Glow-worm

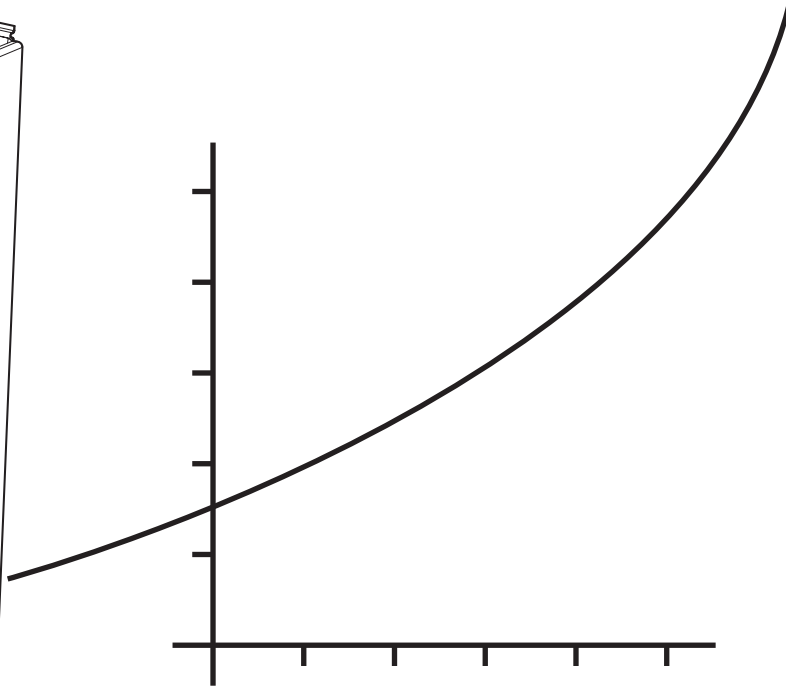
Installation and Servicing

Condensing Boilers/ Flexicom cx

24cx G.C.No. 47-047-33

30cx G.C.No. 47-047-34

35cx G.C.No. 47-047-35



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Guarantee Registration

Thank you for installing a new Glow-worm appliance in your home.
Glow-worm appliances are manufactured to the very highest standard so we are pleased to offer our customers a Comprehensive Guarantee.
This product is guaranteed for 24 months from the date of installation or 30 months from the date of manufacture, whichever is the shorter, for parts and labour.
The second year of the parts guarantee, from the beginning of the 13th month onwards after installation or manufacture, is conditional upon the boiler having been serviced by a **competent person** approved at the time by the Health and Safety Executive in accordance with the manufacturer's recommendations. We strongly recommend regular servicing of your gas appliance, but where the condition is not met, any chargeable spare parts or components issued within the applicable guarantee period still benefit from a 12 month warranty from the date of issue by the manufacturer.
We recommend you complete and return as soon as possible your guarantee registration card.
If your guarantee registration card is missing you can obtain a copy or record your registration by telephoning the Glow-worm Customer Service number 01773 828100.

Customer Service:

01773 828100

Technical Helpline:

01773 828300

General and Sales enquiries:

Tel. 01773 824639
Fax: 01773 820569

To register your Glow-worm appliance call:

0800 0732142

Benchmark places responsibilities on both manufacturers and installers. The purpose is to ensure that customers are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons and that it meets the requirements of the appropriate Building Regulations. The Benchmark Checklist can be used to demonstrate compliance with Building Regulations and should be provided to the customer for future reference.
Installers are required to carry out installation, commissioning and servicing work in accordance with the Benchmark Code of Practice which is available from the Heating and Hotwater Industry Council who manage and promote the Scheme.
Visit www.centralheating.co.uk for more information.

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

CE

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TABLE OF CONTENTS

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.

CONTENTS	DESCRIPTION	SECTION	PAGE
INTRODUCTION	Warnings		4
	Important Information		4
	Statutory Requirements		5
	Boiler Design		6
	Safety Devices		6
	Servicing, Maintenance and Spare Parts		6
INSTALLATION	Boiler Specification	1	7
	Boiler Dimensions and Hydraulic Schematic	2	8
	Boiler Location, Clearances and Ventilation	3	9
	Evacuation of Combustion Gas	4	10
	Water Systems	5	14
	Installation Preparation	6	18
	Gas/Water Connections	7	19
	Boiler Fixing	8	20
	Safety Discharge Valve and Condensate Connections	9	21
	Electrical Connection	10	23
	Commissioning	11	24
MAINTENANCE	Servicing	12	28
	Fault Finding	13	33
	Replacement of Parts	14	39
	Spare Parts	15	47
	Manual Handling	16	48
	Declaration of Conformity	17	49
	Commissioning Checklist		50
	Service Interval Record		51

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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.

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** approved at the time by the Health and Safety Executive 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 16 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 Glow-worm.
Any alteration not approved by Glow-worm, could invalidate the certification, boiler warranty and may also infringe the current issue of the statutory requirements.

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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 2009/142/EC 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** approved at the time by the Health and Safety Executive 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**, approved at the time by the Health and Safety Executive, 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 Supply (water fittings) Regulations 1999 and water byelaws 2000, 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** approved at the time by the Health and Safety Executive 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.
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.

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Boiler Design

Boiler Design

These boilers are designed for use as part of a sealed water central heating system with fully pumped circulation. The pump, expansion vessel and associated safety devices are all fitted within the boiler. The hot water PRE HEAT temperature facility will improve the boilers hot water delivery response. The daily pump and 3 way valve exercise programme combined with the built-in frost protection will help to maintain and protect the boiler.

Range Rating

The boilers are fully modulating for central heating, it is therefore not necessary to range rate the boiler. However, if desired, it is possible to range rate the max. CH output in 1kW increments, refer to section 11.

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.

Pluming 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/Servicing company or Glow-worm service.

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/Servicing company or Glow-worm service.

Safety Discharge Valve

A safety discharge valve and discharge pipe are fitted to the boiler. This valve must not be interferred with, should there be any discharge from the pipe, isolate the boiler electrical supply and call your installer or Glow-worm's own service organisation using the telephone number on the inside front cover of this booklet.

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 an ice blockage in the condense drain, external to the house would also activate the safety feature. Use warm cloths on the pipe to release an ice blockage.
Once the blockage is removed 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 applaince 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** approved at the time by the Health and Safety Executive in accordance with the rules in force in the countries of destination.
To obtain service, please call your installer or Glow-worm's own service organisation using the telephone number on the inside front cover of this literature.
After servicing, complete the relevant Service Interval Record section of the Benchmark Checklist located on the inside back pages of these instructions.

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 Glow-worm.
If a part is required contact Glow-worm's own service organisation using the telephone number on the inside front cover of this booklet.
Please quote the name of the appliance, this infomation will be on the name badge on the front of the appliance.
If in doubt seek advice from the local gas company or Glow-worm's own service organisation using the telephone number on the inside front cover of this booklet.

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1 Boiler Specification

14732

BOILER SPECIFICATION	24cx	30cx	35cx
Lift weight	36kg (79lb)	36kg (79lb)	36kg (79lb)
Total weight (installed)	41kg (90lb)	41kg (90lb)	41kg (90lb)
Gas connection Ø O.D.	15mm. copper	15mm. copper	15mm. copper
Heating and return connection Ø O.D.	22mm. copper	22mm. copper	22mm. copper
Domestic hot water connection Ø O.D.	15mm. copper	15mm. copper	15mm. copper
Condensate connection Ø I.D.	21.5mm. plastic	21.5mm. plastic	21.5mm. plastic
Safety valve discharge connection ØO.D.	15mm. copper	15mm. copper	15mm. copper
Heating circuit safety valve (preset)	3 bar (43.5lbf/in^2)	3 bar (43.5lbf/in^2)	3 bar (43.5lbf/in^2)
Heating system minimum pressure	0.7bar (10.1lbf/in^2)	0.7bar (10.1lbf/in^2)	0.7bar (10.1lbf/in^2)
Maximum domestic hot water circuit	10bar (145lbf/in^2)	10bar (145lbf/in^2)	10bar (145lbf/in^2)
Minimum working pressure to obtain maximum domestic flow	1.0bar (14.5lbf/in^2)	1.0bar (14.5lbf/in^2)	1.0bar (14.5lbf/in^2)
Minimum working pressure to obtain domestic hot water	0.2bar (2.9lbf/in^2)	0.2bar (2.9lbf/in^2)	0.2bar (2.9lbf/in^2)
Specific water rate at 35° rise	9.85L/min.	12.3L/min.	14.4L/min
Min. flow rate around C.H. at 20° rise	776L/hr.	1032L/hr.	1204L/hr
Maximum domestic hot water temperature	63°	63°	63°
Expansion vessel capacity	8 litres (1.76 gallons)	8 litres (1.76 gallons)	8 litres (1.76 gallons)
Expansion vessel charge pressure	0.5bar (7.3lbf/in^2)	0.5bar (7.3lbf/in^2)	0.5bar (7.3lbf/in^2)
Electrical supply	230V~50Hz fused 3A	230V~50Hz fused 3A	230V~50Hz fused 3A
Electrical rating	180W fused 3A	180W fused 3A	180W fused 3A
EN437 IP clasification	IPX4D	IPX4D	IPX4D
Internal fuse rating on main PCB	2A	2A	2A
Gas supply (governed meter only) and Cat	G20 natural gas	G20 natural gas	G20 natural gas
Gas Category	I_{2H}	I_{2H}	I_{2H}
Inlet gas working pressure	20mbar	20mbar	20mbar
Burner % CO_2 case on	9.3 nominal	9.3 nominal	9.3 nominal
Burner % CO_2 case off	9.3 nominal	9.3 nominal	9.3 nominal
Approximate max. gas rate after 10 mins. from cold	1.93 m^3/h	2.59 m^3/h	3.26 m^3/h
	68.1 ft^3/h	91.5 ft^3/h	115 ft^3/h
Approximate min. gas rate after 10 mins. from cold	0.99 m^3/h	0.99 m^3/h	0.99 m^3/h
	35.1 ft^3/h	35.1 ft^3/h	35.1 ft^3/h
Approximate gas rate at part load.	PLEASE REFER TO THE COMMISSIONING SECTION		
Flue type	C_{13}, C_{33}, C_{43}	C_{13}, C_{33}, C_{43}	C_{13}, C_{33}, C_{43}
NOx	Class 5	Class 5	Class 5
Heat output condensing mode	18.8kW	24.9kW	31.0kW
Heat input Nett Q = kW	DHW max. 25.5 min. 9.4	DHW max. 30.8 min. 9.4	DHW max. 35.8 min. 9.4
	CH max. 18.3 min. 9.4	CH max. 24.5 min. 9.4	CH max. 30.8 min. 9.4
Heat output P = kW	DHW max. 25.1 min. 9.3	DHW max. 30.0 min. 9.3	DHW max. 35.0 min. 9.3
	CH max. 18.0 min. 9.3	CH max. 24.0 min. 9.3	CH max. 30.0 min. 9.3
SEDBUK rating % 2005	90.3	90.0	90.2
SEDBUK rating % 2009	88.4	88.3	89.1

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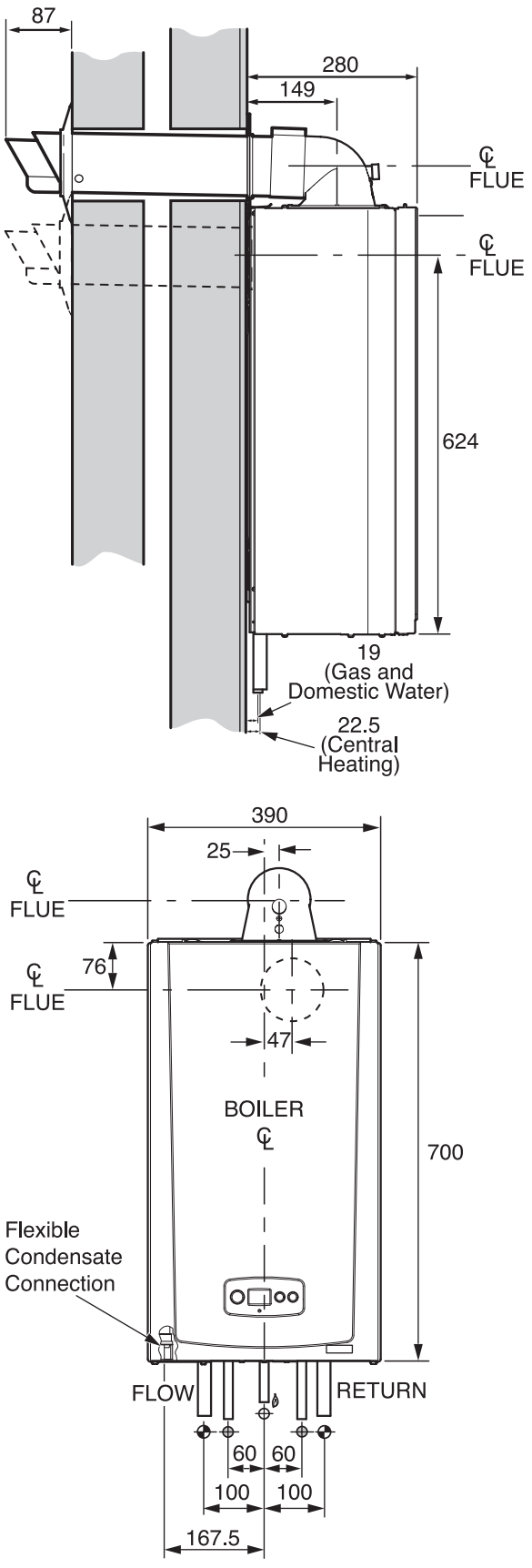

Diagram 2.1

2 Boiler Dimensions and Hydraulic Schematic

All dimensions are given in millimetres (except as noted).
The general arrangment 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.

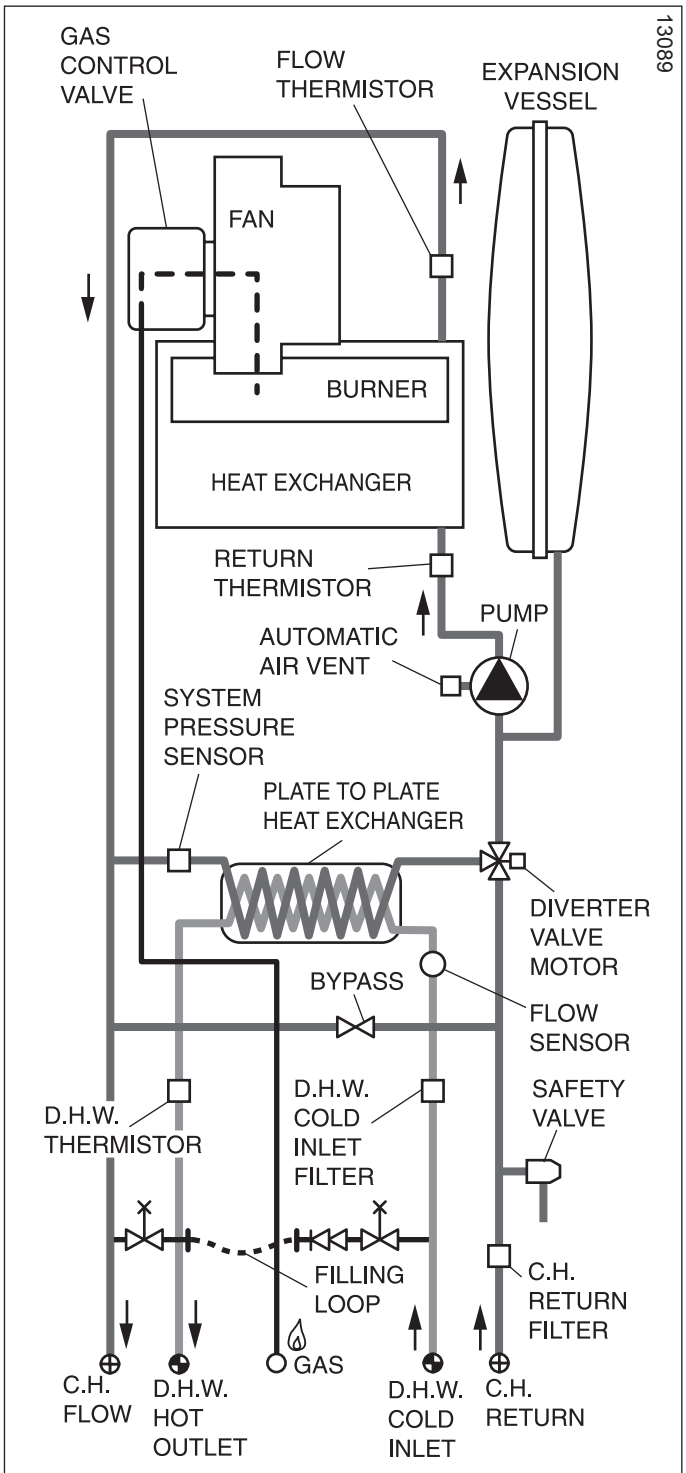

Diagram 2.2

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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.
Additional clearances may be beneficial around the boiler for installation and servicing.
For flue installations where external access is not practicable, consideration should be given for the space required to insert the flue internally, which may necessitate clearance larger 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. If in doubt seek advice from local gas undertaking or Glow-worm.

3.4 Combustible Material

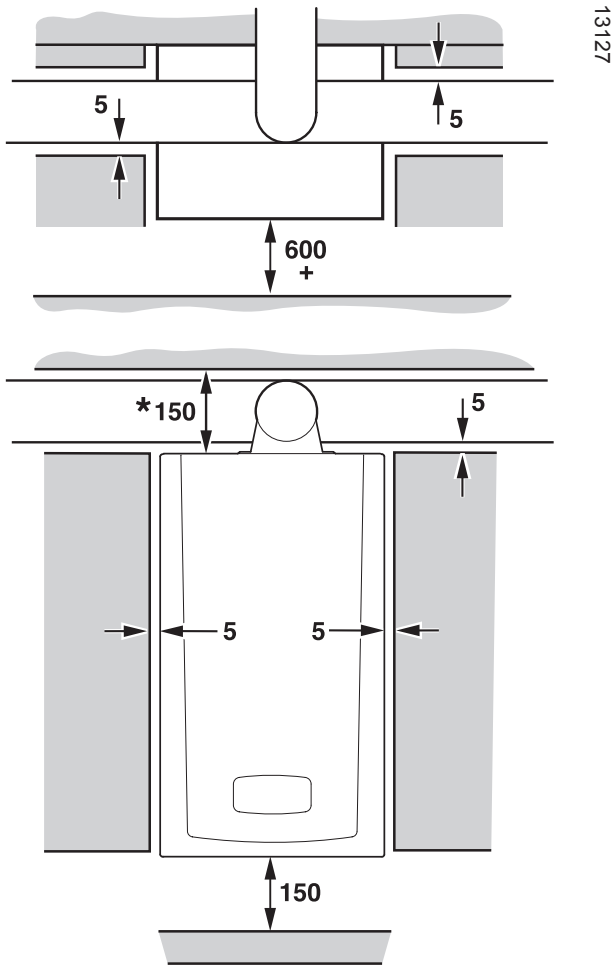
The boiler and flue are suitable for installation onto and through combustible materials provided that:-
1) Minimum 5mm clearance is maintained around the circumference of the flue (air intake).
2) The combustible surface and fixings are suitable for supporting the load.
3) The minimum clearances from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



+ A removable compartment door can be placed a minimum of 5mm

*** This can be reduced to 20mm for a direct rear flue**

Diagram 3.1

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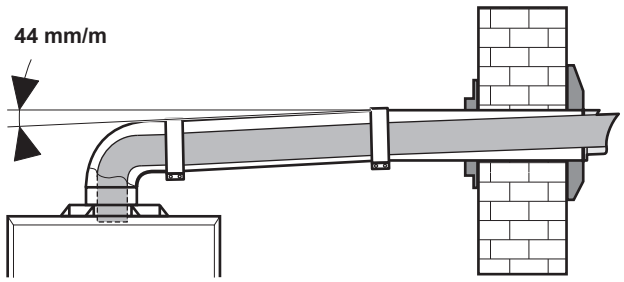
4 Evacuation of Combustion Gas

4.1 Regulation

Only flue accessories supplied by Glow-worm must be used.

Different flue outlet configurations can be carried out.

- Consult your supplier for more information about the other possibilities and associated accessories.



- Standard flue terminal kits have an in-built fall back to the boiler to drain the condensate. These can be fitted level between the appliance and the termination position. All other extended flues must have a fall of at least 44mm/m

The maximum length of the flue outlet is defined according to its type (for example C13).

- Whatever the kind of flue system chosen, observe the minimum distances indicated in the chart below to position the flue terminals.
- To install the flue, refer to the separate flue instruction supplied with your appliance.
- Explain these requirements to the user of the appliance.

If necessary, you must install terminal protection.

Caution! The connection between the flue elbow and the flue outlet must be sealed.

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

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.

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.

If the flue terminal is positioned near a light source insects may enter the flue system. Where safe and practical to do so advise the homeowner to check the flue outlet and clear visible insects from the terminal end.

H* and J* See diagram 4.2. These dimensions comply with the building regulations, but they may need to be increased to avoid wall staining and nuisance from pluming depending on site conditions.

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 4.1.
A suitable guard is manufactured by: -
Tower Flue Components
Morley Rd.
Tonbridge
Kent TN9 1RA.
Size: 280mm x 165mm. Part No: CGDK3

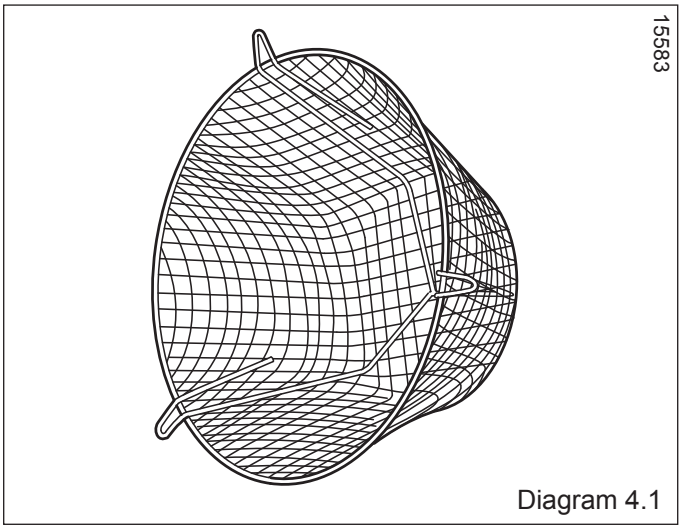


Diagram 4.1

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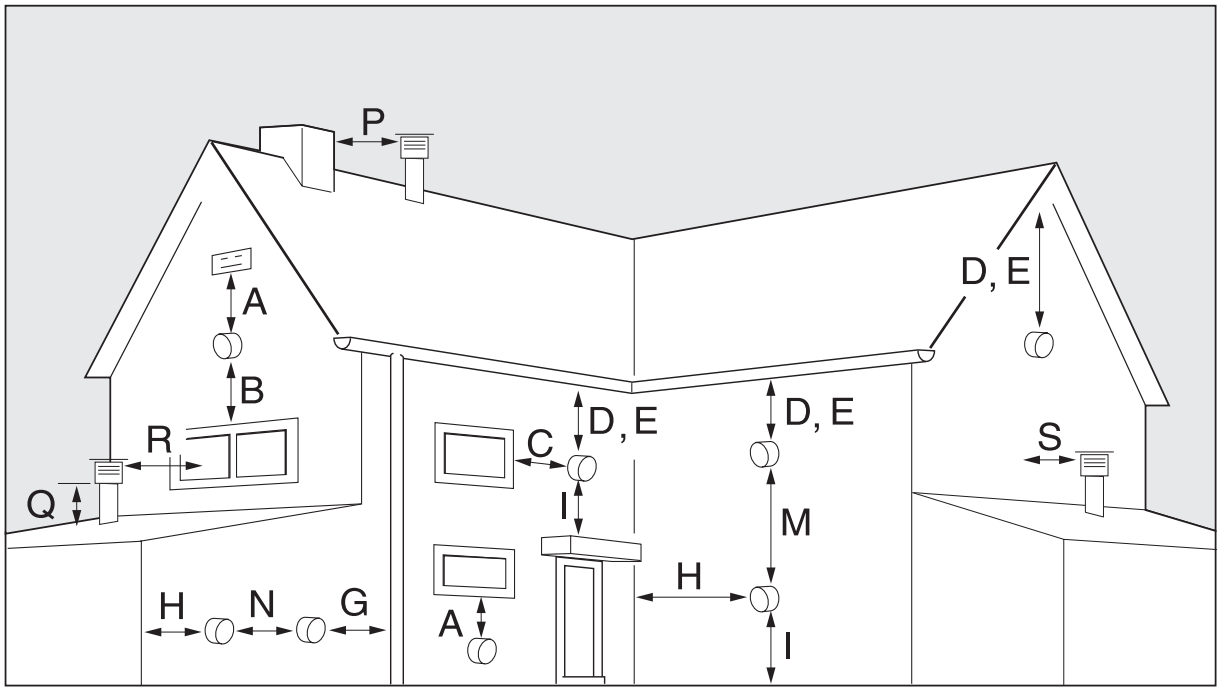

UNDER CAR PORT etc.

