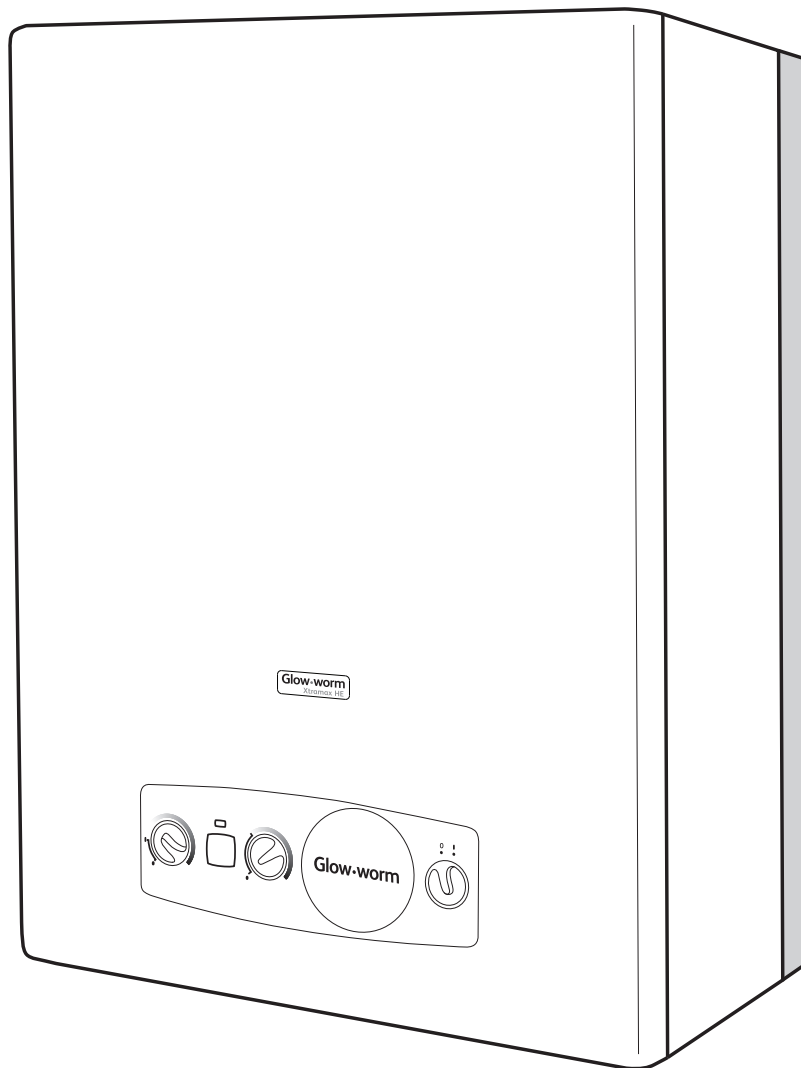


Xtramax HE

G.C. No. 47-047-29

Installation and Servicing



**High Efficiency
Condensing
Boilers**

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.



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

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WARNINGS

Gas Leak or Fault

Turn off the gas emergency control valve immediately. Eliminate all sources of ignition, i.e. smoking, blowlamps, hot air guns etc. Do not operate electrical lights or switches either on or off. Open all doors and windows, ventilate the area.

Sheet Metal Parts

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

Sealed Components

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

Important Information

Gas Category

This boiler is for use only on G20 natural gas, but may be converted for use on G31 gas (propane L.P.G.).

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 ETCL 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.

Statutory Requirements

CE Mark

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

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

Product/production certified by: Notified body 0049 or 1312.

The CE mark on this appliance shows compliance with:

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

IMPORTANT

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

The installation of this boiler must be carried out by a **competent person** 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 Fittings Regulations or Water byelaws in Scotland.

The Health and Safety at Work Act, Control of Substances Hazardous to Health (COSHH).

The Current I.E.E. Wiring Regulations.

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

In IE, the installation must be carried out by a **competent person**, 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 ETCl 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.

Boiler Design

Boiler Design

This boiler is designed to provide central heating and instantaneous hot water for use as part of a sealed water central heating system with fully pumped circulation.

The pumps, expansion vessel and associated safety devices are all fitted within the boiler. The integral programmer is designed for both simple operation and maximum control. Once the controls are set the boiler will operate automatically.

Glow-worm has specially designed accessories for your appliance depending on your requirements, please contact your supplier or visit our website www.glow-worm.co.uk.

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 9 for more details

Plumbing from flue terminal

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

This is normal and not an indication of a fault.

Safety Devices

Electrical Supply Failure Reset Switch

In the event of a power supply failure the boiler will not work.

Normal operation of the boiler should resume when the electrical supply is restored.

However, if the boiler does not resume normal operation turn the mains reset switch off and on. If the boiler does not resume normal operation after this operation the overheat stat may have operated.

Overheating safety

In the event of the boiler overheating the safety devices will cause a safety shutdown. If this happens, call your Installation/ Servicing company.

Discharge and Relief Valves

Heating and Domestic discharge safety valves and a Domestic hot water pressure relief valve are fitted to this appliance. The valves must not be touched except by a competent person.

If the valves discharge at any time, switch the appliance off and isolate it from the electrical supply.

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 7°C.

The burner will fire if the temperature inside the boiler falls to 3°C.

When the temperature reaches 10°C the boiler stops.

Any other exposed areas of the system should be protected by a separate frost thermostat.

Condensate Drain Blockage

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

Servicing, Maintenance and Spare Parts

Maintenance and Servicing

To ensure the continued efficient and safe operation of the appliance it is recommended that it is checked and serviced as necessary at regular intervals. The frequency of servicing will depend upon the particular installation conditions and usage.

If this appliance is installed in a rented property there is a duty of care imposed on the owner of the property by the current issue of the Gas Safety (Installation and Use) Regulations, Section 35.

Servicing/maintenance should be carried out by a **competent person** 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.

Please be advised that the 'Benchmark' logbook should be completed by the installation engineer on completion of commissioning and servicing.

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 information 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.

1 Technical Information

1.1 Technical Data

All dimensions are given in millimetres (except as noted).
See diagrams 1.1, Table 1, Table 1 continued and Table 2.

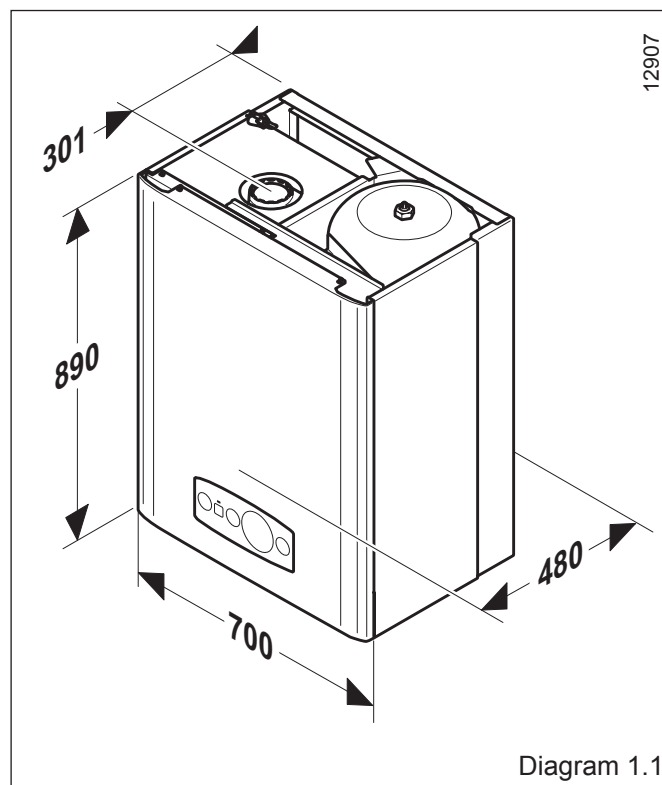


TABLE 1

Description	Unit	Xtramax HE
Gas category		II2H3P
SEDBUK rating	90.6%	Band A
Boiler flue type		C13, C33, C53
Heating		
Heating output at 80°C/60°C (P)	kW	7.6 - 28
Efficiency calculated on net calorific value at 80/60°C	%	95.8 - 97.8
Heating output at 50°C/30°C (P)	kW	8.6 - 30.6
Efficiency calculated on net calorific value at 50/30°C	%	107
Minimum calorific flow rate (Q min)	kW	8
Maximum calorific flow rate (Q max)	kW	28.6
Heating minimum flow rate	l/h	500
Maximum heating temperature	C°	80
Minimum heating temperature	C°	22
Expansion vessel, useful capacity	l	12
Expansion tank initial pressure	bar	0.75
Maximum system capacity at 75°C	l	240
Safety valve, maximum service pressure (PMS)	bar	3
Domestic hot water		
Heating output (P)	kW	7.6 - 33.2
Minimum calorific flow rate (Q min)	kW	8
Maximum calorific flow rate (Q max)	kW	34.2
Minimum hot water temperature	°C	38
Maximum hot water temperature	°C	63

1 Technical Information

TABLE 1 (continued)

