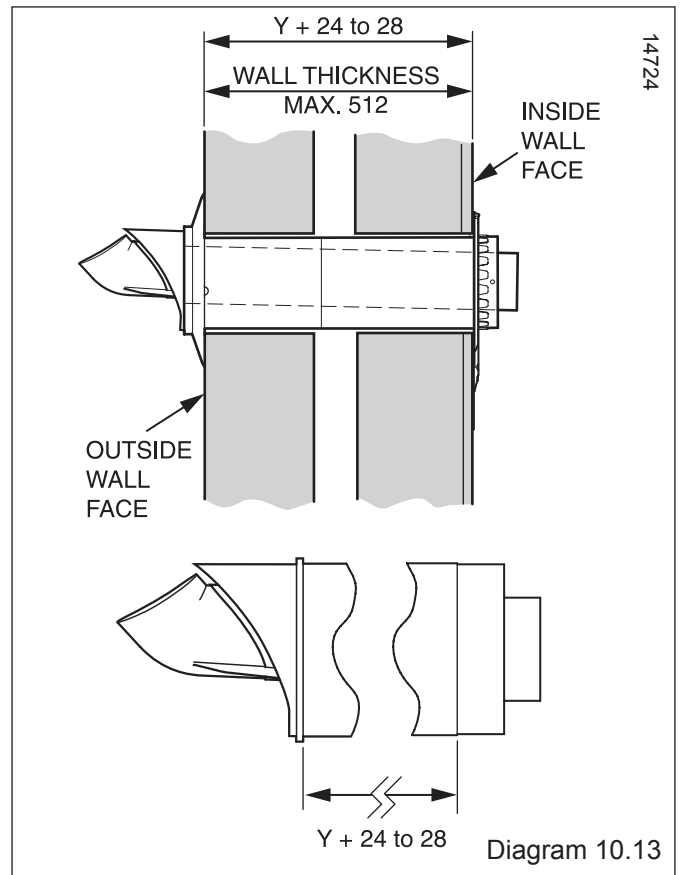
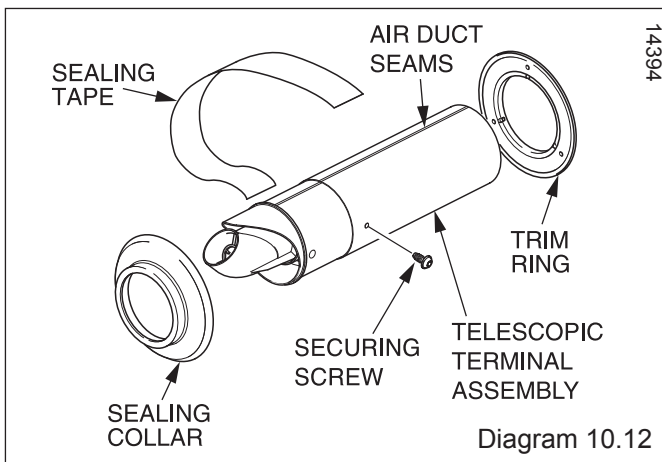
Ensuring the correct alignment of the terminal.

Secure the telescopic terminal assembly using the clamping band supplied. The position of the clamping band securing screw is important, refer to label and wall template.

IMPORTANT: CHECK THE CLAMPING BAND IS SUFFICIENTLY TIGHTENED TO AVOID ANY MOVEMENT OF THE FLUE WHEN FITTING THE BOILER.

Continue at the appropriate paragraph of section 7.

Once the flue is installed the adjustable flue terminal can be set to the required angle, up to 45° left or right, to allow plumbing away from openings, people, cars, windows etc., see diagram 10.11.



10 Vertical Flue - Length, Preparation and Installation

10.9 Vertical flue

The vertical flue system is available as an option where the boiler position does not permit the use of the top horizontal flue system.

The system is made up from accessories. The accessories include terminal assembly, bends 45° and 90°, flue extensions, fixing bracket and appropriate weather collar, see diagram 10.16.

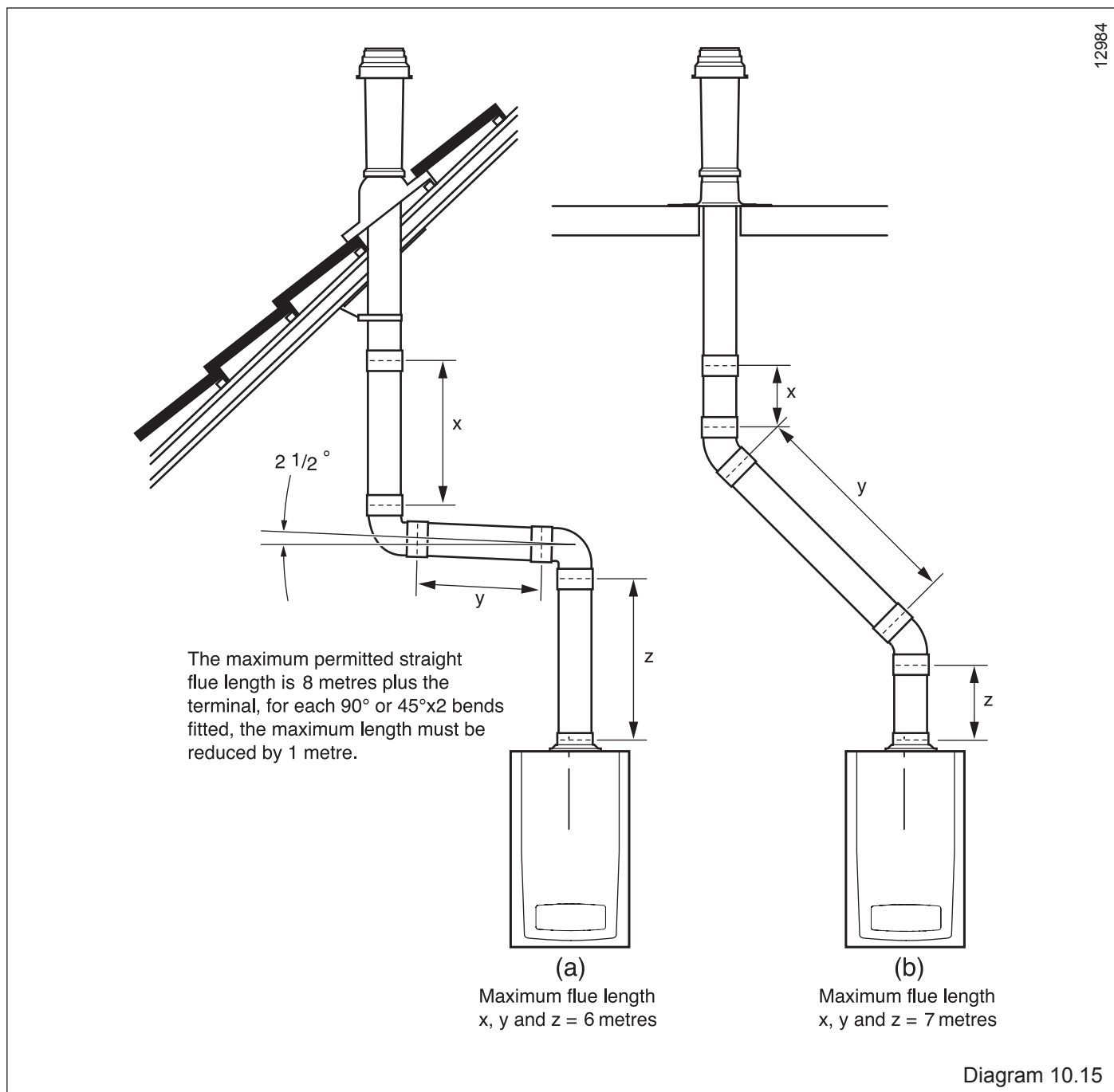
The maximum permitted straight flue length is 8 metres plus the terminal. for each 90° or 2x45° bends fitted, the maximum length must be reduced by 1 metre, see diagram 10.22.

NOTE: 2x45° bends can replace 1x90° bend if necessary. When using 90° bends any horizontal extension pipe should be inclined by a minimum of 44mm/metre (2.5°) towards the boiler to facilitate condensate removal, see (a) in diagram 10.15.

Alternatively use 45° bends to avoid horizontal runs, see (b) in diagram 10.15.

The terminal siting should be as shown in diagram 4.2. Measure the distance of flue length required for the installation.

The flue must be designed with a continuous fall towards the boiler.



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10 Vertical - Flue Length, Preparation and Installation

Flue Installation

Remove the top flue outlet cover complete with resonator and discard, see diagram 10.4.

Refer to diagram 10.17 and secure the flue adapter in position on top of the boiler with four screws supplied, making sure the nib fits into the locating slot in the boiler casing to ensure correct orientation.

NOTE: The rubber 'O' rings of each section should be lubricated prior to assembly. Do not use mineral oils or grease, silicon grease or water is recommended. Secure the first extension pipe to the flue adapter with the securing collar supplied by positioning the collar centrally over the joint, then tighten the two screws on the securing collar, see diagram 10.18.

Fit more extension pipes as required using the collar and screws supplied with each extension pipe. To fit position the collar centrally over the joint, tighten the two screws on the securing collar. Using the holes provided in the securing collar drill and insert the two self tapping screws supplied, see diagram 10.19.

The rubber 'O' rings of each section should be lubricated prior to assembly.

NOTE: Do not use mineral oils or grease, silicon grease or water is recommended.

When installing the flue it is recommended that it is supported every 2 metres and at every bend by a fixing bracket.

Project the rise of the flue pipe to roof level and cut a 150mm hole in the roof.

Flue Terminal Installation

(a) Pitched Roof

Fit the required pitched roof weather collar over the 150mm hole in the roof. Make good the tiling or slating around the collar incorporating the flashing of the weather collar. Position the angle cap over the weather collar in the correct orientation to attain the correct angle for your roof.

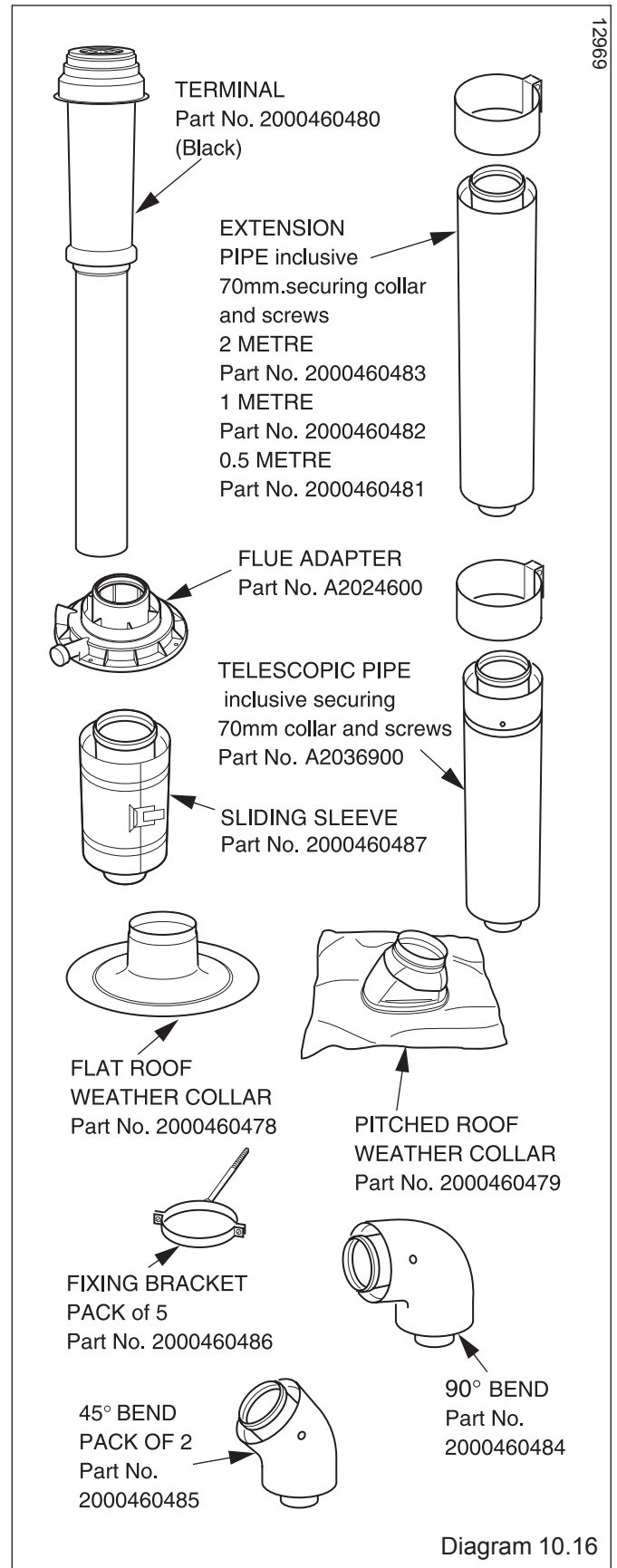
(b) Flat Roof

Fit the aluminium weather collar over the 150mm hole in the roof ensuring a weather tight seal.

From above carefully place the flue terminal through the weather collar.

Flue Terminal to Boiler Connection

Should the clearances above the boiler to roof not allow for extensions, it is permitted to cut the flue terminal ensuring the relationship of flue and air duct lengths are retained.



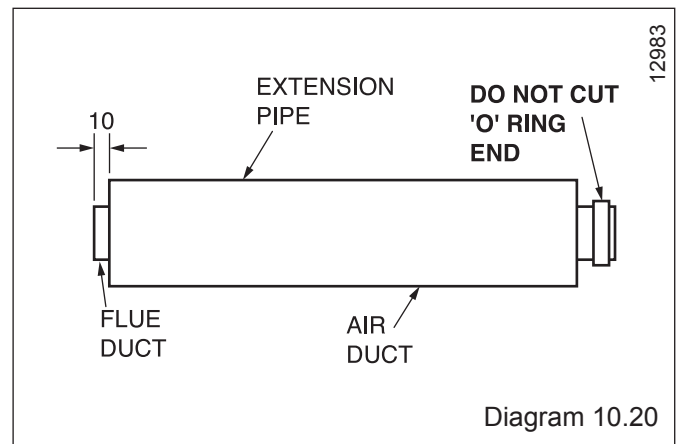
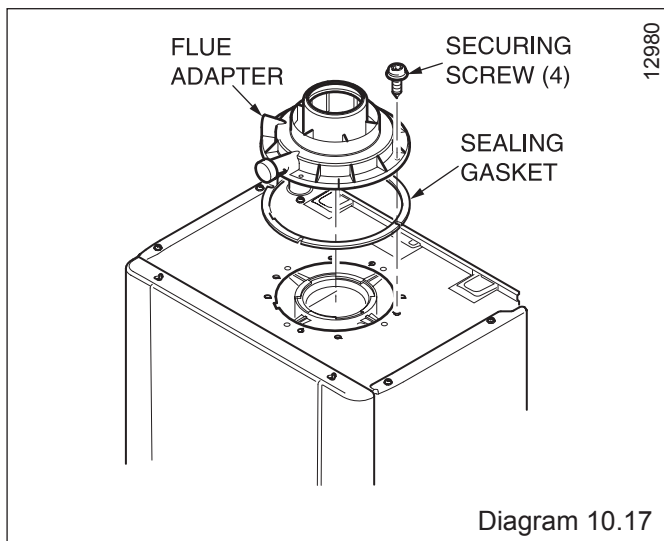
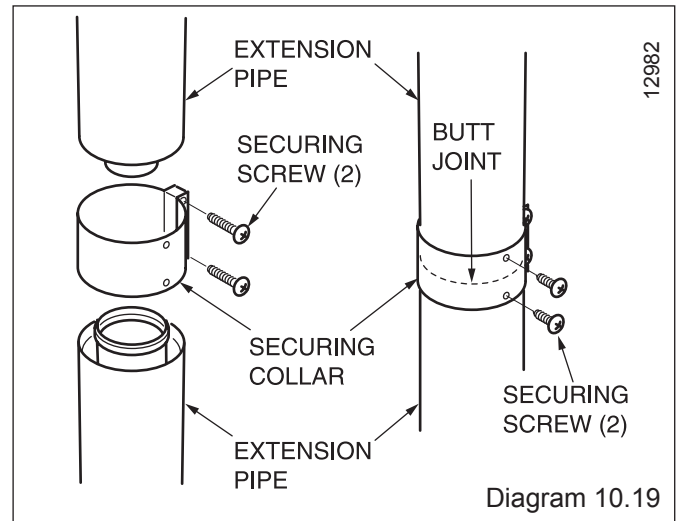
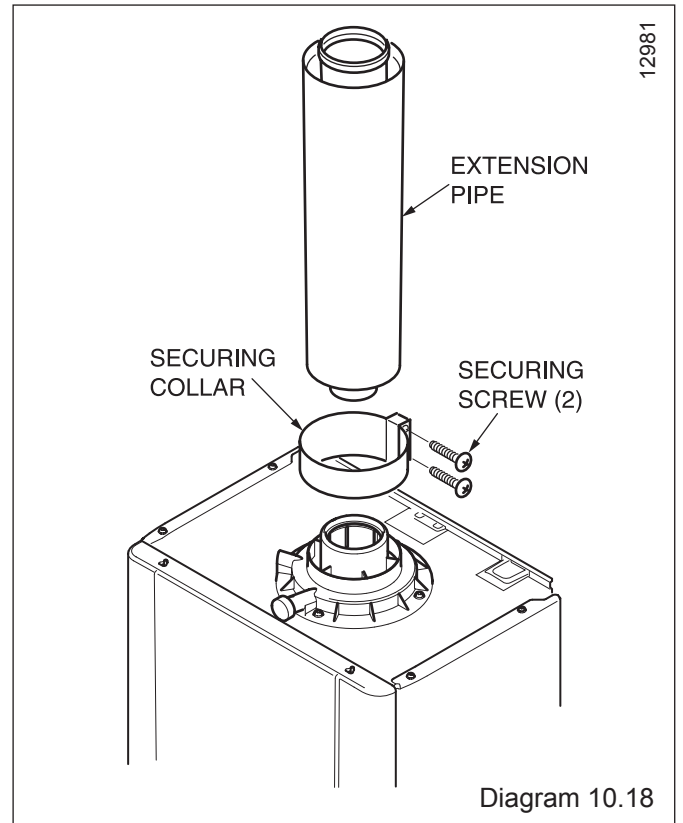
10 Vertical Flue Length, Preparation and Installation

Completion of Installation

With the flue terminal positioned in the roof the length of the final pipe can be determined. If a telescopic length cannot be used, then a standard flue length can be cut to make the correct length. Cut the flue to the desired length measuring from the 'O' ring end and discard the plain end of the tube. The cuts must be square and made free of burrs to allow correct assembly.