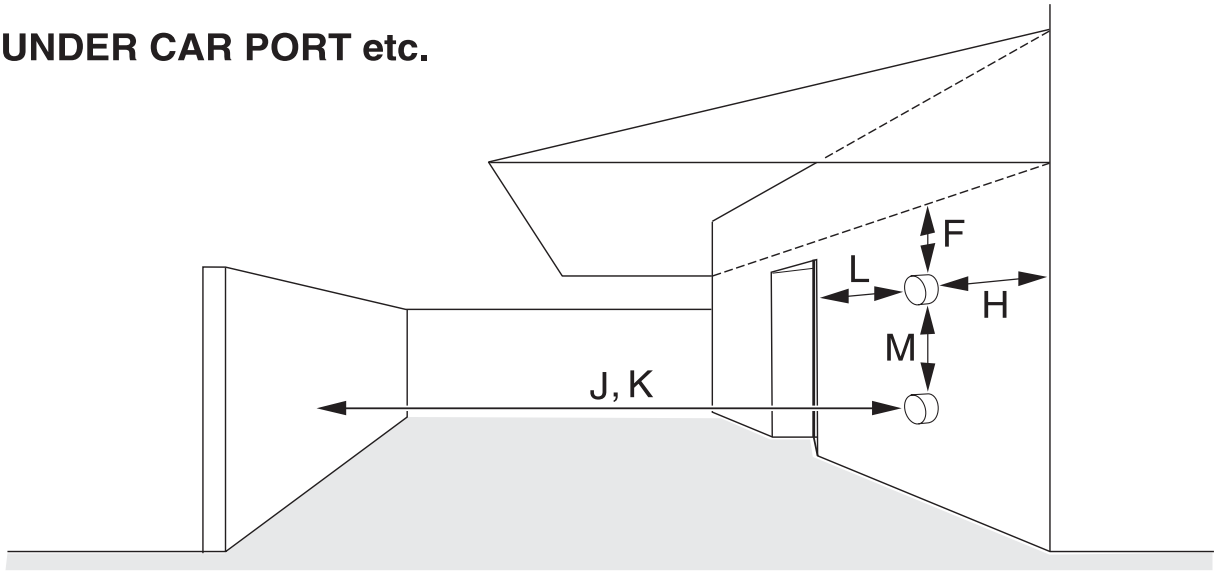

Diagram 4.2

Position	Position of the flue terminal	mm
Horizontal flues		
A	directly below an opening, air brick, opening windows	300
B	above an opening, air brick, opening windows	300
C	horizontally to an opening, air brick, opening windows	300
D	below gutter, drain/soil pipe	25
E	below eaves	25(1)
F	below a balcony or car port	25
G	from vertical drain pipes and soil pipes	25
H	from internal/external corners	25
H(2)	to a boundary alongside the terminal	300
I	above adjacent ground or balcony level	300
J(2)	from surface or a boundary facing the terminal	600

Position	Position of the flue terminal	mm
L	from opening (door/window) in car port into dwelling	1200
M	vertical from a terminal	1500
N	horizontally from a terminal	300
Vertical flues		
P	from another terminal	600
Q	above roof level	300
R	from adjacent opening window	1000
S	from adjacent wall to flue	300

(1) There should be no ventilation/opening in the eaves within 300mm distance of the terminal.

(2) These dimensions comply with the building regulations, but they may need to be increased to avoid wall staining and nuisance from pluming depending on site conditions.

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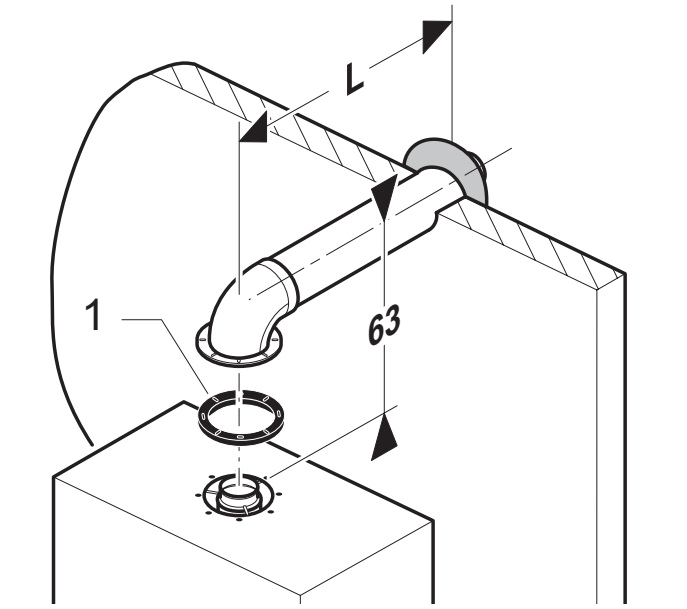
4.2 Flue configuration description

4.2.1 Horizontal concentric flue Ø 60/100 mm or Ø 80/125 mm (C13 type installation)

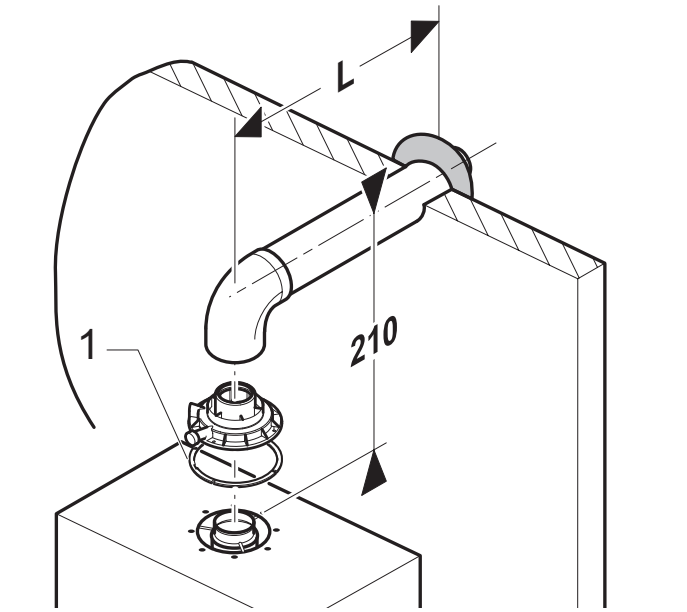
If the terminal is at less than 1.80 m from the ground, you must install a terminal protection kit.

Ø 60/100 mm



Key
1 Gasket (fitted)

Ø 80/125 mm



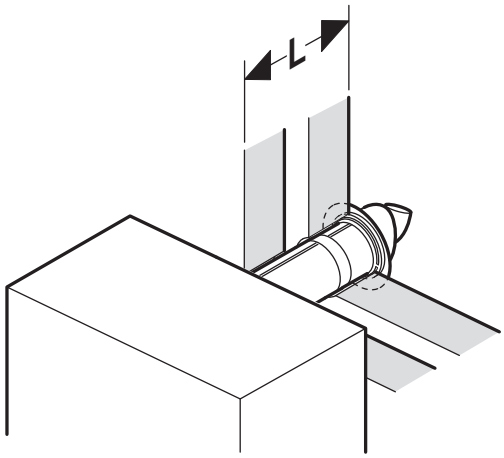
Key
1 Gasket (fitted)

Type	Max length
Ø 60/100	8 m
Ø 80/125	20 m

Each time an additional 90° bend is necessary (or 2 at 45°), the length (L) must be reduced by 1 m.

4.2.2 Telescopic direct rear flue Ø 60/100 mm

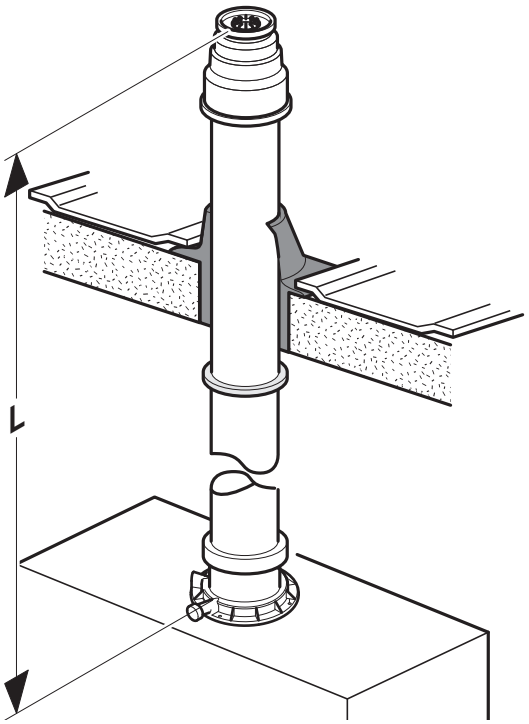
Ø 60/100 mm



Type	Max length
Ø 60/100	512 mm

4.2.3 Vertical concentric flue Ø 60/100 mm or Ø 80/125 mm (C33 type installation)

If the terminal is at less than 1.80 m from the ground, you must install a terminal protection kit.



Type	Max length (L)
Ø 60/100	8 m
Ø 80/125	20 m

Each time an additional 90° bend is necessary (or 2 at 45°), the length (L) must be reduced by 1 m.

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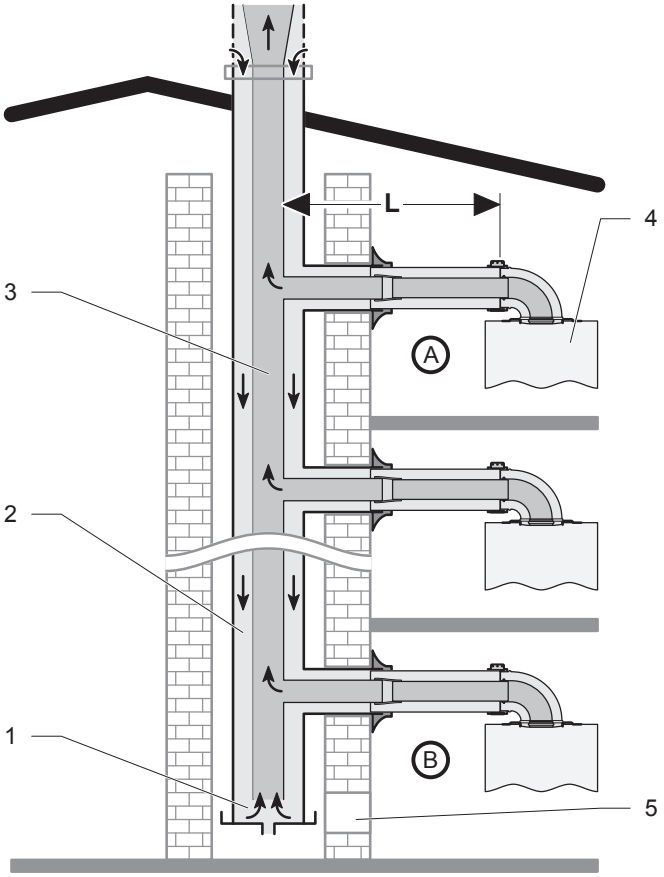
4.2.4 Multiple boiler chimney flue Ø 60/100 mm (C43 type installation)

The flue connecting from the appliance to the flue system must be supplied from the manufacturer of the boiler.

C43 flue systems must not be a 'pressurised system' but act under natural draught principles

C43 type flue systems must have their own condensate drain fitted and not allow condensate to mix into other appliances



Key
1 **Pressure balancing system**
2 **Air-inlet pipe**
3 **Collector pipe**
4 **Boiler**
5 **Inspection hatch**
A **Final storey**
B **Ground floor**

Multiple Boiler Chimney Flue Length

The flue length must be calculated and installed according to the relevant standards EN 13384-1 and 2 (C43 flue systems only) with reference to the table below and the manufacturers instructions supplied.
The appliance maximum flue length must be included when calculating the overall design of the flue system.
NOTE: The horizontal flue terminal must be removed.

Type	Max length (L)
Ø 60/100	8 m

Each time an additional 90° bend is necessary (or 2 at 45°), the length (L) must be reduced by 1 m.

	Flexicom 24cx	Flexicom 30cx	Flexicom 35cx
Exhaust mass rate (g/s)			
At Min Thermal Load (40C°/30°C)	4.30	4.30	4.30
At Max Thermal Load (80C°/60°C)	11.67	14.10	16.39
Exhaust temperature (ºC)			
At Min Thermal Load (40C°/30°C)	33.2	33.2	36.0
At Max Thermal Load (80C°/60°C)	73.3	87.4	86.0

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5 Water Systems - General

5.1 General

This boiler is designed for use as part of a sealed water central heating system with fully pumped circulation. The pump, expansion vessel and associated safety devices are all fitted within the boiler.

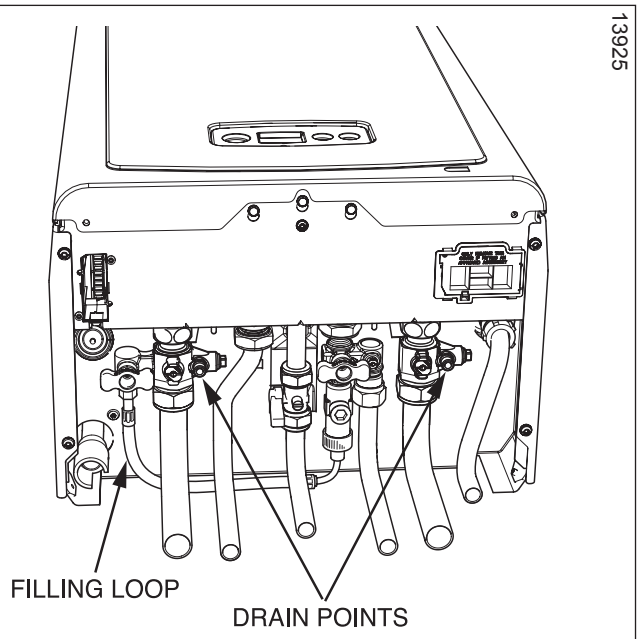

Diagram 5.1

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.
Drain points for the appliance are provided at the positions shown in diagram 5.1.

5.3 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: 2006 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 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 Protector or Salamander corrosion guard inhibitor.

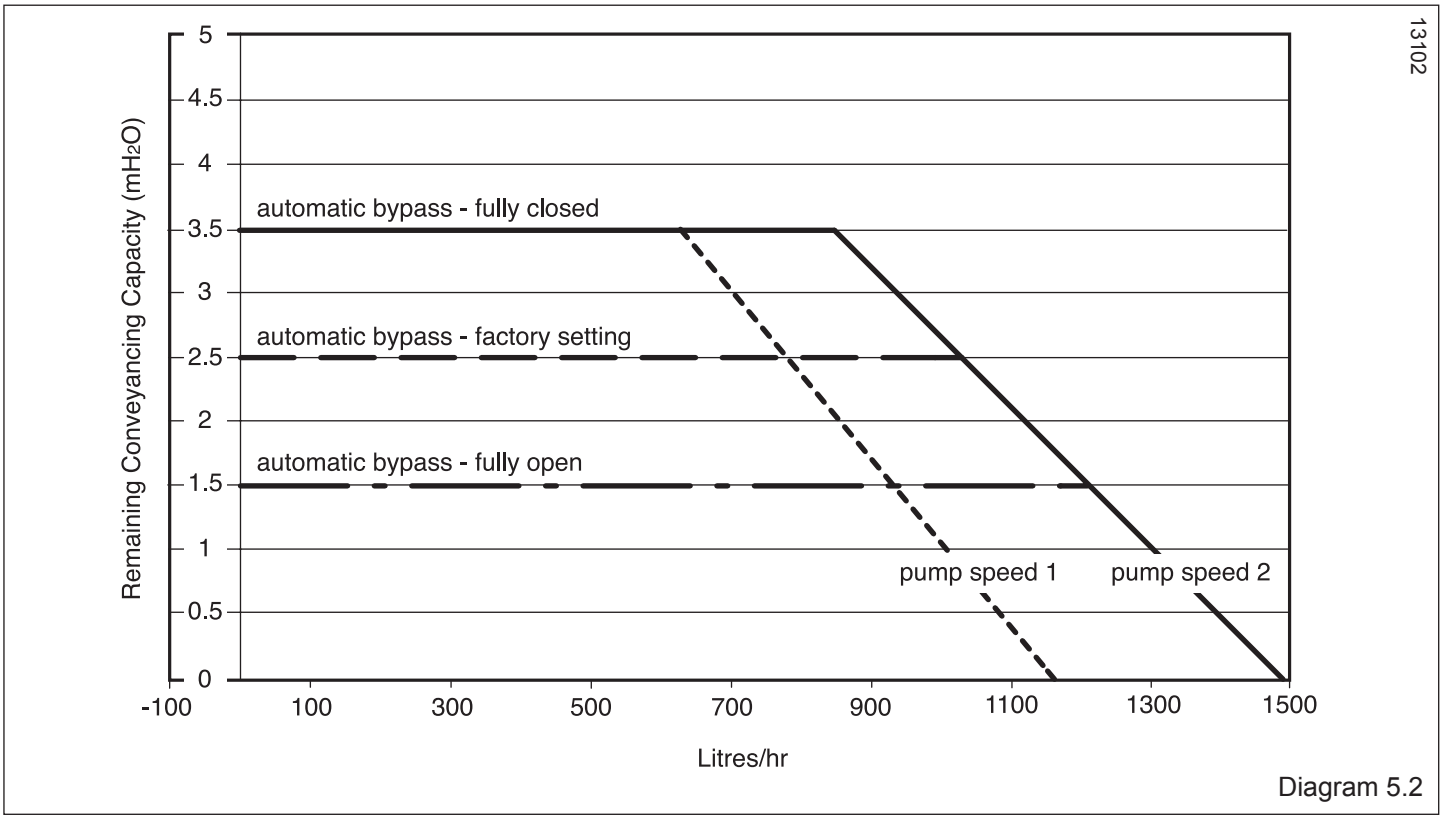

Diagram 5.2

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5 Water systems - Domestic Hot Water

5.4 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).
For IE: The current edition of I.S.813 “Domestic Gas Installations”.

5.5 Water Pressure

The minimum working pressure to obtain the maximum domestic flow is:-
24cx 1.0bar
30cx 1.0bar
35cx 1.0bar
The maximum working pressure of the domestic hot water circuit is 10 bar. If the cold water supply pressure exceeds this, then a pressure-reducing valve must be fitted in the supply to the boiler.

5.6 ‘Hard’ Water Areas

The temperatures within the heat exchanger are limited by the boiler control system to minimise scale formation within the hot water pipework. However, in areas where the water is ‘hard’ (i.e. more than 200mg/litre), it is recommended that the hot water setting is reduced and that a scale reducer is fitted, refer to the manufacturer’s instructions or consult the local water company for additional advice.

5.7 Domestic Water Flow Rate

The water flow rate is restricted to a maximum 9.4 l/min for 24cx, 11.7 l/min for 30cx and 13.0l/min for 35cx by a restrictor factory fitted within the boiler.

5 Water Systems - Sealed Central Heating system

5.8 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 as valve “A” in diagram 5.3. The flow rate through the boiler must not be allowed to fall below that given in section 1 - Specification Table.

5.9 Bypass

The boiler is fitted with an automatic bypass.
Diagram 5.2 shows the pump head remaining for the heating system depending on the bypass setting and the speed setting of the pump, see section 11 Commisioning.
Ensure that under no circumstances does the flow rate drop below the figure specified, refer to section 1 - Specification Table and section 11.9.

5.10 Safety Valve

The safety valve is an integral part of the boiler and it cannot be adjusted. The pipe from the safety discharge valve must not discharge above an entrance, window or any type of public access area.

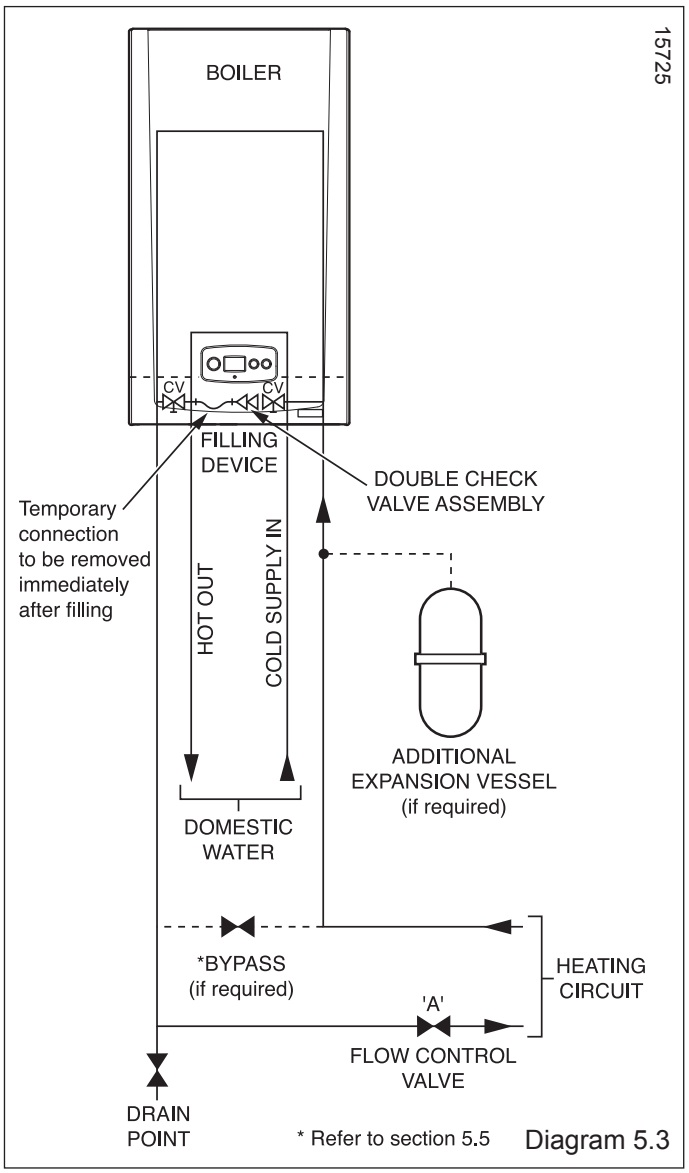

Diagram 5.3

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5.11 Filling the Sealed System

The boiler is supplied with a filling device, see diagram 5.1. This filling device is designed to enable the filling and pressurisation of the system in the event of loss of pressure.
NOTE: The water pressure at the boiler must be at least 1.2bar to enable filling the boiler to a minimum pressure. If not pressurisation must be carried out by an alternative filling loop. Suitable external filling systems are shown diagramatically, see diagram 5.4. The system should be pressurised to 1bar, indicated on the digital display with no heating demand.

5.12 Expansion Vessel

The boiler has an integral expansion vessel with a capacity of 8 litres (1.76 gallons), with a charge pressure of 0.5bar.
NOTE: The expansion vessel volume depends on the total water system volume and the initial system design pressure.
In GB, Guidance on vessel sizing is also given in the current issue of BS5449 and BS7074 Part 1.
In IE, current edition of I.S.813 “Domestic Gas Installations”.