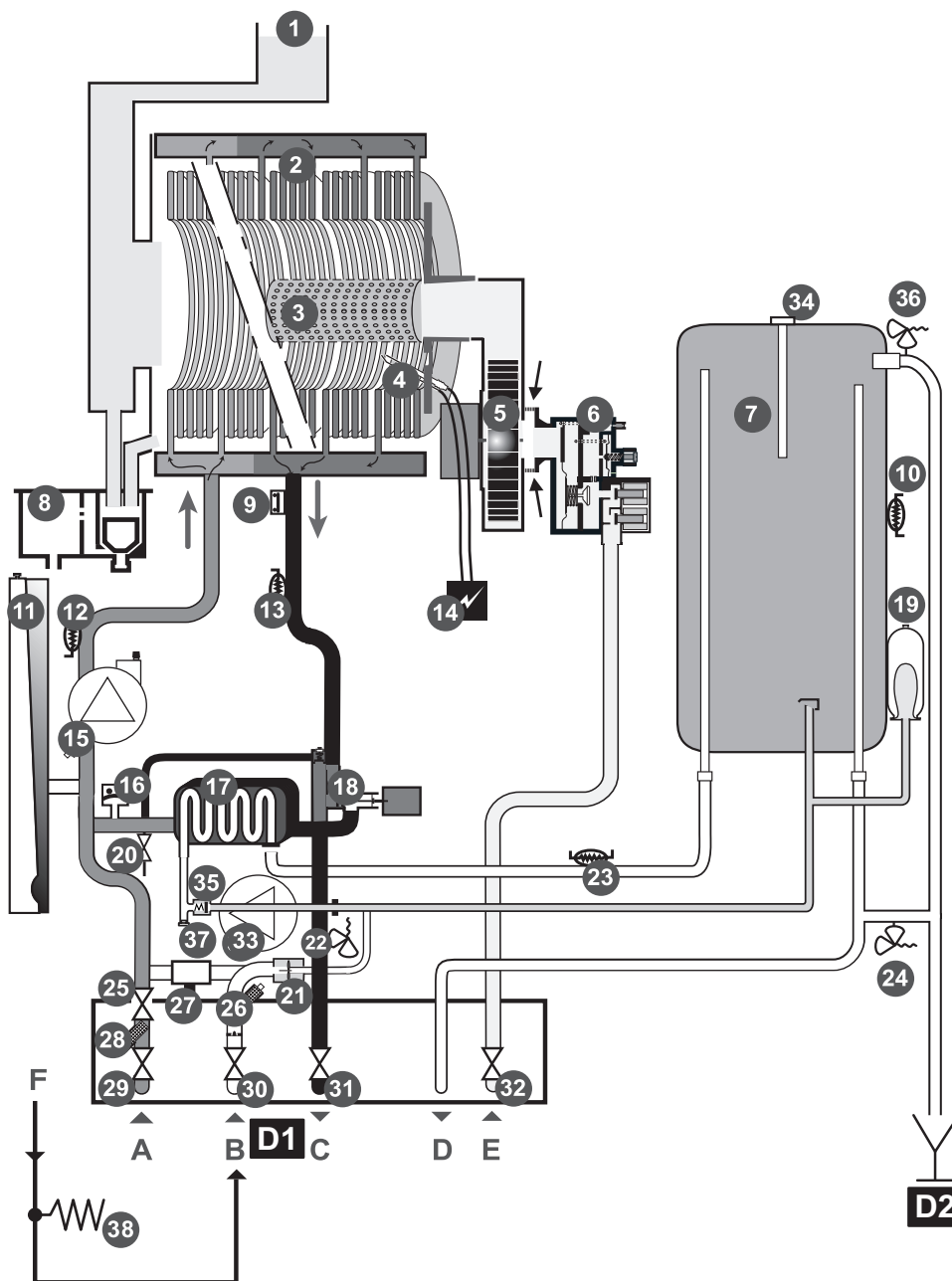
Specific flow rate (D) (ΔT 30°C)	l/min	21
Threshold flow rate	l/min	0
DHW storage vessel	l	42
DHW storage vessel heat up time	min	6
Time to reheat 70% of the storage to 60°C	min	4
Maximum supply pressure	bar	16
Temp./pressure relief valve operating pressure	bar	10
Temp./pressure relief valve operating temperature	°C	90
Cold water flow rate regulator	l/min	16
Safety valve, maximum service pressure	bar	8
Minimum operating pressure	bar	0.7
Maximum operating pressure	bar	10
Combustion		
Fresh air flow rate (1013 mbar - 0°C)	m ³ /h	43
Product outlet flow rate	g/s	15.3
Product outlet temperature	°C	68
Values of product outlet (measured on nominal heating output with G20 reference gas):		
CO	ppm	86
	mg/kWh	92
CO ₂	%	9.2
NO _x balance	ppm	21.1
	mg/kWh	37.3
Dimensions:		
Height	mm	890
Width	mm	700
Depth	mm	480
Net weight	kg	75
Weight of appliance when full	kg	120
Supply voltage	V/Hz	230/50
Maximum absorbed power	W	241
Electrical rating	A	1.05
Fuse	mA	630
Electric protection		IPX4D
Class		1
CE number		1312 BP 4108

TABLE 2

Technical data depending on the gas type	Unit	Xtramax HE
Natural gas G 20 (1)		
Sanitary flow rate at maximum input	m ³ /h	3.62
Heating flow rate at maximum input	m ³ /h	3.02
Flow rate at minimum input	m ³ /h	0.68
Inlet pressure	mbar	20
Burner injector diameter	mm	5.65

(1) 15 °C, 1013,25 mbar

1 Technical Information



- | | | | |
|----|---|----|--|
| 1 | Flue outlet | 25 | Heating isolating valve |
| 2 | Main heat exchanger | 26 | Filter on cold water inlet |
| 3 | Burner | 27 | Filling system |
| 4 | Ignition and control electrode | 28 | Filter on heating circuit |
| 5 | Fan | 29 | Heating isolating valve |
| 6 | Gas control valve | 30 | Domestic cold water isolating valve |
| 7 | DHW storage vessel | 31 | Heating isolating valve |
| 8 | Condensate drain | 32 | Gas isolating valve |
| 9 | Overheat safety thermostat | 33 | DHW pump |
| 10 | Temperature sensor for DHW storage vessel | 34 | Storage anode protection |
| 11 | Expansion vessel | 35 | Non return valve |
| 12 | Heating return thermistor | 36 | Temperature / pressure relief valve |
| 13 | Heating flow thermistor | 37 | Tapping (plug connection) for the recirculation loop |
| 14 | Ignition module | 38 | Pressure reducing valve and check valve |
| 15 | Heating Pump | | |
| 16 | Water pressure sensor | A | Heating return |
| 17 | Domestic plate to plate heat exchanger | B | Cold water inlet |
| 18 | Three way valve | C | Heating flow |
| 19 | Domestic expansion vessel | D | Domestic hot water outlet |
| 20 | Drain cock | D1 | Discharge from HTG safety valves |
| 21 | Flow switch | D2 | Discharge from temp / press and expansion valve (to tundish) |
| 22 | Heating discharge safety valve | E | Gas |
| 23 | DHW temperature sensor | F | Cold water supply |
| 24 | DHW discharge safety valve | | |

2 Boiler Location

2.1 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.

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.

2.2 Clearances

The boiler should be positioned so that at least the minimum operational and servicing clearances are provided, see diagram 2.1.

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 2.1.

2.3 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 the local gas undertaking or Glow-worm.

2.4 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.

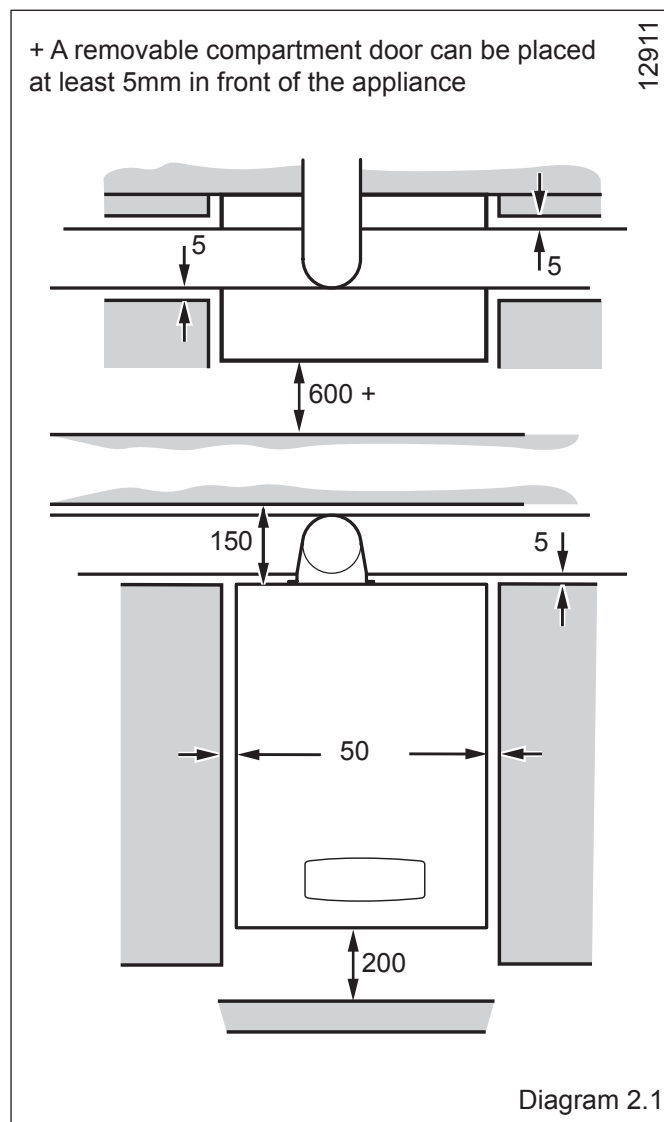
2.5 Room Ventilation

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

2.6 Cupboard or Compartment Ventilation

If the boiler is fitted into a compartment or cupboard it does not require ventilation openings.

Do not use the compartment or cupboard for storage. Leave existing air vents.



3 Flue Location and Ventilation

3.1 Flue Length

See diagrams 3.1 to 3.3 to determine which flue can be used. When extension pipes are used the flue system must be designed to have a continuous fall to the boiler of at least 2.5° to allow condensate to run back into the boiler and out via the drain.

WARNING: Any duct that goes through a wall and whose temperature is over 60°C from the room temperature will be thermally insulated at this passage. The insulation will be composed of an appropriate insulating material whose thickness is ≥ 10 mm and thermal conductivity ≤ 0.04 W/m.K.

Horizontal Concentric Flue - The maximum permissible horizontal flue length is 5 metres plus 1 90° elbow, see diagram 3.1 (dimension L). This can be achieved by the use of the concentric flue accessories, however, for every 90° or 45° elbows used the flue length MUST be reduced by 1 metre.