NOTE: The flue pipe is 10mm longer than the air pipe, see diagram 10.20.

Carefully push the terminal assembly upwards to allow room for fitting the final flue piece. Fit a fixing bracket to the terminal assembly. Pull the terminal assembly down and join to the flue system. Ensure that the terminal is making a weather tight seal on the weather collar. Secure the fixing bracket fitted to the terminal to the roofing struts or a purpose made baton.



10 Twin Flue - Length, Preparation and Installation

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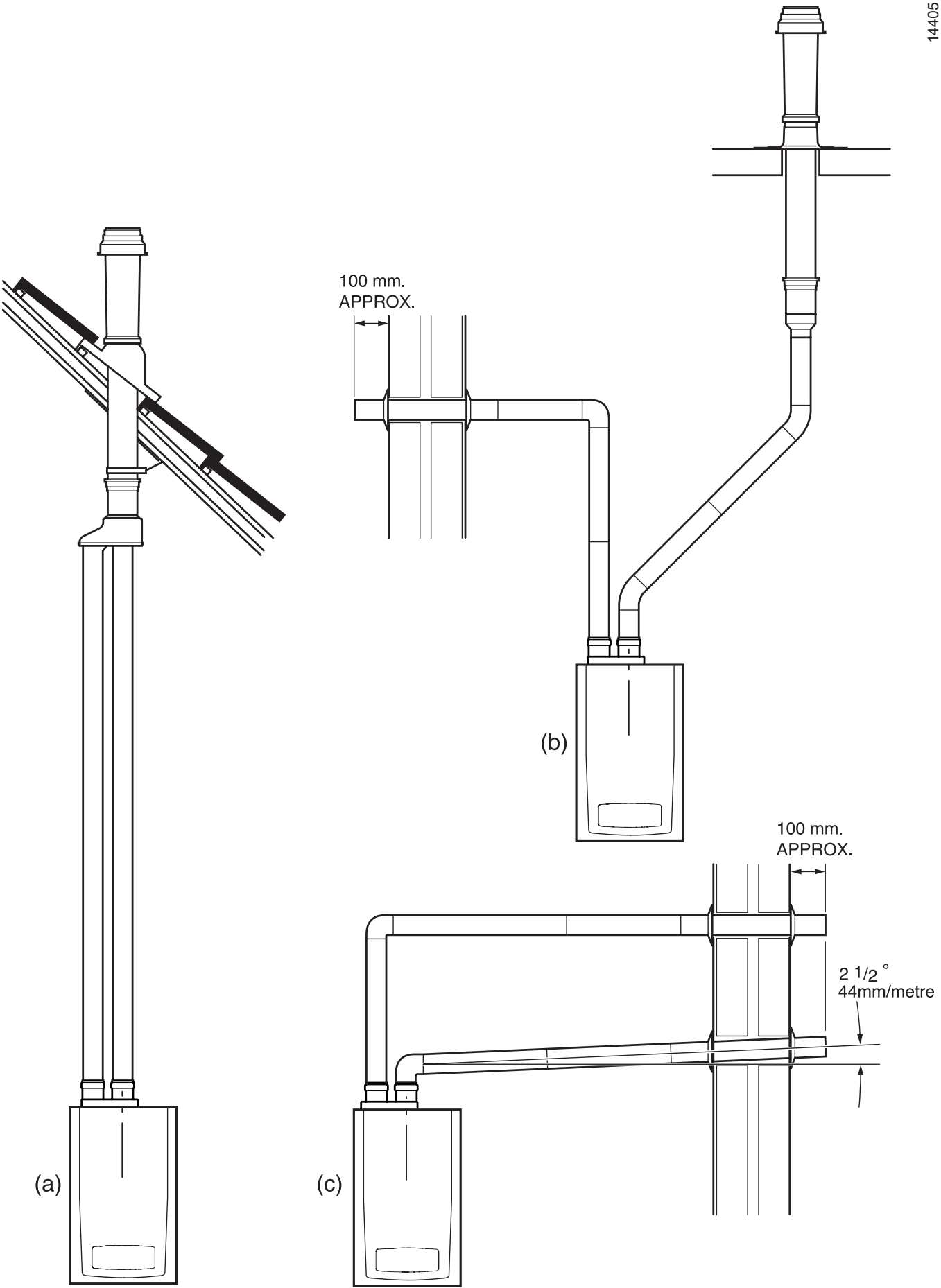
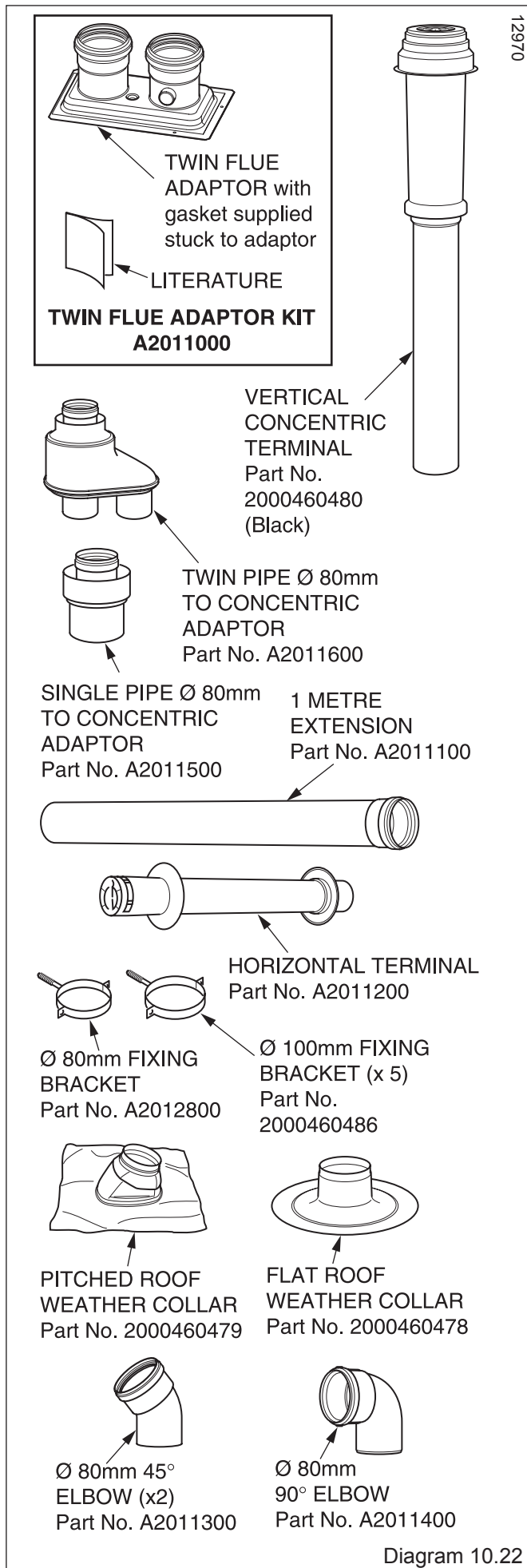


Diagram 10.21

10 Twin Flue - Length, Preparation and Installation



10.15 Twin flue

The twin flue system is available as an option when the top horizontal or vertical flue system is not appropriate. The system can provide an independent horizontal air inlet and flue outlet, horizontal air inlet and vertical flue outlet or vertical air inlet and flue outlet via a concentric terminal. The system is made up from accessories, see diagram 10.22.

NOTE: The air and flue outlets do not have to be equal lengths. 2x45° bends can replace 1x90° bend if necessary. The maximum permitted combined (air inlet + flue outlet) flue length is 20 metres plus terminal assemblies. For each 90° or 45° x 2 bends fitted, the maximum flue length must be reduced by 1 metre, see diagram 10.21.

NOTE: When using 90° bends any horizontal run should be inclined by a minimum of 44mm/metre (2.5°) towards the boiler to facilitate condense removal. Alternatively use 45° bends to avoid horizontal runs in the flue pipe.

Terminal Position

The clearances for a flue outlet are given in the "Flue Location and Ventilation" section.

In addition the horizontal air inlet must not be closer than 300 mm from a flue outlet on the same wall or 1200mm from an opposing flue outlet.

10 Twin Flue - Length, Preparation and Installation

Installation Details

The parts available for a twin flue system installation are shown in diagram 10.29.

Boiler Connection

Remove the top flue outlet cover complete with resonator and discard, see diagram 10.4.

Place the twin flue adaptor onto the outlet of the boiler with the air inlet to the left hand side, see diagram 10.23. Secure the adaptor to the top panel with the screws provided. Care should be taken when inserting the screw through the hole in adaptor top.

To facilitate engagement, it is recommended that the rubber 'O' rings are lubricated with silicone grease or water prior to assembly.

Air and Flue Pipe Installation

The air and flue pipes can now be built up from the boiler. The flue must be designed with a continuous fall towards the boiler. If using the horizontal flue pipe or 90° bends the pipe must be inclined at 44mm/metre (2.5°) minimum, see diagram 10.21.

Alternatively if space allows, use 45° bends in place of 90° bends.

The rubber 'O' rings of each section should be lubricated prior to assembly with silicone grease.

When building the flue up it is recommended that it is supported every 2 metres and at every bend by a fixing bracket.

Horizontal Terminal Installation

With due consideration to terminal clearances mentioned in section 4.2 drill the one or two holes as required with a 90mm core drill.

Push the horizontal terminal through the wall allowing approx. 100mm to protrude outside.

Push a grey rubber wall seal onto either side of the wall ensuring that both wall seals are pushed up to the wall surface, see examples (b) and (c) diagram 10.21.

Vertical Terminal Installation

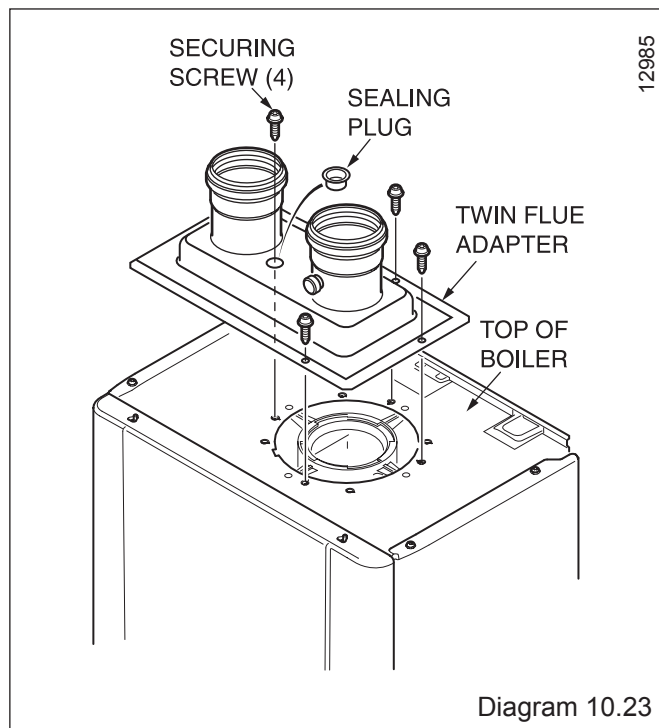
With due consideration to terminal clearances mentioned in Section 4.2, project the rise of the flue pipe to roof level and cut 150mm hole in the roof.

(a) Pitched Roof

Fit the required pitched roof weather collar over the 150mm hole in the roof. Make good the tiling or slating around the collar incorporating the flashing of the weather collar. Position the angle cap over the weather collar in the correct orientation to attain the correct angle for your roof. One way round gives a pitch of 25°-38° and the other gives 37°- 50°.

(b) Flat Roof

Fit the aluminium weather collar over the 150mm hole in the roof ensuring a weather tight seal.



Horizontal Pipes-Completion of Installation

Having built the pipe(s) from the boiler to the terminal(s), the length of the final pipe piece can be determined. Cut pipes at the opposite end to the 'O' ring seal making square and free from burrs. Push the horizontal terminal through the wall to engage the final pipe piece and pull back ensuring the grey wall seals are fully pulled up to the outside and inside wall faces.

Vertical Pipes-Completion of Installation

Refer to diagram 10.21.

For installation of (a), attach the twin pipe to concentric flue adaptor, part number A2011600, to the base of vertical terminal assembly. For installation of (b), attach the single pipe to concentric adaptor, part number A2011500, to the base of vertical terminal assembly.

With the vertical terminal assembly positioned in the roof, the length of the final pipe can be determined. Cut the flue to the desired length measuring from the 'O' ring seal end and discard the plain end of the tube. The cut end should be square and free from burrs. Carefully push the terminal assembly upwards to allow room for fitting the final flue piece(s). Fit a 100mm fixing bracket to the terminal assembly Part No2000460486. Pull the terminal assembly down and join to the flue system. Ensure that the terminal is making a weather tight seal on the weather collar. Secure the fixing bracket fitted to the terminal to the roofing struts or a purpose made batton.

10 Plume Management Kit

IMPORTANT: The flue outlet must not be positioned within 300mm from an opening, air brick or opening windows.

12997

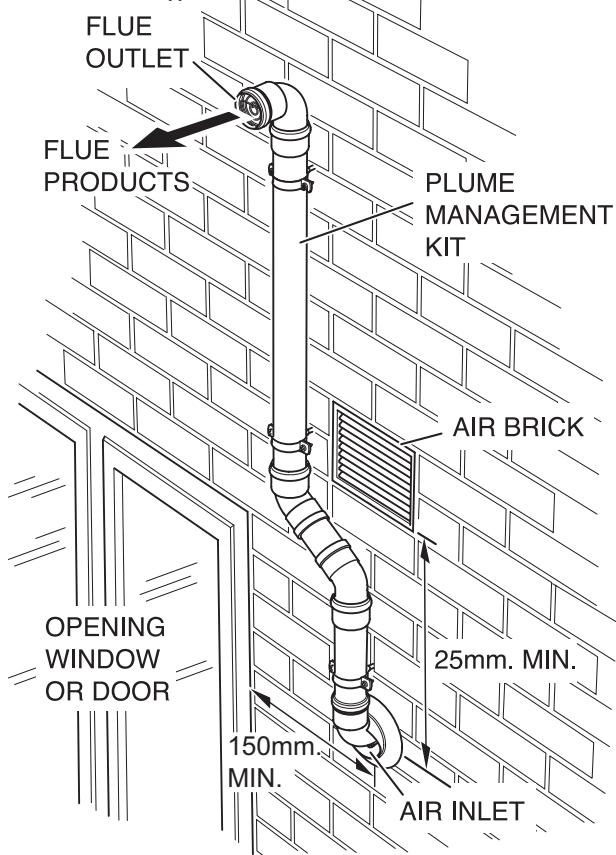


Diagram 10.24

10.16 Plume Management Kit

The Plume Management Kit: Part No. A2044100 (white) or A2044000 (black) can be used to overcome many site issues. The Plume Management Kit will fit to the Top Horizontal Telescopic, Rear Horizontal Telescopic and Standard Horizontal Flue. This enables the flue products to exhaust further away from the boiler, thereby reducing the impact of pluming.

NOTE: The flue air inlet can be sited closer to doors, opening windows and air bricks, than stated in section 4.2, see diagram 10.24.

The maximum length of the Plume Management Kit must NOT exceed 6m with a horizontal concentric flue length of 2m max. For each 90° bend or 2 x 45° bends the maximum length of the Plume Management Kit must be reduced by 1m.

For more information contact Glow-worm, refer to page 2. The Plume Management Kit is supplied with installation instructions.

Refer to BS5546 or BS6798 for advice on disposal of boiler condensate.

11 Electrical Connection

WARNING: This appliance must be earthed.

This appliance must be wired in accordance with these instructions. Any fault arising from incorrect wiring cannot be put right under the terms of the guarantee.

All system components must be of an approved type.

Electrical components have been tested to meet the equivalent requirements of the BEAB.

Do not interrupt the mains supply with a time switch or programmer.

Connection of the whole electrical system and any heating system controls to the electrical supply must be through a common isolator.

Isolation should preferably be by a double pole switched fused spur box having a minimum contact separation of 3mm on each pole. The fused spur box should be readily accessible and preferably adjacent to the boiler. It should be identified as to its use.

A fused three pin plug and shuttered socket outlet may be used instead of a fused spur box provided that both the plug and socket comply with the current issue of BS1363.

This boiler is suitable for installation in bathroom zones 2 and 3.

11.1 Electrical Wiring

Remove the electrical cartridge from the fittings pack.

NOTE: To improve cable routing, remove the breakout tab and route cables out through the side.

Remove the securing screw to open the cartridge, see diagram 11.1.

NOTE: There are two screws supplied loose in the electrical cartridge, these will be required to secure the cartridge into the electrical interface housing.

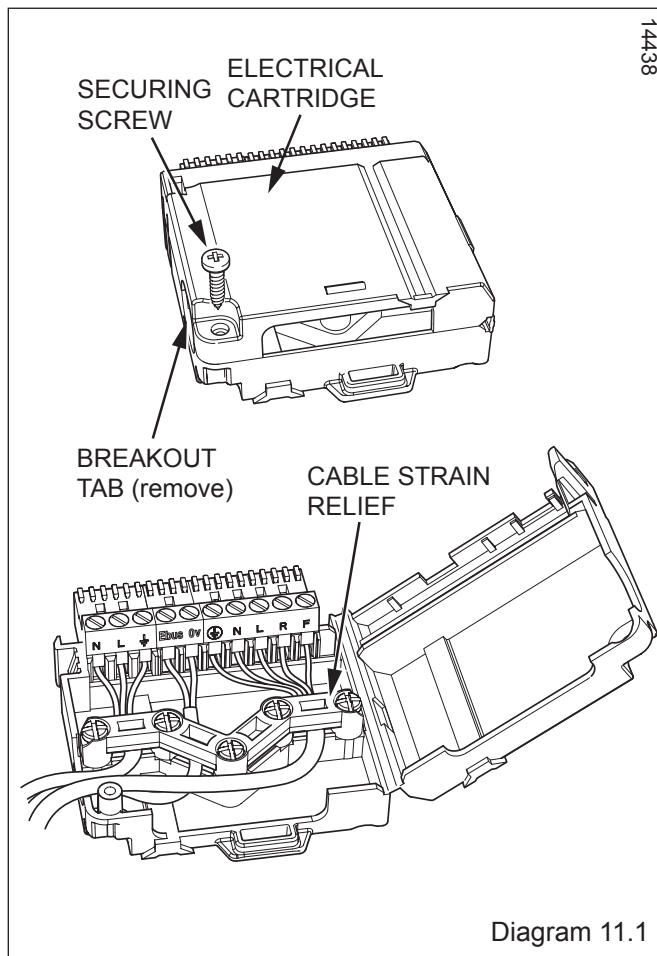
Slacken the cable strain relief screws in the electrical cartridge, see diagram 11.1.