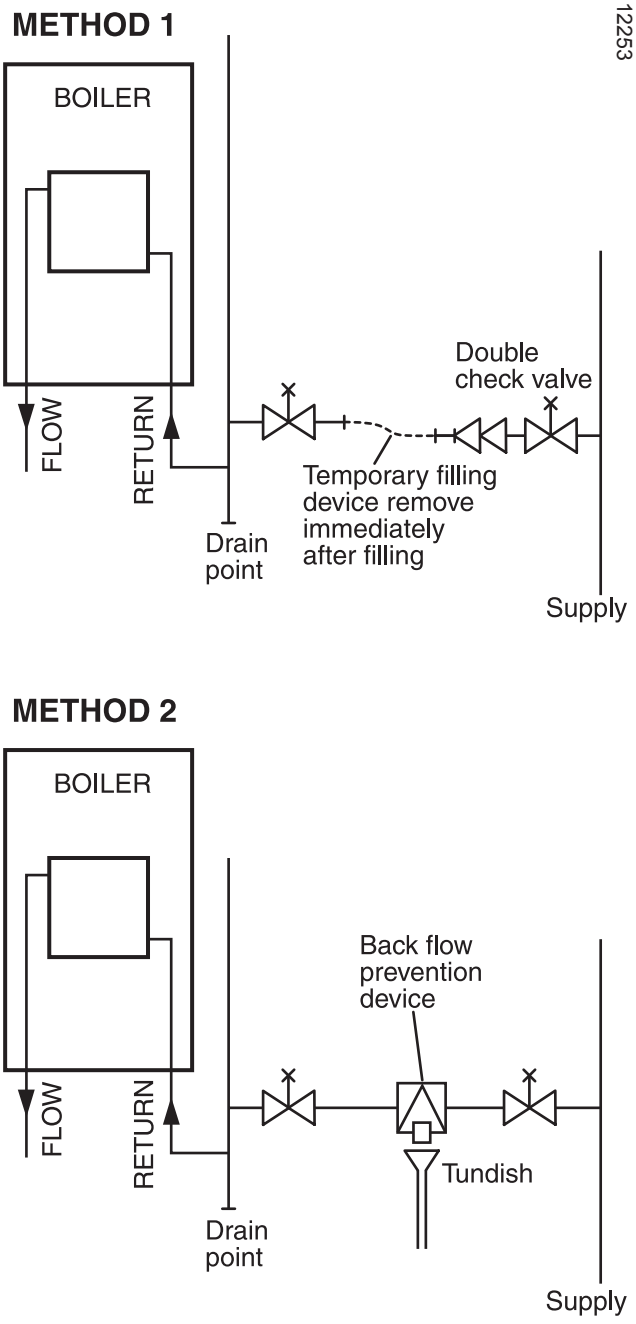

Diagram 5.4

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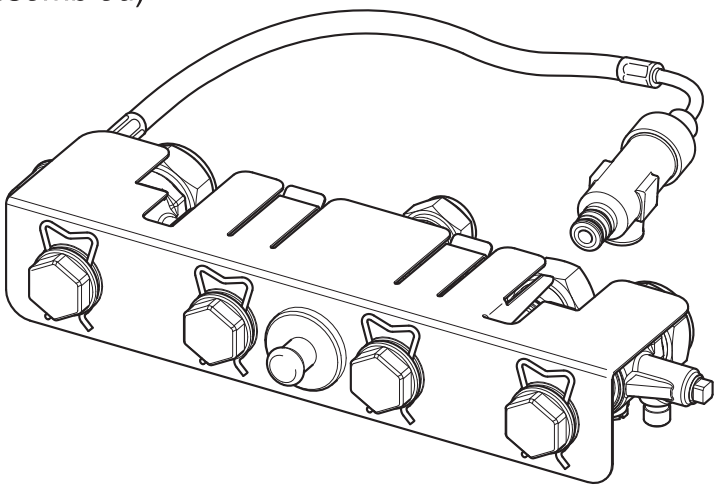
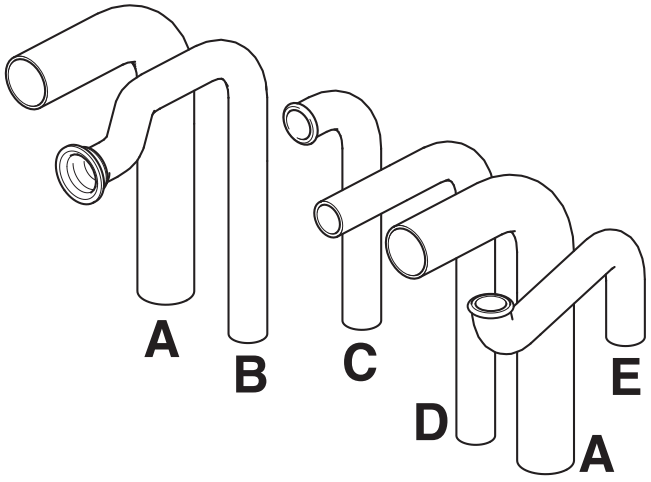
Fixing Jig (pre-assembled)



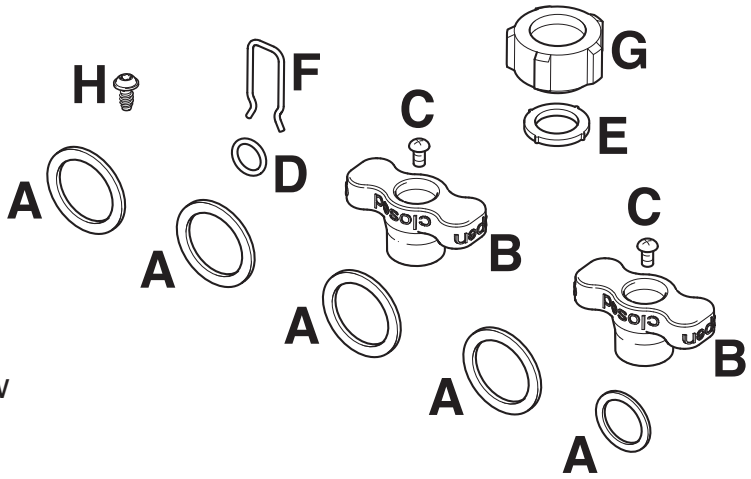
Pipe Pack

A - Central Heating x 2
B - Domestic Water flow
C - Gas
D - Domestic Water return
E - Safety Discharge Valve



Loose Items Pack

A - Sealing Washer
B - Handle
C - Screw
D - "O" Ring Seal
E - Sealing Washer
F - Wire Retaining Clip
G - Union Nut
H - Boiler Securing Screw



Documentation Pack (not illustrated)
Wall Template, User Instructions, Installation
Flue Installation Instructions
and Servicing Instructions

Diagram 6.1

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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 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.

6.5 Wall Hanging Bracket Assembly

The Wall Hanging Bracket is supplied in the main boiler packaging at the rear of the boiler.
Reposition the wall template over the flue hole and mark the position of the fixing holes for the hanging bracket, see diagram 6.3.
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.
Fit the fixing jig support plate to the bottom of the wall hanging bracket, push down to locate.
Mark, drill and plug at fixing points and secure the jig support plate, see diagram 6.3.

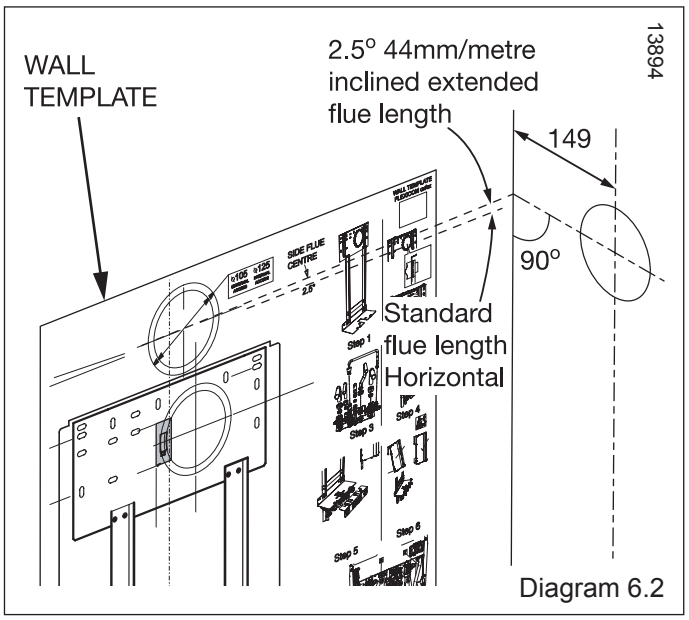

Diagram 6.2

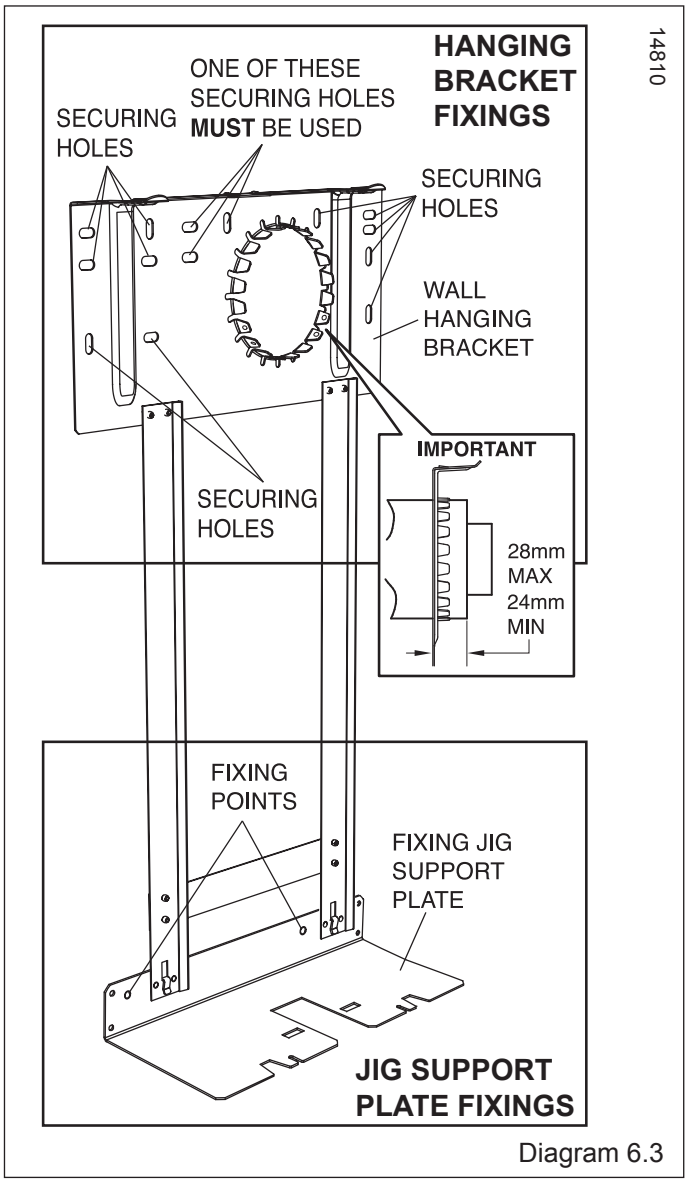

Diagram 6.3

Direct Rear Flue only - The flue can now be pulled back through the hanging bracket and secured as shown in diagram 6.3.

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7 Gas/Water Connections

7.1 System connection

NOTE: The appliance may contain a small amount of water, place a water container beneath the boiler connections

NOTE: The Gas and Water systems can be connected and filled prior to installation of boiler, refer to section 12 Commissioning. Make sure the drain points are accessible, refer diagram 5.4.

All water and gas connections are on the fixing jig with the exception of the condense drain and safety discharge, the positions of these are shown on the wall template.
An Upward Piping Frame, part no. A2041500 should be used if the supplies come from above the boiler otherwise the pipes will have to be chased into the wall.

Assemble the pipes to the jig as shown in diagram 7.1.

Fit 'O' ring seal to the Double Check Valve assembly.

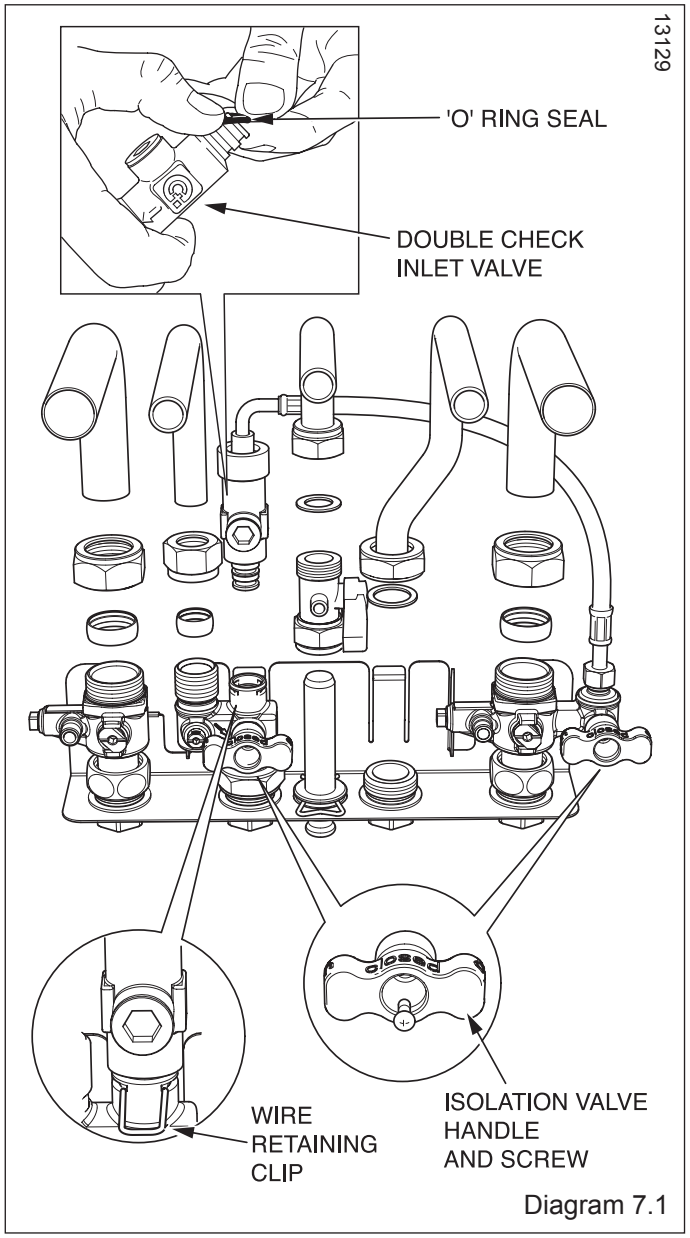

Diagram 7.1

Fit the Central Heating Isolation Valve handles and secure with screws provided.

Fit the assembled Jig Plate to the Support Plate as shown in diagram 7.2.

Assemble the Gas service isolation valve and position onto the plastic plug.

Plumb system pipe work to the copper tails. Do not subject isolation valves to heat.

Fit Double Check Valve into Isolation Valve and secure with the wire retaining clip.

Prior to filling the water system ensure that the blanking plugs and isolation valves are secured.

Flush out the domestic hot water and the heating systems.

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".

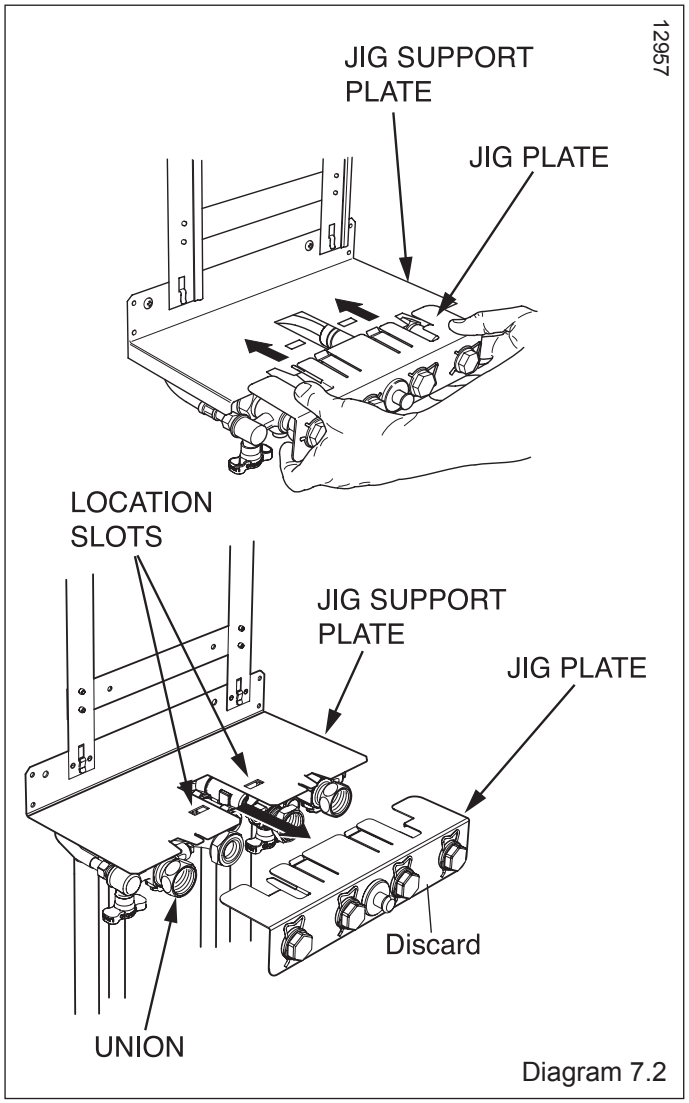

Diagram 7.2

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8 Boiler Fixing

8.1 Boiler Hanging

IMPORTANT: With regards to the Manual Handling Operations, 1992 Regulations, the following lift operation exceeds the recommended weight for a one man lift, refer to section 16 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.
The appliance and jig (pre-filled) may contain a small amount of water, place a water container beneath the boiler connections.
Make sure the isolation valves are closed before disconnecting the blanking plugs and discarding the jig plate.
Position the sealing washers supplied in the Loose Items pack, as shown in diagram 6.1.

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, secure with screw provided, see diagram 8.1.
Remove the protective caps.
Engage the fixing jig connections, ensuring that the previously positioned washers have not been disturbed.
There are flats on the body of the valves for locating a spanner to aid tightening to copper tails using the tightening sequence shown in diagram 8.2.
Make good the final connections.

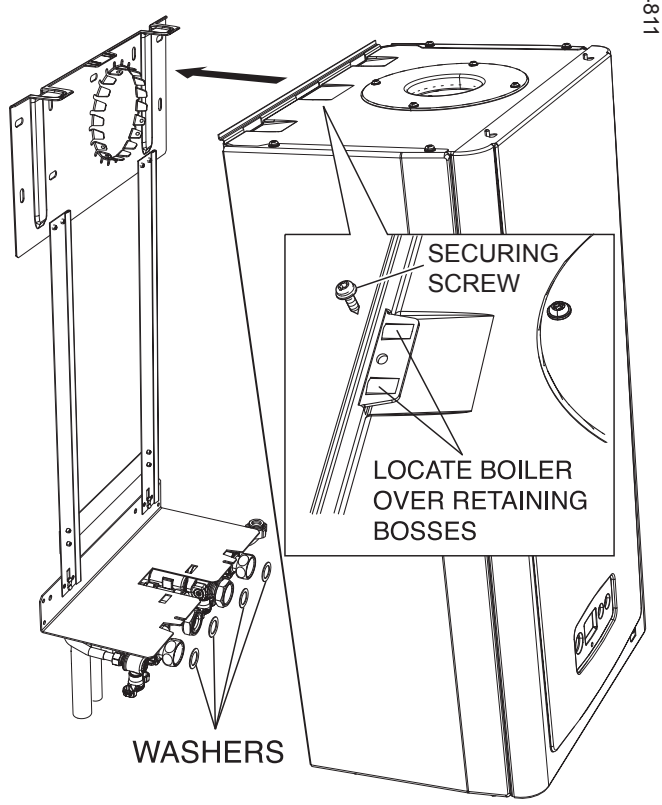
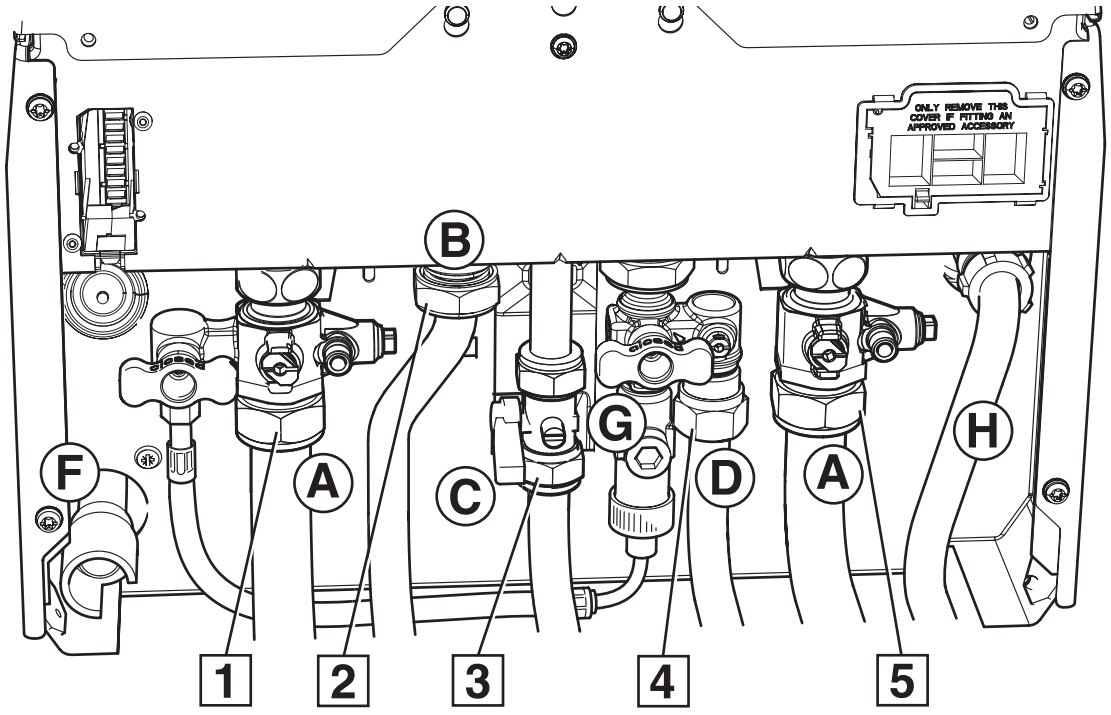


Diagram 8.1



A - Central Heating Isolation Valve
B - Domestic Hot Water
C - Gas Service Isolation Valve
D - Domestic Cold Water
E - Washers (not shown)
F - Condensate Connection
G - Double check inlet valve
H - Safety Discharge Valve

Numbers 1 - 5 show the sequence to be used when tightening to copper tails.

Diagram 8.2

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9 Condensate Connections

9.1 Safety Discharge Valve

Take the safety discharge pipe, supplied in the pipe pack and the union nut and seal, supplied in the loose items pack and fit as shown in diagram 9.1.
This must be extended, using not less than 15mm o.d. pipe, to discharge, in a visible position, outside the building, facing downwards, preferably over a drain.
To ease future servicing it is advisable to use a compression type fitting to extend the safety discharge valve tube.
The pipe must have a continuous fall and be routed to a position so that any discharge of water, possibly boiling, or steam cannot create any danger to persons, damage to property or external electrical components and wiring.

9.2 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 8.2.

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

NOTE: the pipe should have a fall of a 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 9.2.
It is recommended that any external condensate drain pipe is protected 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.

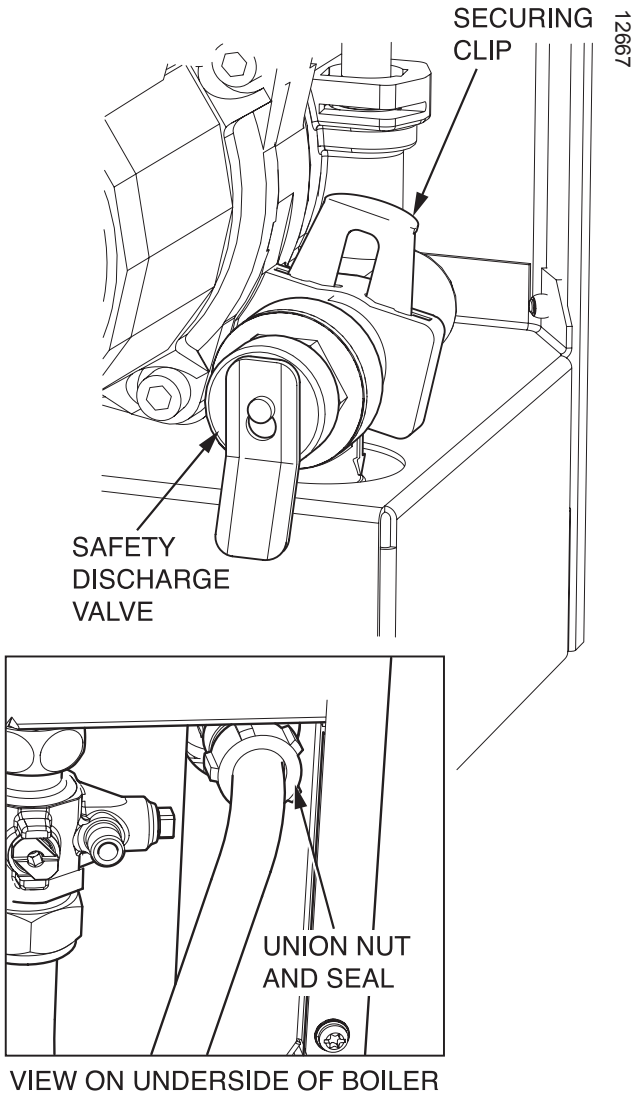

Diagram 9.1

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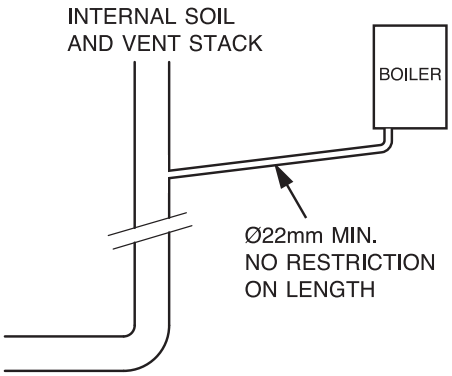
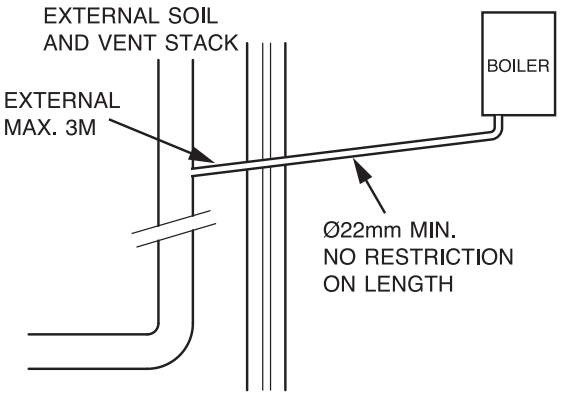


Internal Soil and Vent Pipe



External Soil and Vent Pipe

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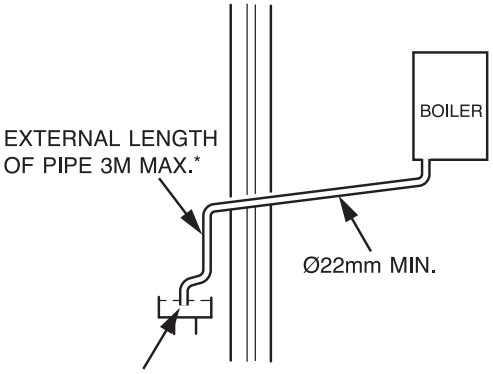
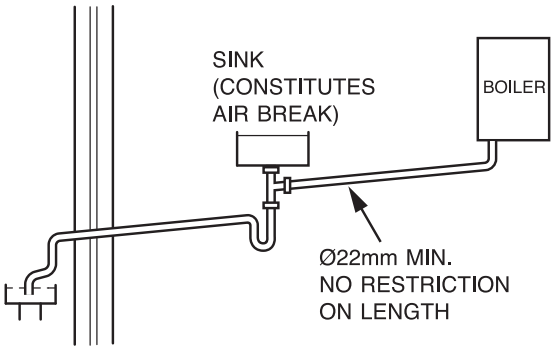
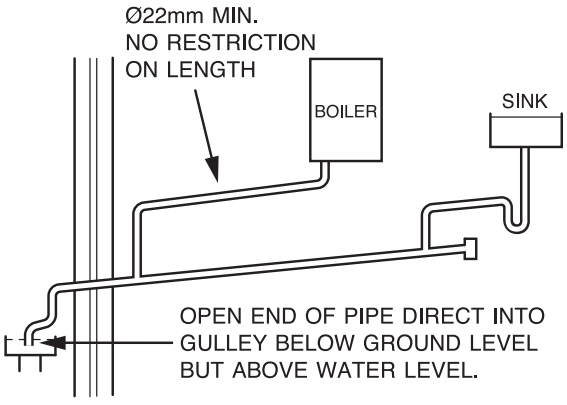


*NOTE: FOR EXTENDED PIPE RUNS 32mm DIA. PIPE SHOULD BE USED.