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

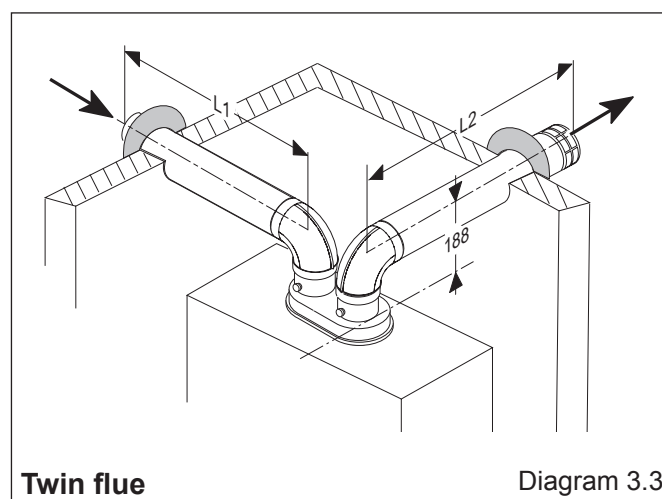
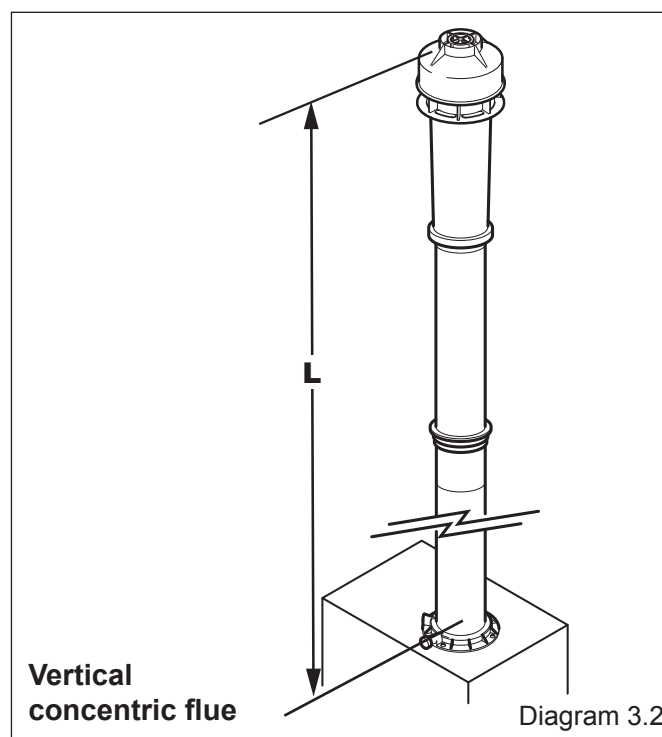
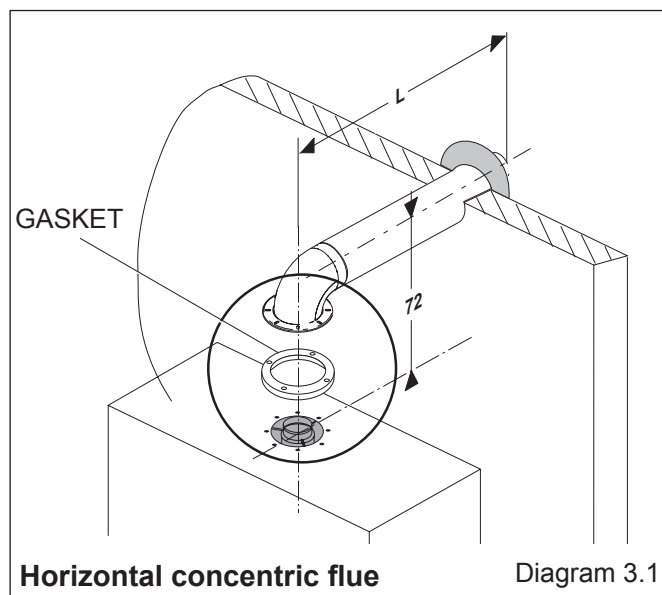
Vertical Concentric Flue - The maximum permissible vertical flue length is 5.5 metres plus 1 90° elbow,. This can be achieved by the use of The concentric flue accessories, however, for every 90° or 45° elbows used the flue length MUST be reduced by 1 metre.

Twin Flue - The maximum permissible flue length is 40 metres inclusive of 2 90° elbows the separator and the combined duct lengths L1 and L2, however, for every 90° or 45° elbows used the flue length MUST be reduced by 1 metre.

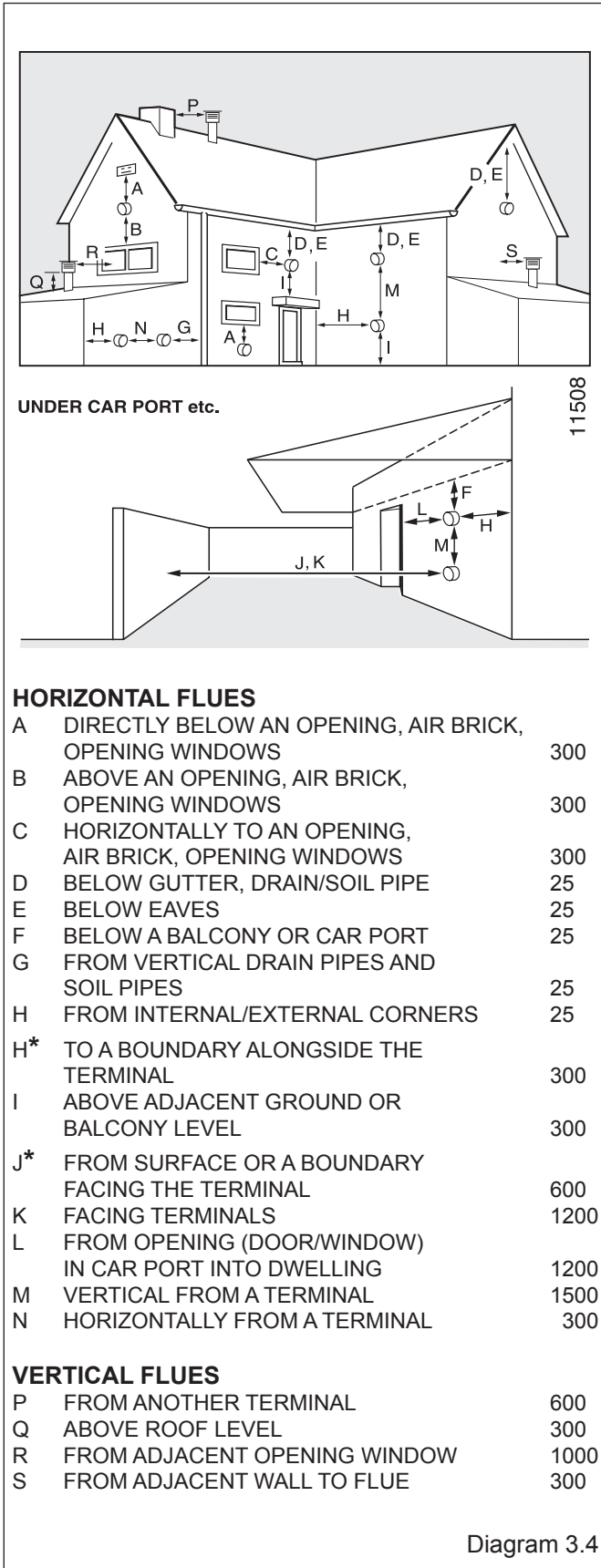
3.2 Flue Accessories

Additional accessories are available.

See Glow-worm “Flue Options Guide” for configurations available.



3 Flue Location and Ventilation



3.3 Terminal Position

The minimum acceptable siting dimensions for the terminal from obstructions, other terminals and ventilation openings are shown in diagram 3.4. For Ireland 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 plumbing 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.

H* and J* See diagram 3.4 . These dimensions comply with the building regulations, but they may need to be increased to avoid wall staining and nuisance from plumbing depending on site conditions.

Increased siting flexibility can be achieved by using the Glow-worm Plume Management Kit. A2044000 (black) or A2044100 (white).

NOTE: 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.

3.4 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 3.5.

A suitable guard is manufactured by: -

Tower Flue Components

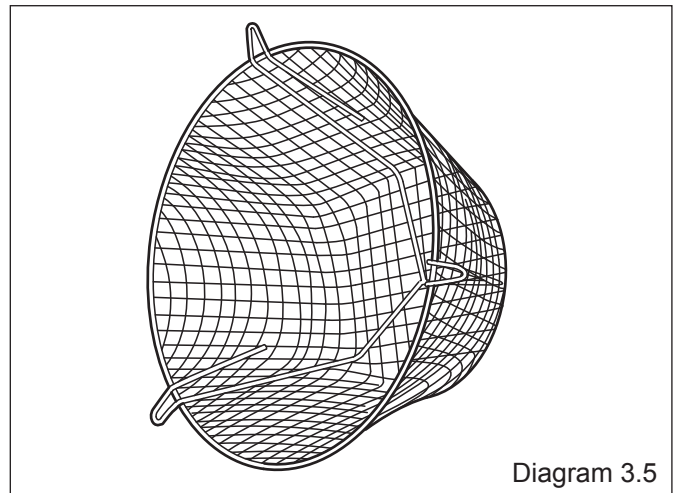
Morley Rd.

Tonbridge

Kent

TN9 1RA.

Size: 280mm x 165mm. Part No. CGDK3



4 Heating System

4.1 General

The boiler is for use only with sealed central heating systems.

The safety valve is an integral part of the boiler and it cannot be adjusted.

The digital readout on the controls fascia indicates the system pressure when there is no demand.

The circulation pumps are integral with the boiler.

4.2 Expansion Vessel

The boiler has an integral expansion vessel with a useful capacity of 12 litres (2.6 gallons), with a charge pressure of 0.75bar.