Route the mains supply and system cables through the strain relief and connect to the relevant plug, see diagram 11.2.

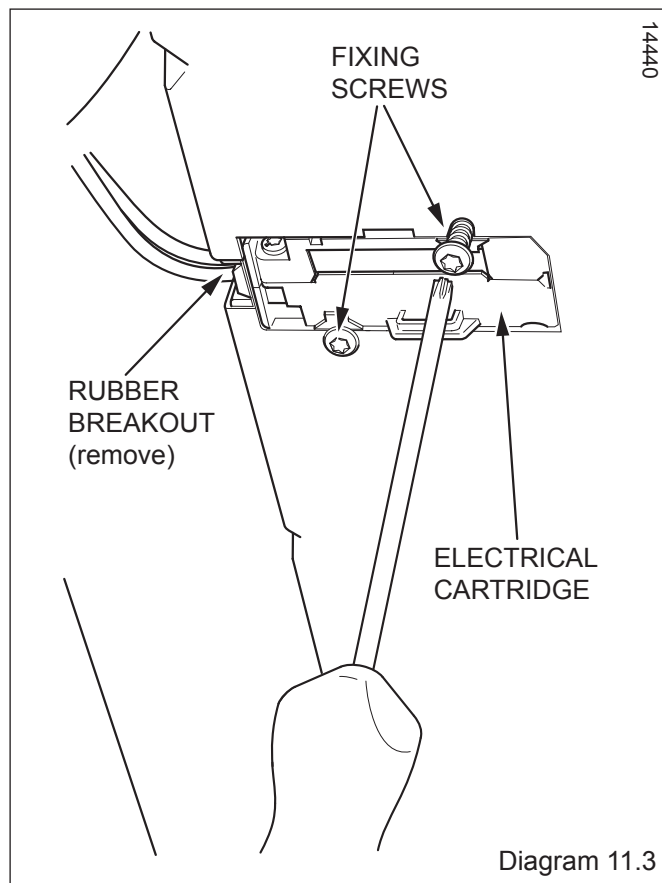
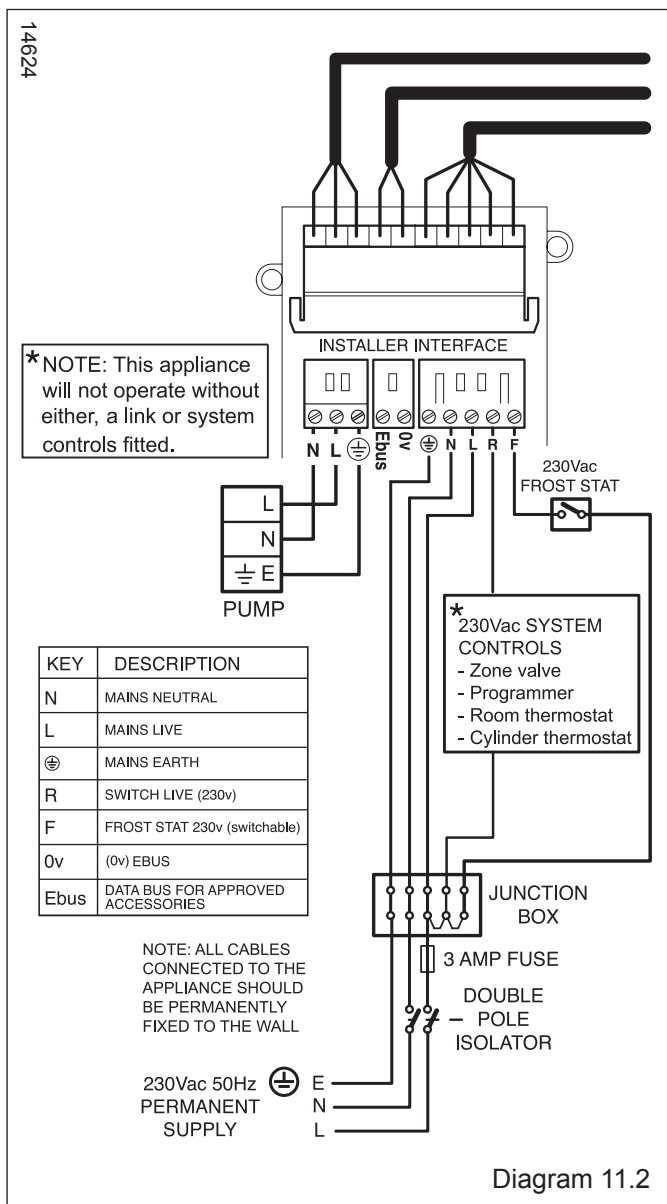
11.2 Pump Wiring

Ensure that a separate pump supply cable is routed through the strain relief and connected to the relevant plug, see diagram 11.2.

Slacken the cable strain relief and route the pump electrical supply cable and connect as shown in diagrams 11.1 and 11.2.



11 Electrical Connection



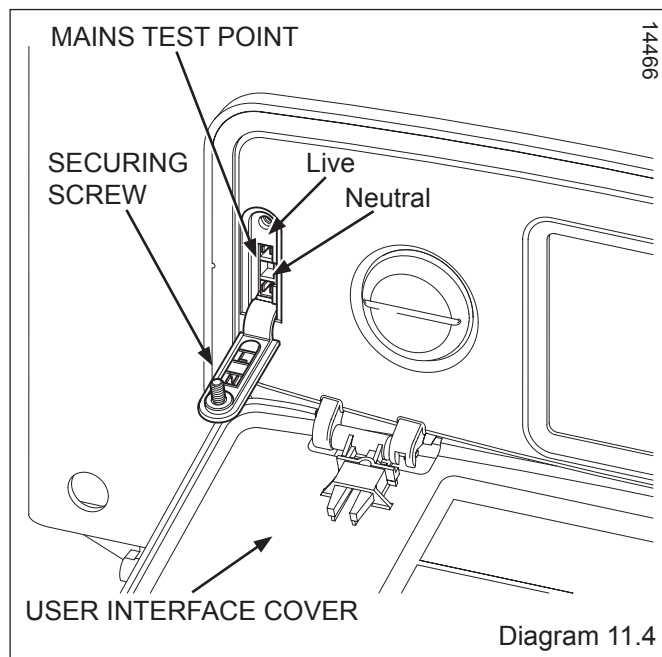
11.3 Electrical Cartridge Securing

Close the cartridge and secure with the previously removed screw.

Remove the rubber breakout on the rear of the interface housing, see diagram 11.3.

Push the electrical cartridge into the interface housing on completion of the wiring, see diagram 11.3.

Secure with the two cartridge retaining screws provided in the cartridge body.



12 Commissioning

12.1 Electrical Connections - Testing

Carry out preliminary electrical system checks as described below, see diagram 11.4 for mains test point. Use a flat bladed screwdriver to release the mains test point cover.

1. Test insulation resistance to earth of mains cables.
2. Test the earth continuity and short circuit of cables.
3. Switch on the boiler, test the polarity of the mains.

NOTE: If you require to test the appliance refer to section 14.

12.2 Preliminaries - All Systems

The commissioning should be carried out by a competent person in accordance with the current issue of BS6798. DO NOT operate the boiler without water.

Make sure that the system has been thoroughly flushed out with cold water and that all cleanser, if used, has been removed.

Isolate the boiler from the mains electrical supply.


Test for gas tightness and purge air from the gas supply.

12.3 Filling the Heating Circuit

With the gas service isolation valve closed and with no demand from any external controls.

1. Fill the heating system.
 - Sealed system only** - fill the system to a pressure of 1.0bar.
2. Vent all air from the system - repeat as necessary until the system is full and all the air has been vented.

12.4 Initial Lighting

1. Check that the gas service isolation valve is open, see diagram 12.1.
2. If you are in any doubt about the boiler being filled with water contact your installer or British Gas Service using the telephone number on the front cover of this booklet. **Do not operate the boiler without water.**
3. Check that the electrical supply to the boiler is ON and there is no demand from any external controls.
4. Select your required function, refer to diagram 12.2, press "MODE" repeatedly to Central Heating 
5. Turn ON your external controls and select the room temperature you require.

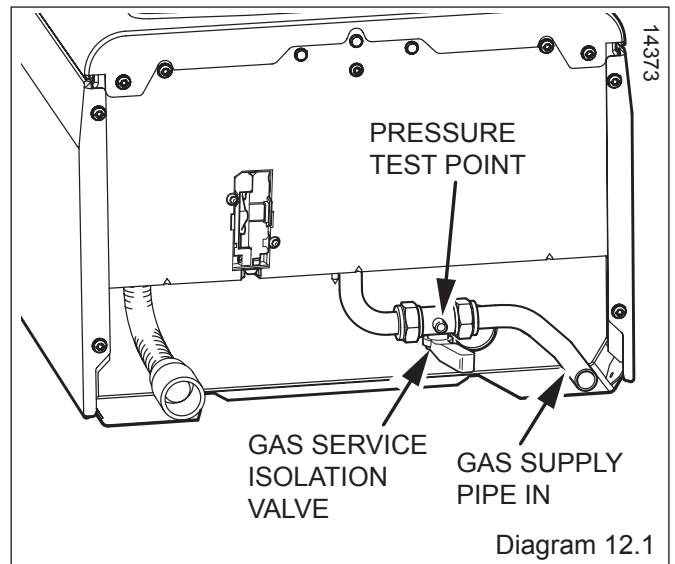
The boiler will operate automatically.

NOTE: The display will indicate the heating system water temperature or a fault code (see section Fault Finding).

12.5 Range Rating

The boiler is factory set at 18kW, however, if desired, it is possible to range rate the boiler between 10 and 30kW in 1kW increments as follows:

- a) Press and hold the 'MODE' button for 5 seconds. The display will change to flashing '0'.
- b) Use the '+' or '-' button to scroll to 96.
- c) Press 'MODE' to confirm.
- d) The display now shows a flashing 'd. 0'. The part load setting is displayed above in kW
- e) Press 'MODE' to change, use the '+' or '-' button to change this value to the desired setting.
- f) Press 'MODE' to confirm, the new setting has been saved.
- g) Press and hold 'MODE' to exit.



NOTE: For maximum gas rates at part load, refer to table below. When the output of the appliance has been set, this should be clearly indicated on the range rating label on the base of the appliance.

kW	m3/hr	ft3/hr	kW	m3/hr	ft3/hr
30	3.3	117	19	2.0	69.9
29	3.2	113	18	1.9	66.4
28	3.0	106	17	1.8	62.9
27	2.9	102.4	16	1.7	58.9
26	2.8	98.9	15	1.6	55.4
25	2.7	95.3	14	1.5	51.5
24	2.5	88.6	13	1.4	48.0
23	2.4	84.7	12	1.3	44.1
22	2.3	81.2	11	1.2	40.6
21	2.2	77.3	10	1.0	36.7
20	2.1	73.8	-	-	-

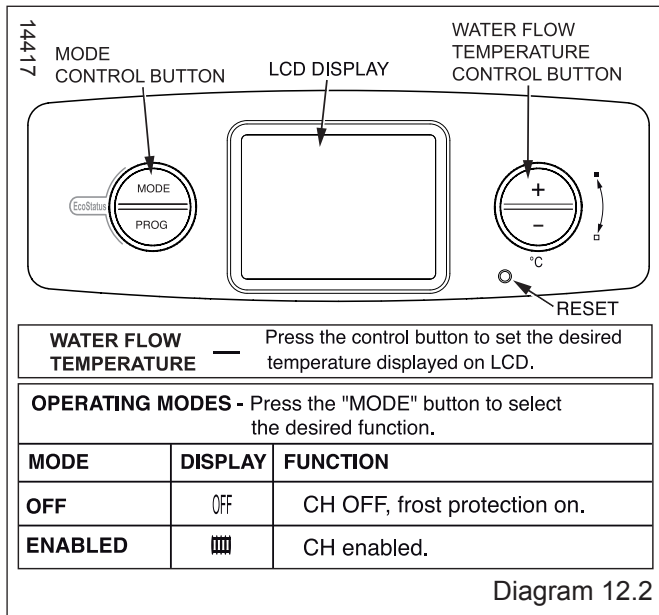
NOTE: If fitting the intelligent wiring kit, then it is possible to separately range rate the appliance for operation in DHW mode. This allows for exact matching of the appliance and the particular tank.

The DHW part load is factory set to 18 kw, however, it is possible to adjust this in 1 kw increments between 10 and 30 kw if desired procedure is as follows:-

- a) Press and hold the 'MODE' button for 5 seconds. The display will change to a flashing "0".
- b) Use the '+' and '-' button to scroll to 35.
- c) Press 'MODE' to confirm.
- d) The display now shows a flashing 'd.0'. Use '+' and '-' to change to 'd.77'. The DHW part load valve is displayed above in kw.
- e) Press 'MODE' to change. Use '+' and '-' to change this valve to the desired setting.
- f) Press 'MODE' to confirm, the new setting is saved.
- g) Press and hold 'MODE' to exit.

NOTE: If the internal sealed system kit is used the appliance should not be rated above the factory pre-set of 18 kw.

12 Commissioning



12.6 System Identification

Use one of the markers supplied in the loose items pack to clearly mark if the appliance has been fitted to an open vented or sealed system.

If the appliance rating for heating or tank loading is adjusted from the factory pre-set of 18 kw the higher of the two ratings must be clearly marked on the label fixed to the base of the appliance using one of the markers supplied in the loose items pack.

12.7 Gas Rate

Should any doubt exist about the gas rate, check it using the gas meter test dial and stop watch at least 10 minutes after the burner has lit, making sure that all other gas burning appliances and pilot lights are off.

It should be noted that this appliance will modulate the heat input according to demand. This may affect the gas rates measured if the appliance reaches its operating temperature during the measurement.

The gas valve is factory set for natural gas (G20) and should need no adjustment. It should be checked that the supply pressure is 20mbar when the boiler is firing at full rate. This can be achieved by turning on several hot water taps and checking the inlet pressure at the pressure test point on the gas service isolation valve, see diagram 12.1. Turn taps off and disconnect pressure gauge.

In the unlikely event that the gas valve needs adjusting, refer to section 13.9. Re-setting of the gas valve requires a combustion analyser and any adjustment should only be carried out by a **competent person**.

NOTE: The burner pressure cannot be measured at the gas valve as it is altered by the suction of the fan and modulated according to demand.

12.8 Testing - Heating System

Check that all external controls are calling for heat. The boiler will fire automatically. Fully open all radiator valves, flow control valve and bypass valve if fitted.

Balance the radiators as required and if fitted adjust flow control valve to give the required system differential. Turn off all radiators that can be shut off by the user and check to see if less than the maximum differential allowed of 20°C can be achieved across flow and return.

Allow the system to reach maximum temperature then switch off the boiler by isolating from the electrical supply.

Drain the entire system rapidly whilst hot, using the drain tap at the lowest part of the system. Fill and vent the system as described previously in section 12.3

Lock or remove the handle from controls valve, if fitted.

12.9 Completion

Adjust the boiler temperature control and any system controls to their required settings.

GB: It is a requirement that the British Gas logbook is completed and left with the user.

IE: it is necessary to complete a "Declaration of Conformity" to indicate compliance to I.S.813. An example of this is given in the current edition of I.S.813.

Testing Flue Gases: If any doubt exists that the flue products are not exhausting correctly, investigate by use of a gas analyser (FGA).

12.9 EcoStatus (if required)

This procedure allows the user to view the EcoStatus monitor. In addition the default display will show time (in 24 hour format) and a day indicator.

- Press and hold the 'MODE' button, see diagram 12.2.
- Using the + and - buttons, scroll through to 96, press 'MODE'.
- Using the + and - buttons, scroll through to diagnostic value d.66. Press 'MODE' to change the value.

To enable the feature d.66 = 1.

Press and hold 'MODE' button to exit.

The clock, day of week, year, month, date will now have to be set.

Press and hold 'PROG' for approximately 5 seconds to enter time adjustment screen. 'Hours' flashes, use '+' and '-' to set the hours, press 'PROG' to confirm.

The process automatically scrolls to minutes, then week days, month, date and year, set as previously described.

12.10 Instruct the User

Demonstrate, then instruct the User about the lighting procedure and heating system controls operation.

Advise the user on the use and maintenance of any scale reducer and pass on any relevant instructional documents.

Advise that to ensure the continued efficient and safe operation of the boiler it is recommended that it is checked and serviced at regular intervals. The frequency of servicing will depend upon the installation conditions and usage, but in general, once a year should be enough.

Draw attention, if applicable, to the current issue of the Gas Safety (Installation and Use) Regulations, Section 35, which imposes a duty of care on all persons who let out any property containing a gas appliance in the UK.

The user shall not interfere with or adjust sealed components. It is the Law that any servicing is carried out by a **competent person**.

Advise the user that, like all condensing boilers this appliance will produce a plume of condensation from the flue terminal in cool weather. This is due to the high efficiency and hence low flue gas temperature of the boiler.

Advise the user of the precautions necessary to prevent damage to the system, boiler and the building, in the event of the heating system being out of use during frost or freezing conditions.

Advise the user that the permanent mains electrical supply SHOULD NOT be switched off, as the built in frost protection and pump/valve saver program will not operate.

Advise the User if the mains electricity and gas are to be turned off for any long periods during severe weather, it is recommended that the whole system, including the boiler, should be drained to avoid the risk of freezing.

NOTE: Contact your installation/servicing company as draining, refilling and pressurising MUST be carried out by a **competent person**.

Leave these instructions and the British Gas logbook with the user.

13 Servicing

IMPORTANT NOTES:

1. To ensure the continued efficient and safe operation of the boiler it is recommended that it is checked and serviced at regular intervals. The frequency of servicing will depend upon the particular installation and usage, but in general once a year should be enough.
2. It is the Law that any servicing is carried out by a **competent person**.
3. Before commencing with a service or replacement of parts the boiler should be isolated from the electrical supply and the gas supply should be turned off at the gas service isolation valve.
4. When replacing a part on this appliance, use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by British Gas.
5. If any electrical connections have been disconnected and after their connection, checks to the earth continuity, polarity, short circuit and resistance to earth must be repeated using a suitable multimeter, as described in section 14.
6. On completion of servicing the "Benchmark" logbook should be completed.

13.1 General Inspection

Before servicing the appliance inspect the following and then carry out the functional checks:

1. Condition of case and flue.
2. Flue terminal for obstructions.
3. Electrical supply connections.
4. Water connections.
5. Gas connection.
6. System pressure.

Correct any fault before continuing.