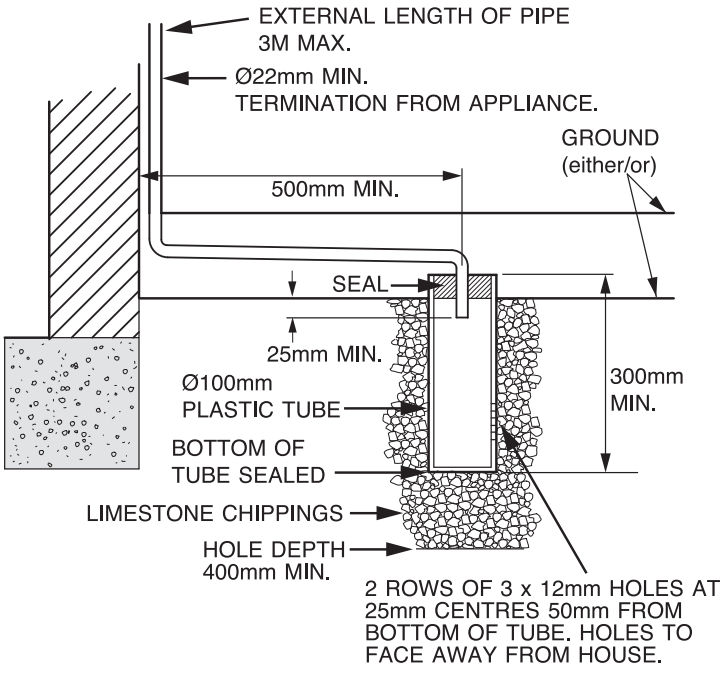
External Termination to a Gulley or Hopper



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

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10 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 Glow-worm 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 it is not used in a room containing a fixed bath or shower.
● The boiler is suitable for installation in bathroom zones 2 and 3.

10.1 Electrical Wiring

Remove the electrical cartridge from the fittings pack.

Remove the securing screw to open the cartridge.
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 screws of the cable strain relief in the electrical cartridge, see diagram 10.1.

Route the mains supply and system cables through the strain relief and connect to the relevant plug, refer to the appropriate sections 10.2 or 10.3.

Initially, if system controls are not fitted, leave the “Red Link” in place, this will create a continuous demand.

10.2 System Controls 24V

WARNING: UNDER NO CIRCUMSTANCES MUST ANY MAINS VOLTAGE BE APPLIED TO ANY OF THE TERMINALS ON THE 24V CONNECTION PLUG.

Connect the mains supply and system heating controls e.g. room thermostat as diagram 10.2.
External controls should be fitted in accordance with the rules in force.

10.3 Mains Voltage System Controls

WARNING: UNDER NO CIRCUMSTANCES MUST ANY MAINS VOLTAGE BE APPLIED TO ANY OF THE TERMINALS ON THE 24V CONNECTION PLUG.

Connect mains supply and system controls as diagram 10.3.
External controls should be fitted in accordance with the rules in force.

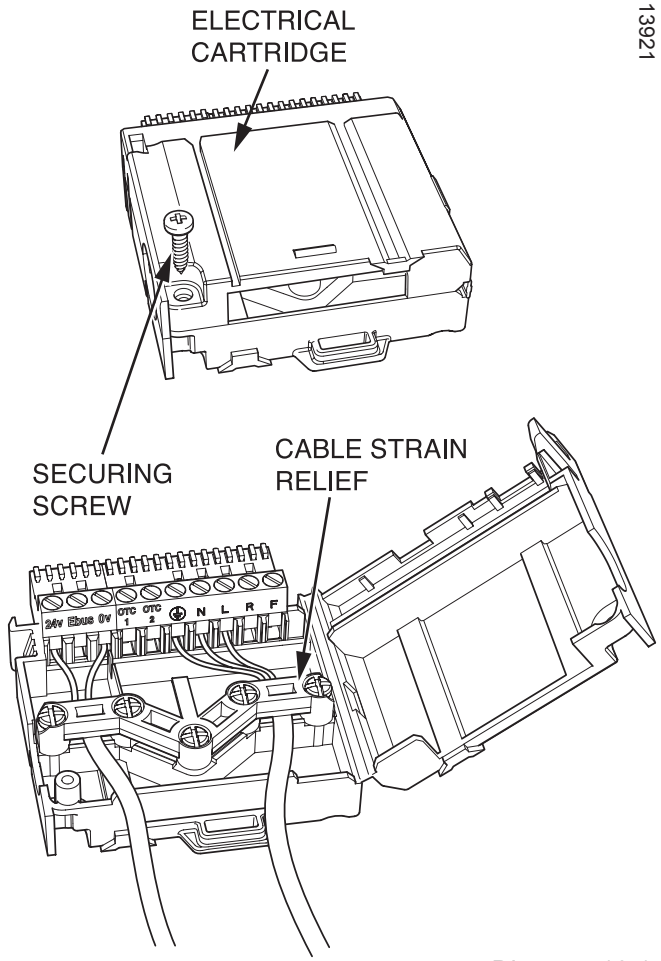

Diagram 10.1

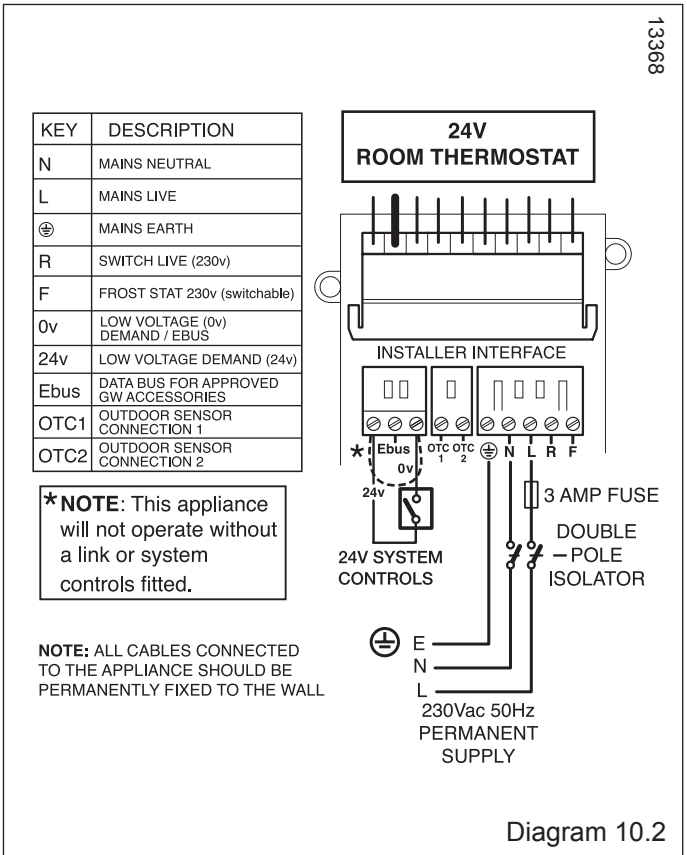

Diagram 10.2

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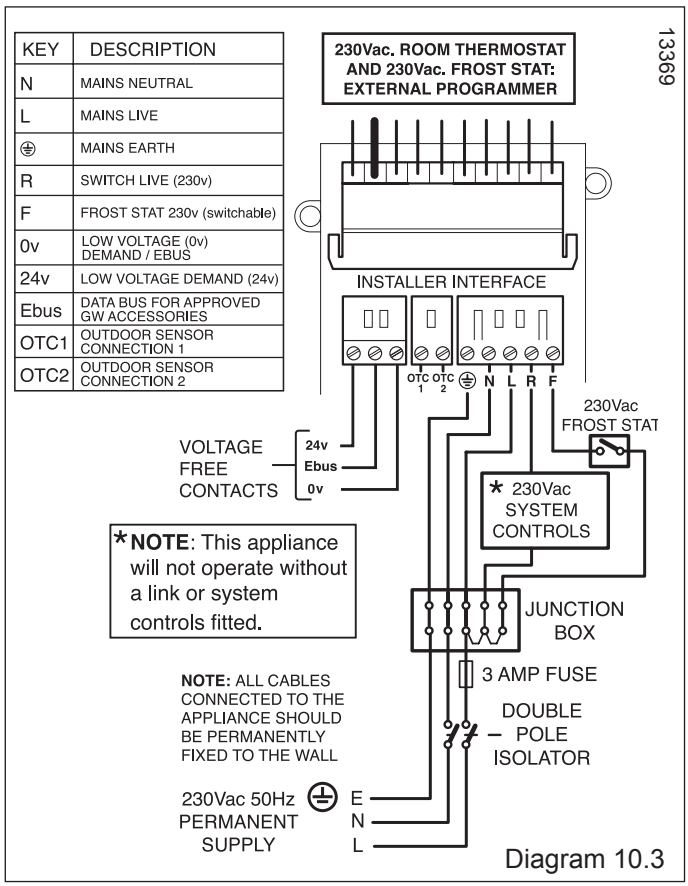

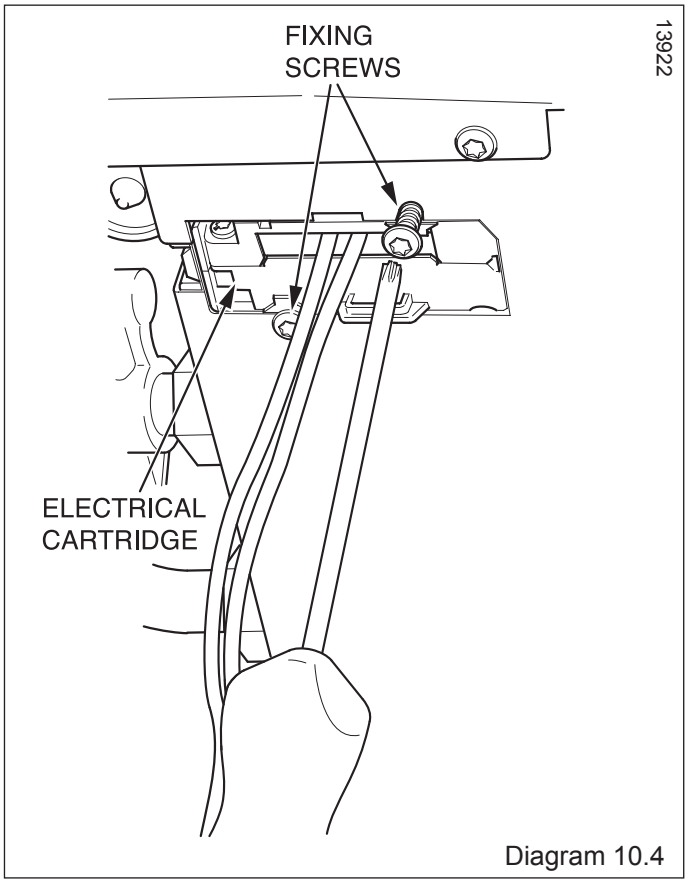

10.4 Electrical Cartridge Securing

With the gas service isolation valve closed and with no demand from any external controls, fit the electrical cartridge into the interface housing, see diagram 10.4.
Secure with the two cartridge retaining screws provided in the cartridge body.

10.5 Electrical Connections - Testing

Carry out preliminary electrical system checks as below:
1. Test insulation resistance to earth of mains cables.
2. Test the earth continuity and short circuit of cables.
3. Test the polarity of the mains.

NOTE: If you require to test the appliance refer to section 13.

11 Commissioning

IMPORTANT: At the time of commissioning, complete all relevant sections of the Benchmark Checklist located in the inside back pages of this document.

11.1 Pre-filling the Heating Circuit

Do Not operate the boiler without water.
The commissioning should be carried out by a **competent person** approved at the time by the Health and Safety Executive and in accordance with the current issue of BS6798.
Make sure that the system has been thoroughly flushed out with cold water and that all cleanser if used has been removed.
With the gas service isolation valve closed, with no demand from any external controls and the power supply to the boiler switched off.
Test for gas tightness and purge air from the gas supply.

Refer to diagram 11.1
1. Ensure that the flexible hose is connected to the double check valve by tightening the knurled nut marked ‘E’.
2. Ensure that the water isolation valves are securely tightened onto the jig blanking plugs.
3. Open the Central Heating Flow and Return isolation valves marked ‘A’ using a screwdriver or a 4mm allen key - slot in line with the axis of the isolation valves (shown closed in diagram).
4. Ensure ALL cold water taps are shut off then open the Domestic Cold Water isolation valve marked ‘B’ using a screwdriver or a 3mm allen key - slot in line with the axis of the isolation valve (shown closed in diagram).

NOTE: A manometer kit accessory, part no. 0020016995 is available to monitor system pressure during filling, this should be attached to the drain point connection marked ‘C’ and the drain point opened to enable a reading of the system pressure to be taken. If the manometer kit is not used caution should be taken not to overpressurise the system.

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5. Open the two filling taps marked ‘D’ by rotating them through 90° to fill the heating system to a pressure of 1.0bar. Close the two filling taps.
6. Vent all air from the system - repeat step 5 as neccessary until the system is full and all the air has been removed.
7. Close the Domestic Cold Water isolation valve marked ‘B’ using a screwdriver or a 3mm allen key (shown closed in diagram).
8. Close the Central Heating Flow and Return isolation valves marked ‘A’ using a screwdriver or a 4mm allen key (shown closed in diagram). If the manometer kit was used, close drain point marked ‘C’ and remove the manometer.
9. To comply with the water regulations the flexible hose must be disconnected from the double check valve - undo the knurled nut marked ‘E’ and pull the flexible hose from the double check valve.

11.2 Filling the System and Boiler

1. Ensure that the flexible hose is connected to the double check valve by tightening the knurled nut marked ‘E’.
2. Open the Central Heating Flow and Return isolation valves marked ‘B’ using a screwdriver or a 4mm allen key - slot in line with the axis of the isolation valve (shown closed in diagram).
3. Open the Domestic Cold Water cock marked ‘B’ using a screwdriver or a 3mm allen key - slot in line with the axis of the isolation valve (shown closed in diagram).
4. Switch on the appliance, refer to diagram 11.2.
   Set the Central Heating temperature and the Domestic Hot Water temperature to OFF by pressing the MODE button on the User Interface until it shows the appropriate symbol or and then pressing the - (minus) SELECTOR button.
   The display will now permanently show system pressure.
5. Open the two filling taps marked ‘D’ by rotating them through 90° to fill the heating system to a pressure of 1.0bar. Close the two filling taps marked ‘D’.
6. Vent all air from the system - repeat step 5 as neccessary until the system is full and all the air has been removed.
7. After filling is complete set the Central Heating temperature and the Domestic Hot Water temperature to the desired level using the MODE and + (plus) SELECTOR buttons as described above.
8. To comply with the water regulations the flexible hose must be disconnected from the double check valve - undo the knurled nut marked ‘E’ and pull the flexible hose from the double check valve.

11.3 Filling Domestic Water Circuit

Fully open any valves in the domestic water supply to the boiler. Open the domestic water isolation valve, slot in line with the length of the valve (shown closed in diagram).
Open all hot water taps in turn and close them when water flows. Check for water soundness of the complete domestic water system.
The water flow rate is restricted by a restrictor factory fitted to the boiler.

11.4 Re-pressurising System

1. Ensure that the flexible hose is connected to the double check valve by tightening the knurled nut marked ‘E’.
2. Open the two filling taps marked ‘D’ by rotating them through 90° to fill the heating system to a pressure of 1.0bar. Close the two filling taps marked ‘D’.
3. Vent all air from the system - repeat step 2 as neccessary until the system is full and all the air has been removed.
4. To comply with the water regulations the flexible hose must be disconnected from the double check valve - undo the knurled nut marked ‘E’ and pull the flexible hose from the double check valve.

11.5 Gas Supply

The gas valve is factory set for natural gas (G20) and should need no adjustment. Turn on the gas supply at the isolation valve, see diagram 11.1. Check the supply pressure at the pressure test point is 20mbar.

Commissioning should only be carried out by a **competent person** approved at the time by the Health and Safety Executive.

11.6 Initial Lighting

NOTE: The combustion for this appliance has been checked, adjusted and preset at the factory for operation on natural gas (G20) as defined on the appliance data label. Do not adjust the Gas/Air ratio valve.
No measurement of the combustion is necessary, having checked :

- the appliance has been installed in accordance with the instructions.
- the integrity of the flue system and flue seals.
- that all internal/external controls are calling for heat.
- the gas service isolation valve, diagram 11.1, is open.

As an option, a chargeable boiler performance and function

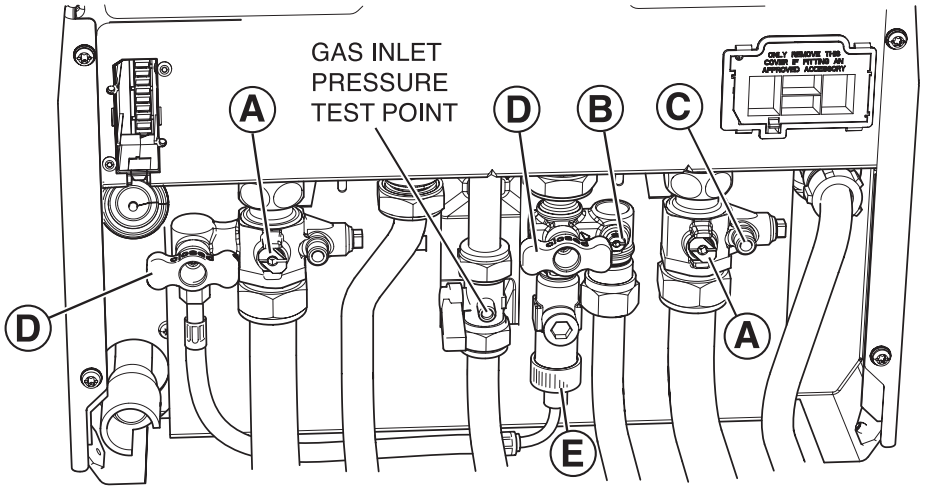

Diagram 11.1

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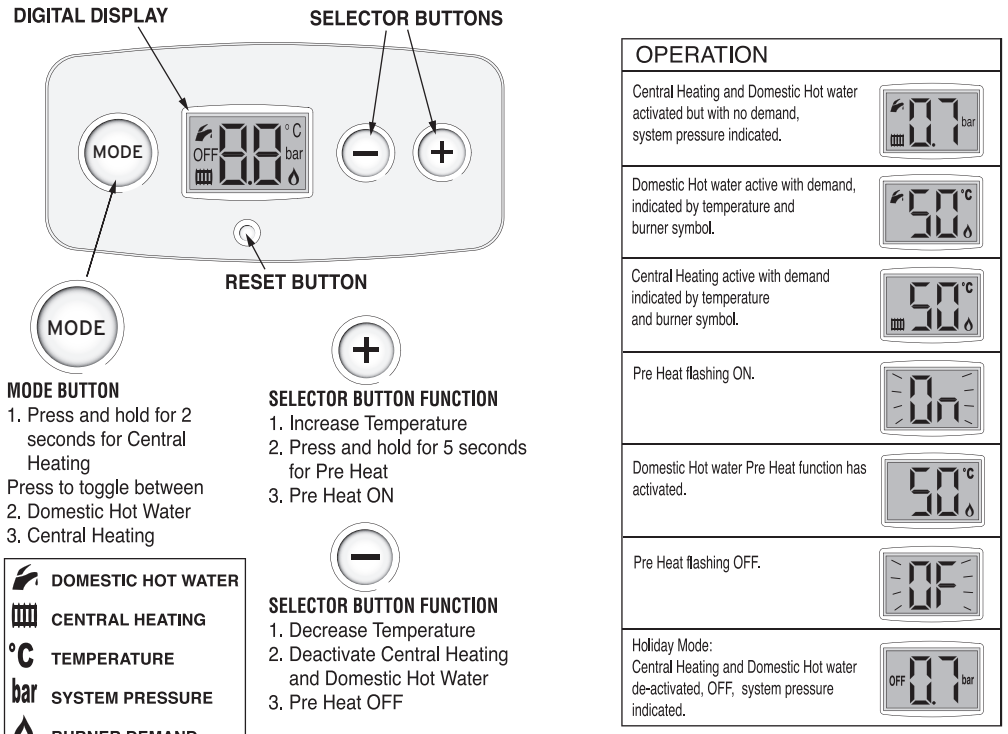

Diagram 11.2

service can be provided by Glow-worm Service by calling telephone No. 01773 828100.
DO NOT operate the boiler without water.
Check that all external controls are calling for heat.
Set the Central Heating temperature and the Domestic Hot Water temperature to ON by pressing the MODE button on the User Interface until it shows the appropriate symbol or and then pressing the - (minus) SELECTOR button.
The lighting procedure of the boiler is fully automated.
The digital display, refer to diagram 12.2, will show water temperature in central heating demand.

- The appliance will enter a self checking routine then the fan should start and the ignition will commence.

The boiler, if necessary, will automatically repeat the ignition sequence a further 4 times.

- If the burner fails to ignite “F1” will be displayed, initially, this may be due to air in the gas supply line.
- Once the system has been purged of air. Set the hot water to the desired temperature by using the MODE and + (plus) SELECTOR buttons.

Open a hot water tap, the diverter valve motor will move to hot water supply and the display will read domestic hot water temperature.
Check that hot water is available at all taps, then close.

- Set the Central heating water temperature to the desired temperature by using the MODE and + (plus) SELECTOR buttons.

The appliance will then continue to operate in central heating until the user controls are satisfied or there is another demand made for hot water.

11.7 Check the Gas Inlet Pressure & Gas Rate

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 as necessary.
NOTE: Due to the modulating operation of the boiler and the need to check the gas inlet pressure and measure the gas rate at maximum rate, it will be necessary to force it to maximum. After a period of 10 minutes, with the boiler operating in C.H. mode, turn on several hot water taps, this will operate the boiler at maximum rate.

Operational Gas Inlet Pressure

With ALL other gas appliances operating, check the operational supply pressure at the gas service isolation valve test point, see diagram 11.1.
The nominal supply pressure for Natural Gas (G20) is 20mbar.
Turn the taps and appliances off, then disconnect the pressure gauge.
Additionally the safe nominal maximum heat input of the appliance can be achieved at an inlet pressure down to 15mbar.
NOTE: The **BURNER PRESSURE** cannot be measured and is not used to measure the gas rate.