NOTE: The expansion vessel volume depends on the total water system volume and the initial system design pressure. Guidance on vessel sizing is also given in the current issue of BS5449 and BS7074 Part 1, for IE refer to the current edition of I.S.813 "Domestic Gas Installations".

4.3 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. The flow rate through the boiler must not be allowed to fall below **500 litres/hr.**

4.4 Bypass

The boiler is fitted with an automatic bypass. Ensure that under no circumstances does the flow rate drop below the figure specified.

The installation of the boiler must comply with the requirements of the current issue of BS6798, in Ireland, refer also to the current edition of I.S.813 "Domestic Gas Installations".

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.

4.5 Filling the Sealed System

NOTE: The water pressure at the boiler must be at least 1.2bar to enable filling the boiler to a minimum pressure. The boiler is supplied with a filling device.

This filling device is designed to enable the filling and pressurisation of the system in the event of loss of pressure.

4.6 Water Treatment

In the case of an existing installation, it is ESSENTIAL that prior to installing the new boiler the system is thoroughly flushed. For optimum performance after installation of a new system, the boiler and its associated central heating system should also be flushed. Flushing should be carried out in accordance with BS7593: 1992 using a cleanser such as Sentinel X300 or X400, Fernox cleanser or Salamander corrosion guard cleaner.

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

4.7 Draining Points

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

A drain point for the appliance is provided as an integral part of the hydroblock.

5 Domestic Hot Water System

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

5.1 Water Pressure

The circuit should be designed to avoid any unnecessary flow losses (decrease the number of elbows).

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.

The boiler will operate with a minimum supply pressure but with a low flow. Optimum performance will be achieved with a pressure of 1 bar.

5.2 '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 a scale reducer is fitted.

Refer to the manufacturer's instructions or consult the local water company for additional advice.

5.3 Domestic Water Flow Rate

The water flow rate is restricted to a maximum 16 l/min by a restrictor fitted during boiler installation.

6 Installation Preparation

6.1 Appliance Pack

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 Manual Handling section 15.

Please check the contents of packs.

The boiler carton includes the document pack and parts pack.

Items within the document pack include:

- 1 User manual
- 1 Installation manual
- 1 Guarantee envelope
- 1 Wiring diagram
- 1 Gasket pack

Items within the parts pack include:

- 1 Connection pack 1
- 1 Connection pack 2 plus wall template
- 1 Guarantee envelope
- 1 Safety valve drain pack

The flue is supplied separately.

6.2 Wall Template

Take the wall template from connection pack 2 and place in the desired position on a flat wall, giving due consideration to boiler clearances, see diagram 2.1, and the flue you are fitting.

6.3 Flue Hole Cutting

The standard horizontal concentric flue is designed with an internal fall of 35mm/metre towards the boiler for disposal of condensate. If the standard flue length alone is being used then the flue hole of diameter 105mm can be cut in the position marked on the wall template.

Remove the wall template whilst drilling the flue hole.

6.4 Hanging Bracket

Reposition the wall template over the flue hole and mark the position of the fixing holes for the hanging bracket, see diagram 6.1.

The hanging bracket will be adapted to the features of the bearing wall and will have to take into account the weight of the boiler filled with water.

Drill the holes for the fixing screws in accordance to the diagram below and to the size of the wall template delivered with the appliance.

Insert suitable wall plugs.

Screws mechanical features will match, at least, the values indicated, see diagram 6.1.

6.5 Appliance Connection

Remove front panel, unscrew and remove the two retaining screws from the bottom of the front panel.

Remove front panel by lifting up and forward.

Remove the self adhesive wiring diagram label from the document envelope, fit the self adhesive wiring diagram label to the inside of the front panel, put front panel in a safe place to avoid damaging it.

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 Manual Handling section 15.

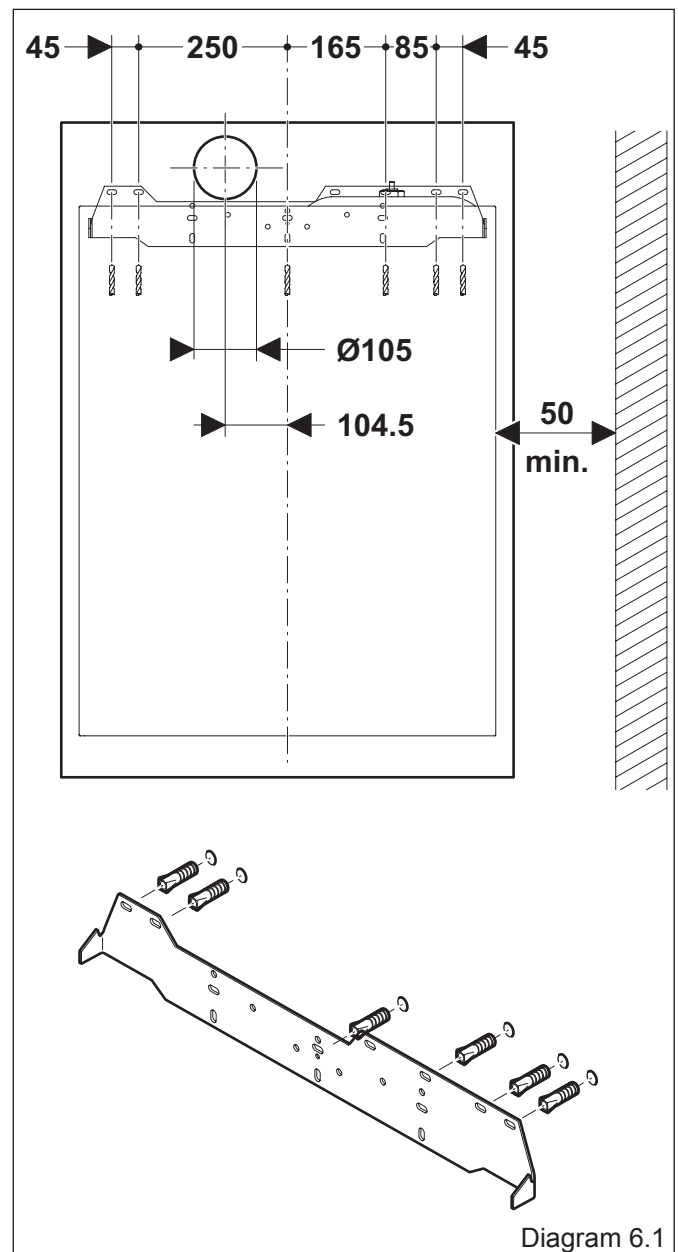
Place the boiler above the hanging bracket.

Slowly lower the boiler.

Set the seals on the different pipe fittings.

Make connections to boiler, gas, water and heating cocks with the tube assemblies supplied in piping pack.

Do not forget to connect the filling loop extension on the filling tap.



7 Gas / Water and Appliance Connection

7.1 Gas Connection

Before connection check supply of local gas.
Refer also to statutory requirements.
Do not subject the gas service cock to heat.

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".

7.2 Water & Appliance Connections

Before undertaking any operation, carefully clean the pipes with an appropriate product in order to remove impurities such as filings, welds, oils and greases that may be present.

These foreign bodies may enter the boiler and disrupt the operation.

Do not use any solvents that could damage the heating circuit.
Flush out the domestic hot water and the heating systems before connecting to the boiler.

Take care when soldering pipes as the heat could damage the seals and cause leakage.

Make the connections to the domestic hot water and heating systems.

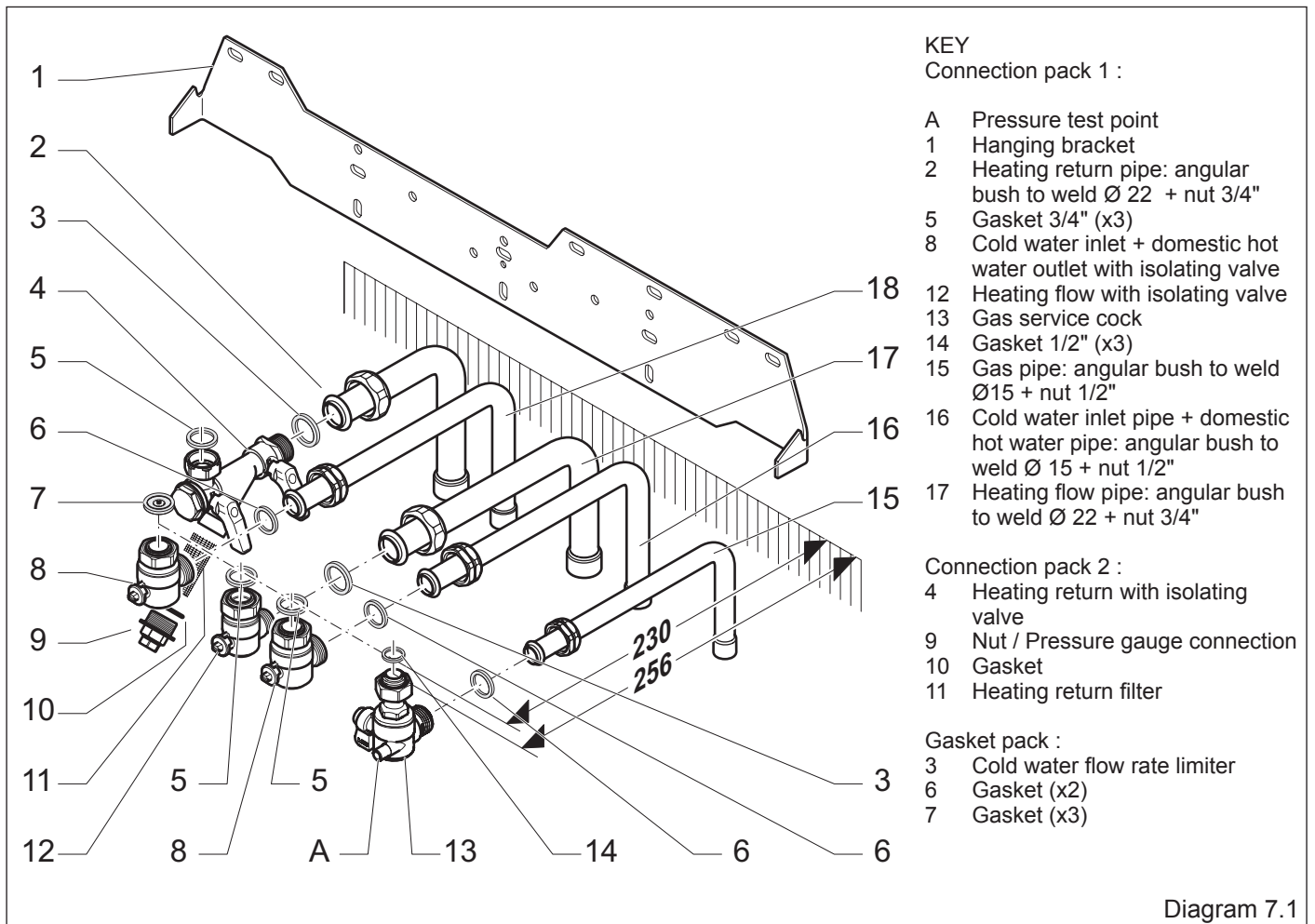
The heating return adapter is fitted with a filter (11) that can be reached by unscrewing the end nut.