13.2 Functional Checks

With the appliance operational carry out the following:

BOILER OUTPUT (range rating)

CHECK - By pressing and holding the 'MODE' button for 5 seconds. The display will change to flashing '0'. Use the '+' or '-' button to scroll to 96. Press 'MODE' to confirm. The display now shows a flashing 'd. 0'. The setting is displayed above in kW, check against the range rating label. Press and hold 'MODE' to exit.

COMBUSTION

CHECK - with a flue gas analyser as described in section 13.9. If **NO** gas analyser is available the appliance **MUST** be turned off and disconnected until such equipment is available.

GAS RATE

CHECK - the gas rates, refer to section 12.4. If you cannot measure the gas rate it is acceptable to measure the combustion as described in section 13.9, however, if you do not have either facility then the appliance **MUST** be turned off and disconnected until such equipment is available. If the gas rate requires adjustment you **MUST NOT** adjust the gas valve without a gas analyser, refer to section 13.9.

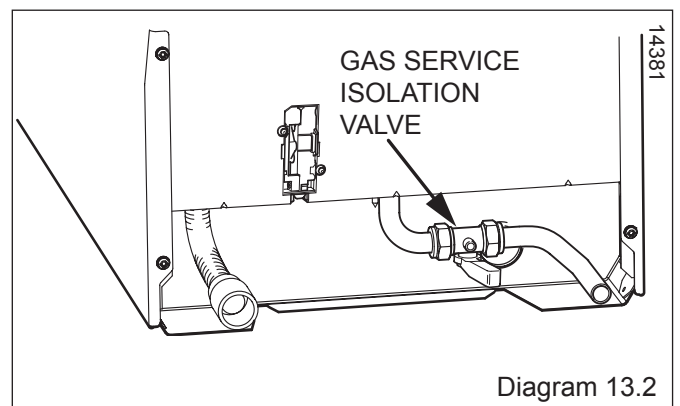
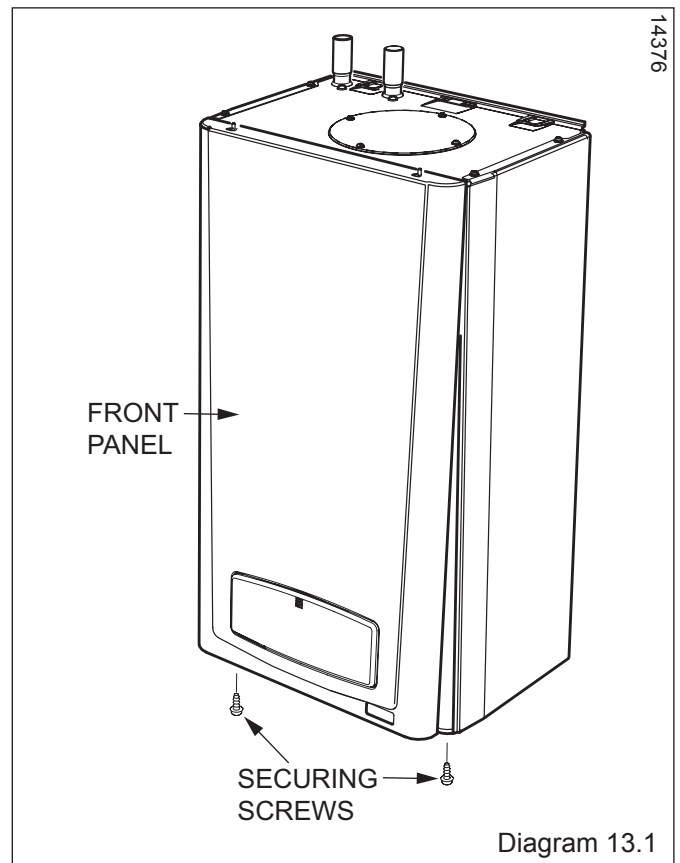
If the Combustion and Gas rate checks did not require adjustment then it will not be necessary to service the Combustion Chamber, Burner, Heat Exchanger or Spark Electrode, proceed to section 13.11.

If the combustion or gas rate requires adjustment you must complete the servicing as described in sections 13.3 to 13.8, then repeat the functional checks before proceeding to section 13.11 to complete the servicing.

13.3 Servicing the Appliance

On completion of paragraphs 13.1 and 13.2, proceed with the following.

All routine servicing requirements can be achieved by the removal of the front panel, see diagram 13.1.



Before commencing with a service or replacement of parts the boiler should be isolated from the electrical and gas supplies, see diagram 13.2 for the position of the gas service isolation valve.

13 Servicing

13.4 Spark Electrode

NOTE: If the functional checks did not indicate poor combustion then it is not necessary to service this component.

Ease the securing clips away from the sump to release the retaining catch then push the flue hood up to disengage from the sump, see diagram 13.3.

To remove, swivel flue hood 90° and pull down and out, see diagram 13.3.

Check seal for wear or damage and replace if necessary.

IMPORTANT: Do not allow fixings, nuts, screws, etc. to fall into the open flue hood sump, use a temporary cover whilst removing any parts.

Disconnect the spark electrode plug and earth lead. Remove the two securing screws and withdraw the spark electrode carefully from the combustion chamber, see diagram 13.4.

Inspect the tips for damage.

Clean away any debris and check the spark gap is 4mm.

Check the electrode gasket for signs of damage and replace if necessary.

13.5 Burner

NOTE: If the functional checks did not indicate poor combustion then it is not necessary to service this component.

Disconnect the gas supply at the gas valve and electrical connections, see diagram 13.5.

The Silencer (front) is a push fit so no tools are required for its removal or fitting, see diagram 13.6.

Release the igniter unit support bracket, see diagram 13.7.

Remove the fan retaining bracket.

To ease removal of the securing nut from the fan retaining bracket, a flat bladed screwdriver can be used in the position shown and gently levered down as indicated, see diagram 13.8.

Remove the fan and gas valve assembly.

The silencer (rear) is a push fit so no tools are required for its removal or fitting, see diagram 13.9.

Check the spark electrode gap is 4mm. Clean and adjust as necessary, see diagram 13.4.

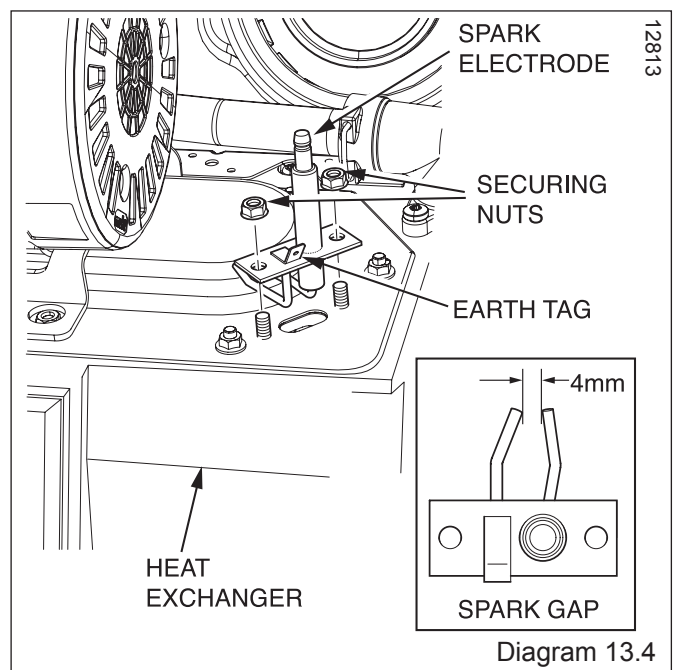
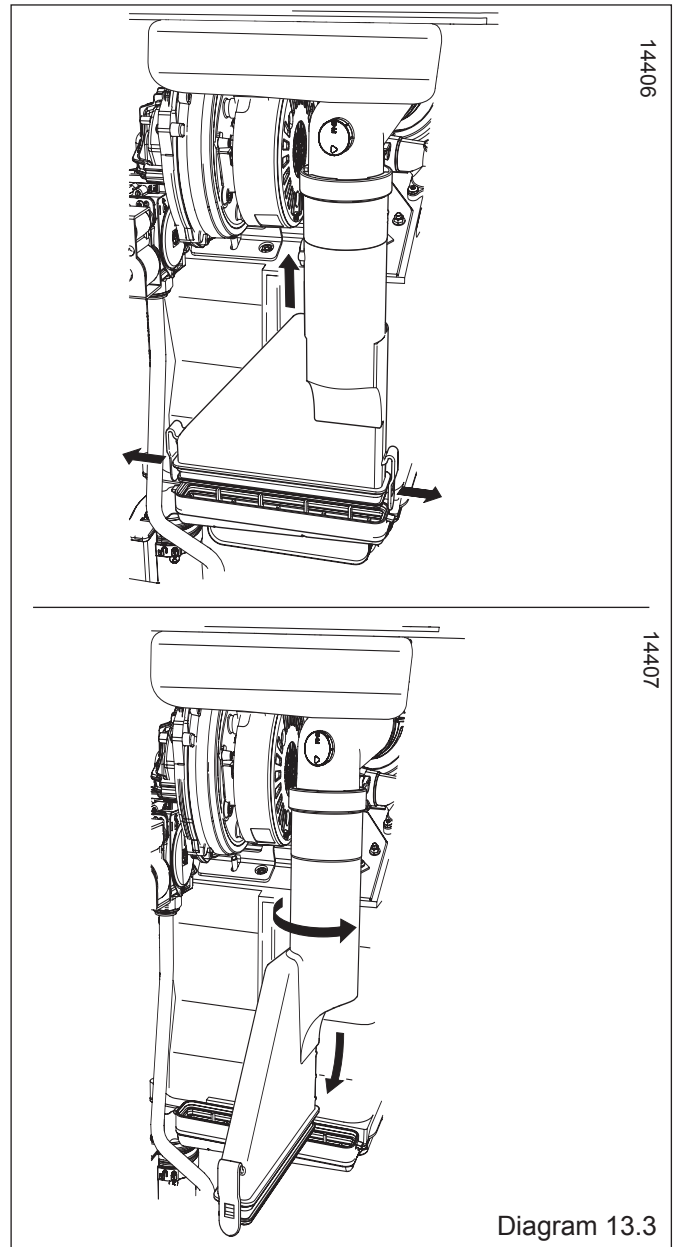
It should not be necessary to remove the spark electrode from the burner during servicing.

Remove the flanged nuts and studs that secure the burner, note that two studs at the rear also hold the fan clamping bracket, see diagram 13.10.

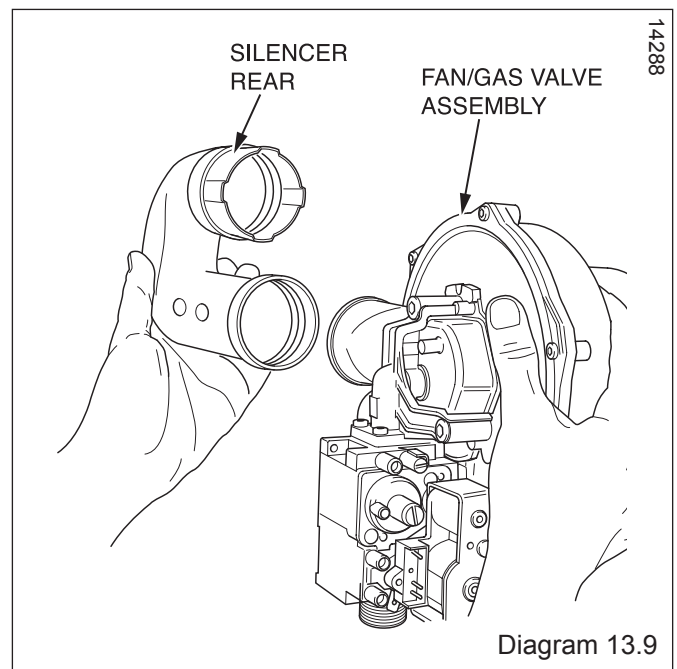
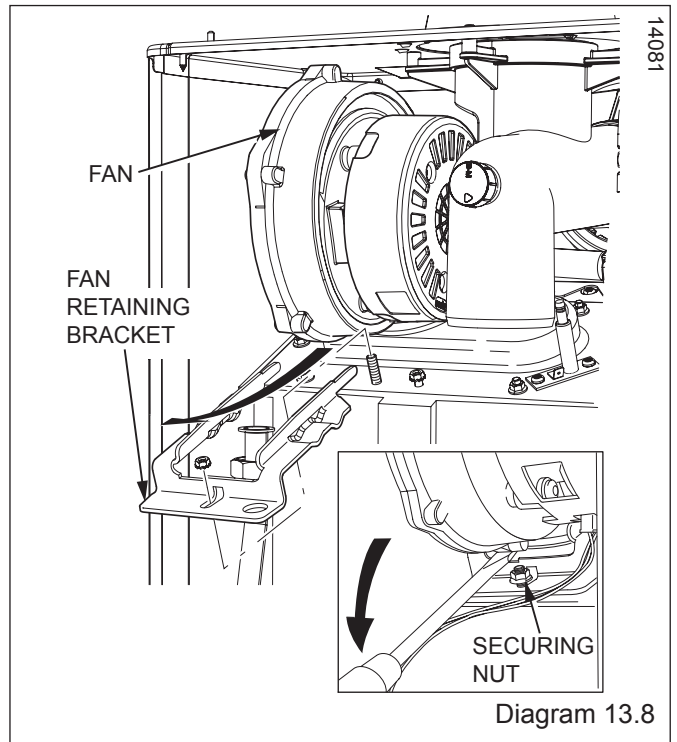
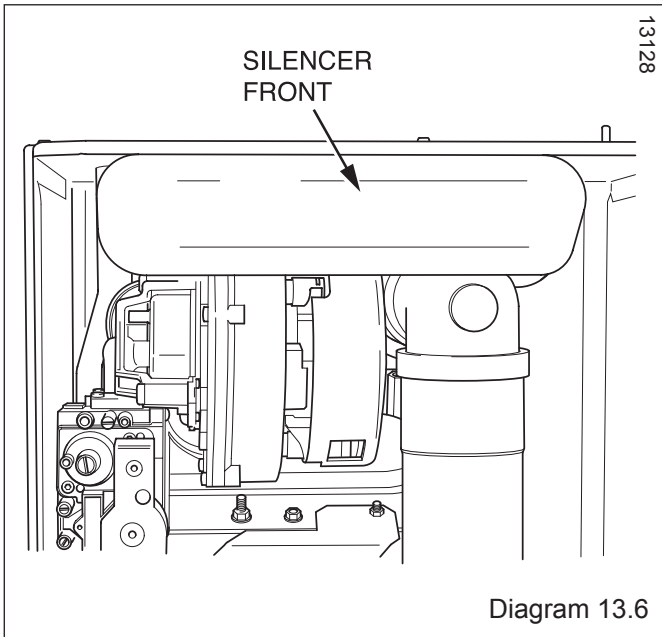
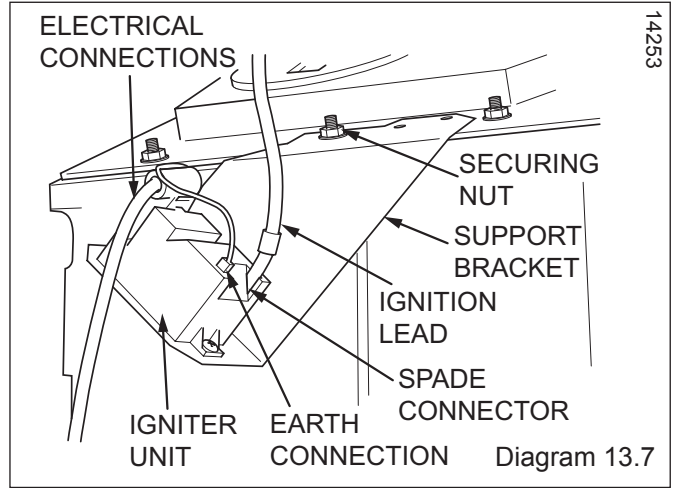
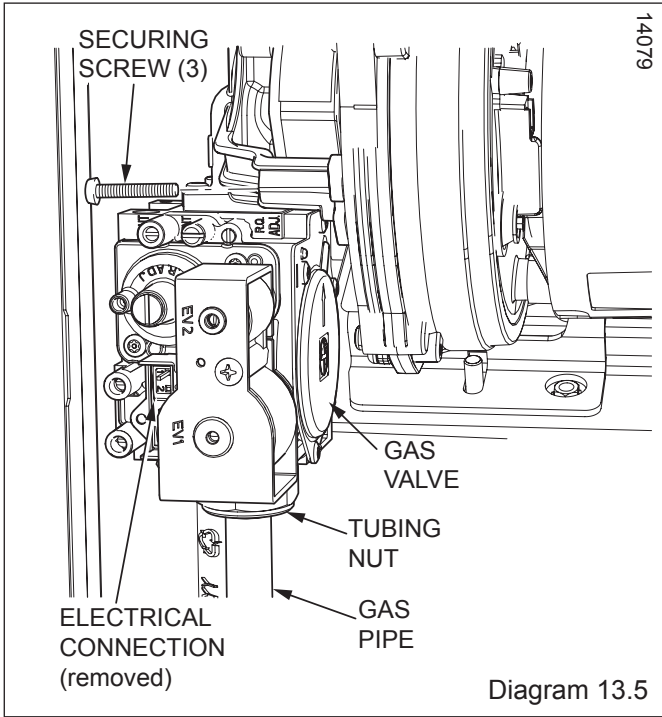
Clean the burner with a soft brush taking great care not to damage the surface of the burner. **DO NOT** use wire or sharp instruments to clean the mesh of the burner.

NOTE: The burner gasket should be inspected but will not need replacing unless there are signs of wear or damage.

Follow the tightening sequence when re-fitting the burner, see diagram 13.10.



13 Servicing



13 Servicing

13.6. Heat Exchanger

NOTE: If the functional checks did not indicate poor combustion then it is not necessary to service this component.

Remove loose debris from inside the heat exchanger using a soft brush and vacuum cleaner.

Carefully flush by spraying water into the heat exchanger, any remaining debris should pass through the condensate trap (Ensure the water is kept away from electrical components).

13.7 Condense Trap and Siphonic Drain

The condensate trap and siphonic drain does not normally need servicing unless material deposits exceed beyond the service fill level, see diagram 13.11.