Gas Rate

Make sure that ALL other gas burning appliances and pilot lights are off.
Check the gas rate using the gas meter test dial and stop watch, at least 10 minutes after the burner has lit.
The approximate maximum gas rates are:

24cx : 1.9m3/h (68ft/3/h)
30cx : 2.6m3/h (92ft/3/h)
35cx : 3.3m3/h (115ft/3/h)

kW	m3/hr	ft3/hr	kW	m3/hr	ft3/hr
			20	2.1	74.2
30	3.2	113	19	2.0	70.6
29	3.1	109.5	18	1.9	67.1
28	3.0	106	17	1.8	63.6
27	2.9	102.4	16	1.7	60.0
26	2.8	98.9	15	1.6	56.5
25	2.6	91.8	14	1.5	53.0
24	2.5	88.3	13	1.4	49.5
23	2.4	84.8	12	1.3	45.9
22	2.3	81.2	11	1.2	42.4
21	2.2	77.7	10	1.1	38.9

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11.8 Central Heating Range Rating

The boilers are fully modulating for central heating, therefore it is not necessary to range rate them, however, if desired, you can adjust the CH output in 1kW increments between:

24cx : 10 - 18kW
30cx : 10 - 24kW
35cx : 10 - 30kW
as follows:

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

Please refer to the above table to check the gas rates.

11.9 Heating System

Ensure that the external controls and programmer are calling for heat.
Fully open all radiator valves, flow control valve, if fitted, see diagram 5.3.
Press the "MODE" button to change to the CH.
Balance the radiators as required and if fitted adjust 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.
NOTE: Should the system require that the appliance has to be adjusted, the front casing will need to be removed as described in the servicing section 12 and the control box lowered into its service position.
The appliance pump has two speeds and can be adjusted to suit the requirements of the system.
The appliance has an inbuilt automatic adjustable bypass valve, see diagram 11.3. The pressure can be adjusted between approx 1.5 and 3.5mH_2O but is factory pre-set to approx 2.5mH_2O. The pressure changes by approx 0.1mH_2O for each full turn of the bypass screw. Turning clockwise increases the pressure and turning anti-clockwise decreases the pressure.
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 taps at all the low points of the system. Fill and vent the system as described previously in section 11.2.
Lock or remove the handle from control valve, if fitted.
Adjust the boiler temperature controls and any system controls to their required settings.

11.10 Completion

Ensure that the magnetic lighting instruction label is placed on the surface of the boiler casing.
GB: In addition it is necessary to complete the "Benchmark" logbook.
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.

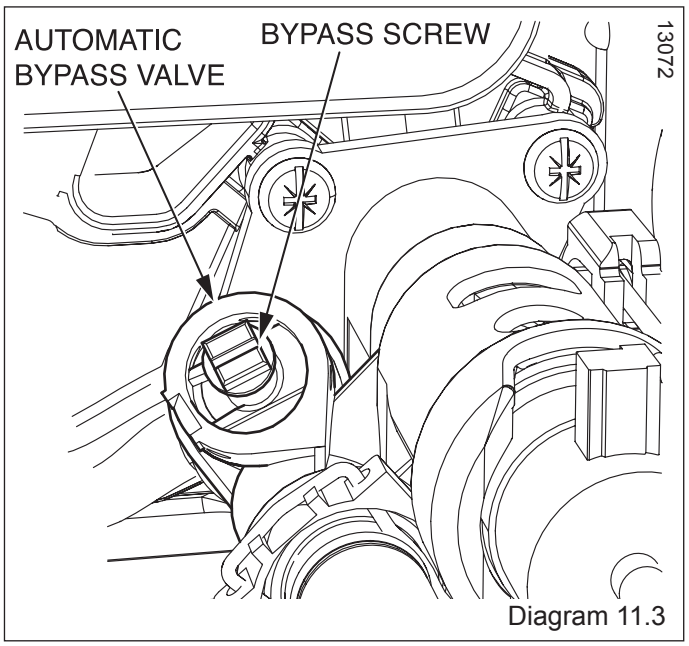

Diagram 11.3

11.11 Instruct the User

● Demonstrate, then instruct the User about the lighting procedure and heating system controls operation.
● 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** approved at the time by the Health and Safety Executive.
● 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 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: Sealed System: Contact your installation/servicing company as draining, refilling and pressurising MUST be carried out by a **competent person** approved at the time by the Health and Safety Executive.
● Leave these instructions and the 'Benchmark' Installation, Commissioning and Service Record with the user.

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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** approved at the time by the Health and Safety Executive**.**
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 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 Glow-worm.
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 13.
6. After servicing, complete the relevant Service Interval Record section of the Benchmark Checklist located in the inside back pages of this document.

12 Servicing

General Inspection

Prior to, during servicing and after any maintenance or changed parts, the following must be checked.
● The integrity of the flue system and flue seals.
● The integrity of the appliance combustion circuit and relevant seals.
● Electrical, gas and water connections.
● System pressure.
● the combustion performance, refer to the following procedure.
● The operational gas inlet pressure and gas rates, refer to the commissioning section paragraph 11.7.
Correct any fault before continuing.

COMPETENCY TO CARRY OUT THE CHECK OF COMBUSTION PERFORMANCE

NOTE: BS 6798: 2009 Specification for installation and maintenance of gas-fired boilers of rated input not exceeding 70kW net advises that:
● The person carrying out a combustion measurement must be assessed as competent in the use of a flue gas analyser and the interpretation of the results.
● The flue gas analyser used should be one meeting the requirements of BS7927 or BS-EN50379-3 and be calibrated in accordance with the analyser manufacturers' requirements.
● Competence can be demonstrated by satisfactory completion of the CPA1 ACS assessment, which covers the use of electronic portable combustion gas analysers in accordance with BS 7967, parts 1 to 4.
● Ensure that the gas analyser is set to the correct fuel setting.
● Select the "", constant central heating with DHW function by pressing the "Mode" button repeatedly, refer to commissioning section.The boiler should fire automatically.
NOTE: Safe combustion can only be verified by measuring CO/CO_2 ratio. This must not exceed the value shown in the table below.

G20 BURNER % CO_2			
MODEL	**CHECK**	**SETTING**	**CO/CO_2 ratio**
24cx	8.8 to 9.8	9.2 +0.3 - 0.3	0.004
30cx	8.8 to 9.8	9.1 +0.3 - 0.3	0.004
35cx	8.8 to 9.8	8.8 +0.3 - 0.3	0.004

COMBUSTION CHECK AND SETTING THE AIR/ GAS RATIO VALVE

● Remove the front casing panel, see diagram 12.2 and hinge down the control box. Taking care not to touch any internal components, proceed as follows:
● Connect the CO2 combustion analyser to the relevant test point, see diagram 12.1.

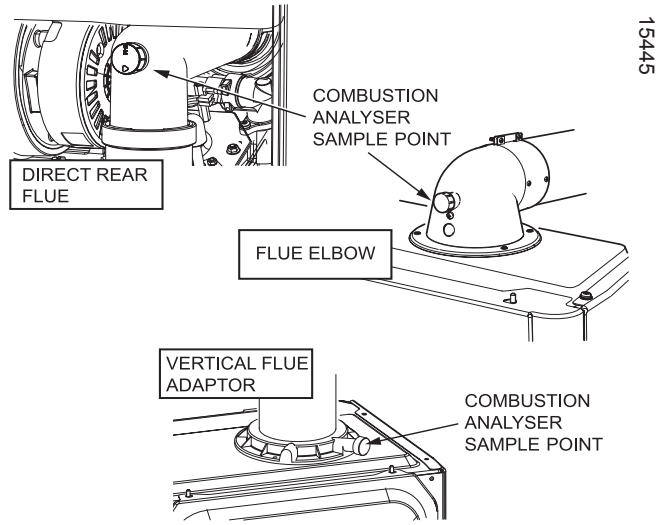

Diagram 13.1

1. Maximum Rate Check and Adjustment

NOTE: To verify the maximum gas rate CO2 setting the appliance must be checked at the maximum rate first. 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. Wait until the CO2 value is stable and check that the value is within the range specified in table in the "check" column.
If the combustion reading is not within the acceptable values AND the integrity of the complete flue system and combustion circuit seals have been verified and the inlet gas pressure (and gas rate) have been verified, then, it will necessary to adjust the combustion rate of the appliance.
NOTE: Adjustment is made by turning the gas valve throttle an ⅛ of a turn, waiting 1 minute to allow the appliance to stabilise before checking or making further adjustments.

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● Rotate the “throttle”(anti-clockwise to increase), to the required CO2, refer to diagram 12.4 and the “SETTING” column in the table.
● Exit the forced rate function, press the “mode” and “+” buttons simultaneously, this will reset the boiler to the default display. Now proceed to check the minimum rate adjustment.

2. Minimum Rate Check and Adjustment

● Now check the minimum gas rate CO2 setting: Press and release the “reset” button on the controls fascia, then immediately press and hold in either of the “+” buttons. After approximately 5 seconds “Hi” will be displayed. Pressing the “+” or “-” buttons will toggle between “Hi” and “Lo”. Press the mode button when “Lo” is selected, this will force the boiler to minimum rate and the display will flash “Lo”, indicating the boiler is operating at minimum.
● Wait until the CO2 value is stable and check that the value is within the range specified in table in the “check” column.
If adjustment is necessary, proceed as follows:
NOTE: Adjustment of the CO2 at minimum rate is very coarse and should not be adjusted more than an ⅛ of a turn at a time. Wait 1 minute to allow the appliance to stabilise before checking or making further adjustments.
● Gradually rotate the “offset adjustment” (anti-clockwise to decrease) to the required CO2, refer to diagram 12.4 and the “SETTING” column in the table.
● Exit the minimum rate function, press the “mode” and “+” buttons simultaneously, this will reset the boiler to the default display.

3. Re-Check CO2 and check the CO/CO2 combustion ratio.

● Re-check the maximum and minimum CO2 values to ensure that they are within the “setting” limits in the table then check the CO/CO2 combustion ratio does not exceed the value in the CO/CO2 column of the table. If the CO/CO2 ratio exceeds the value in the table, a complete servicing of the appliance will be necessary, refer to section 12.1.
If the CO2 and the CO/CO2 ratio falls within the tolerances quoted, exit the function press the “mode” and “+” buttons simultaneously, this will reset the boiler to the default display.
Remove the analyser probe and replace the cap on the sampling point, replace the controls fascia, inner and front casing panels.
IMPORTANT: Remember to replace the sample point cap on completion of the test.

GAS RATE CHECK

Check the gas rates as described in the commissioning section.

COMPLETION

If it is not possible to achieve the required results for either the combustion or gas rates, it will be necessary to complete a full service of the appliance and then repeat the combustion check procedure. If after servicing and adjustment of the appliance the combustion values are still unacceptable and after further remedial work has been carried out, the appliance must be disconnected until the CO/CO2 ratio is acceptable. Advice can be sought from the Glow-worm Technical Helpline.

12.1 Servicing

NOTE: If the Combustion CO2, CO/CO2 ratio & Gas rate checks did not require adjustment then it will not be necessary to complete a full service.

All routine servicing requirements can be achieved by the removal of the front panel, see diagram 12.2. Position the control box into the service position, see diagram 12.3. Before commencing with a service or replacement of parts. The boiler should be isolated from the electrical and gas supplies.

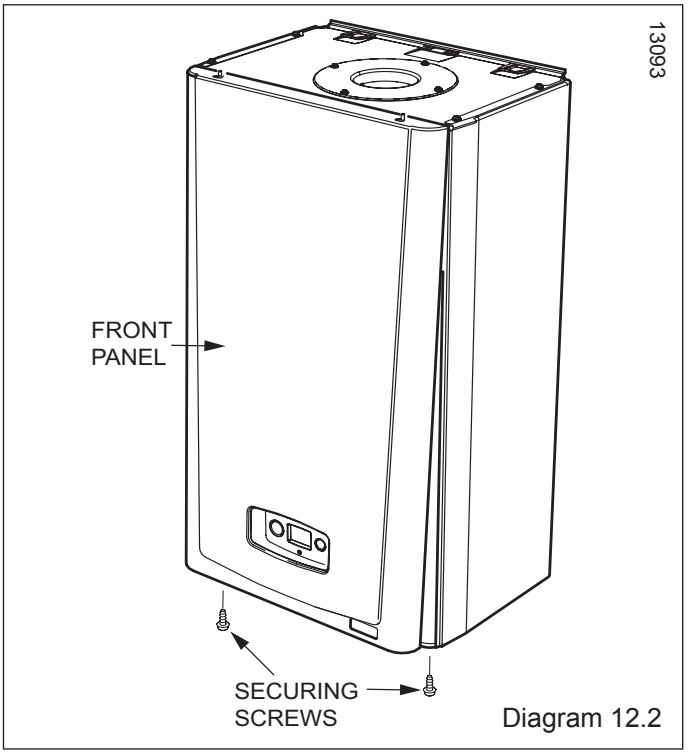

Diagram 12.2

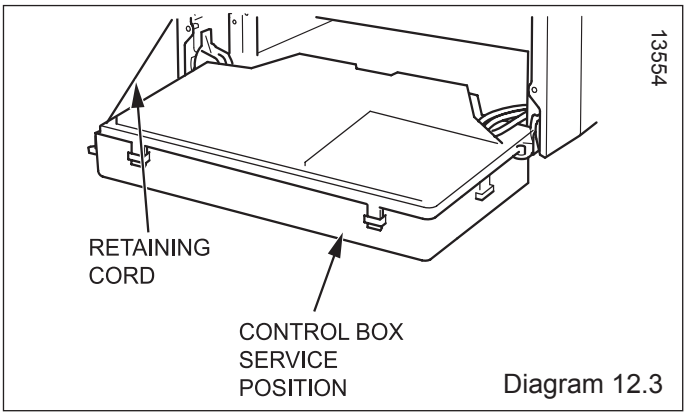

Diagram 12.3

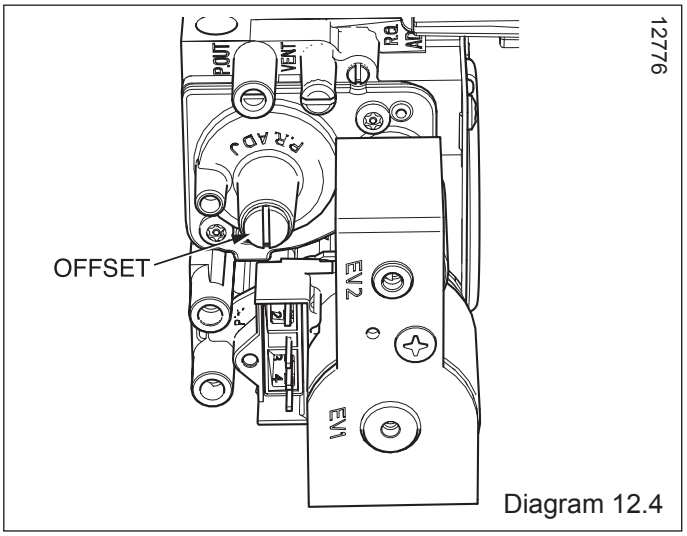

Diagram 12.4

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12.2 Spark Electrode

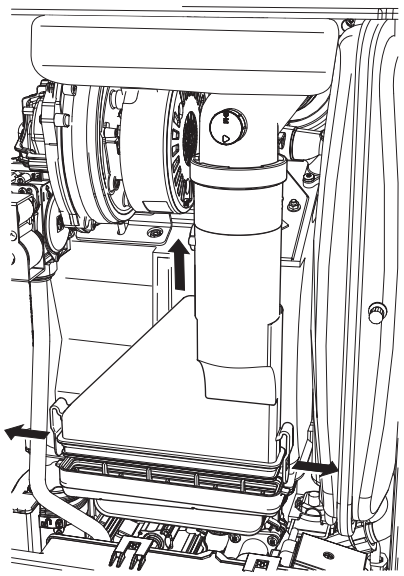
NOTE: If the functional checks did not indicate poor combustion then it is not necessary to service this component.
Ease the securing clips away from the sump to release the retaining catch then push the flue hood up to disengage from the sump, see diagram 12.5.
To remove, swivel flue hood 90° and pull down and out, see diagram 12.5.
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 12.6.
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.

12.3 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 12.7.
The Silencer (front) is a push fit, so there is no need for tools to remove or fit, see diagram 12.8.
Release the igniter unit support bracket, see diagram 12.9.
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 12.10.
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 12.9.
Check the spark electrode gap is 4mm. Clean and adjust as necessary, see diagram 12.6.
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 12.12.
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 12.12.

12.4 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).



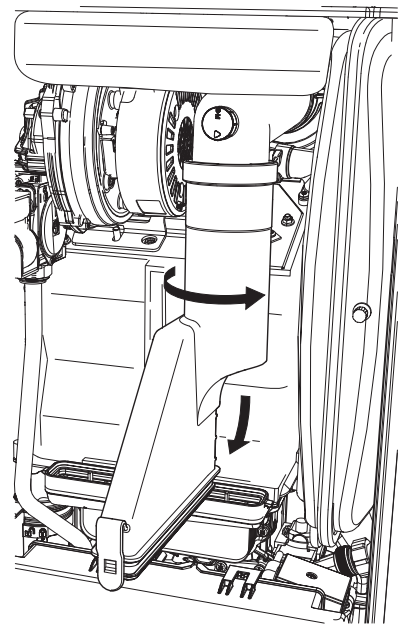


Diagram 12.5

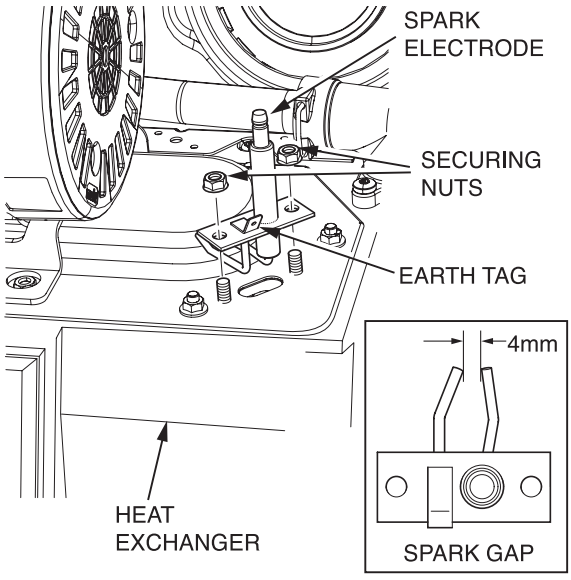


Diagram 12.6

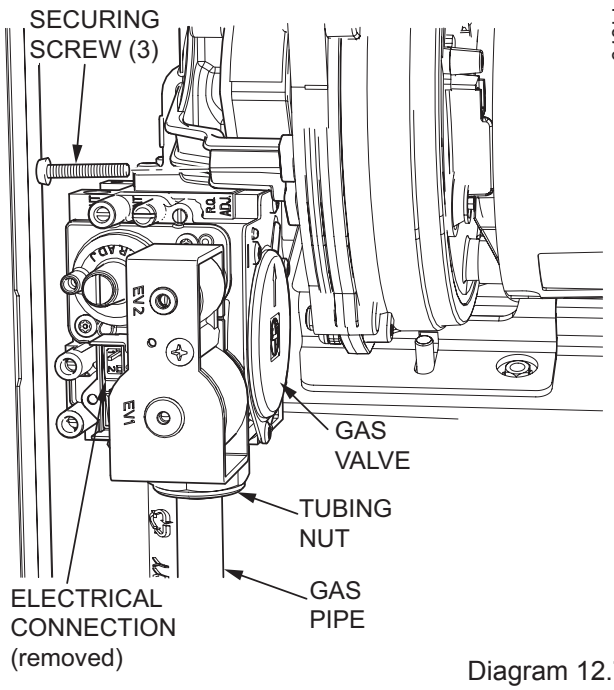


Diagram 12.7

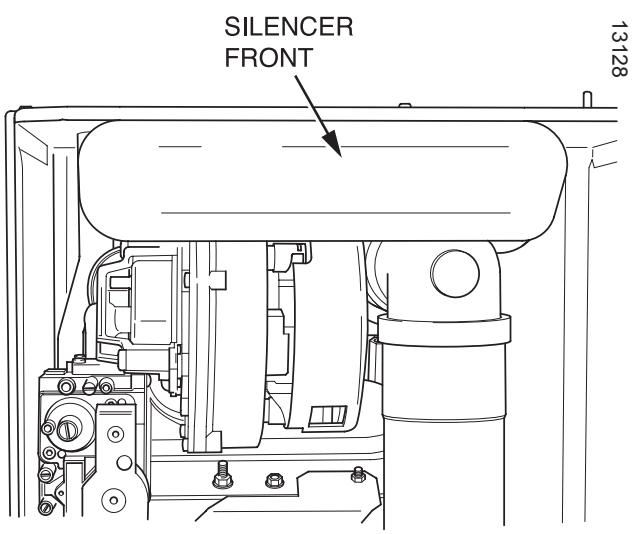


Diagram 12.8

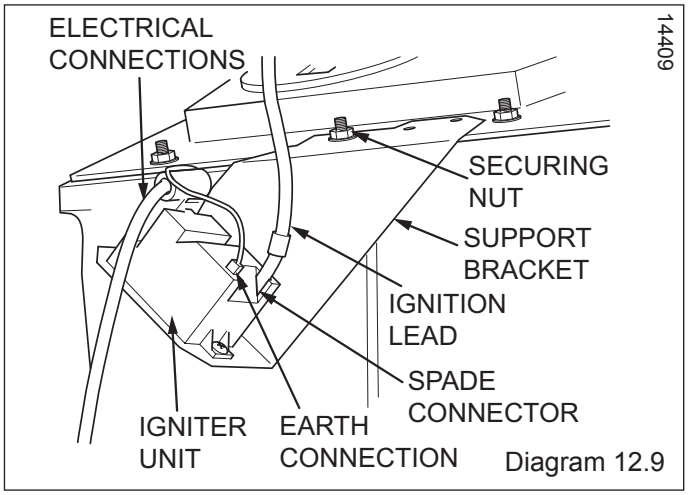


Diagram 12.9

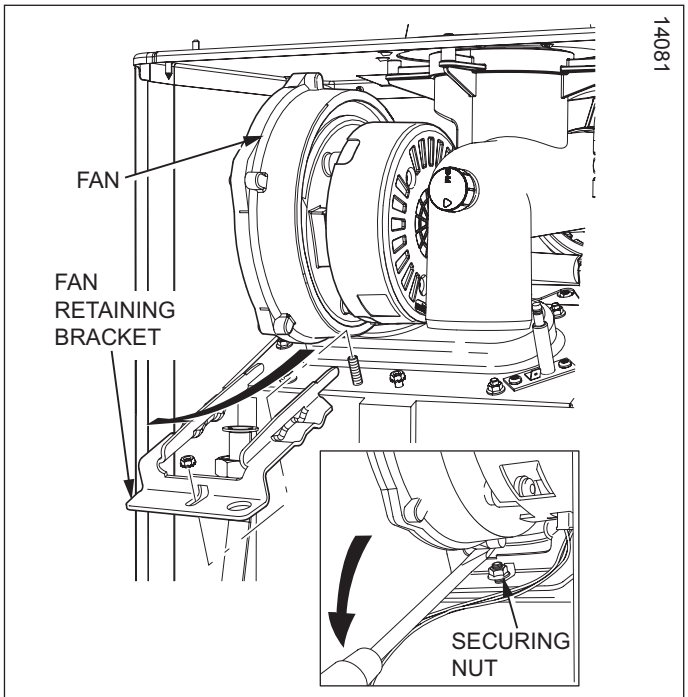


Diagram 12.10

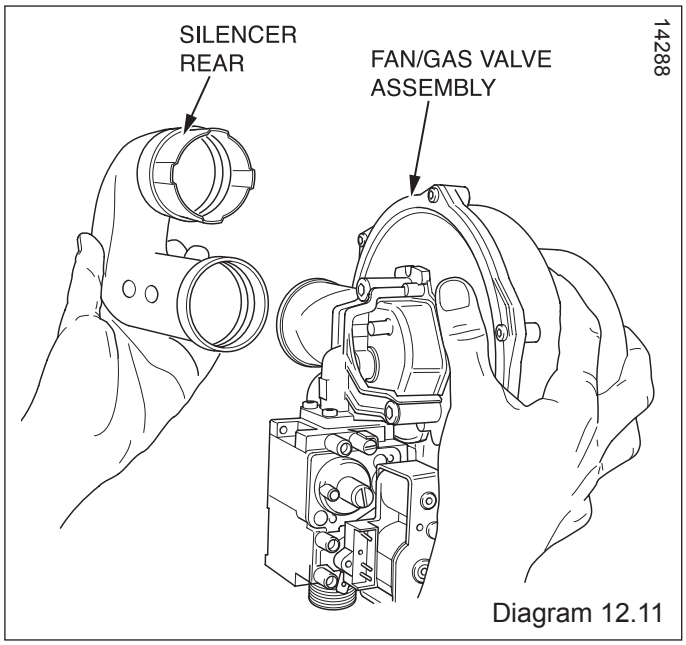


Diagram 12.11

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12.5 Condense Trap and Siphonic Drain

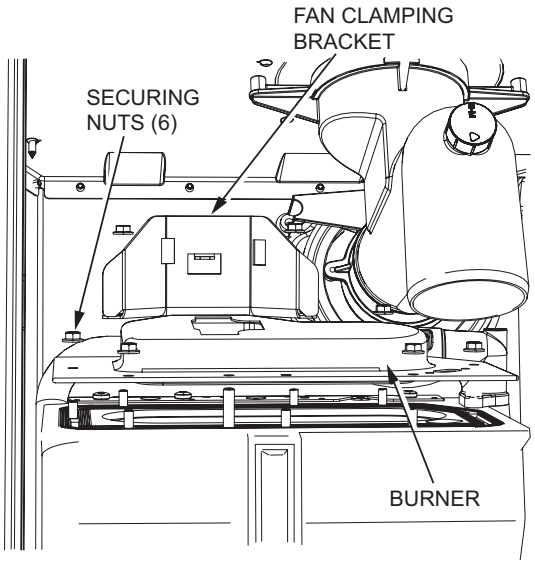
The condense trap and siphonic drain does not normally need servicing unless material deposits exceed beyond the service fill level, see diagram 12.13.
To clean the condense trap remove the sump and rinse with water.