This operation must be achieved once the heating return shut-off taps are closed.

The test pressure will be read on a pressure gauge (9) (not supplied) screwed in the position of the first nut of the heating return adapter.

Only use the genuine seals delivered with the appliance.

Check that there is no leakage.



8 Safety Discharge, Condensate and Tundish Connections

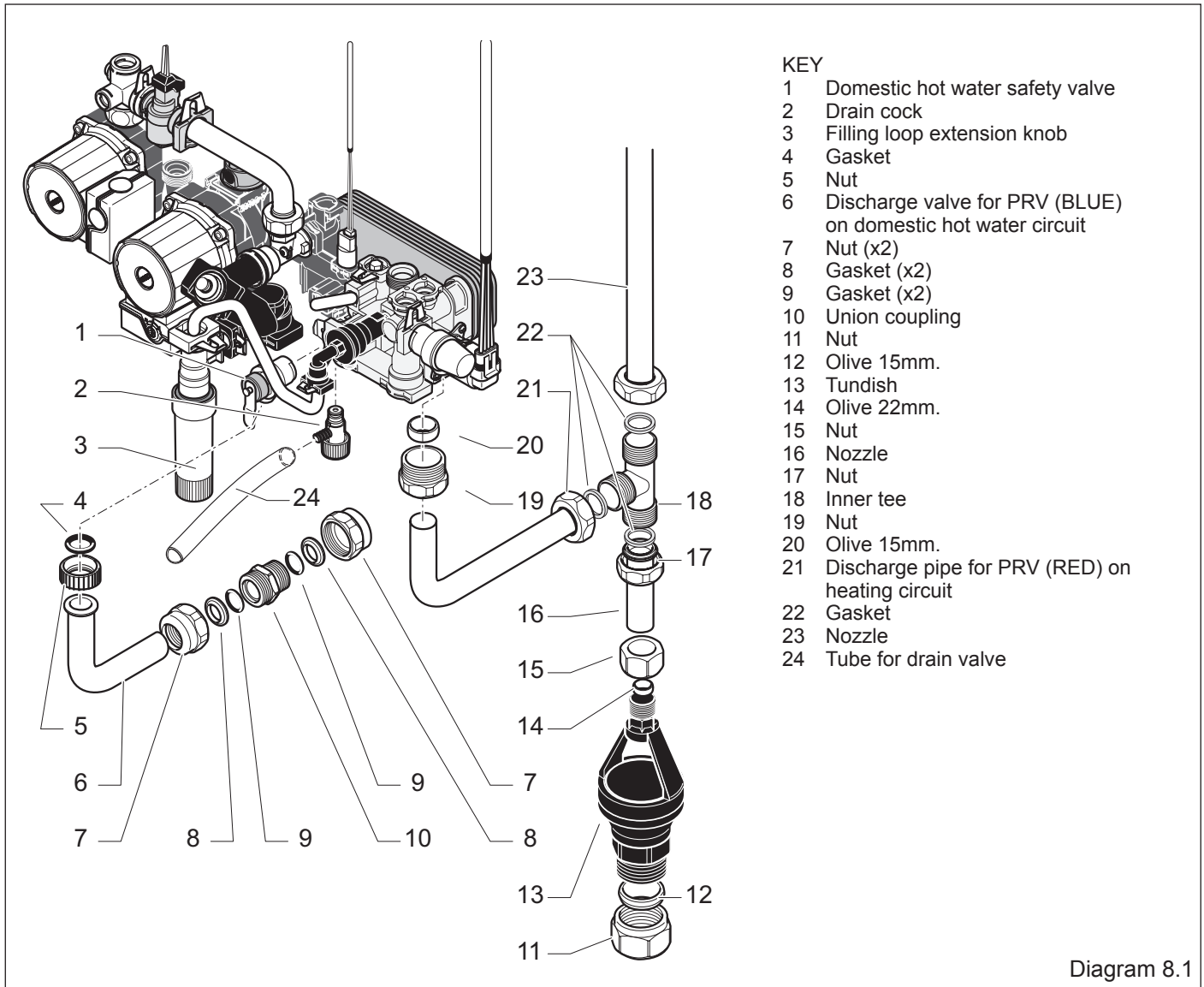


Diagram 8.1

NOTE: The pipes from the heating and domestic hot water safety discharge valves must not discharge above an entrance, window or any type of public access area.

8.1 DHW Safety Discharge Valve

Take the short safety discharge tube, union nut and seal, supplied loose in the boiler fittings pack.

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.

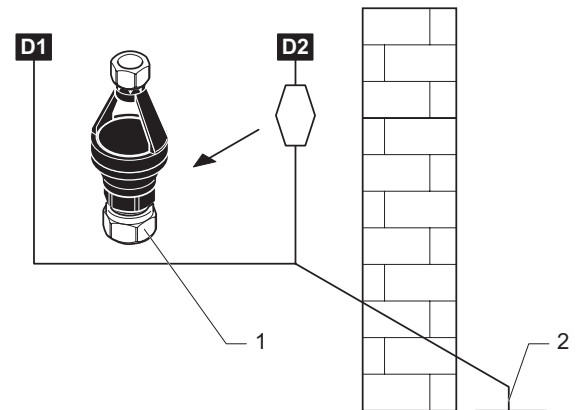
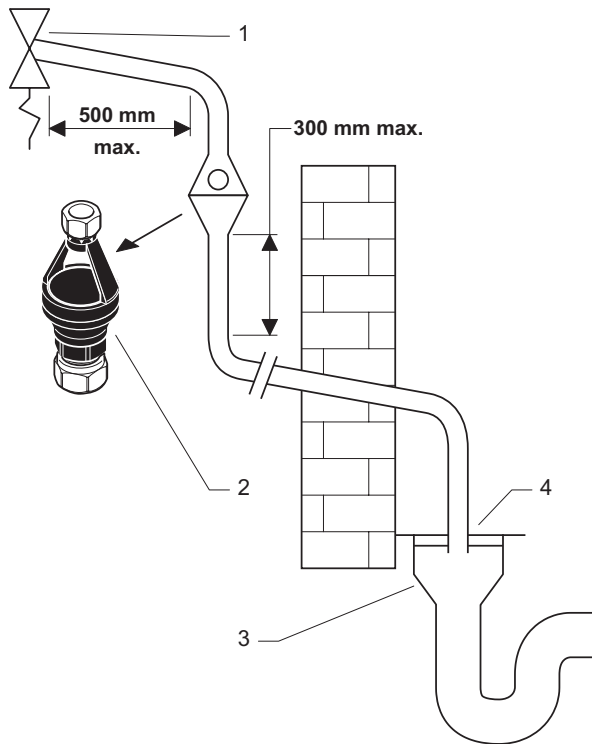
The pipe must have a continuous fall and be routed to a position so that any discharge of water, possibly boiling, or steam cannot create any danger to persons, damage to property or external electrical components and wiring.

To ease future servicing it is advisable to use a compression type fitting to extend the safety discharge valve tube.

WARNING: Cylinder relief valve connections should not be used for any other purpose.

8 Safety Discharge, Condensate and Tundish Connections

Valve outlet size	Minimum size of discharge to tundish D1	Minimum size of discharge pipe D2 from tundish	Maximum resistance allowed expressed as a length of straight pipe i.e. no elbows or bends	Resistance created by each elbow or bend
G 1/2"	15 mm	22 mm 28 mm 35 mm	up to 9 m	0.8 m 1.0 m 1.4 m
G 3/4"	22 mm	28 mm 35 mm 42 mm	up to 18 m	1.0 m 1.4 m 1.7 m
G 1"	28 mm	35 mm 42 mm 54 mm	up to 27 m	1.4 m 1.7 m 2.3 m



- KEY
- 1 Tundish (supplied)
 - 2 Gully
 - D1 Discharge pipe
 - D2 Discharge pipe

Discharge pipe D1: from heating safety valve on jig.
 Discharge pipe D2: from domestic hot water safety valve.

- KEY
- 1 Safety device eg. temperature relief valve
 - 2 Tundish (supplied)
 - 3 Trapped gully
 - 4 Fixed grating

Discharge pipe D1: from temperature relief valve to tundish.
 Discharge pipe D2: from tundish with continuous fall.
 See table above for size examples.

Diagram 8.3

8 Safety Discharge, Condensate and Tundish Connections

8.3 Tundish discharge

The internal safety valves, 24 and 36 have been tee'd together and the discharge pipe run so that it exits at the right hand bottom of the boiler (Block diagram) 11.8.

The tundish (supplied) must be used with this outlet within the normal guidelines and code of practice and must be installed so that it is visible to the occupants and positioned away from any electrical devices.