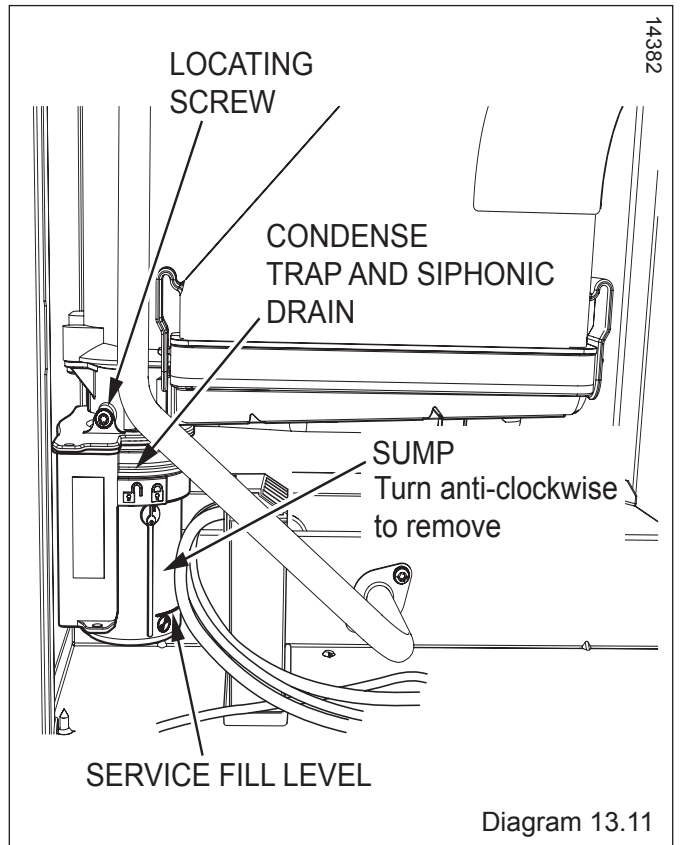
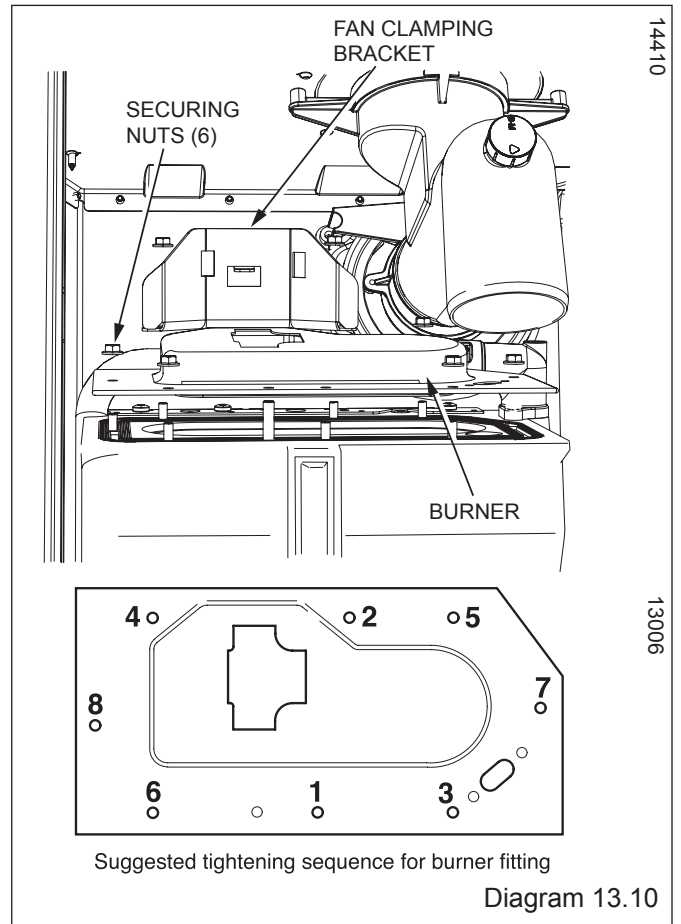
To clean the condensate trap remove the sump and rinse with water.

13.8 Casing panel seal check

NOTE: If the functional checks did not indicate poor combustion then it is not necessary to service this component.

Check the condition of the seal and replace if worn or damaged.

To replace remove the old seal and thoroughly clean the casing surfaces. Fit the new seals, these are supplied to the correct lengths and are in four pieces, for use on the sides, top and bottom.



13 Servicing

13.9 Combustion Check

With the appliance operational connect the CO₂ combustion analyser to the flue elbow test point or if direct rear flue fitted, the test point shown in diagram 13.12.

IMPORTANT: Remember to replace the cap on completion of the test.

A **competent person** only should carry out any adjustment to the gas valve, refer to diagram 13.13.

Monitor the combustion reading and at max rate the reading should be 9.3% ± 0.5.

Check the burner %CO₂ at maximum rate (as described below) is as shown in the "CHECK" column of the table and if the reading falls within the tolerance, disconnect the analyser, fit the test point cap and return to functional checks - gas rate. If adjustment is required remove the front casing panel, see diagram 13.1. Taking care not to touch any internal components, proceed as follows:

Press the "reset" button on the controls fascia, release and immediately press and hold in the "+" button. After approximately 5 seconds "Hi" will be displayed. Pressing the mode button when "Hi" is selected will force the boiler to maximum rate, the display will flash between "Hi" and the "default display" this will indicate the boiler has been forced to maximum.

Adjust the maximum rate CO₂ with the throttle to 9.3%.

(Rotate anti-clockwise to increase).

To exit the check sequences press the "mode" and "+" buttons simultaneously, this will reset the boiler to the default display.

Monitor the combustion reading and at min rate the reading should be 9.3% ± 0.5.

If adjustment proves necessary then proceed as follows:

Press the "reset" button on the controls fascia, release and immediately press and hold in the "+" button. After approximately 5 seconds "Hi" will be displayed. Pressing the "+" or "-" buttons will cycle between "Hi" and "Lo". Pressing the mode button when "Lo" is selected will force the boiler to minimum rate, the display will flash between "Lo" and the "default display" this will indicate the boiler has been forced to minimum.

Refer to diagram 13.13, remove the offset screw cover.

Adjustment of the CO₂ at minimum rate is very coarse so carefully adjust the CO₂ with the offset adjustment to 9.3%. (Rotate clockwise to increase).

Refit the offset cover and the cap on the test point.

To exit the check sequences press the "mode" and "+" buttons simultaneously, this will reset the boiler to the default display.

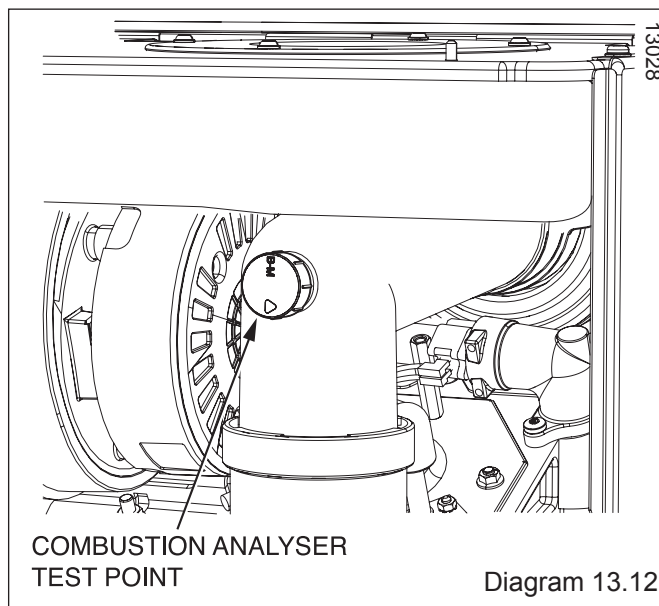
NOTE: Check the casing panel is fitted correctly giving an air tight seal.

13.10 Gas Rate Adjustment

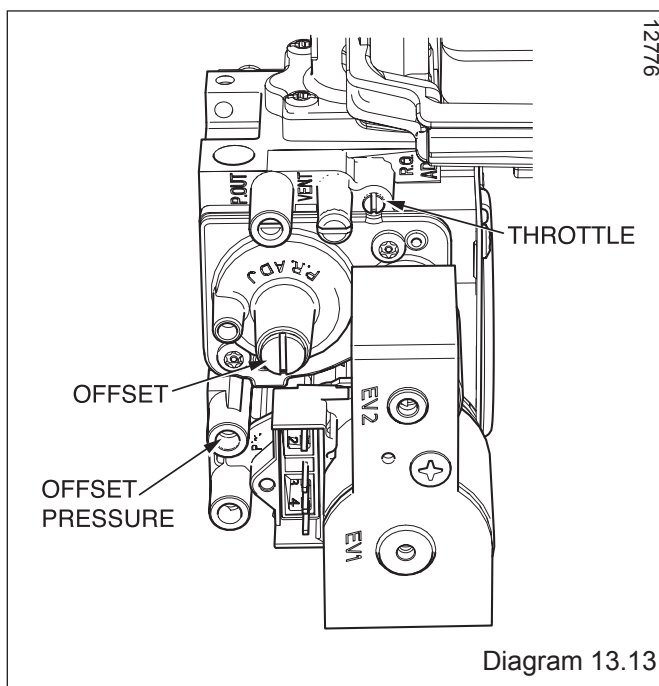
This appliance incorporates a pre-mix burner. The gas rate should be correct if the combustion measured in section 13.9 is correct.

13.11 Service Completion

On completion of the service the "Benchmark" logbook should be completed.



G20 BURNER % CO ₂	
CHECK (case on)	SETTING (case off)
8.8 to 9.8	9.2 +/- 0.3



14 Fault Finding

14.1 Preliminary fault finding

The following checks should be performed before proceeding onto specific diagnostics:

- Check the external electrical supply to the boiler is on and a supply of 230V is present at the 'L' and 'N' terminals at the installer interface.

For access remove and open the electrical cartridge, see diagrams 11.3. and 11.1.

Test at the 'L' and 'N' terminals on the installer interface, refer to diagrams 11.1 and 14.4.

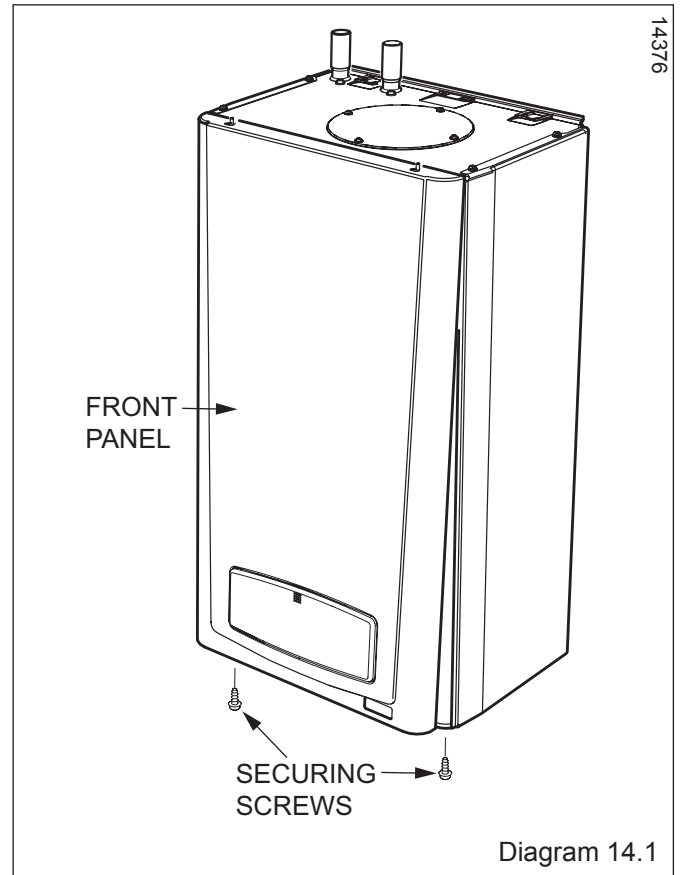
- Check the electrical installation and appliance, carry out tests for earth continuity, polarity, short circuit and resistance to earth, using a suitable multimeter.

An aid to electrical test

Carry out preliminary electrical system checks as described below, see diagram 14.2 for mains test point. Use a flat bladed screwdriver to release the mains test point cover.

For earth, use gas supply pipe, see diagram 12.1.

1. Test insulation resistance to earth of mains cables.
 2. Test the earth continuity and short circuit of cables.
 3. Switch on the boiler, test the polarity of the mains.
- Check chassis earth at a bare metal point on the boiler.
- Check that there is a gas supply to the boiler and the gas service isolation valve is turned on, see diagram 12.1.
 - Check pressure at the gas service isolation valve, refer to section 12.4.
 - Check that the heating system pressure indicates at least 1bar, if not, fill and vent the system as described in section 12.2.
 - Check that all external controls are on.
 - Check the functional flow diagram, 14.5.



14.2 Fault Codes

Fault codes take priority over all other display functions in the event of a fault occurring, refer to diagram 14.6. Fault codes and short code texts are also available on the user interface cover label.

If multiple faults occur the codes will be displayed for approx. 2 seconds in rotation.

14.3 Fault Memory

The Fault memory stores details of the ten most recent faults. To access this menu, refer to diagram 14.3:

- a) Press and hold 'MODE' for 5 seconds.
- b) When the display shows a flashing '0' press 'MODE' button.
- c) Press '+' button to scroll through the fault memory (Position 1 is most recent), see fault memory display, diagram 14.3.

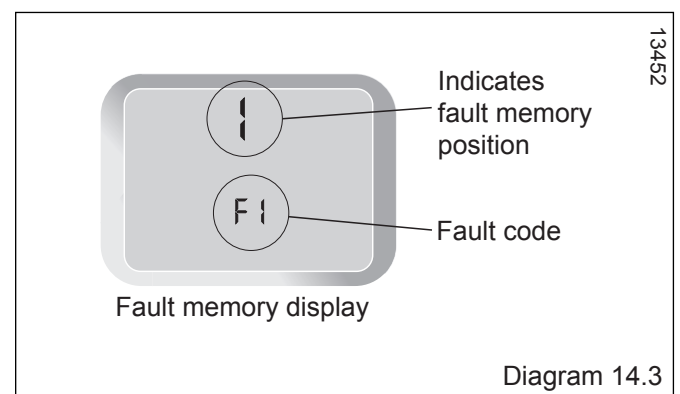
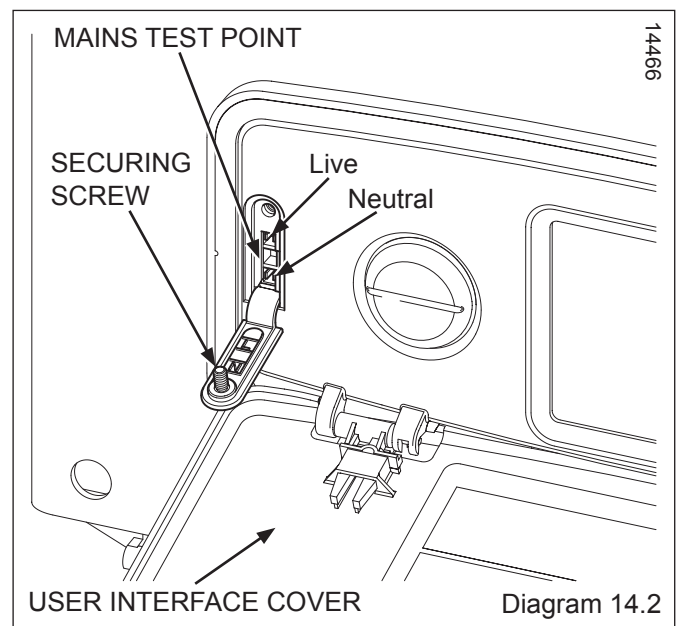
To exit this menu, press the 'MODE' button.

14.4 Diagnostic Menu

The Diagnostic Menu provides the ability to view and change certain parameters. See diagram 14.7 for available parameters.

14.5 Status Codes

The status codes provide information about the current operating condition of the boiler and can be accessed through the diagnostic display, refer to diagram 14.8.



14 Fault Finding

14377

KEY	
br	BROWN
b	BLUE
g/y	GREEN/YELLOW
gy	GREY
g	GREEN
bk	BLACK
y	YELLOW
r	RED
w	WHITE
or	ORANGE
p	PURPLE
pk	PINK