12.6 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.

12.7 Service Completion

Re-check the combustion as described at the beginning of this section.
On completion of the service the “Benchmark” Service Record should be completed.



Suggested tightening sequence for burner fitting

Diagram 12.12

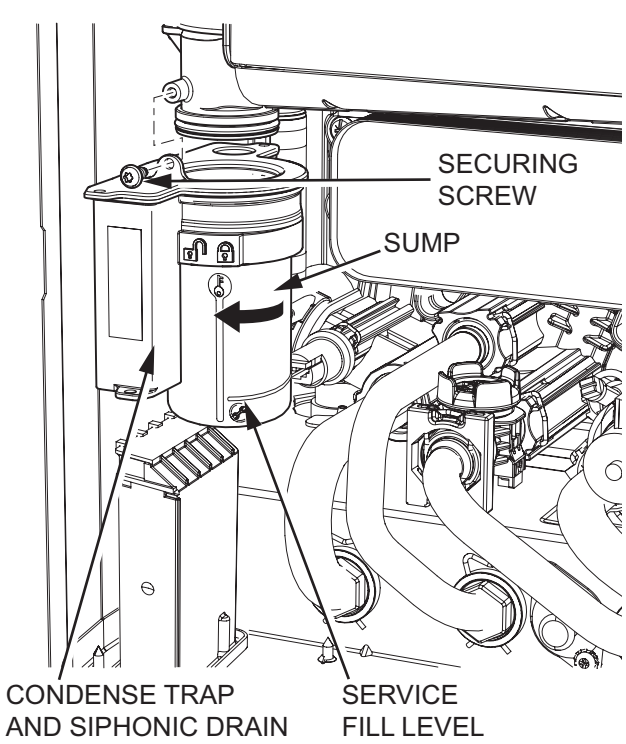


Diagram 12.13

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13 Fault Finding

13.1 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 10.4. and 10.1.

Test at the 'L' and 'N' terminals on the installer interface, refer to diagrams 10.1 and 13.4.

• 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 test

Remove the front casing panel, see diagram 13.1 and hinge down the control box.

Unclip the rear cover to gain access to the main PCB.

Carry out the tests at connector plug X17, see diagram 13.2. 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 8.2.

• Check pressure at the gas service isolation valve, refer to section 11.7.

• Check that the heating system pressure indicates at least 1mb, if not, fill and vent the system as described in section 11.2.

• Check that all external controls are on.

• Check the functional flow diagram, 13.5.

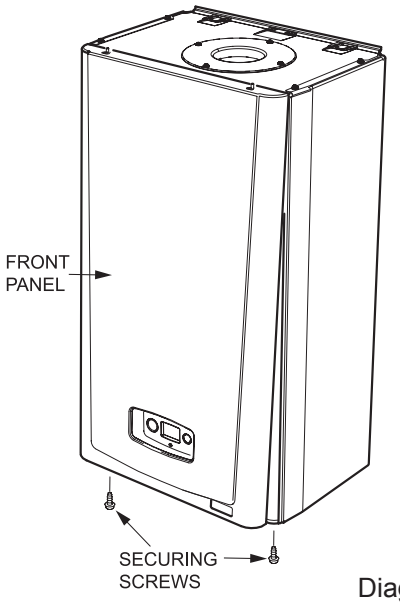

Diagram 13.1

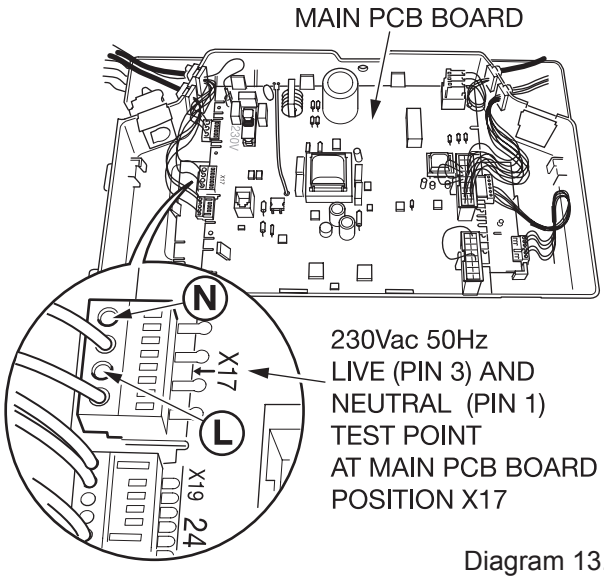

Diagram 13.2

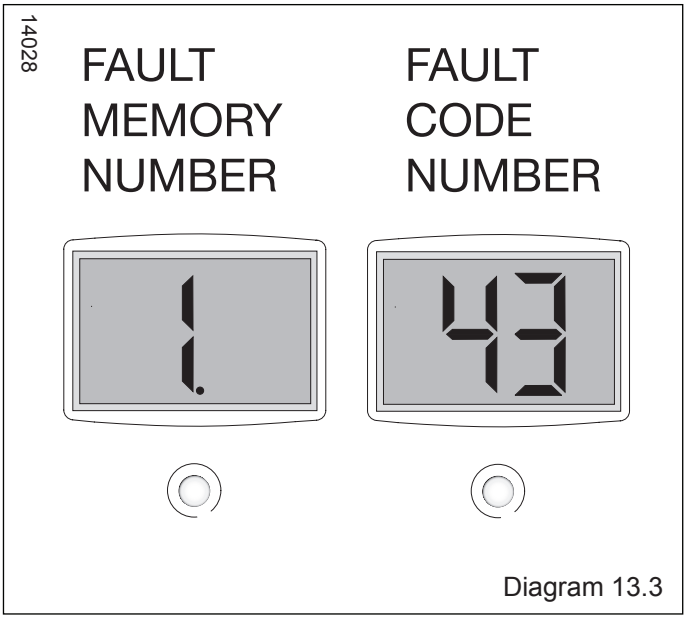

Diagram 13.3

13.2 Fault Codes

Fault codes take priority over all other display functions in the event of a fault occuring, refer to diagram 13.6.
If multiple faults occur the codes will be displayed for approx. 2 seconds, alternatively.

13.3 Fault Memory

The Fault memory stores details of the ten most recent faults.

To access this menu, refer to diagram 13.3:
a) Press and hold 'MODE' and '-' buttons for 5 seconds.
b) The display will stop flashing and alternate between the fault memory number and the fault code.
c) Press '+' button to scroll through the fault memory (Position 1 is most recent), see fault codes.
To exit this menu, press the 'MODE' button.

13.4 Diagnostic Menu

The Diagnostic Menu provides the ability to view and change certain parameters. See diagram 13.7 for available parameters.

13.5 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 13.8.

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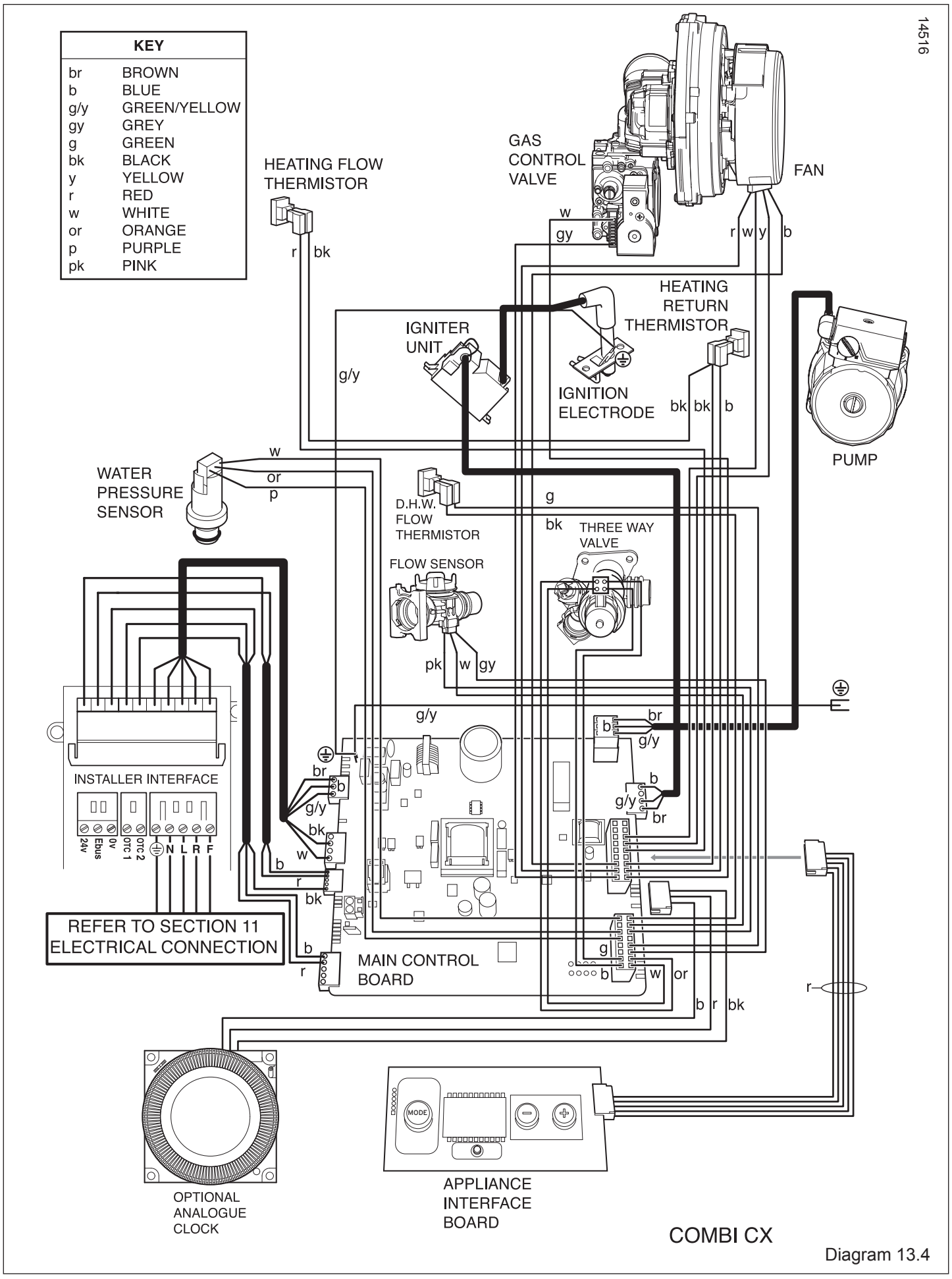

Diagram 13.4

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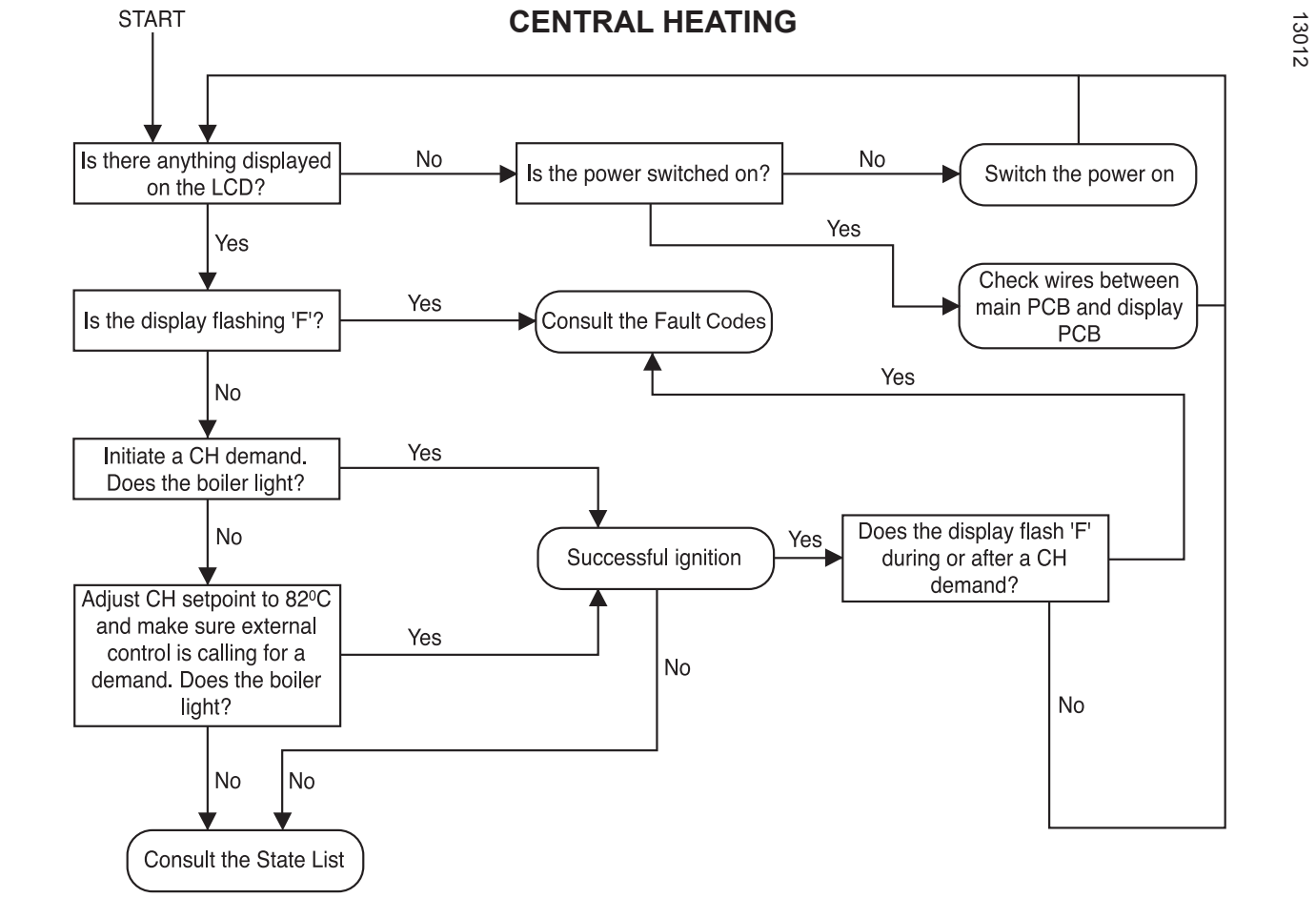

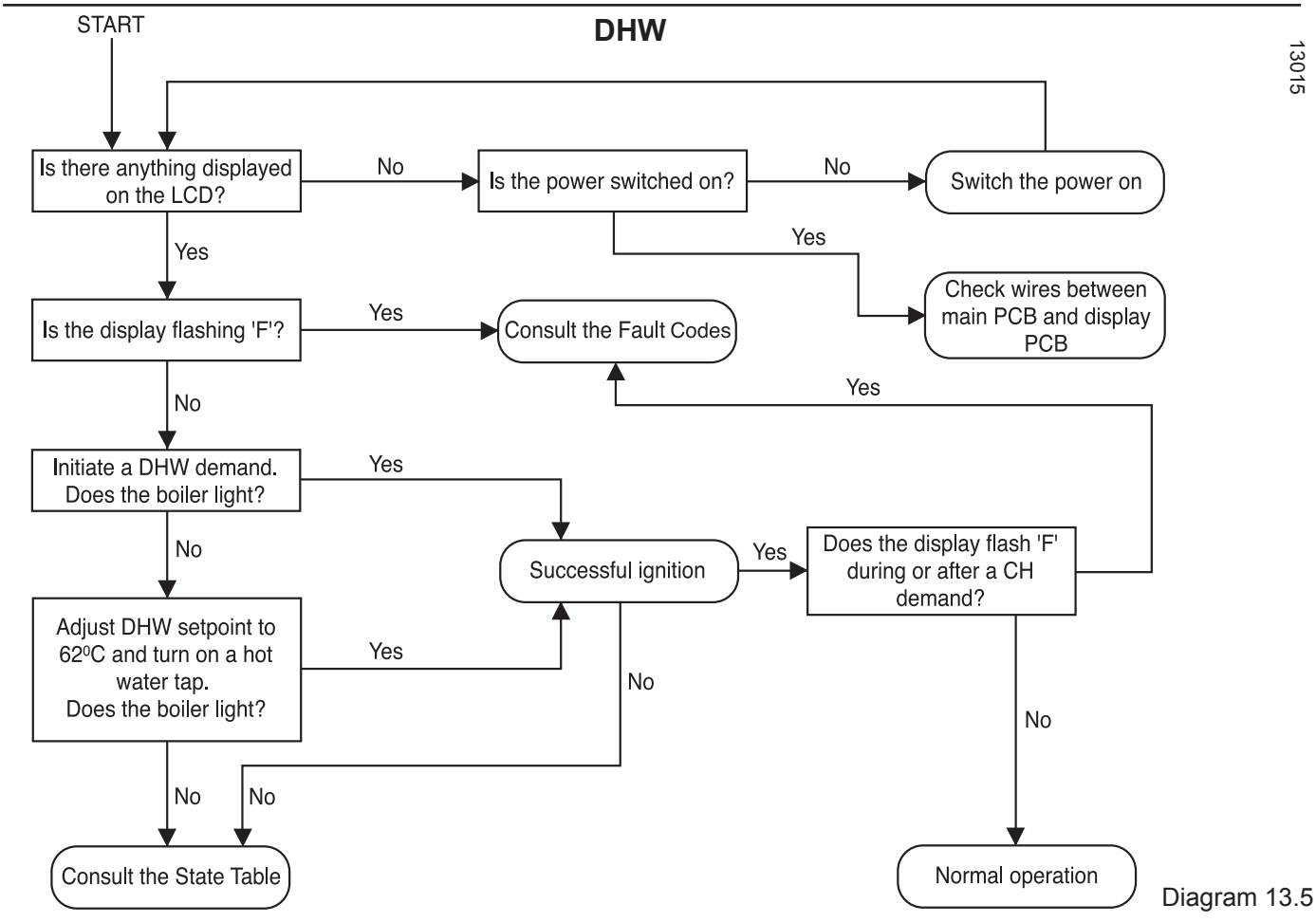

Diagram 13.5

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FAULT CODES

CODE	DESCRIPTION	POSSIBLE CAUSE
F1	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 fault	Fan speed incorrect. Fan connector loose, unconnected, faulty or wires trapped. Faulty fan.
F4	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	Overheat	Boiler has overheated – allow to cool then press reset button
F6	CH Flow Thermistor connection fault	Thermistor wires unconnected, faulty, trapped.
F7	DHW Flow Thermistor connection fault	Thermistor wires unconnected, faulty, trapped.
F9	Pressure	Water pressure connector loose, unconnected, faulty or wires trapped. Water Pressure Sensor faulty Pump ceased, faulty.
F10	CH Return Thermistor connection fault	Thermistor wires unconnected, faulty, trapped.
F11	Flow and/or return NTC faulty	Thermistor wires unconnected, faulty, trapped.
F13	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 Valve control defective	Gas valve connector loose, wires unconnected, faulty or trapped. Faulty main board. Faulty gas valve.
F15	eBus Voltage failure	Short circuit on eBus, overload on eBus.
F22	Low Water pressure or Ignition temperature rise too slow	Not enough water in the system. CH flow or return thermistor wire loose, faulty, trapped. CH flow or return thermistor not connected to pipe correctly. Air in the system. Faulty pump or pump speed too fast.
F25	CH Flow temperature rise too high during operation. CH Return temperature rise or temperature difference too high during operation. CH 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	Software incompatible	Telephone Group Service
F77	Condensate pump error (Option)	Trapped, faulty wiring, blockage in condensate pump.
NO DISPLAY or 'Er' displayed - Check connection from display PCB to main PCB connector X51		

Diagram 13.6

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State list - To access the state lists the '-' button must be pressed for longer than 5 seconds until it begins to flash 'S' and then a number to indicate the state. The state numbers are given below.

STATE LISTS

	Central heating mode	Description
S.00	no heating required	NORMAL OPERATING STATE FOR CH MODE
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	
	Domestic hot water mode	
S.10	domestic hot water demand	NORMAL OPERATING STATE FOR DHW MODE
S.11	fan pre-run	
S.13	ignition	
S.14	burner on	
S.15	pump / fan overrun	
S.16	fan overrun	
S.17	pump overrun	
	Preheat mode	
S.20	domestic hot water cycling mode active	NORMAL OPERATING STATE FOR PRE-HEAT MODE
S.21	fan pre-run	
S.22	Pump pre run	
S.23	ignition	
S.24	burner on	
S.25	pump / fan overrun	
S.26	fan overrun	
S.27	pump overrun	
S.28	Anticycling 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	Antifreeze active – fan speed variation too high – waiting during blocking function	Check fan connection.
S.34	frost protection active (Priority 4)	Temperature below 8^{O} C - check thermistor connection if this is not true.
S.36	No Heating demand from external controls 24V	Check wiring in external controller. Check wiring at Installer Interface.
S.42	Accesory 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.97	Water pressure sensor check is running, demand (DHW or heating) is blocked	Check connection to pressure sensor. Check pump has not seized.
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.

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Diagram 13.7

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To enter the diagnostics menu follow the procedure below:-
Press and hold the 'MODE' and '+' buttons for approx 5 seconds until the screen changes. Use the '+' or '-' button to select the number 96, this is the password. Hold the 'MODE' for approx 5 seconds when 96 is selected, when the screen changes release the button. The screen will flash between 'L1' and a number. 'L1' indicates you have level 1 access, the number indicates the diagnostic number below. Use the '+' and '-' to cycle through the selections below. To select a diagnostic number press the 'MODE' button when the correct number is selected. The display will show the parameter value of the diagnostic number selected. To return to the diagnostic number selector simply press the 'MODE' button. To change the parameter use the + or - buttons. Once the value has been changed it must be saved by holding the 'MODE' button for approximately 5 seconds. This will return to the diagnostic number selector.

14512

DIAGNOSTIC CODES - 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. 3	Domestic hot water flow temperature reading	in °C
	d.5	Flow temperature setpoint	In °C, min. 28 and max. 82
	d.6	Domestic hot water setpoint	In °C, 40 to 60°C
	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 internal heating pump	1 = on, 0 = off
	d.11	Status external heating pump	1 to 100 = on, 0 = off
	d.13	Hot water circulation pump (via accessory module)	1 to 100 = on, 0 = off
	d.22	Domestic hot water demand	1 = on, 0 = off
	d.23	Summer/Winter function	1 = Winter, 0 = Summer
	d.24	System water pressure	in bar.
	d.25	Hot water activation via eBUS Control	1 = yes, 0 = no
■	d.27	Option Relay 1	Reserved for future use
■	d.28	Option Relay 2	Reserved for future use
	d.33	Fan speed target value	in rpm/100
	d.34	Fan speed actual value	in rpm/100
	d.35	Position of diverter valve	0 = Heating; 100 = Hot water; 40 = Centre position
	d.40	Flow temperature	Actual value in °C
	d.41	Return temperature	Actual value in °C
	d.44	Ionisation current	Actual value (10nA) >8 no flame, <4 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.67	Remaining burner anti cycling time (block time)	Quantity
	d.68	Unsuccessful ignitions in the first attempt	Quantity
	d.69	Unsuccessful ignitions in the second attempt	Quantity
	d.76	Appliance variant (device specific number)	00 to 99
	d.80	Heating operating hours	in h
	d.81	Water heating operating hours (combination boilers only)	in h
	d.82	Cycles in heating mode	Quantity
	d.83	Cycles in hot water operation	Quantity
	d.90	Digital regulator status	1 = identified, 0 = unidentified (eBUS Address < = 1 0)
■	d.97	Activation of the second diagnostic level	Password needed
	d.99	State List	(see table opposite)

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

Diagram 13.8

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14 Replacement of Parts

14.1 General

Replacement parts that have associated components that need replacing on removal, i.e. 'O' ring, seals, gasket, etc., will be supplied and should be fitted.
Replacement of parts must be carried out by a **competent person** approved at the time by the Health and Safety Executive.
Before replacing any parts of the boiler it 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 14.1.
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.