It is necessary, during installation, to connect a 22 mm diameter metal discharge pipe to a suitable position outside the building. It is permissible to use copper pipe.

WARNING: The discharge pipe from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge, be of metal and:

Be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9m long i.e. discharge pipes between 9m and 18m equivalent resistance length should be at least larger than the nominal outlet size of the safety device, between 18m and 27m at least 3 sizes larger, and so on.

Bends must be taken in to account in calculating the flow resistance.

Have a vertical section of pipe at least 300mm long, below the tundish before any elbows or bends in the pipework.

Be installed with a continuous fall.

Be positioned away from any electrical appliances.

Have discharges visible at both the tundish and the final point of discharge but where this is not possible or practically difficult there should be clear visibility at one or these of these locations.

Examples of acceptance discharge arrangements are:

Ideally below a fixed grating and above the waterseal in a trapped gully.

Downward discharges at a low level; i.e. up to 100mm above external surfaces such as car parks, hard standing, grassed areas etc. are acceptable providing that where children may play or otherwise come in to contact with discharges, a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility.

Discharges at high level; e.g into metal hopper and metal down pipe with the end of the discharge pipe clearly visible (tundish visible or not) or into a roof capable of withstanding high temperature discharges of water and 3m from any plastics guttering systems that would collect such discharges (tundish visible).

Where a single pipe serves a number of discharges, such as in blocks of flats, the number served should be limited to not more than 6 systems so that any installation can be traced reasonably easily.

The single common discharge pipe should be least one pipe size larger than the largest individual discharge pipe to be connected.

If unvented hot water storage systems are installed where discharges from safety devices may not be apparent i.e. in dwellings occupied by blind, infirm or disabled people, consideration should be given to the installation of an electronically operated device to warn when discharge takes place.

NOTE: the discharge will consist of scalding water and steam. Asphalt, roofing felt and non-metallic rainwater goods may be damaged by such discharges.

WARNING: This appliance must be earthed. Incorrect installation can cause electric shock or appliance damage.

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.

8.2 Condensate Drain Connection

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 diagram 8.4 for more details

Connect the flexible pipe to the condensate drain flexible connection pipe supplied (1). Ensure there is a continual fall of 2.5° (44 mm/m).

(Do not use copper pipes).

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

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

It is not necessary to provide air breaks or extra traps in the discharge pipe as there is already a trap inside the boiler, see diagram 8.2.

Fitting an extra trap may cause the boiler siphon to work incorrectly.

IMPORTANT NOTE:

The float of the condensate trap also ensures fume tightness. Therefore, it is not necessary to add water in the condensate trap.

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

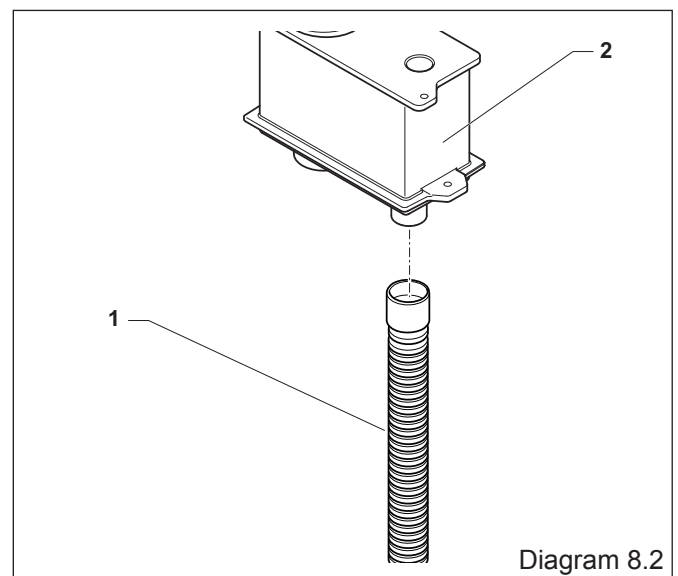
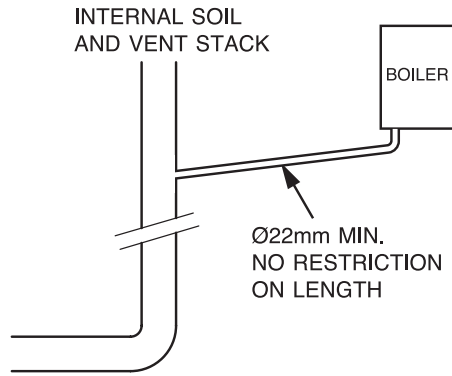


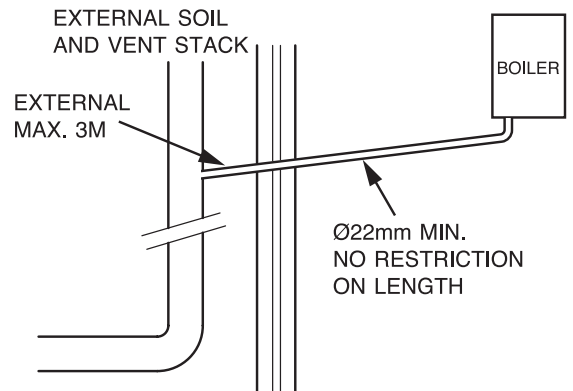
Diagram 8.2

8 Safety Discharge, Condensate and Tundish Connections

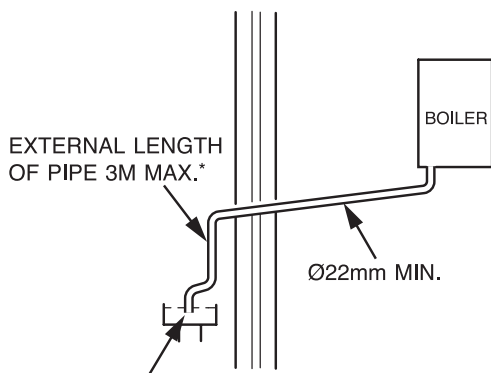
13000



Internal Soil and Vent Pipe



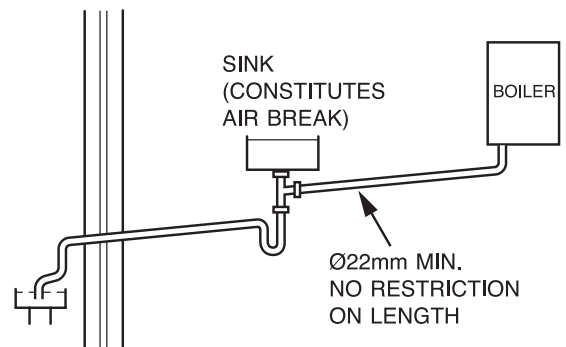
External Soil and Vent Pipe or Rainwater Pipe



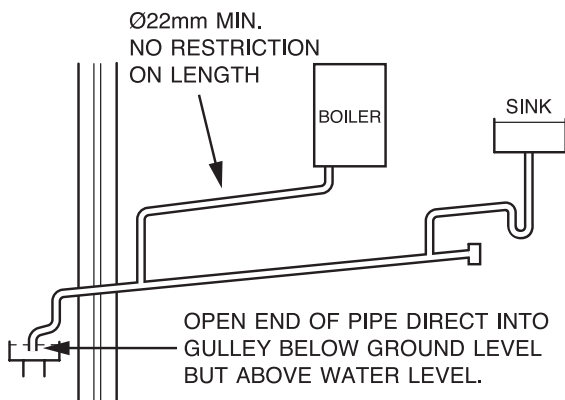
OPEN END OF PIPE DIRECT INTO GULLEY BELOW GROUND BUT ABOVE WATER LEVEL

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

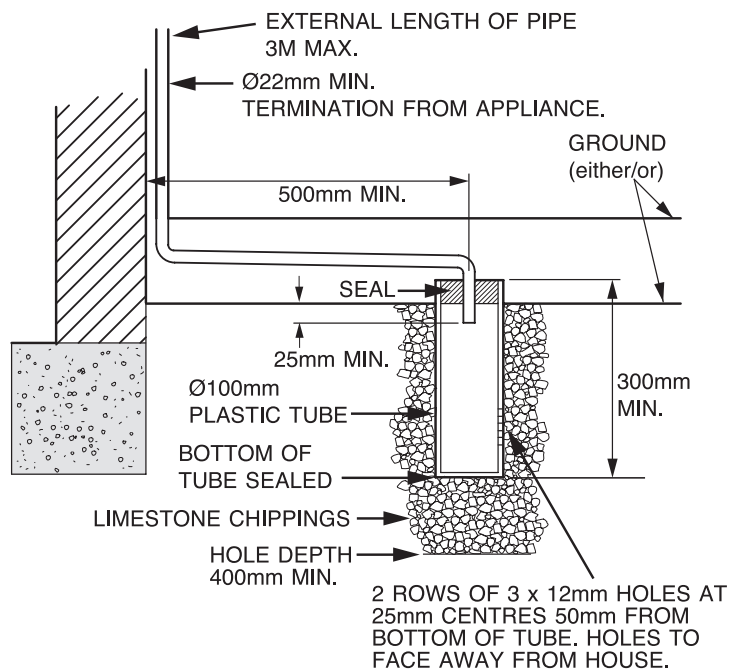
External Termination to a Gully or Hopper



Internal Termination into Combined Sink Waste



Internal Termination Downstream of Sink Waste



External Termination into Soakaway

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

9 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.

9.1 Mains Supply Cable

The appliance mains supply cable should be permanently connected to a cable anchorage. The cable anchorage shall relieve conductors from strain, including twisting at the terminals and should also protect the insulation of the conductors from abrasion.

9.2 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.

Please ensure the "Benchmark" logbook is completed and left with the user and the magnetic lighting instruction label is placed on the surface of the boiler casing.