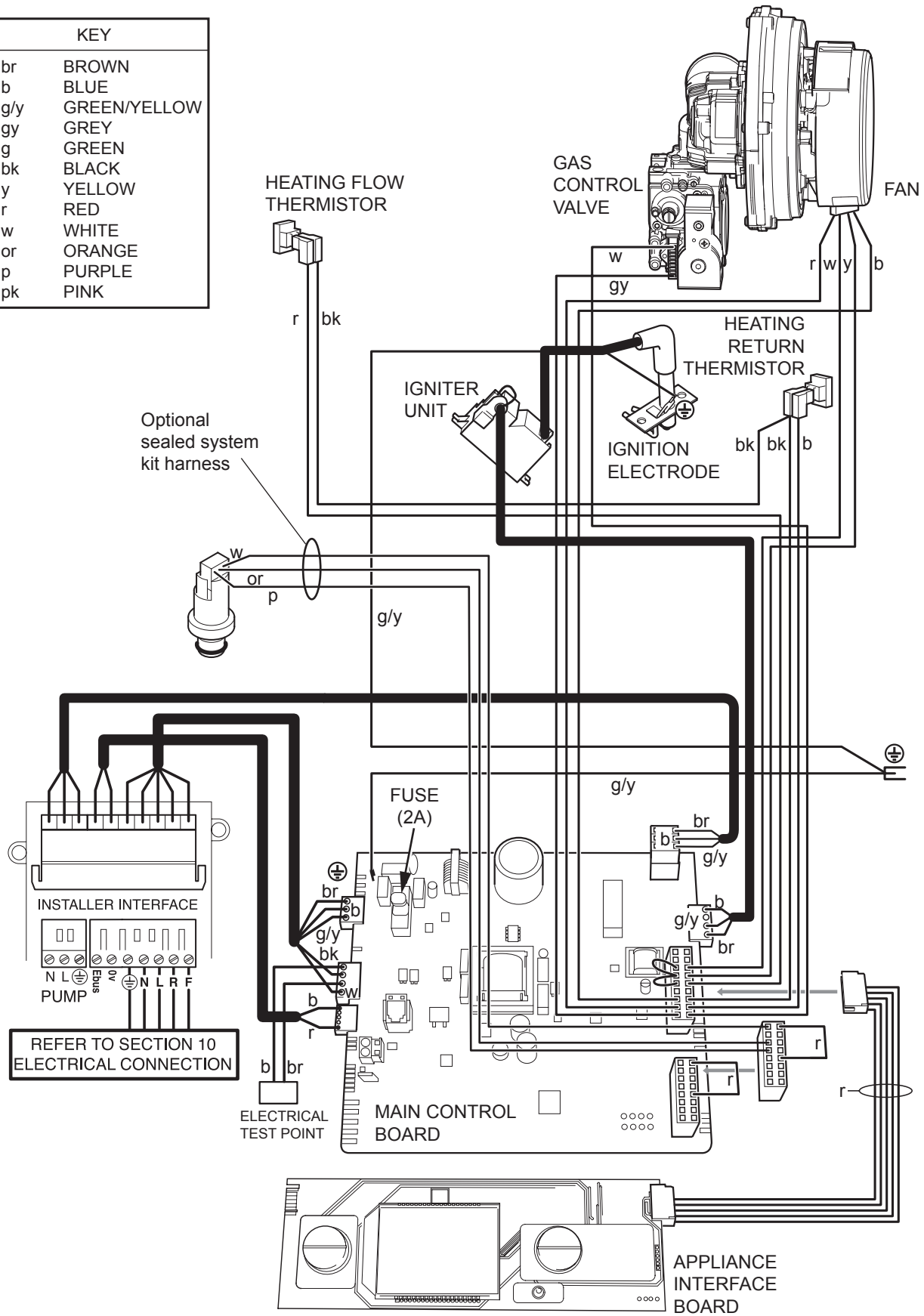
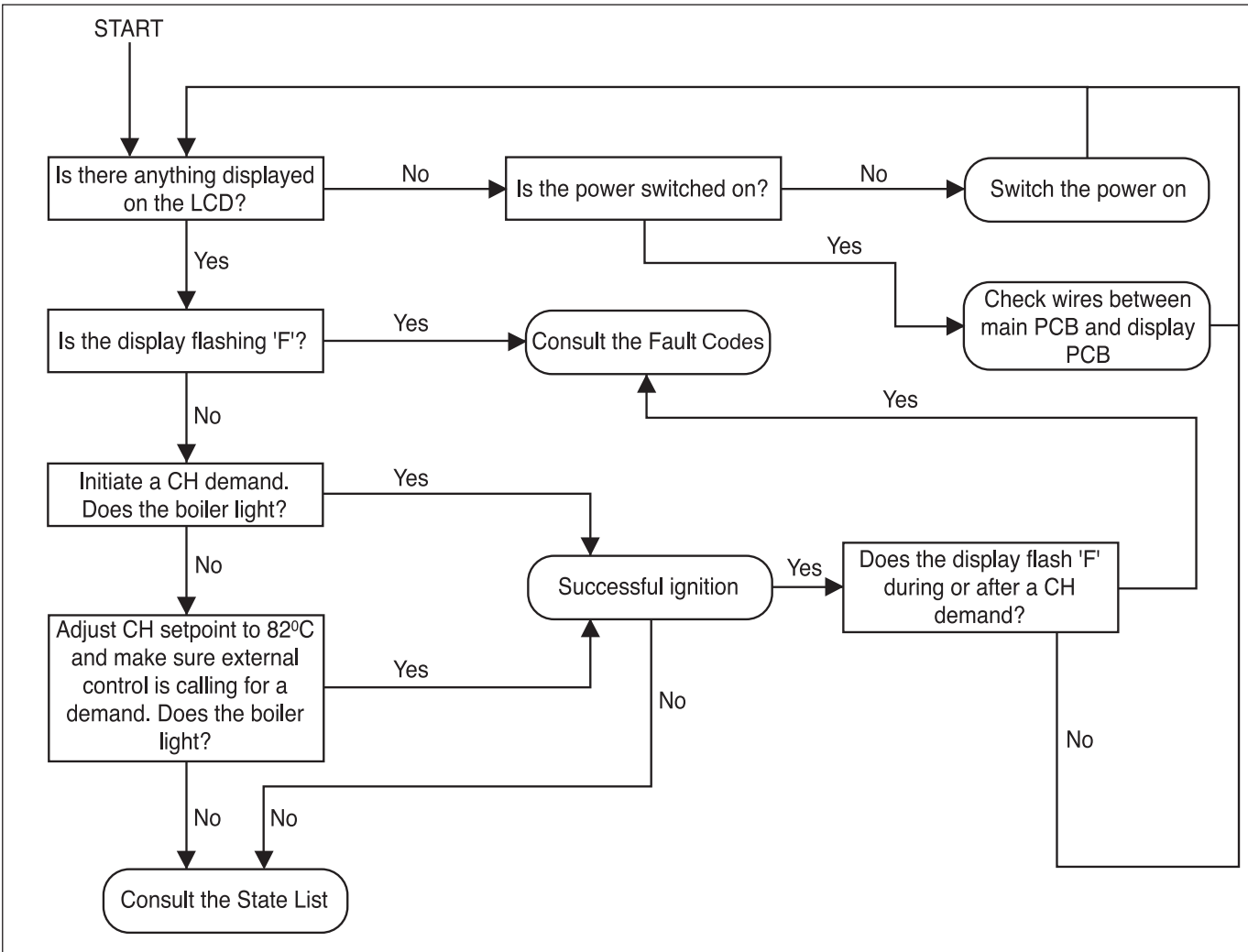


Diagram 14.4

14 Fault Finding

13012



Fault Finding - Sealed System Kit (if fitted)

14704

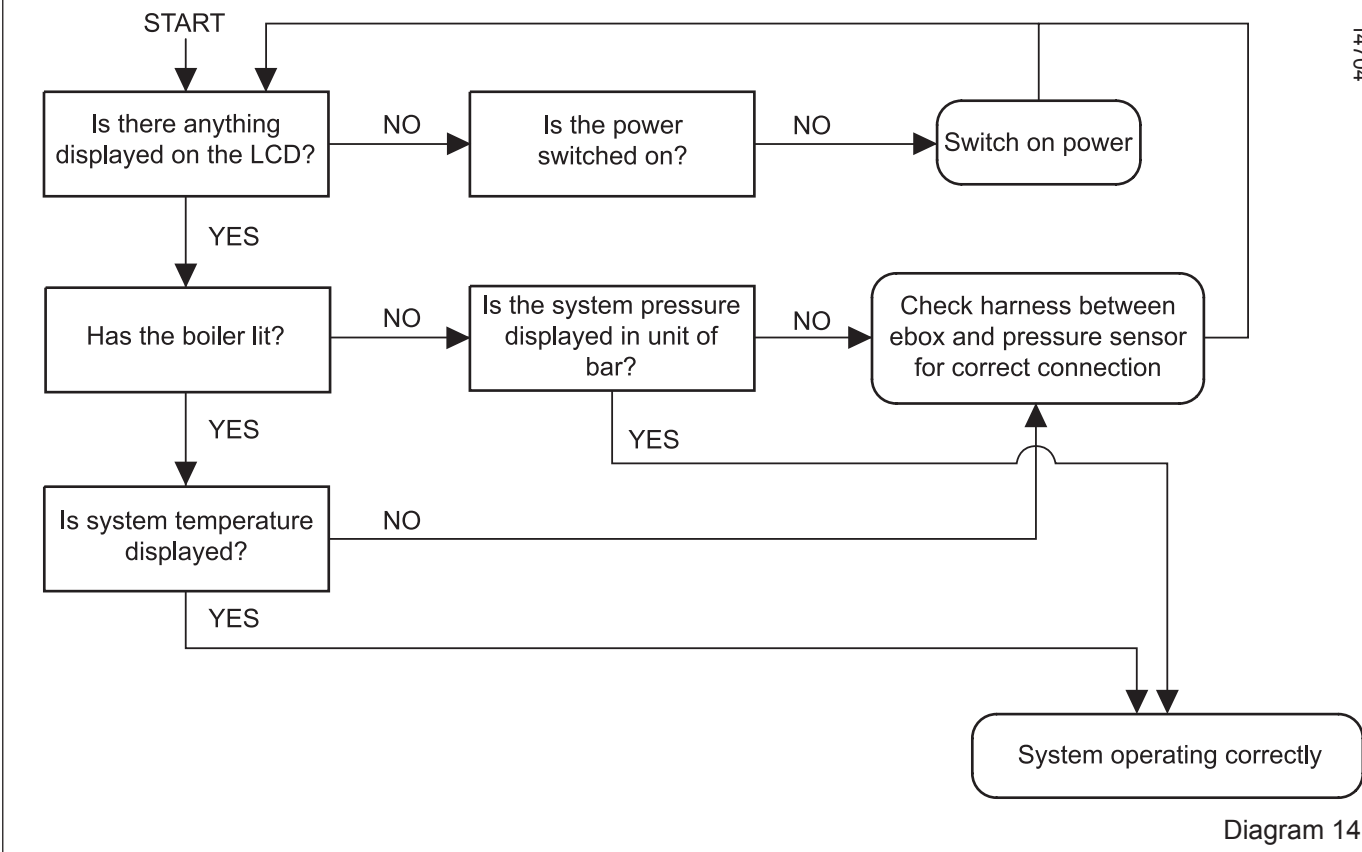


Diagram 14.5

14 Fault Finding

In all circumstances press the reset button to clear the fault. If the fault persists, consult the table below.

Fault Codes

14501

CODE	SHORT TEXT	DESCRIPTION	POSSIBLE CAUSE
F1	ign	Boiler has attempted to light 5 times and failed on all occasions	Gas tap is closed. Gas valve connector is loose, unconnected, faulty, or wires are trapped. Ignitor connectors are loose, unconnected, faulty, trapped. Faulty Ignitor. Low gas inlet pressure. Incorrect gas valve adjustment. Electrode Ignition leads loose, unconnected, faulty, trapped. Electrode broken, defective, or position incorrect. Air inlet blocked, flue inlet blocked, flue duct leaking. Earthing connection loose, disconnected. Condensate blocked.
F3	fAn	Fan fault	Fan speed incorrect. Fan connector loose, unconnected, faulty or wires trapped. Faulty fan.
F4	ign	Flame goes out whilst lit during a demand	Gas tap is closed. Gas valve connector is loose, unconnected, faulty, or wires are trapped. Ignitor connectors are loose, unconnected, faulty, trapped. Faulty Ignitor. Low gas inlet pressure. Incorrect gas valve adjustment. Electrode Ignition leads loose, unconnected, faulty, trapped. Electrode broken, defective, or position incorrect. Air inlet blocked, flue inlet blocked, flue duct leaking. Earthing connection loose, disconnected. Condensate blocked.
F5	hEAt	Overheat	Boiler has overheated – allow to cool then press reset button
F6	Fntc	Central Heating Flow Thermistor connection fault	Thermistor wires unconnected, faulty, trapped.
F10	rntc	Central Heating Return Thermistor connection fault	Thermistor wires unconnected, faulty, trapped.
F11	ntc	Flow and/or return NTC faulty	Thermistor wires unconnected, faulty, trapped.
F13	pcb	PCB Memory or sensing fault	Loose connections on Main PCB or display PCB. Central Heating Flow or Return Thermistor wires unconnected, faulty, trapped. Electrode Ignition leads loose, unconnected, faulty, trapped. Earthing connection loose, disconnected.
F14	gAS	Gas Valve control defective	Gas valve connector loose, wires unconnected, faulty or trapped. Faulty main board. Faulty gas valve.
F15	ebUS	eBus Voltage failure	Short circuit on eBus, overload on eBus.

Diagram 14.6

14 Fault Finding

Fault Codes (continued)

14455

F22	dry	Low Water or Ignition temperature rise too slow	Not enough water in the system. Central heating flow or return thermistor wire loose, faulty, trapped. Central heating flow or return thermistor not connected to pipe correctly. Air in the system. Faulty pump or pump speed too fast.
F25	diff	Central Heating Flow temperature rise too high during operation. Central Heating Return temperature rise or temperature difference too high during operation. Central Heating Temperature difference (between Flow and Return) too high during operation.	Check thermistors are connected to pipes correctly. Air in the system. System is too restrictive.
F43		Generic error	Check all electrical connections - internal & external
F70	dSn	Software incompatible	Telephone British Gas Service
F77	acc	Condensate pump error (Option)	Trapped, faulty wiring, blockage in condensate pump.
F78	acc	Wrong configuration of accessory	Intelligent Wiring Kit connected but connector on main PCB (X2) not connected. Check connection.
NO DISPLAY or 'Er' displayed - Check connection from display PCB to main PCB connector X51			

Diagram 14.6

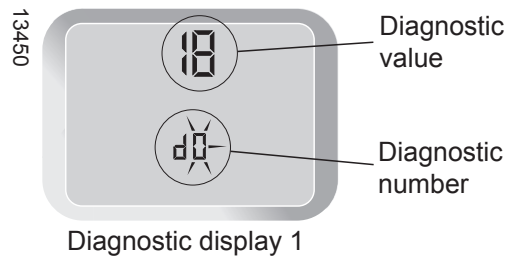
Diagnostic Menu

The Diagnostic Menu provides the ability to view and change certain parameters.

See Diagram 14.7 for available parameters.

To enter the diagnostic menu:

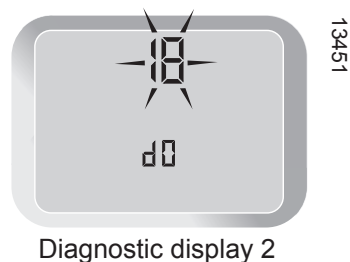
- Press and hold the 'MODE' button for 5 seconds. The display will change to flashing '0'.
- Use the '+' or '-' buttons to scroll to 96 (This is the installer level access password).
- Press 'MODE' to confirm, see diagnostic display 1.



Use the '+' or '-' buttons to view the appropriate diagnostic number, see diagram 14.7.

If necessary the values can be changed by:

- Pressing the 'MODE' button.
 - The diagnostic value flashes, see diagnostic display 2.
 - Use the '+' and '-' buttons to cycle through available values.
 - The change is saved by pressing 'MODE' once more. (**NOTE:** Only certain parameters can be adjusted)
- To exit the diagnostic menu press and hold the 'MODE' button for 5 seconds.



14 Fault Finding

14502

Diagnostic Menu - Level 1 Installer Access

Display	Description	Range
■ d.0	Heating part load	Adjustable heating part load in kW (factory setting: max. output)
■ d.1	Water pump over run time for heating mode	2 - 60 min (factory setting: 5 min)
■ d.2	Max. burner anti cycling period at 20°C Flow temperature	3 - 60 min (factory setting: 20 min)
d.4	Tank temperature	in °C -99 will be displayed. Reserved for future use.
d.5	Flow temperature setpoint	In °C, min. 38 and max. 82
d.8	External controls heat demand	0= no heat request (open) 1 = heat request (closed)
d.9	Flow target temperature from external intelligent control	In °C
d.10	Status central heating pump	1,2 = on, 0 = off
d.11	Status additional heating pump (option)	1 to 100 = on, 0 = off
d.13	Hot water circulation pump (via accessory module)	1 to 100 = on, 0 = off
d.23	Summer/Winter function	1 = Winter, 0 = Summer
d.25	Hot water activation via eBUS Control	1 = yes, 0 = no
■ d.27	Option Relay 1	} For use with accessory modules { See supplied documentation
■ d.28	Option Relay 2	
d.33	Fan speed target value	in rpm/10
d.34	Fan speed actual value	in rpm/10
d.40	Flow temperature	Actual value in °C
d.41	Return temperature	Actual value in °C
d.44	Ionisation current	Actual value (10nA) > 80 no flame < 40 good flame
d.60	Number of safety temperature limiter cut offs	Quantity
d.61	Number of lock outs	Number of unsuccessful ignitions in the last attempt
d.64	Average ignition time	In seconds
d.65	Maximum ignition time	In seconds
■ d.66	EcoStatus display enabled	0 = disabled (default) 1 = enabled
d.67	Remaining burner anti cycling time (block time)	Minutes
d.68	Unsuccessful ignitions in the first attempt	Quantity
d.69	Unsuccessful ignitions in the second attempt	Quantity
■ d.71	Maximum nominal value of flow temperature	50 - 82°C (default = 82°C)
d.76	Appliance variant (device specific number)	00 to 99
d.80	Heating operating hours	in h
d.82	Cycles in heating mode	Quantity (in hundreds)
d.90	External intelligent control connected	1 = identified, 0 = unidentified (eBUS Address <= 10)
■ d.91	Internal Programmer type (for use with Options board kit)	0:24 hour (default) 1:7 day
■ d.92	Enable/Disable Internal Programmer (for use with Options board kit)	0: CH Off, DHW Off (default) 1: CH Off, DHW On 2: CH On, DHW Off 3: CH On, DHW On
■ d.97	Activation of the second diagnostic level	Password needed
d.99	State List	(see diagram 14.8)

■ Indicates read and write function - all other diagnostics are read only

Diagram 14.7

14 Fault Finding

State list - Accessed through Diagnostic Codes - Level 1, Installer Access d.99

13568

STATE LISTS

	Central heating mode (Priority 3)	Description
S.00	no heating required	} NORMAL OPERATING STATE FOR CENTRAL HEATING
S.01	fan pre-run	
S.02	pump pre-run	
S.03	ignition	
S.04	burner on	
S.05	pump / fan overrun	
S.06	fan overrun	
S.07	pump overrun	
S.08	Anti cycling period	
	Special cases of status messages	
S.30	No Heating demand from external controls 230V	Check wiring in external controller. Check wiring at Installer Interface.
S.31	summer mode	Check CH setpoint / Check external controls
S.32	Fan speed variation too high – waiting during blocking function	Check fan connection.
S.34	frost protection active (Priority 4)	Temperature below 8°C - check thermistor connection if this is not true.
S.42	Accessory Module is blocking burner operation	Check accessory module.
S.53	waiting time: temperature difference flow - return sensor too high (Check thermistor fit)	Check flow & return thermistor connections to pipes. Check harness connection to thermistor. Check harness wires are not trapped between any internal components.
S.54	waiting time: no water in system, temperature (gradient error) rise flow / return sensor too high	Check flow & return thermistor connections to pipes. Check harness connection to thermistor. Check harness wires are not trapped between any internal components.
S.76	Waiting period – pressure sensor	Check system pressure - default display.
S.96	Return-Sensor check is running, demand (DHW or heating) is blocked	Check return thermistor connection to pipe. Check harness connection to thermistor.
S.98	Flow/Return-Sensor check is running, demand (dhw or heating) is blocked	Check flow & return thermistor connections to pipes. Check harness connection to thermistor. Check harness wires are not trapped between any internal components.

Diagram 14.8

15 Replacement of Parts

15.1 General

Replacement of parts must be carried out by a **competent person**.

Replacement parts that have associated components that need replacing on removal, ie. 'O' ring seals, gasket, etc; will be supplied and should be fitted.

Before replacing any parts the boiler should be isolated from the mains electric supply and the gas should be turned off at the gas service isolation valve on the boiler, see diagram 15.1.

Ensure that components with electrical connections are disconnected before removal.

Unless stated otherwise parts are replaced in the reverse order to removal.

After replacing any parts always test for gas tightness and if necessary carry out functional test of the controls.

For replacement of parts the front casing of the boiler will need to be removed. To remove undo the two screws on the underside of the front casing and lift off.

The side panels can be removed to aid replacement of parts.