Boiler Access

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.
If the appliance site situation has sufficient side clearances the side panels can be hinged sideways and 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.

Draining of Boiler Heating Circuit

Drain down the Heating Circuit of the boiler only, by closing the heating flow and return isolating valves on the wall mounting jig. Attach a length of hose to the drain point and open the drain valve, see diagram 14.1.
After replacing parts, close the drain valve and remove the hose. Open the heating flow and return isolating valves and refill, vent and pressurise the heating circuit, refer to section 11. Check for leaks.

Draining of Boiler Hot Water Circuit

Drain the Domestic Hot Water circuit by closing the cold-water isolation valve on the wall mounting jig, see diagram 14.1.
Open one or more hot water taps to drain the hot water circuit.
After replacing parts open the cold-water isolation valve and slowly open a hot water tap to remove air. Close the hot water tap and check for any leaks.

14.2 Igniter Unit

For access, refer to section 14.1.
Remove ignition lead and electrical connections then remove igniter unit by removing two securing screws, see diagram 12.9.

14.3 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 diagram 12.6.

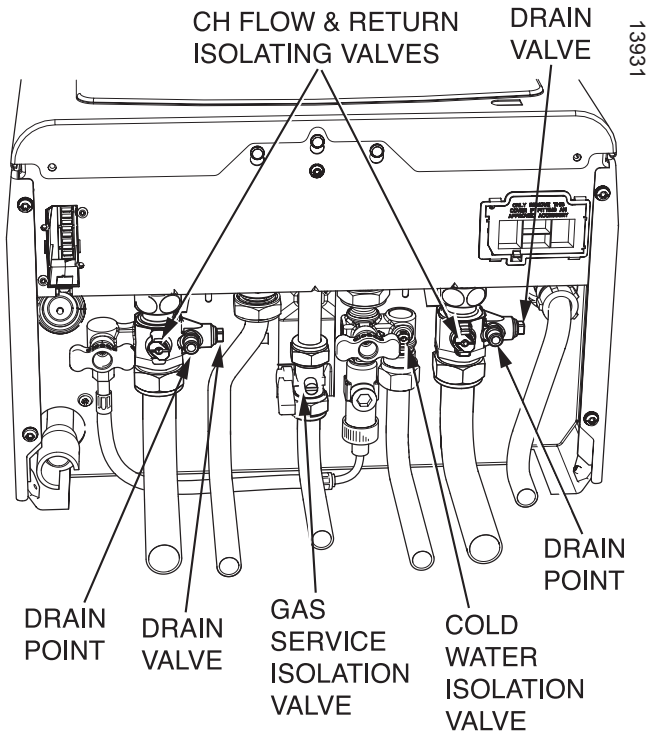

Diagram 14 .1

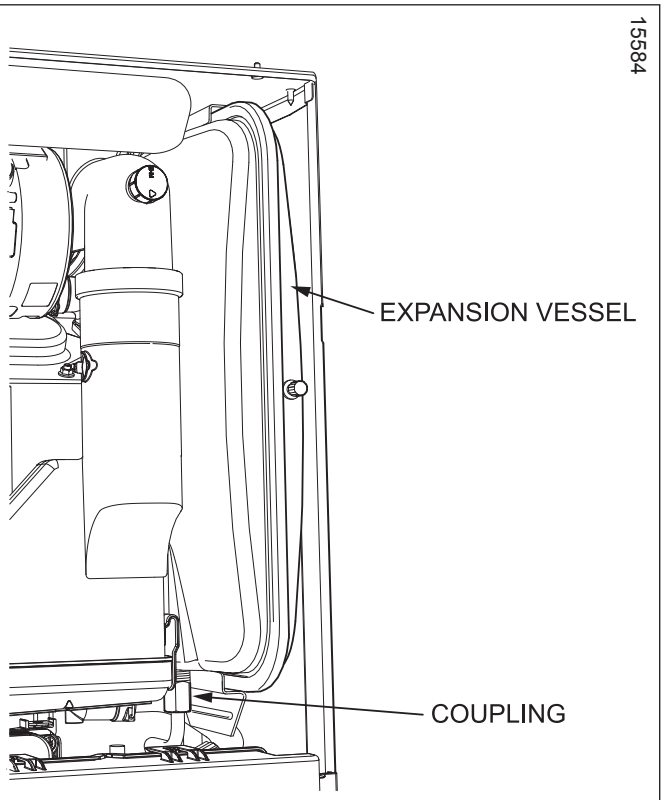

Diagram 14.2

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14.4 Gas Valve

Remove the three securing screws, holding the gas valve to the fan, see diagram 12.7.
Remove the gas valve.
After re-fitting check the combustion CO_2 and adjust if necessary, refer to section 12, Combustion Check.
After assembly test for gas tightness and purge in accordance with the current issue of BS6891or in IE, the current edition of I.S.813 “Domestic Gas Installations”.

14.5 Flue Hood

For access, refer to section 14.1.
Pull the flue hood securing clips away from the flue hood sump and push flue hood up slightly towards flue hood top, see diagram 12.5.
To remove swivel flue hood 90° and pull down and out towards front of boiler.

14.6 Fan

For access, refer to section 13.1.
Remove the gas valve as described in the relevant parts of section 14.8.
Remove the securing nut holding the fan retaining bracket, lift front of bracket away from stud and pull forward to release the fan, see diagram 12.10, check and replace any seals or gaskets if necessary.

14.7 Expansion Vessel

For access, refer to section 14.1.
Drain the boiler heating circuit, refer to section 14.1.
Undo the coupling at the base of the vessel, see diagram 14.2.
The expansion vessel can now be removed by sliding it forward clear of its support guides.
When re-fitting a new gasket will be required between the expansion vessel and coupling.
Refill, vent and pressurise the boiler.
Check for leaks.

14.8 Fan/Gas valve assembly

For access, refer to section 14.1.
Undo the tubing nut to remove the gas valve from the gas pipe and any electrical connections, see diagram 12.7.
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 12.10.
Lift fan/gas valve assembly up and forward away from locating studs.
Remove fan gasket and replace if necessary.
To replace the fan and retaining bracket correctly, insert into slots on fan clamping bracket, see diagram 12.12 and locate onto lugs on the burner.

14.9 Silencer assembly (rear)

For access, refer to section 14.1.
Remove the fan/gas valve assembly, see relevant sections.
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 14.11.

14.10 Spark Electrode

For access, refer to section 14.1.
Remove the spark plug lead and earth lead.
Remove the two securing nuts, see diagram 12.6.
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.

14.11 Burner

For access, refer to section 14.1.
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 12.12.
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.

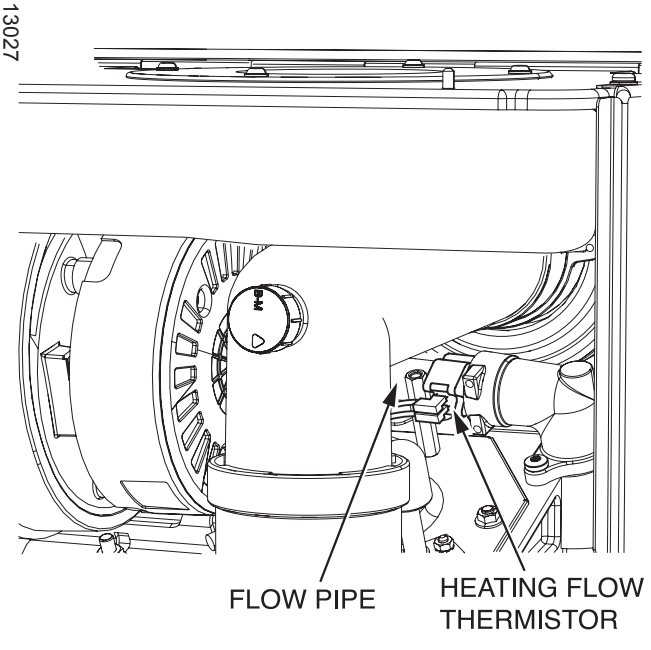

Diagram 14.3

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14.12 Silencer Assembly (front)

For access, refer to section 14.1.
Pull forwards to remove.
The silencer is a push fit so no tools or fixings are required for its removal or fitting, see diagram 12.8.

14.13 Condensate Trap

For access, refer to section 14.1.
Remove the drain outlet pipe from the base of the trap. Remove the condensate drain securing screw and carefully pull the trap forward, see diagram 12.13.
On the condensate trap there is a key symbol that should be in line with the locked padlock symbol on the condense drain.
To remove the trap turn in the direction indicated, see diagram 12.13, toward the unlock symbol and carefully pull down clear of the condense drain.
Remove any solids found in the condense trap.
Flush water through the trap to remove any remaining solids.
Check for any debris in the outlet pipe of the condensate drain and clean as necessary.
Reassemble and refit the condense trap.

14.14 Heating Flow Thermistor

For access refer to section 14.1.
Remove the silencer front, fan/gas valve assembly and flue hood for access. See relevant sections.
Refer to diagram 14.3.
Remove the electrical connections from the thermistor.
Remove the retaining clip from the flow pipe.
Remove the thermistor from the retaining clip.
Note that the polarity of the wiring to thermistors is unimportant.

14.15 Heating Return Thermistor

For access, refer to section 14.1.
Refer to diagram 14.4.
Remove the electrical connections from the thermistor.
Remove the retaining clip from the return pipe.
Remove the thermistor from the retaining clip.
Note that the polarity of the wiring to thermistor is unimportant.
Note that the polarity of the wiring to thermistor is unimportant.

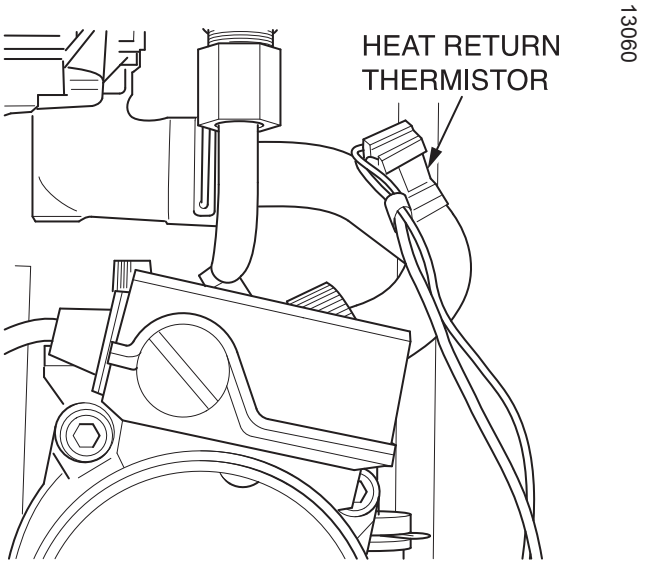

Diagram 14.4

14.18 Domestic Hot Water Thermistor

For access, refer to section 14.1.
Refer to diagram 14.5.
Remove the electrical connections from the thermistor.
Remove the retaining clip from the DHW pipe.
Remove the thermistor from the retaining clip.
Note that the polarity of the wiring to thermistor is unimportant.

14.19 Plate-to-Plate Heat Exchanger

For access, refer to section 14.1.
Drain the boiler heating circuit, refer to section 14.1.
Refer to section 14.3 and drain the boiler hot water circuit.
Refer to diagram 14.6.
Remove the gas supply pipe from the gas service isolation valve and the gas valve, refer to relevant parts of section 14.4.
Remove the condensate trap as described in section 14.13.
Remove the four screws securing the plate-to-plate heat exchanger to the hydroblock, see diagram 14.6.
Remove the plate-to-plate heat exchanger.
When replacing the plate-to-plate heat exchanger ensure that the four rubber sealing washers are fitted into the hydroblock.
NOTE: The plate-to-plate heat exchanger only fits one way round.
Refill, vent and pressurise the boiler.
Open the cold-water isolation valve and slowly open a hot water tap to remove air.
Close the hot water tap and check for any leaks.
Open the heating circuit isolation valves, re-pressurise the system as necessary, refer to diagram 14.1.

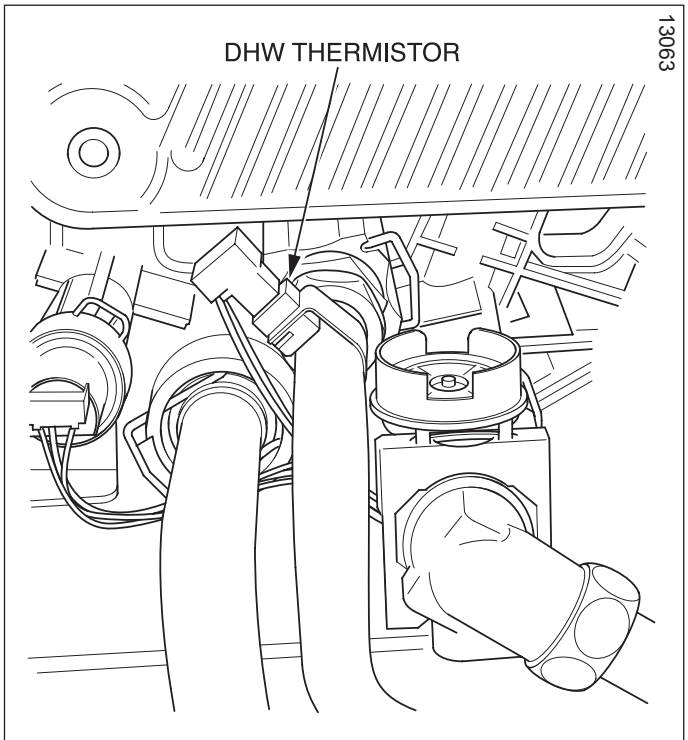

Diagram 14.5

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14.20 Pump (head only)

For access, refer to section 14.1.
Refer to section 14.1 and drain the boiler heating circuit.
Refer to diagram 14.7.
Remove the four cap head screws.
Carefully remove the pump head together with cable. Do not strain cable.
Support the pump head, unscrew cable cover at the side of pump head and remove.
Disconnect wiring from pump head.
Reconnect wiring to new pump head and fit cover.
Fit the new pump head with 'O' ring.
Refill, vent and pressurise the boiler and check for leaks.

14.21 Safety Discharge Valve

For access, refer to section 14.1.
Refer to section 14.1 and drain the boiler heating circuit.
Refer to diagram 14.8.
Undo the safety discharge valve union and remove from the pipework.
Remove the retaining clip and withdraw the safety discharge valve.
Fit new 'O' ring.
Refill, vent and pressurise the boiler and check for leaks.

14.22 Automatic Air Vent

For access, refer to section 14.1.
Refer to section 14.1 and drain the boiler heating circuit.
Refer to diagram 14.9.
Remove the retaining clip to release the automatic air vent.
Fit the new automatic air vent and 'O' ring ensuring the vent cap is left loose.
Refill, vent and pressurise the boiler and check for leaks.

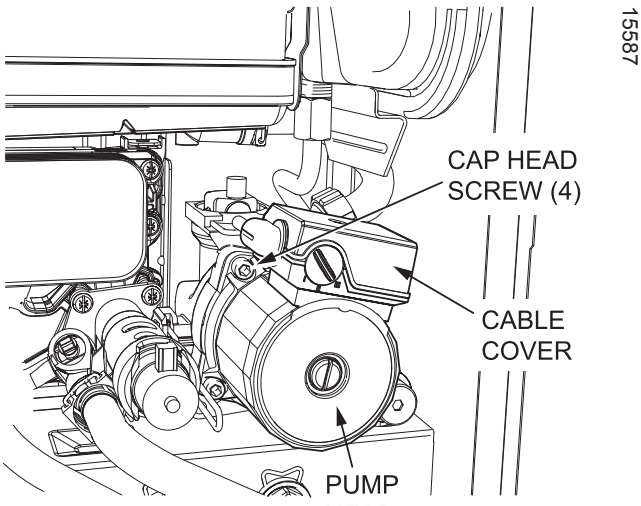

Diagram 14.7

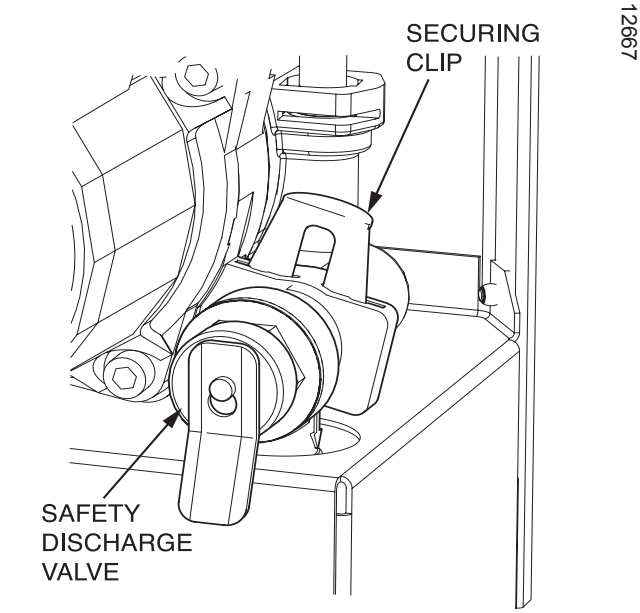

Diagram 14.8

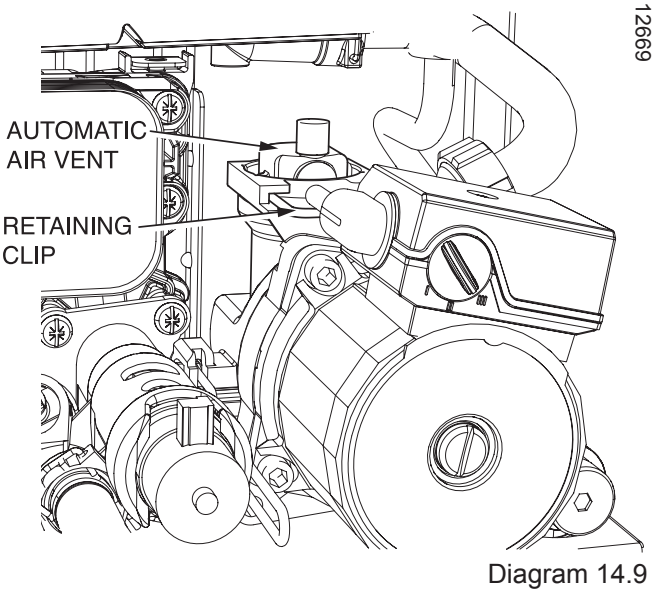

Diagram 14.9

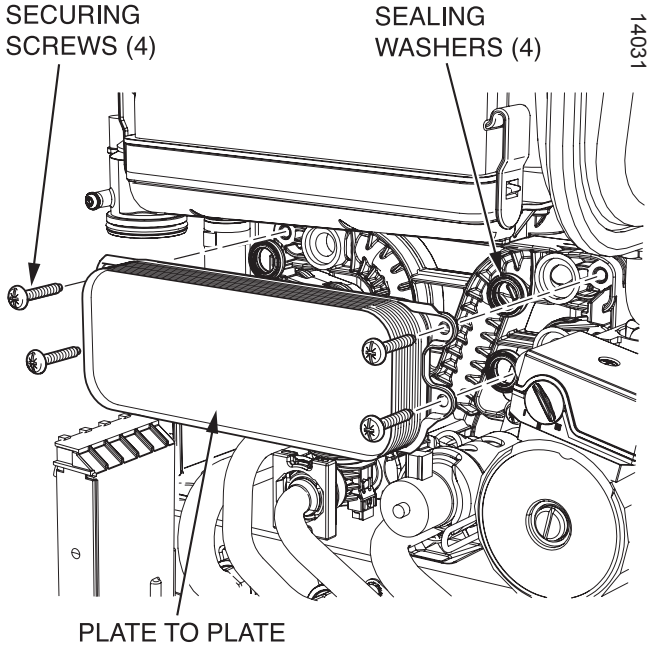

Diagram 14.6

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14.23 Flow Sensor

For access, refer to section 14.1.
Refer to section 14.1 and drain the boiler hot water circuit.
Refer to diagram 14.10.
Undo the brass securing nut on the domestic cold water return pipe.
Remove the securing clip between the hydroblock and the flow sensor.
Remove the electrical connection to the flow sensor.
Remove the securing clip holding the brass elbow to the flow sensor.
Partially withdraw the flow sensor to allow removal of the electrical connection before full removal of the sensor.
Remove flow sensor.
Fit new 'O' rings.
After replacing the flow sensor, open the cold-water isolation valve and slowly open a hot water tap to remove air.
Close the hot water tap and check for any leaks.

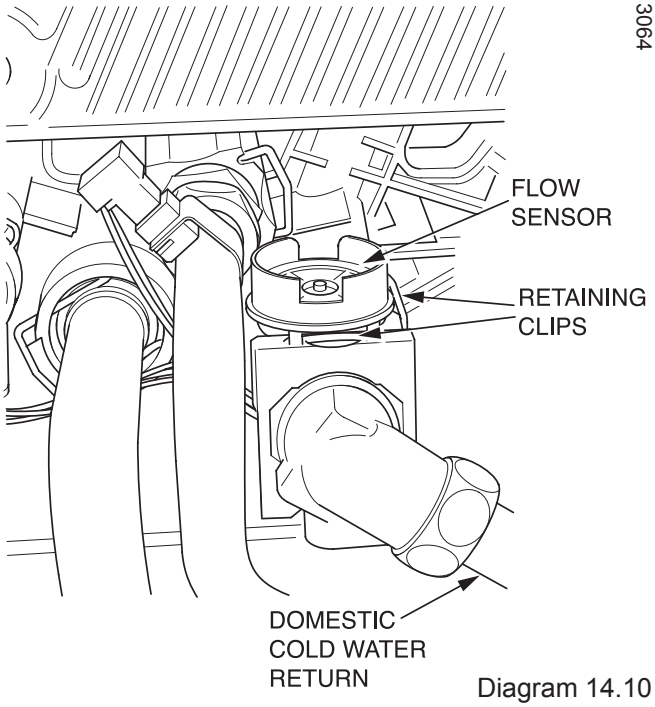

Diagram 14.10

14.24 Three Way Valve

For access, refer to section 14.1.
Refer to section 14.1 and drain the boiler heating circuit and the boiler hot water circuit.
Refer to diagram 14.11.
Undo the nut retaining the heating return isolation valve to the fixing jig. Be careful not to lose the sealing washer.
Undo the securing nut on the underside of the fixing jig and pull the pipe away from the three-way valve assembly.
Fully remove the three securing screws and pull the three-way valve assembly towards the left to disengage from the hydroblock. (Ensure that the original o-ring has not been retained in the hydroblock.)
Fit the new three-way valve assembly.
Reassemble, refill, vent and pressurise the boiler and check for leaks.

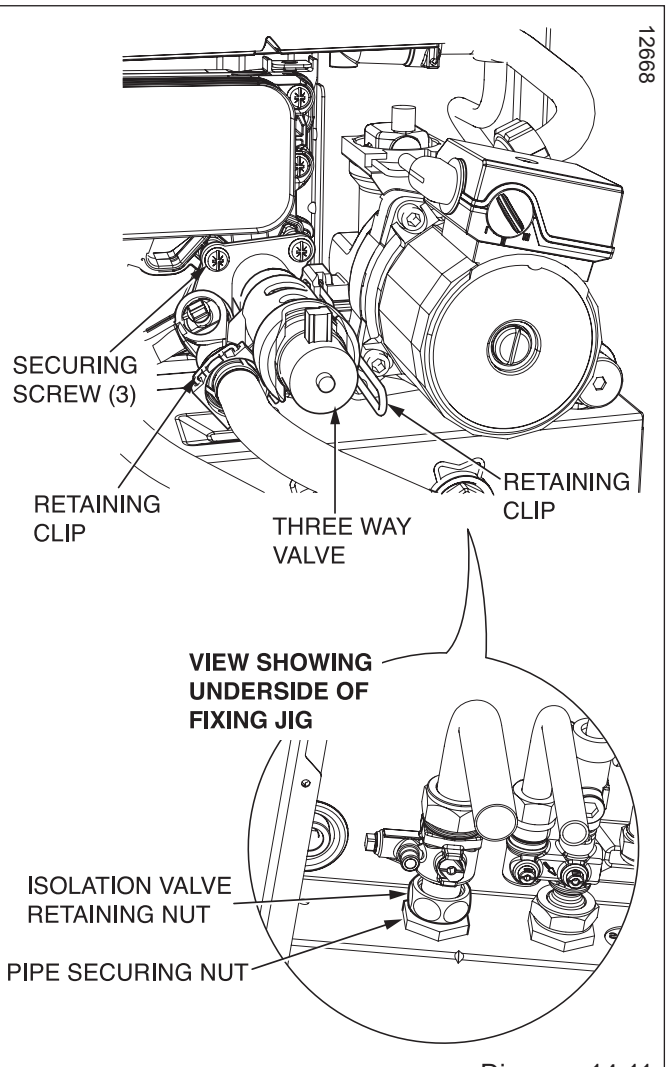

Diagram 14.11

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14.25 Heat Exchanger

For access, refer to section 14.1.
Refer to section 14.1 and drain the boiler heating circuit and the boiler hot water circuit.