9.3 Voltage Free System Controls

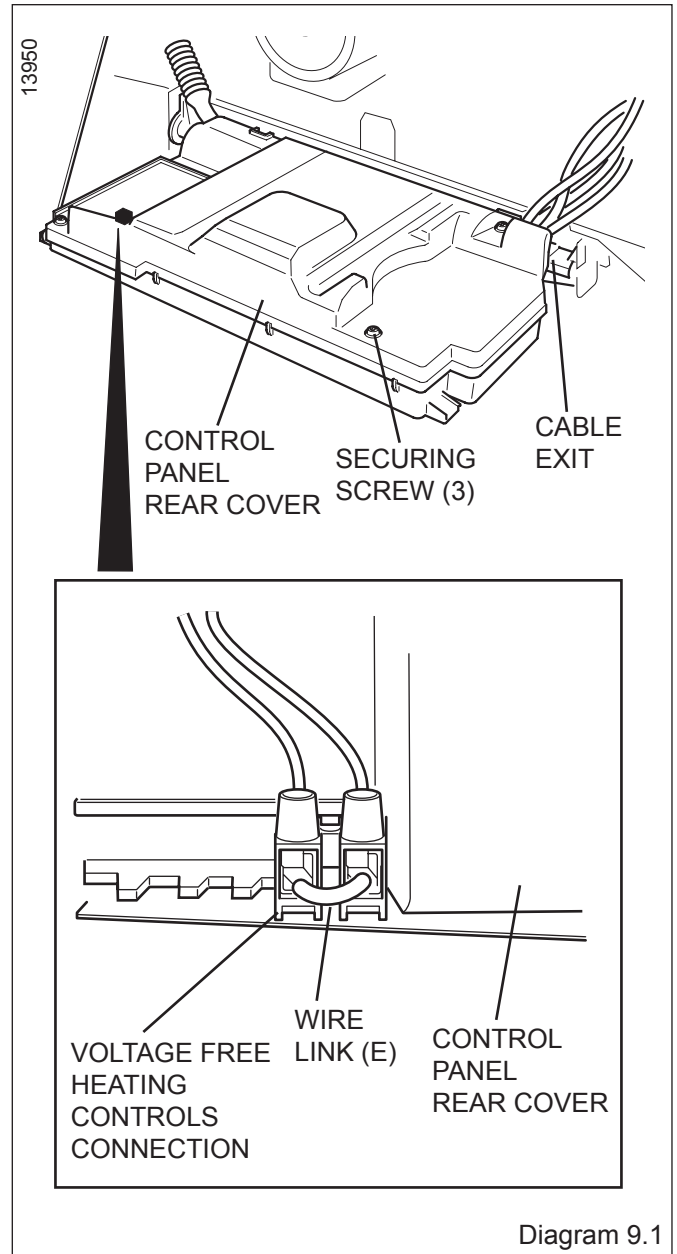
WARNING: UNDER NO CIRCUMSTANCES MUST ANY MAINS VOLTAGE BE APPLIED TO ANY OF THE TERMINALS ON THE VOLTAGE FREE HEATING CONTROLS CONNECTION PLUG.

This boiler will operate continuously on heating as supplied, if the wire link (E), fitted between the two terminals of the heating controls connection, is left in place, see diagram 9.1.

System heating controls e.g. Room thermostat, should be fitted in accordance with the rules in force.

IMPORTANT NOTE

ALL electrical connections to the boiler must be permanently fixed to a wall or a sturdy support feature in a tidy manner.



10 Commissioning

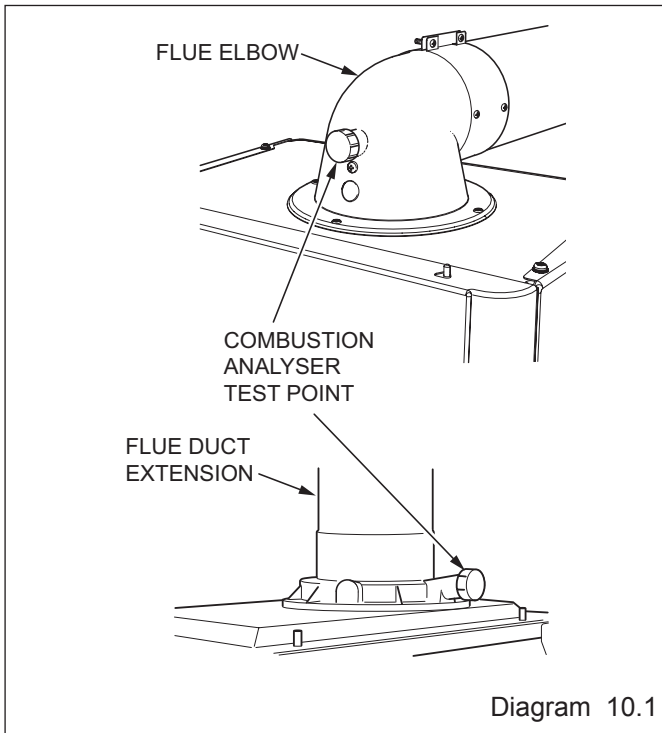


Diagram 10.1

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

10.1 Preliminaries - All Systems

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 soundness and purge air from the gas supply.

10.2 Filling the Heating Circuit

Refer to section 4 to fill the system.

1. Open the two central heating isolating valves and domestic cold water inlet valve, slots in line with the length of the valve.
To enable the system pressure to be viewed, turn the Central heating temperature knob and hot water temperature knob to the off position, see diagram 10.3.
2. Turn the mains electricity supply on to the appliance and ensure that the mains switch on the appliance fascia is set to the on position.

The system pressure is shown on the digital display on the controls panel fascia, see diagram 10.3.

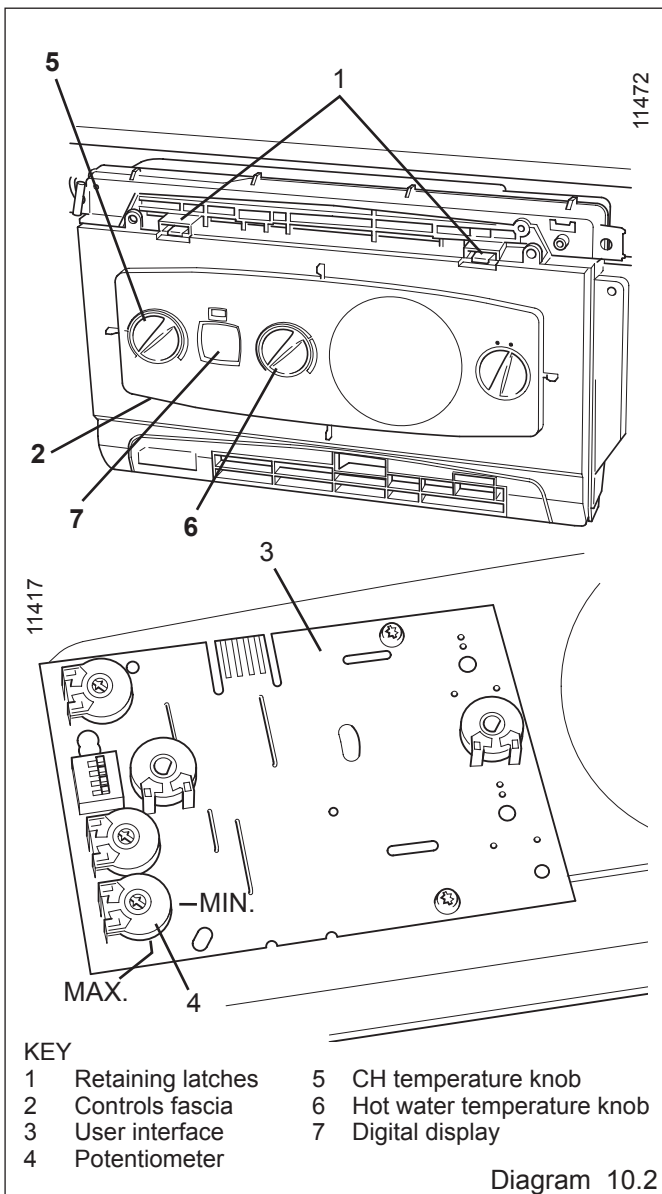
3. Open the auto air vent on the pump as well as the automatic bleeders of the system.
4. Open the blue filling loop valve situated under the boiler until you obtain a 2 bars pressure on the digital display.
5. Bleed each radiator to remove the air, re-tighten bleed screws. Leave the cap on the pump auto air vent open.
6. Flush the domestic hot water system by opening the hot water taps for several minutes.
Make sure the display indicates a system pressure of between 1 and 2 bars.
7. Re-fill system as necessary.
Check the heating system and boiler connections for water soundness.

10.3 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.

Open all hot water taps in turn and close them when water flows. Check for water tightness of the complete domestic water system.



KEY

- | | |
|---------------------|------------------------------|
| 1 Retaining latches | 5 CH temperature knob |
| 2 Controls fascia | 6 Hot water temperature knob |
| 3 User interface | 7 Digital display |
| 4 Potentiometer | |

Diagram 10.2

10 Commissioning

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

10.4 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.

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.
- the integrity of the appliance combustion circuit and relevant seals.
- that all internal/external controls are calling for heat.
- the gas service isolation valve is open.

LPG Conversion: See section 10.9.

The lighting procedure of the boiler is fully automated.

Check that all external controls are calling for heat. If the integral programmer is fitted check that it is correctly programmed and if necessary overridden to provide heat.

Ensure that both the central heating water temperature and the hot water temperature control knobs are turned OFF (0).

Turn on the mains electrical supply and the mains reset knob to (I) on the controls fascia.

Turn the central heating water temperature control knob to (I) MINIMUM.

The digital display will show water temperature in central heating demand.