To hinge a side panel undo and remove the four screws securing each side panel to the boiler, two below and two at the top.

15.2 Igniter Unit

For access, refer to section 15.1.

Remove ignition lead and electrical connections then remove igniter unit by removing two securing screws, see diagram 13.7.

15.3 Ignition Lead

For access, refer to section 15.1.

Pull the spark plug style connector off the spark electrode and the spade connector connected to the igniter unit, see diagrams 13.4 and 13.7.

15.4 Silencer Assembly (front)

For access, refer to section 15.1.

Pull forwards to remove.

The silencer is a push fit so no tools or fixings are required for its removal or fitting, see diagram 13.6.

15.5 Gas Valve

For access, refer to section 15.1.

Remove the three securing screws, holding the gas valve to the fan, see diagram 13.5.

Remove the gas valve.

After re-fitting check the combustion CO_2 and adjust if necessary, refer to section 13.9, Combustion Check.

After assembly test for gas tightness and purge in accordance with the current issue of BS6891 or in IE, the current edition of I.S.813 "Domestic Gas Installations".

15.6 Flue Hood

For access, refer to section 15.1.

Pull the flue hood securing clips away from the flue hood sump and push flue hood up slightly towards flue hood top, see diagram 13.3.

To remove swivel flue hood 90° and pull down and out towards front of boiler.

15.7 Fan/Gas valve assembly

For access, refer to section 15.1.

Undo the tubing nut to remove the gas valve from the gas pipe and any electrical connections, see diagram 13.5.

Remove the securing nut holding the fan retaining bracket, press down on burner to ease removal of securing nut. Slide out the fan retaining bracket.

Lift front of bracket away from stud and pull forward to release the fan, see diagram 13.8.

Lift fan/gas valve assembly up and forward away from locating studs.

Remove fan gasket and replace.

To replace the fan and retaining bracket correctly, insert into slots on fan clamping bracket and locate onto lugs on the burner, see diagram 13.10.

15.8 Silencer assembly (rear)

For access, refer to section 15.1.

Remove the fan/gas valve assembly, see section 15.5.

Pull Silencer rear away from fan/gas valve assembly.

The rear silencer is a push fit so no tools or fixings are required for its removal or fitting, see diagram 13.9.

15.9 Spark Electrode

For access, refer to section 15.1.

Remove the spark plug lead and earth lead.

Remove the two securing nuts.

Withdraw the spark electrode by slowly pulling up and leaning it forward towards the centre of the heat exchanger to ensure that the electrode does not foul on the hole in the burner casing.

Check spark gap, see diagram 13.4.

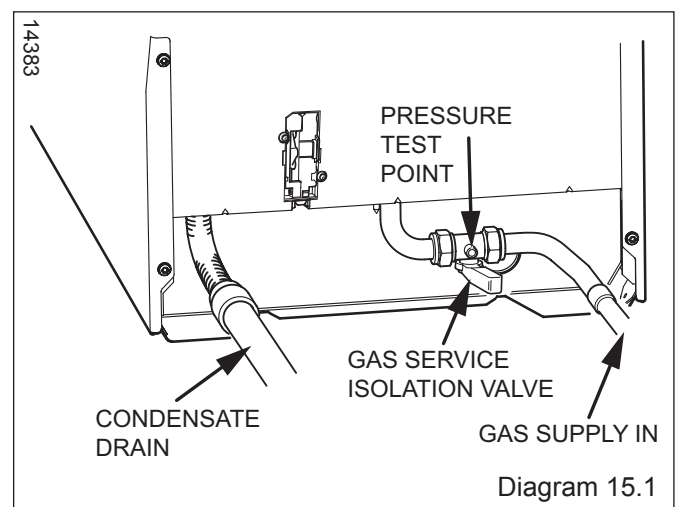


Diagram 15.1

15 Replacement of Parts

15.10 Burner

For access, refer to section 15.1.

Remove igniter unit, flue hood, fan and gas valve assembly and spark electrode lead, refer to relevant sections.

Remove the flanged nuts and studs that secure the burner, note that two studs at the rear also hold the fan clamping bracket, see diagram 13.10.

NOTE: The burner gasket should be inspected but will not need replacing unless there are signs of wear or damage.

IMPORTANT: Do not allow fixings, nuts, screws, etc. to fall into the open flue hood sump, use a temporary cover whilst removing any parts.

15.11 Condensate Trap

For access, refer to section 15.1.

Remove securing screw, see diagram 13.11.

Disconnect the flexible condensate drain pipe from the external plastic drain pipe beneath the boiler.

Carefully pull the condensate trap down and forward so as not to spill its contents. The trap should be removed complete with the sealing grommet and flexible condensate drain pipe.

15.12 Heating Flow Thermistor

For access refer to section 15.1

Remove the silencer front, fan/gas valve assembly and flue hood for access. Refer to the relevant sections and diagram 15.2.

15.13 Casing Seal

Refer to Section 13.8

15.14 Access to User interface and Main PCB

For access, refer to section 15.1.

Hinge down the control box and unclip the rear cover to gain access.

Remove electrical connections from main PCB noting their positions for replacement.

Unclip main PCB and remove, see diagram 15.8.

Unclip user interface and remove.

For replacement, see diagram 15.9 and ensure that the user interface connection cable is refitted.

NOTE: When re-fitting any of the control boards make sure you support the control box to avoid straining hinges as you push down and clip back into place.

Remove the electrical connections from the thermistor.

Remove the retaining clip from the flow pipe.

Remove the thermistor from the retaining clip.

NOTE: The polarity of the wiring to thermistors is not important.

15.15 Heating Return Thermistor

For access, refer to section 15.1.

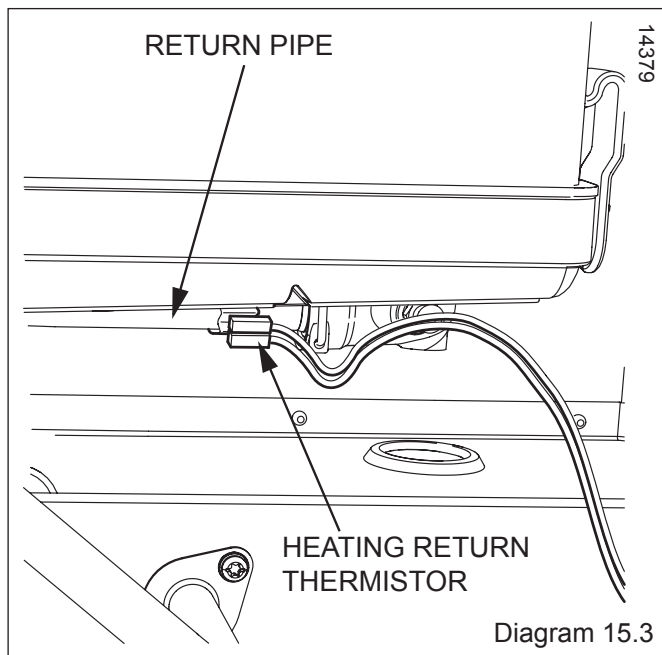
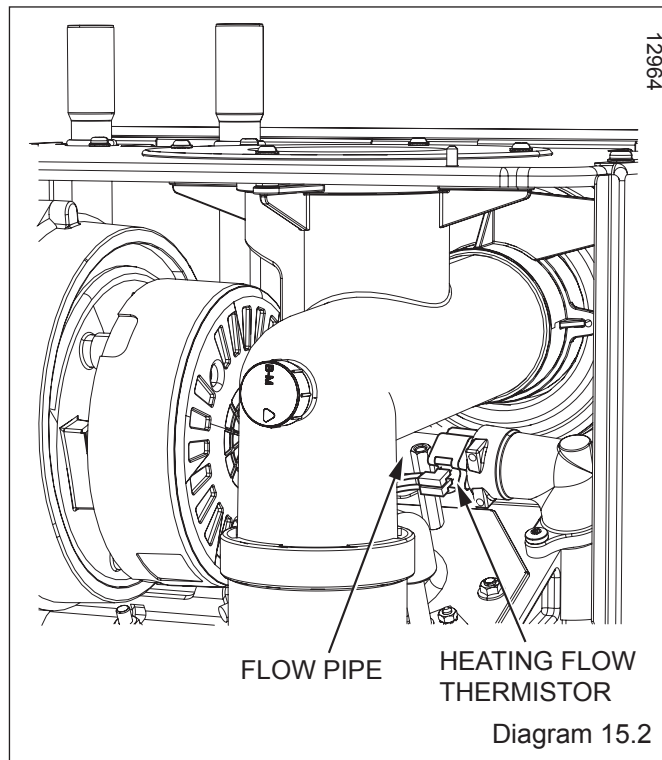
Refer to diagram 15.3.

Remove the electrical connections from the thermistor.

Remove the retaining clip from the return pipe.

Remove the thermistor from the retaining clip.

NOTE: The polarity of the wiring to thermistors is not important.



15 Replacement of Parts

15.16 Heat Exchanger

For access, refer to section 15.1.
Drain down the boiler heating circuit.
Refer to the relevant sections for the removal of the silencer front, flue hood front, igniter unit with support bracket, gas valve/fan and condensate trap.

Drain the heat exchanger

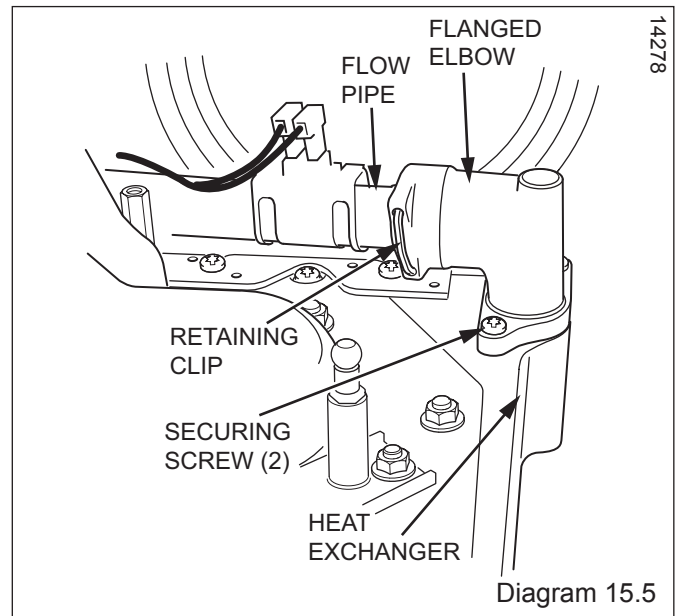
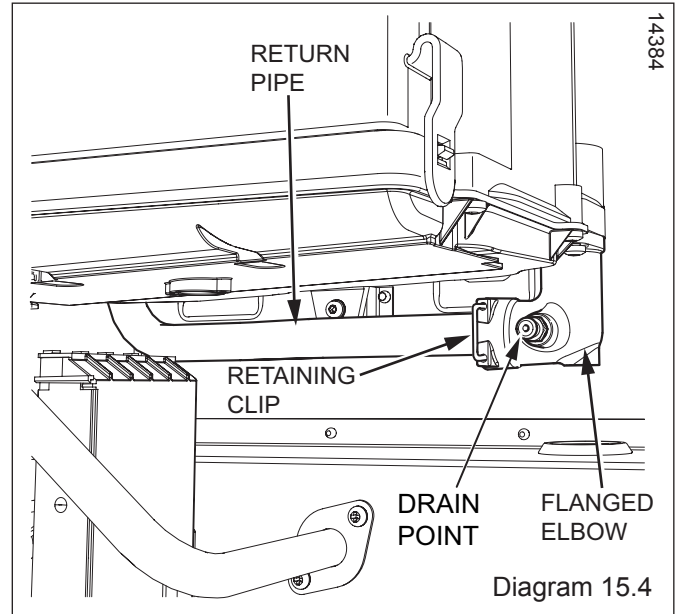
Drain the heat exchanger using the drain point on the right hand side of the heat exchanger, see diagram 15.4.

Remove the heat exchanger

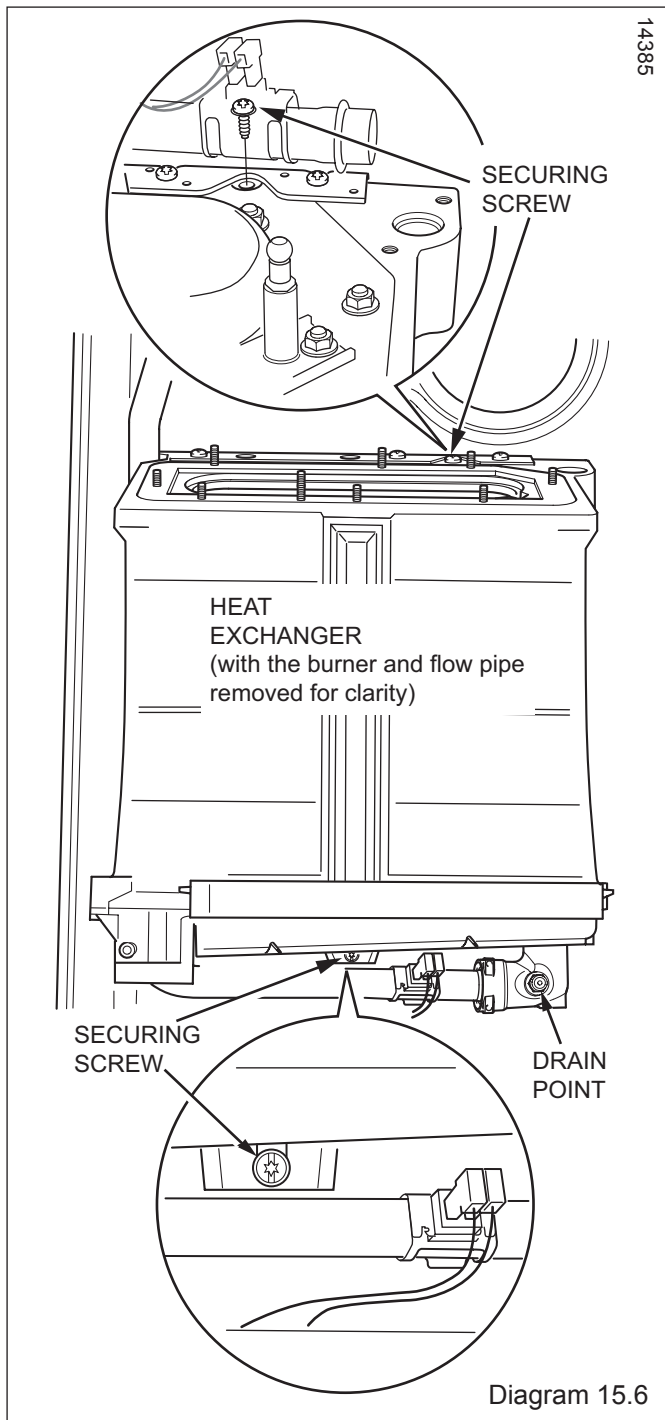
Undo the screws securing the flanged elbow on the top right hand side of the heat exchanger and remove the retaining clip from the flanged elbow, see diagram 15.5.
Remove retaining clip from the flanged elbow on the bottom of the heat exchanger, see diagram 15.4.
Remove screws securing the heat exchanger, one on top and one underneath the heat exchanger, see diagram 15.6.
Lift up heat exchanger slightly to disengage it from its hanging bracket.
Remove the heat exchanger by pulling forward, then pulling to the right to disengage the return pipe and tilting backwards to ease removal complete with sump. Discard the heat exchanger and flanged elbows.

Remove the burner

Remove the six flanged nuts and two studs that secure the burner, note that the two studs also hold the fan clamping bracket, see diagram 15.7.
Taking great care not to damage the surface of the burner.
NOTE: Replace the burner gasket and follow the tightening sequence when re-fitting the burner, see diagram 15.7.
NOTE: Fit all replacement gaskets and seals when re-fitting parts.
Commission the appliance as described in Section 12.



15 Replacement of Parts



15.17 Casing Seal

Refer to Section 13.8.

15.18 Access to User interface and Main PCB

NOTE: For access, refer to section 15.1.

Please wait 30 seconds before handling PCB after isolation of mains supply.

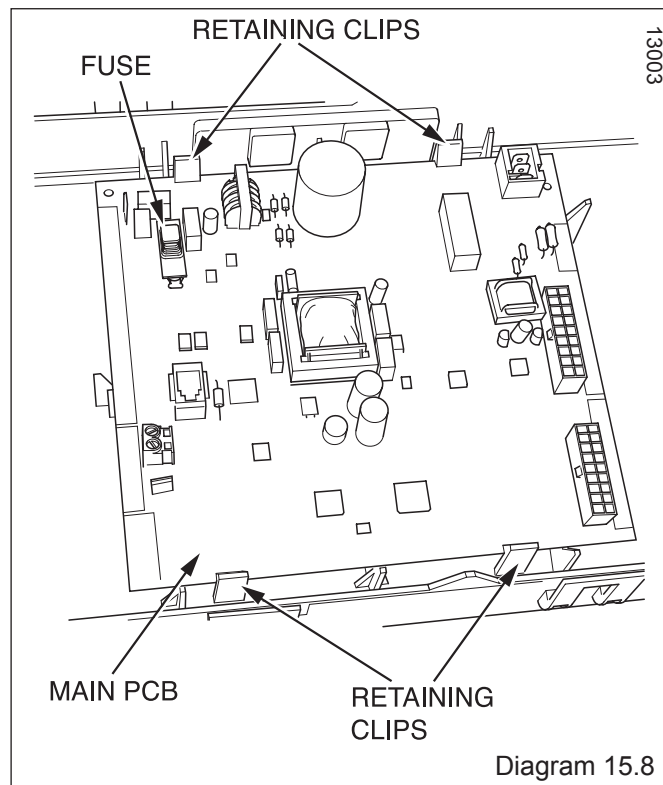
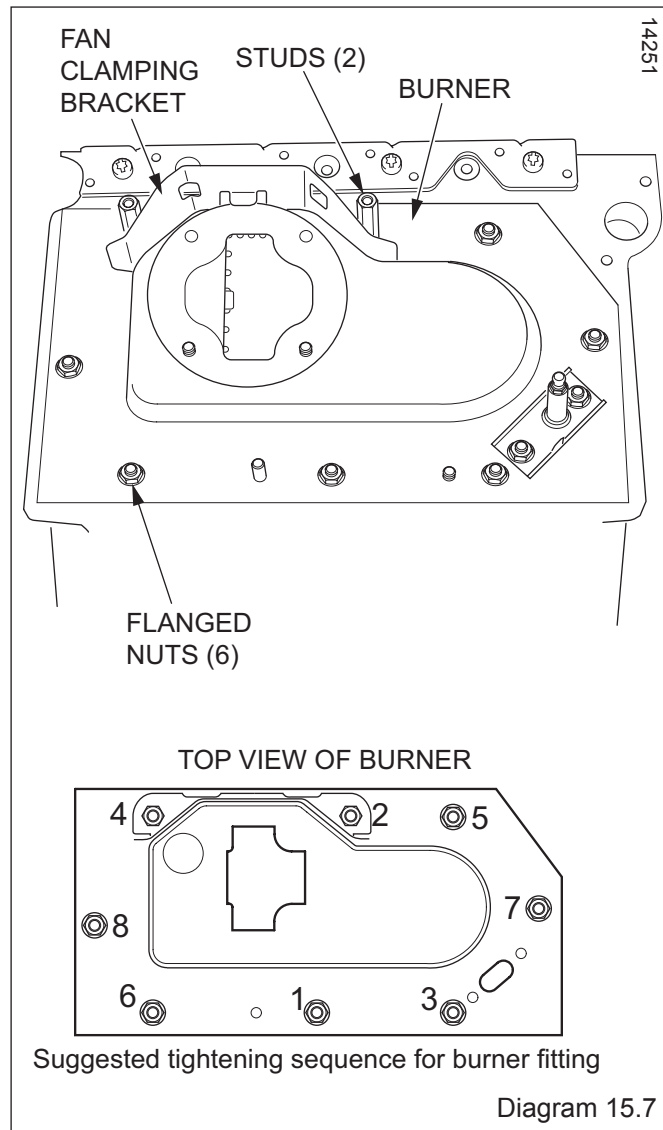
Hinge down the control box and unclip the rear cover to gain access.