Remove the silencer front

Pull forwards to remove.
The silencer is a push fit so no tools or fixings are required for its removal or fitting, see diagram 12.8.

Remove the flue hood front

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 12.5.
To remove, swivel flue hood 90° and pull down and out, see diagram 12.5.

Remove the igniter unit with support bracket

Disconnect the electrical connections and ignition lead.
Release the igniter unit support bracket.
Remove the igniter unit assembly, see diagram 12.9.

Remove the gas valve/fan

Disconnect the tubing nut at the gas valve, see diagram 12.7.
Remove the fan retaining bracket, see diagram 12.10.
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.
Remove the spark electrode plug and earth connection.
Remove the fan and gas valve electrical connections.
Remove the fan and gas valve assembly.

Remove the condensate trap

Remove the drain outlet pipe from the base of the trap, see diagram 14.1. Remove the condensate drain securing screw and carefully pull the trap forward, see diagram 12.13.

Remove the heat exchanger

Remove the retaining clip, see diagram 14.12, which secures the flow pipe brass elbow into the hydroblock. Remove the retaining clip, which secures the flow pipe into the flanged elbow in the top right hand corner of the heat exchanger, see diagram 14.14.
Remove the left hand side panel to aid removal of the copper flow pipe. Note that the minimum clearance from the side panel is 5mm. Remove the flow pipe.
Undo the union nut connecting the flow pipe to the pump.
Remove the retaining clip from the flanged elbow at the right hand bottom of the heat exchanger, see diagram 14.13.
Remove screws securing the heat exchanger, one on top and one underneath the heat exchanger, see diagram 14.14.
Lift up heat exchanger slightly to disengage it from its hanging bracket.
Remove the heat exchanger by pulling forward and tilting backwards to ease removal complete with sump, return pipe and flanged elbows. Remove the return pipe then discard the heat exchanger complete with sump and flanged elbows.

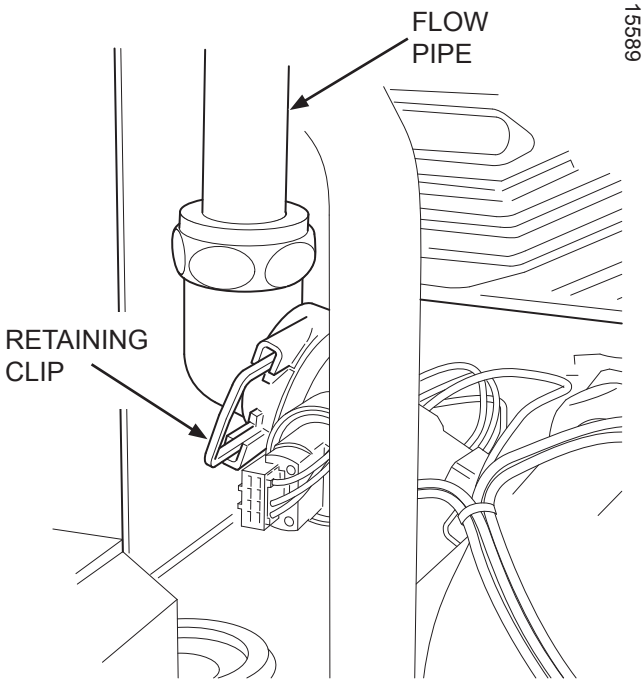

Diagram 14.12

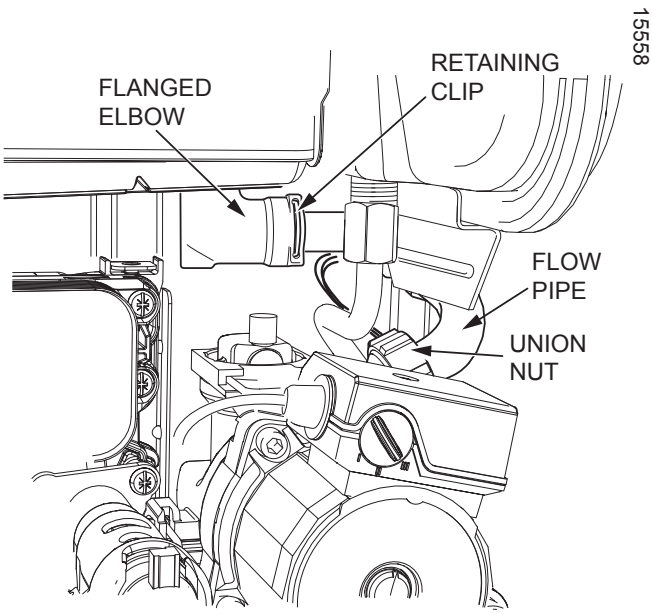

Diagram 14.13

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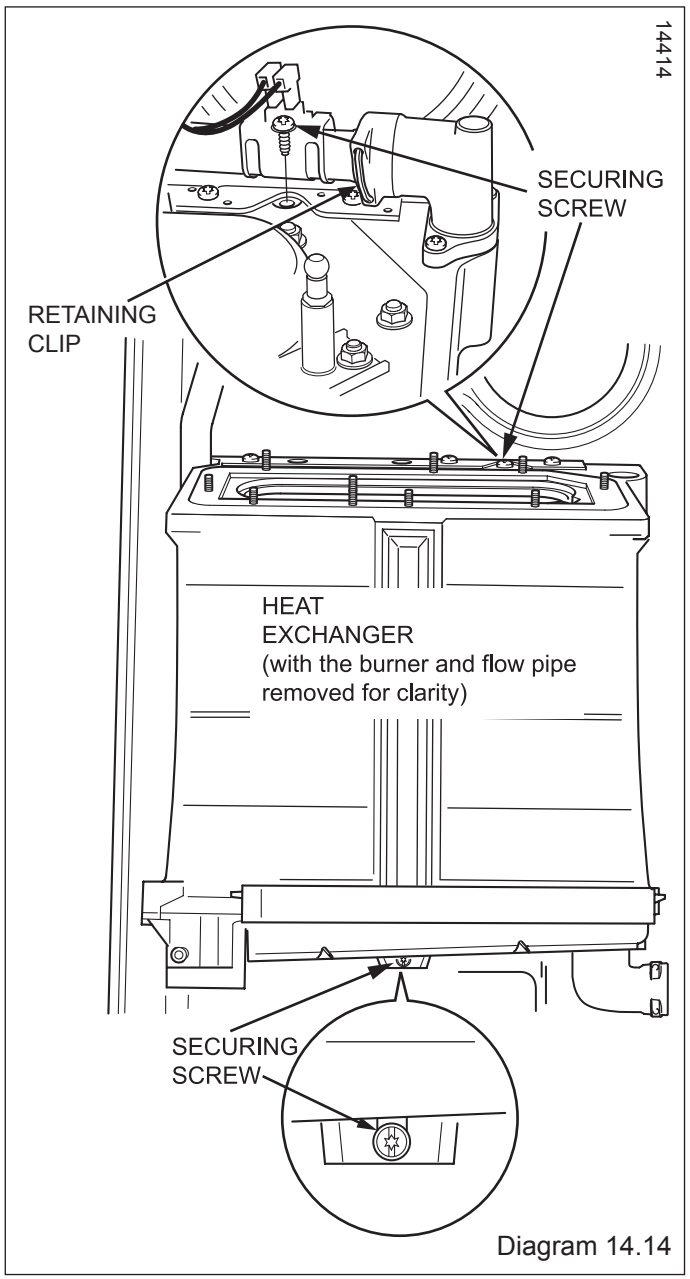
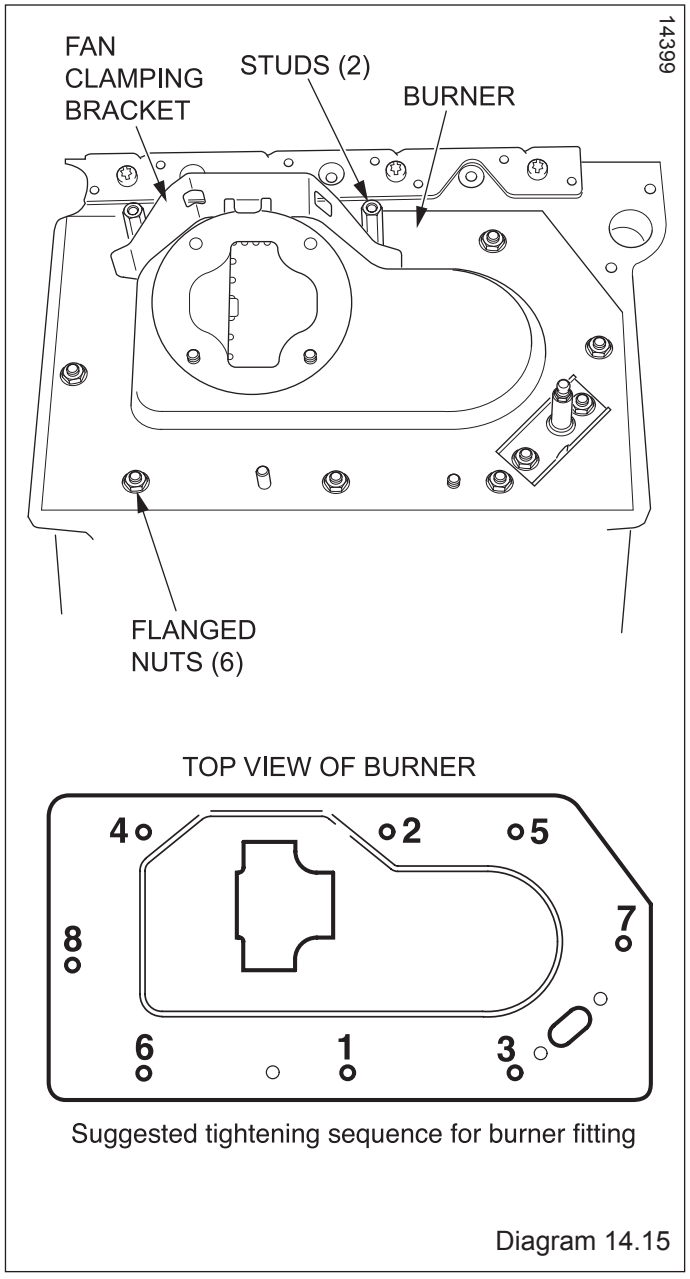


Diagram 14.14



Suggested tightening sequence for burner fitting

Diagram 14.15

Remove the burner

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 14.15.

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 14.15.

NOTE: Fit all replacement gaskets and seals when re-fitting parts.

Filling the boiler heating circuit/domestic hot water system and re-pressurising

After replacing parts open the cold-water isolation valve and slowly open a hot water tap to remove air. Close the hot water tap and check for any leaks.

After replacing parts, close the drain valve and remove the hose. Open the heating flow and return isolating valves and refill, vent and pressurise the heating circuit, refer to Section 11, Commissioning.

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14.26 Access to User interface and Main PCB

For access, refer to section 14.1.
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 14.16.
Unclip user interface and remove.
For replacement, see diagram 14.17 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.

14.27 Control Box

For access, refer to section 14.1.
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 15.18.

14.28 Fuse - Main PCB - Control Box

For access, refer to section 14.26.
The fuse is located at the top left hand corner of the main PCB, see diagram 14.16.

14.29 Installer Interface Electrical Cartridge

Remove the Installer Interface securing screw accessed from beneath the boiler.
Carefully pull down the electrical cartridge, disconnect the cables.

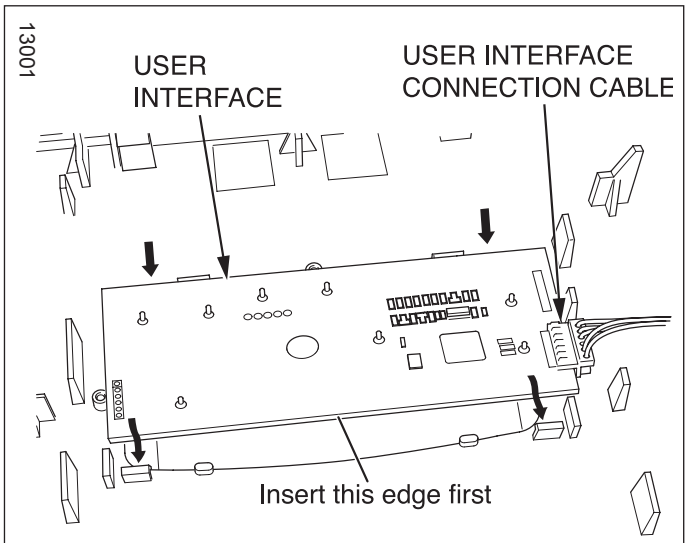

Diagram 14.17

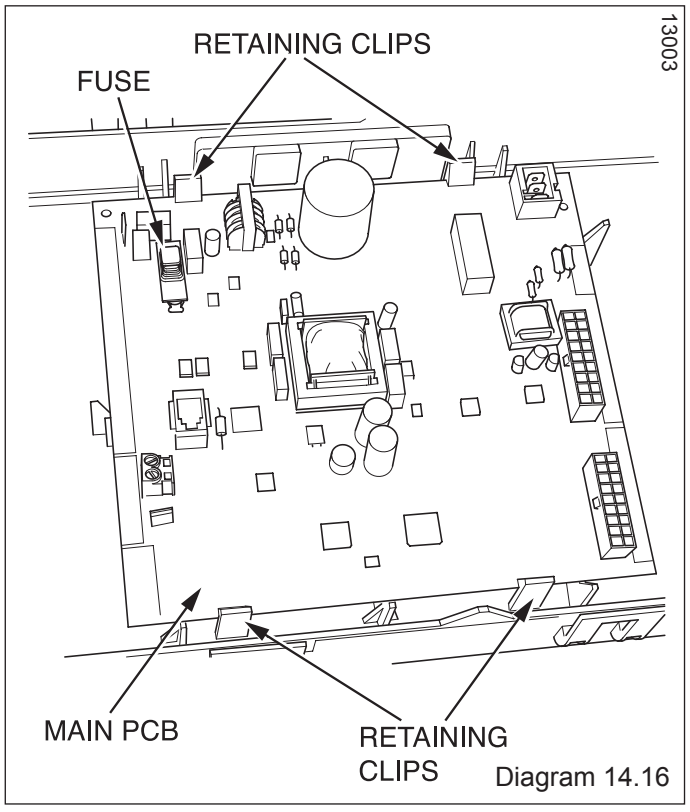

Diagram 14.16

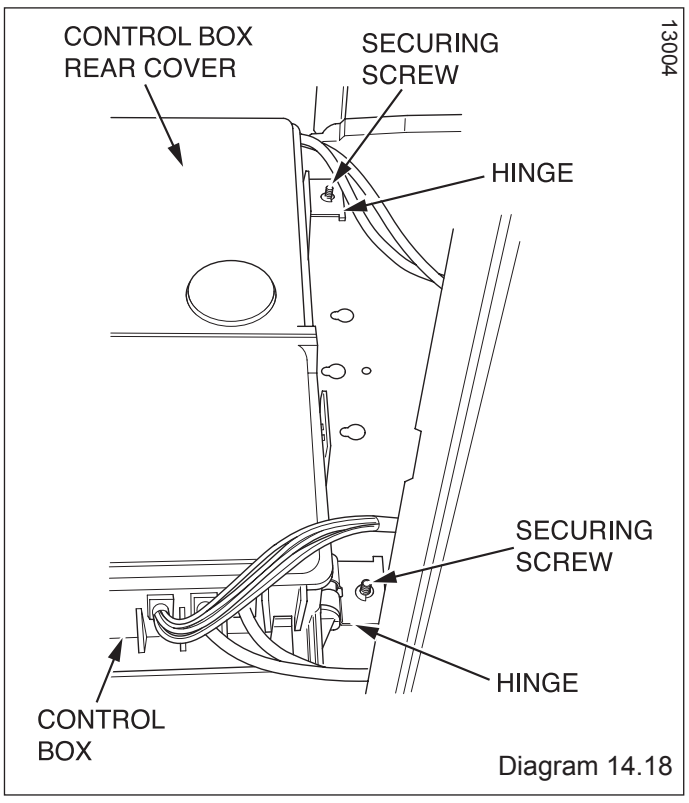

Diagram 14.18

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15 Spare Parts

When ordering spare parts, contact Glow-worm's own service organisation using the telephone number on the inside front cover of this booklet. Please quote the name of the appliance and serial number, to be found on the data label. If ordering from British Gas also quote the G.C. number of the part.

Key No.	Part No.	Description	GC No
1	0020020734	Fan	H42723
2	0020020763	Igniter unit	H42773
3	0020020781	Heating flow & return thermistor (2)	H42792
4	0020014160	DHW thermistor	H36325
5	0020020735	Gas valve 24cx / 30cx	H42724
5	0020059600	Gas valve 35cx	H69002
6	0020020731	Electrode	H42720
7	0020020728	Burner 24cx / 30cx	H42718
7	0020059602	Burner 35cx	H69008
8	0020023826	User interface	H42784
9	0020014402	Plate to plate heat exchanger 24cx	H43160
9	0020014402	Plate to plate heat exchanger 30cx	H43160
9	0020014403	Plate to plate heat exchanger 35cx	H69009
10	0020014171	Pump	H42760
11	0020014174	Flow sensor	H43155
12	0020023825	Main PCB	H42783
13	0020079644	Water pressure sensor	H80-150

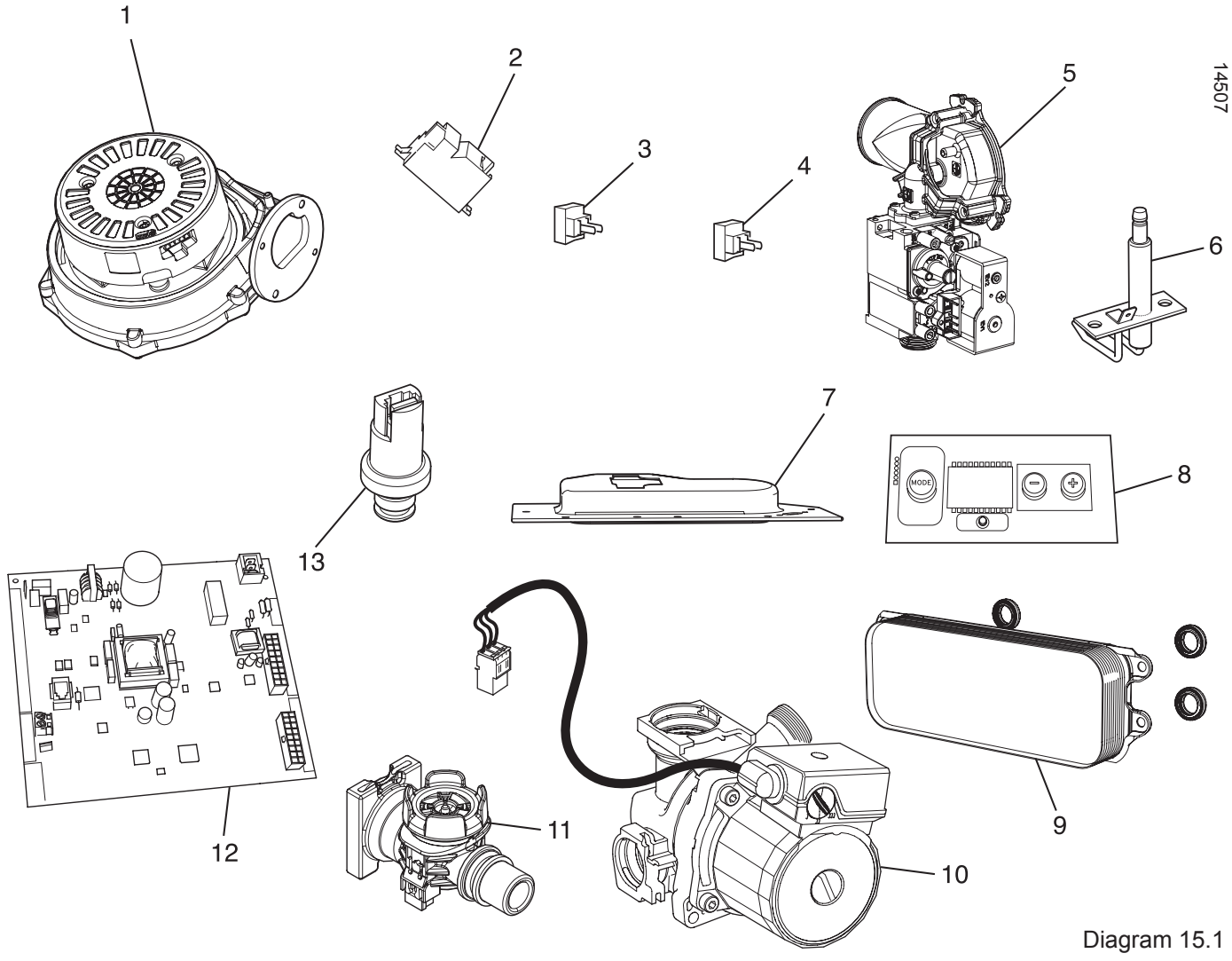

Diagram 15.1

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16 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. Cut the carton straps, lift carton up and slide over polystyrene end packs. Remove top polystyrene pack with fittings.

Positioning of Appliance for Final Installation – no obstructions.
Recommend 2 persons lift appliance to position into place. 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.
Recommend 2 persons lift appliance to position into place. 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.
Recommend 2 persons lift appliance to position into place, space permitting. 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.
Recommend 2 persons lift appliance to position into place, space permitting. 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 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.

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17 Declaration of Conformity

15732

Glow-worm

EC declaration of conformity

Name and Address of the manufacturer:	Glow-worm Nottingham Road Belper Derbyshire DE56 1JQ
Identification of product:	Glow-worm :- Flexicom Series, Condensing Wall Hung Combination Boilers
Appliance type:	Flexicom 24cx, 30cx, 35cx

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

2009/142/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: **87BQ86**
92/42/EEC including amendments "Directive of efficiency relating to boiler burning gaseous fuels"	Designed and built according to European Standards:
2006/95/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 625** **EN 60335-1** **EN 60529** **EN 50165**
2004/108/EEC including amendments "Directive on the approximation of the law of the member states relating to electromagnetic compatibility "	**EN 55014** **EN 61000-3-2** **EN 61000-3-3**

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, March 2010	S. Keet	A. Beardsley
(place, date)	Program Manager S. Keeton	Certification Group Manager A. Beardsley

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BENCHMARK LOG BOOK
SERIAL NUMBER Model Name

Please affix the label positioned on the top panel of your boiler over this area.

PEEL OFF

COMMISSIONING CHECKLIST
GAS BOILER SYSTEM

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

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

Customer Name _____ Telephone Number _____

Address _____

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

Company Name _____ Telephone Number _____

Company Address _____

_____ Commissioning Date _____

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

Building Regulations Notification Number *(if applicable)* _____

CONTROLS Tick the appropriate boxes

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

ALL SYSTEMS

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

What system cleaner was used? _____

What inhibitor was used? Quantity _____ *litres*

CENTRAL HEATING MODE Measure and Record:

Gas Rate _____ m^3/hr OR _____ ft^3/hr

Burner Operating Pressure (if applicable) _____ mbar OR Gas Inlet Pressure _____ mbar

Central Heating Flow Temperature _____ °C

Central Heating Return Temperature _____ °C

COMBINATION BOILERS ONLY

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

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

What type of scale reducer has been fitted? _____

DOMESTIC HOT WATER MODE Measure and Record:

Gas Rate _____ m^3/hr OR _____ ft^3/hr

Burner Operating Pressure (at maximum rate) _____ mbar OR Gas Inlet Pressure (at maximum rate) _____ mbar

Cold Water Inlet Temperature _____ °C

Hot water has been checked at all outlets Yes ☐ Temperature _____ °C

Water Flow Rate _____ *l/min*

CONDENSING BOILERS ONLY

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

ALL INSTALLATIONS

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

The heating and hot water system complies with the appropriate Building Regulations Yes ☐

The boiler and associated products have been installed and commissioned in accordance with the manufacturer's instructions Yes ☐

The operation of the boiler and system controls have been demonstrated to and understood by the customer Yes ☐

The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer Yes ☐

Commissioning Engineer's Signature _____

Customer's Signature _____

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

*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

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benchmark COLLECTIVE MARK
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SERVICE INTERVAL RECORD

It is recommended that your heating system is serviced regularly
and that you complete the appropriate Service Interval Record Below .

Service Provider. Before completing the appropriate Service Interval Record below, please ensure you have carried out the service as described in the boiler manufacturer's instructions. Always use the manufacturer's specified spare part when replacing all controls.

SERVICE 1 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 2 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 3 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 4 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 5 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 6 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 7 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 8 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 9 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

SERVICE 10 Date

Energy Efficiency Checklist completed? Yes ☐ No ☐

Engineer Name

Company Name

Telephone Number

Engineer ID Number

Comments

Signature

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Subject to engineering changes

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