Remove electrical connections from main PCB noting their positions for replacement.

Unclip main PCB and remove, see diagram 15.8.

Unclip user interface and remove.

When replacing, ensure that the user interface connection cable is refitted, see diagram 15.9.



15 Replacement of Parts

NOTE: When re-fitting any of the control boards make sure you support the control box to avoid straining hinges as you push down and clip back into place.

15.19 Control Box

For access, refer to section 15.1.

Hinge down the control box and unclip the rear cover to gain access.

Remove relevant electrical connections from main PCB and grommets from the control box.

IMPORTANT: Support the control box whilst undoing the hinges.

Remove the hinge securing screws accessed from beneath the boiler and remove the control box, see diagram 15.10.

15.20 Fuse - Main PCB - Control Box

For access, refer to section 15.16.

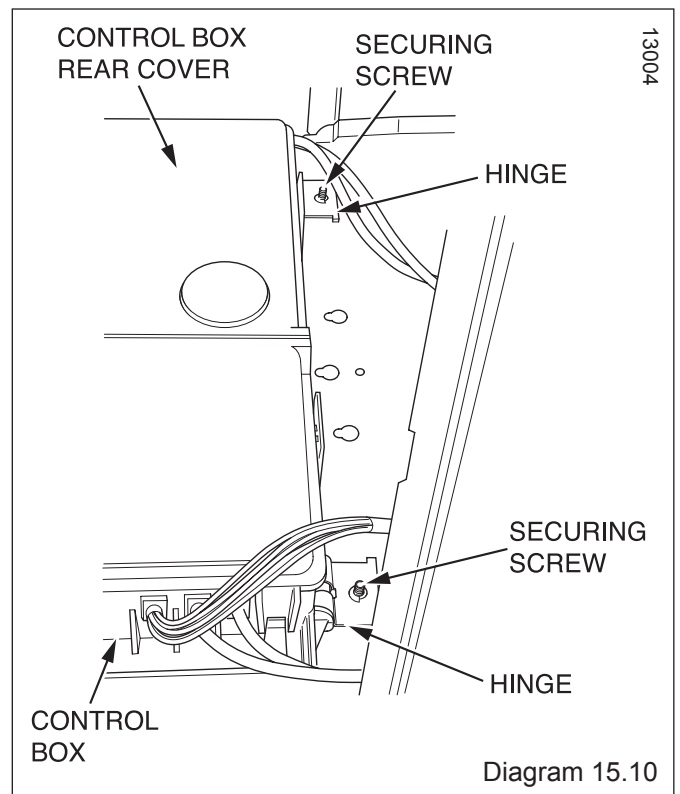
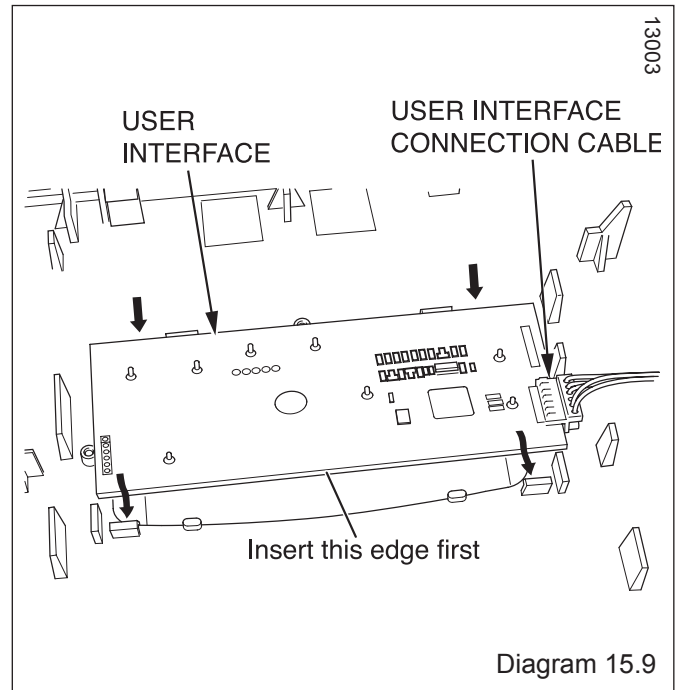
The fuse is a 2A 'slow blow' type, 20mm cartridge.

This is located at the top left hand corner of the main PCB, see diagram 15.8.

15.21 Installer Interface Electrical Cartridge

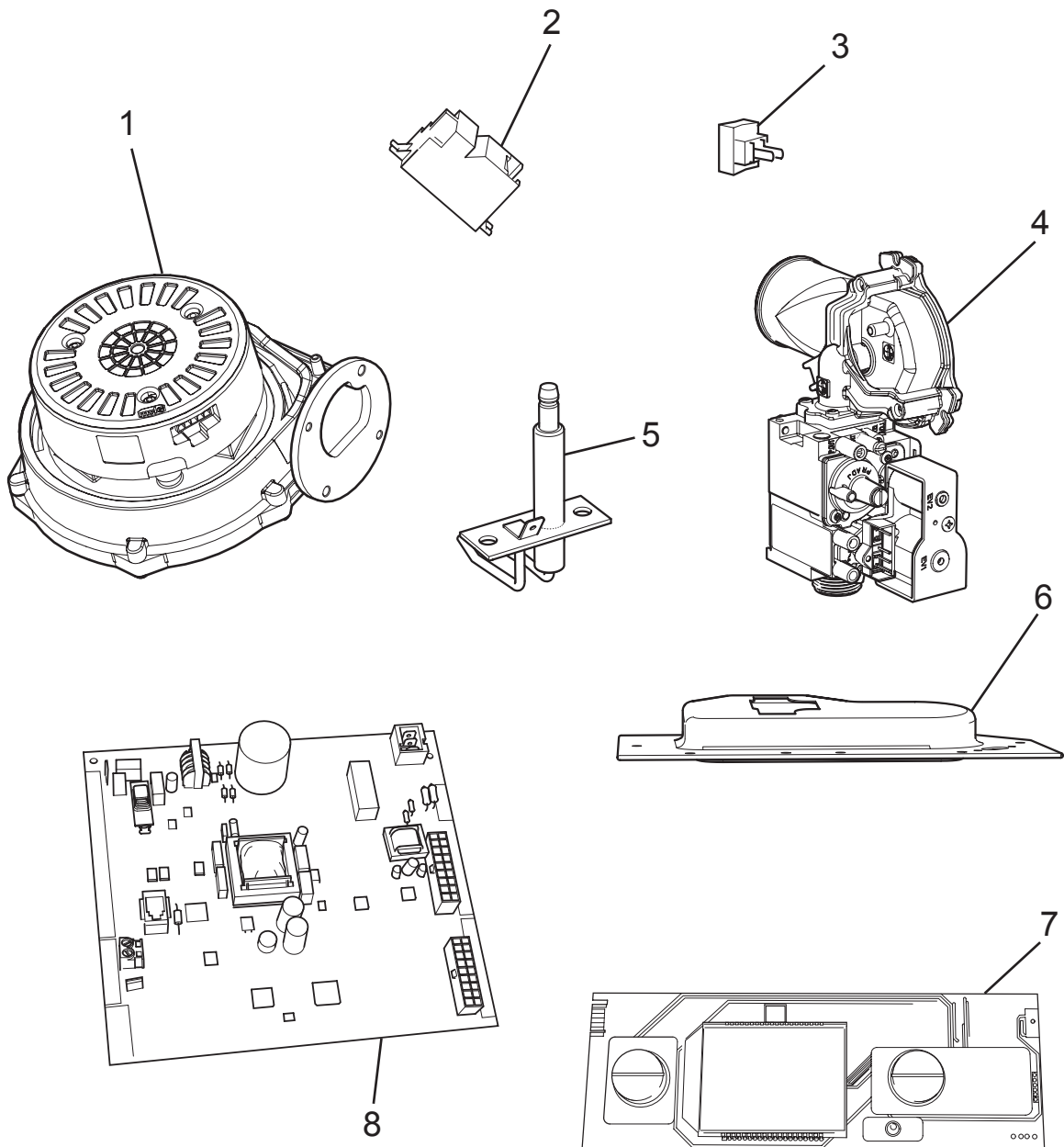
Remove the Installer Interface securing screw accessed from beneath the boiler.

Carefully pull down the electrical cartridge, disconnect the cables.



16 Spare Parts

Key No.	Part No.	Description	GC No
1	0020020734	Fan	*****
2	0020020763	Igniter unit	*****
3	0020020781	Heating flow & return thermistor (2)	*****
4	0020020735	Gas valve	*****
5	0020020731	Spark Electrode	*****
6	0020020728	Burner	*****
7	0020058974	User interface	*****
8	0020058975	Main P.C.B.	*****



13013

Diagram 16.1

17 Manual Handling

IMPORTANT. With regards to the Manual Handling Operations, 1992 Regulations, the following lift operation exceeds the recommended weight for a one man lift.

General recommendations when handling

Clear the route before attempting the lift.

Ensure safe lifting techniques are used – keep back straight – bend using legs. Keep load as close to body as possible. Do not twist – reposition feet instead. If 2 persons performing lift, ensure co-ordinated movements during lift. Avoid upper body/top heavy bending - do not lean forward/sideways. Recommend wear suitable cut resistant gloves with good grip to protect against sharp edges and ensure good grip. Always use assistance if required.

Removal of carton from delivery van

Recommend 2 person lift or 1 person with use of sack truck. If 1 person is performing lift, straddle the load, tilt and place carton into position on truck. Recommend secure appliance onto truck with suitable straps. Ensure safe lifting techniques are used – keep back straight – bend using legs. Keep load as close to body as possible. If 2 persons performing lift, ensure co-ordinated movements during lift. Always use assistance if required.

Carriage of carton from point of delivery to point of installation – ground floor.

Recommend 2 person lift or 1 person with use of sack truck. If 1 person is performing lift, straddle the load, tilt and place carton into position on truck. Recommend secure appliance onto truck with suitable straps. Ensure safe lifting techniques are used – keep back straight – bend using legs. Keep load as close to body as possible. If 2 persons performing lift, ensure co-ordinated movements during lift. Clear the route before attempting the lift. If removing boiler from truck straddle the load and tilt forwards to facilitate secure grip. Ensure safe lifting techniques are used – keep back straight – bend using legs. Do not twist – reposition feet instead. Take care to avoid trip hazards, slippery or wet surfaces and when climbing steps and stairs. Always use assistance if required.

Carriage of carton from point of delivery to point of installation – first or higher floor, cellar.

Recommend 2-person lift or 1 person with use of sack truck. If 1 person is performing lift, straddle the load, tilt and place carton into position on truck. Recommend secure appliance onto truck with suitable straps. Ensure safe lifting techniques are used – keep back straight – bend using legs. Keep load as close to body as possible. If 2 persons performing lift, ensure co-ordinated movements during lift. Avoid upper body/top heavy bending - do not lean forward/sideways. Clear the route before attempting the lift. If removing boiler from truck straddle the load and tilt forwards to facilitate secure grip. Ensure safe lifting techniques are used – keep back straight – bend using legs. Do not twist – reposition feet instead. Take care to avoid trip hazards, slippery or wet surfaces and when climbing steps and stairs. Always use assistance if required.

Carriage of carton from point of delivery to point of installation – roofspace.

Recommend 2-person lift. Ensure co-ordinated movements during lift. Avoid upper body/top heavy bending - do not lean forward/sideways. Clear the route before attempting the lift. Take care to avoid trip hazards, slippery or wet surfaces and when climbing steps and stairs. When transferring appliance into roofspace, recommend 1 person to be in roofspace to receive the appliance and other person to be below to pass up and support appliance. Ensure safe lifting techniques are used – keep back straight – bend using legs. Keep load as close to body as possible. Always use assistance if required. It is assumed safe access, flooring and adequate lighting are provided in the roof space. It is recommended a risk assessment of the roof space area be carried out before moving the appliance into the area to take into account access, stability of flooring, lighting and other factors, and appropriate measures taken.

Unpacking of appliance from carton.

Recommend 2 persons unpack appliance from carton. Always keep working area clear. Recommend cut base end of carton and open carton flaps, then tilt boiler forwards from its side onto its base and remove carton by sliding up over the boiler. Ensure safe lifting techniques are used – keep back straight – bend using legs. Keep load as close to body as possible. Always use assistance if required. Dispose

of packaging in a responsible manner. Recommend wear suitable cut resistant gloves with good grip to protect against sharp edges and ensure good grip when handling appliance outside packaging.

Positioning of Appliance for Final Installation – no obstructions.

This appliance is deemed to be a one person lift when removed from the carton. Fit bracket securely onto wall before lifting appliance into position. Obtain firm grip on front and sides of appliance, lift upwards, ensure stable balance achieved and lift upwards to position in place on bracket. Ensure safe lifting techniques are used – keep back straight – bend using legs - when lifting load from floor level. Do not twist – reposition feet instead. Keep boiler as close as possible to body throughout lift to minimise strain on back. Ensure co-ordinated movements to ensure equal spread of weight of load. Always use assistance if required. Recommend wear suitable cut resistant gloves with good grip to protect against sharp edges and ensure good grip when handling appliance.

Positioning of Appliance for Final Installation – above worktop, foreseeable obstructions etc.

This appliance is deemed to be a one person lift when removed from the carton. Fit bracket securely onto wall before lifting appliance into position. Obtain firm grip on front and sides of appliance, lift upwards, onto worktop if practicable. Ensure stable balance achieved and lift upwards to position in place on bracket. If 2 persons positioning onto bracket obtain firm grip at front and sides/base of boiler. Ensure co-ordinated movements during 2 person lifts to ensure equal spread of weight of load. Ensure safe lifting techniques are used – keep back straight – bend using legs - when lifting load from floor level. Do not twist – reposition feet instead. Keep boiler as close as possible to body throughout lift to minimise strain on back. Avoid upper body/top heavy bending - do not lean forward/sideways. Always use assistance if required. Recommend wear suitable cut resistant gloves with good grip to protect against sharp edges and ensure good grip when handling appliance.

Positioning of Appliance for Final Installation – within compartment etc. restricting installation.

This appliance is deemed to be a one person lift when removed from the carton. Fit bracket securely onto wall before lifting appliance into position. Obtain firm grip on front and sides of appliance, lift upwards, onto worktop if practicable. Ensure stable balance achieved and lift upwards to drop into place onto bracket. If 2 persons positioning onto bracket obtain firm grip at front and sides/base of boiler. Ensure co-ordinated movements during 2 person lifts to ensure equal spread of weight of load. If 1 person positioning onto bracket recommend obtain firm grip supporting base of boiler. Ensure safe lifting techniques are used – keep back straight – bend using legs - when lifting load from floor level. Do not twist – reposition feet instead. Keep boiler as close as possible to body throughout lift to minimise strain on back. Always use assistance if required. Recommend wear suitable cut resistant gloves with good grip to protect against sharp edges and ensure good grip when handling appliance.

Positioning of Appliance for Final Installation – in roof space restricting installation.

This appliance is deemed to be a one person lift when removed from the carton. Obtain firm grip on front and sides of appliance, lift upwards, ensure stable balance achieved and lift upwards to drop into place onto bracket. If 2 persons positioning onto bracket obtain firm grip at front and sides/base of boiler. Ensure co-ordinated movements during 2 person lifts to ensure equal spread of weight of load. If 1 person positioning onto bracket recommend obtain firm grip supporting base of boiler. Ensure safe lifting techniques are used – keep back straight – bend using legs - when lifting load from floor level. Do not twist – reposition feet instead. Keep boiler as close as possible to body throughout lift to minimise strain on back. Always use assistance if required. Recommend wear suitable cut resistant gloves with good grip to protect against sharp edges and ensure good grip when handling appliance. It is recommended a risk assessment of the roof space area be carried out before moving the appliance into the area to take into account access, stability of flooring, lighting and other factors, and appropriate measures taken.

EC declaration of conformity

Name and Address of the manufacturer: Glow-worm
Nottingham Road
Belper
Derbyshire DE56 1JT

Identification of product: Condensing Wall-Hung Heating Boiler

Appliance type: British Gas/ Scottish Gas 330+ - BG 330+

The appliance types satisfy the essential requirements of the relevant directives and Standards:

90/396/EEC including amendments
"Directive on the approximation of the law of the member states relating to appliances burning gaseous fuels"

Designed and built to CE-type examination certificate:

PIN no: 87BS63

92/42/EEC including amendments
"Directive of efficiency relating to boiler burning gaseous fuels"

Designed and built according to European Standards:

73/23/EEC including amendments
"Directive on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits"

EN 483
EN 677
EN 60335-1
EN 60529
EN 50165
EN 55014
EN 61000-3-2
EN 61000-3-3

89/336/EEC including amendments
"Directive on the approximation of the law of the member states relating to electromagnetic compatibility"

Any change to the appliance and/or any use not according to the instructions will lead to the invalidation of this Declaration of Conformity

Belper, January 2008
(place, date)


Program Manager
S. Keeton


Certification Manager
A. Beardsley



Manufactured by Glow-worm exclusively for British Gas
Glow-worm, Nottingham Road, Belper, Derbyshire. DE56 1JT
www.glow-worm.co.uk

Because of our constant endeavour for improvement, details may vary slightly from those shown in these instructions.