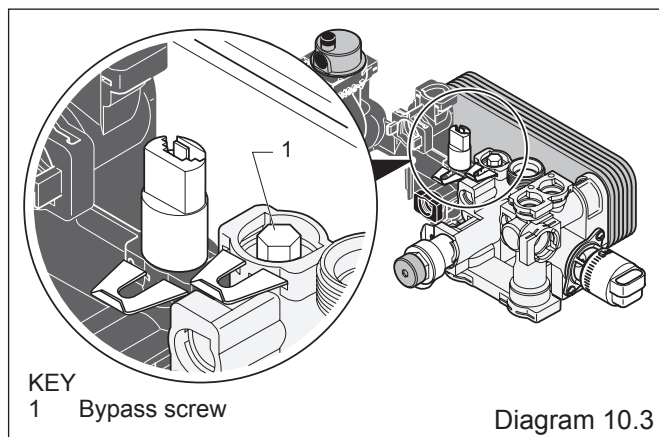


Diagram 10.3

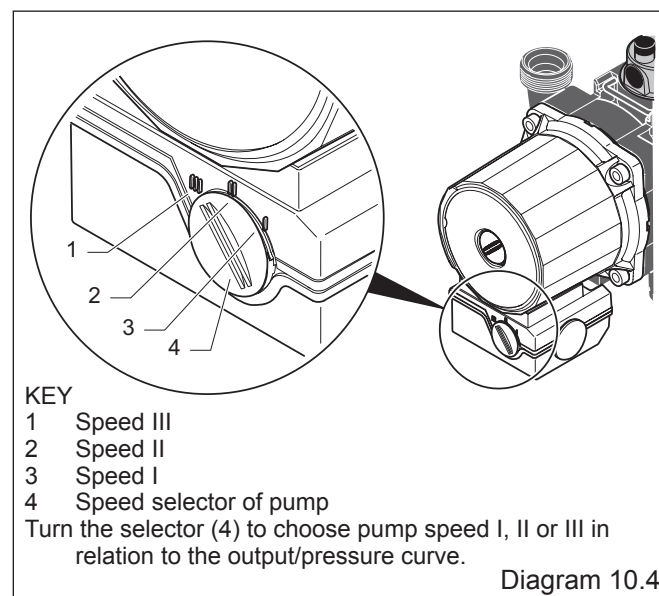


Diagram 10.4

Speed I	Speed II	Speed III
8 By-pass fully shut	5 By-pass fully shut	1 By-pass fully shut
9 Open 1/2 turn	6 Open 1/4 turn	2 Open 1/4 turn
	7 Open 1/2 turn	3 Open 1/2 turn
		4 Open 2 turns

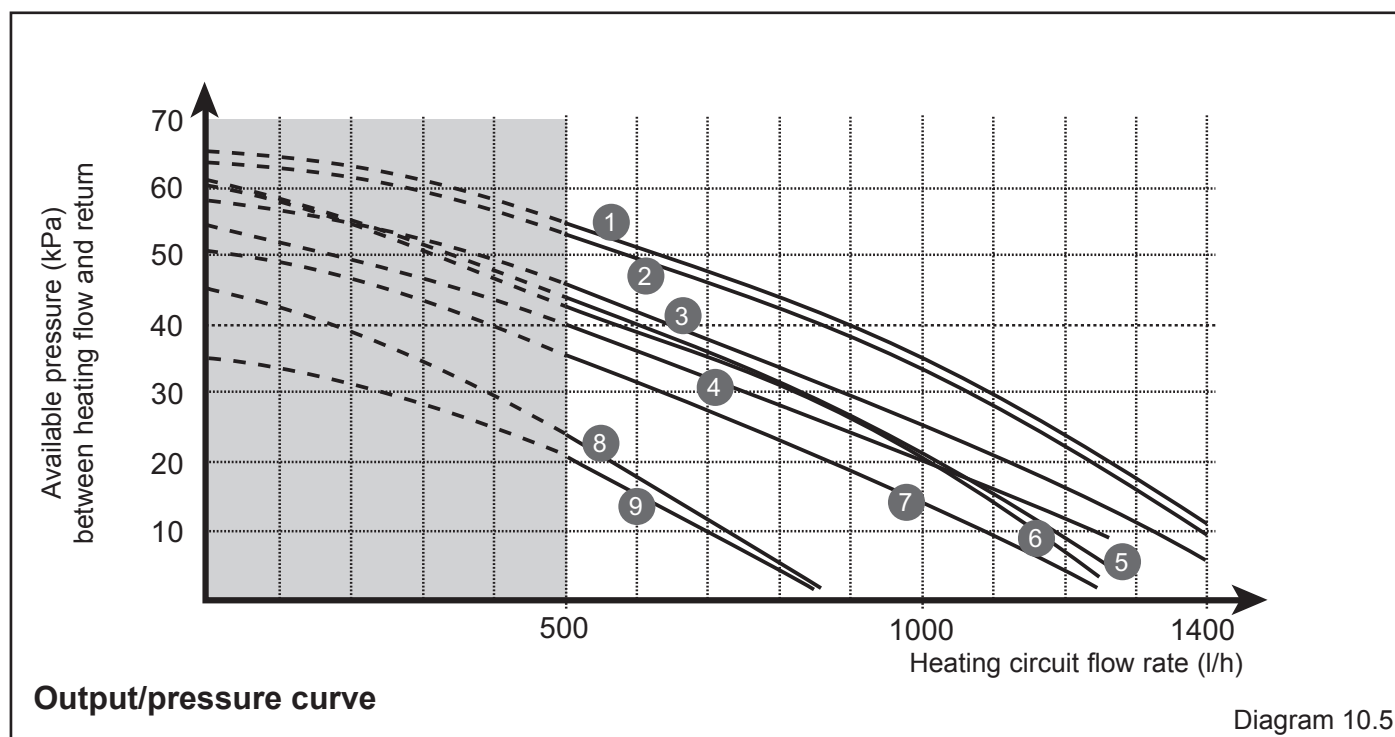


Diagram 10.5

10 Commissioning

The fan should start and after a few seconds the ignition will commence.

If the burner fails to light the fan will stop. Initially this may be due to air in the gas supply line. The boiler will automatically have three attempts at ignition.

If necessary turn the reset switch to the off position (0), then back to the on position (I) and the boiler will restart.

After the boiler has lit, allow to warm at MINIMUM temperature setting to purge any air from the system.

NOTE: If the appliance is operated above MINIMUM on initial lighting, there is a possibility that the overheat thermostat will trip and "F5" will be displayed on controls fascia, this is due to air not having been completely purged. See diagram 9.1 for main reset switch.

Once the system has been purged of air turn the Hot water temperature control knob to the desired position and open a hot water tap. The diverter valve motor will move to hot water supply and the display will read system pressure. Check that hot water is available and then close the hot water tap.

Turn the Central heating water temperature control knob to the desired temperature.

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

10.5 Check the Gas Inlet Pressure and 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.

This can be achieved by turning on several hot water taps.

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 7.1.

The nominal supply pressure for Natural Gas (G20) is 20mbar.

The nominal supply pressure for LPG (G31) is 37mbar.

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, see table below for approximate rates.

GAS RATES (G20)		GAS RATES (G31)
approx. after 10 mins from cold		approx. after 10 mins from cold
MAX		MAX
m ³ /h	ft ³ /h	kg/hr
3.62	128	2.66

In communal or LPG installations where the gas rate cannot be measured it is acceptable to measure the combustion rate as described in the servicing section.

10.6 Heating System

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

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

This boiler has a built in bypass, see diagram 10.4.

The boiler is supplied with the bypass open half a turn. It should not be necessary to adjust the bypass, but if required turn the adjustment screw clockwise to close the valve, see diagram 10.4.

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

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

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

Replace inner casing panel and front casing panel.

10 Commissioning

10.7 Completion

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

GB: It is a requirement that the “Benchmark” Installation, Commissioning and Service Record is completed and left with the user.

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

10.8 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.

Natural Gas (G20) to LPG (G31) Conversion

10.9 LPG CONVERSION - all models

As an option, a chargeable boiler only commissioning service can be provided by Glow-worm Service by calling telephone No. 01773 828100.

NOTE: Steps 10.1 and 10.3 will need to be completed before the appliance can be converted.

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

During the conversion to Propane use of a suitable flue gas analyser is necessary.

- The person carrying out a combustion measurement should have been 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.

Tools required to make the conversion are a 2mm Allen key and an electrician's screwdriver.

Having checked :

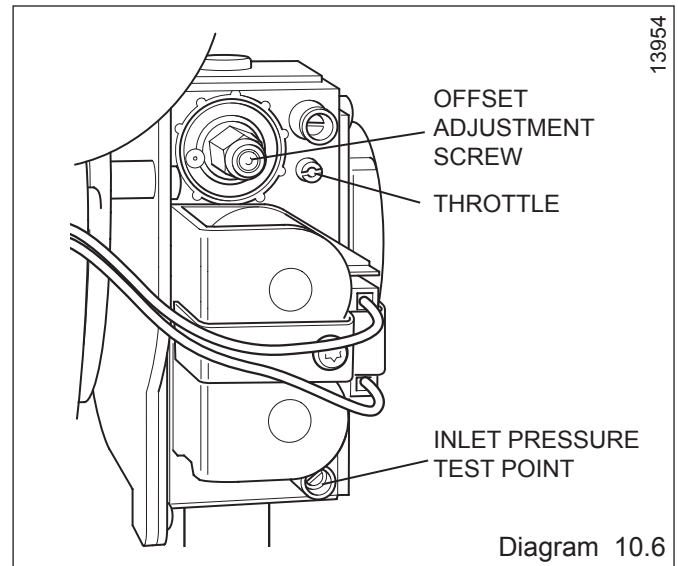
- the appliance and system have been installed in accordance with the instructions.
- the integrity of the flue system and flue seals....
- the integrity of the appliance combustion circuit and relevant seals....
- that all internal/external controls are calling for heat.
- the gas service isolation valve 'F', diagram 7.1, is open.

- (1) Access the gas valve.
- (2) Refer to diagram 10.1 and turn the gas valve throttle fully clockwise.
- (3) Turn the throttle back anti-clockwise by 5 1/2 turns.
- (4) Ensure that the gas analyser is set to the correct fuel setting - Propane.
- (5) Attach combustion analyser to the combustion test point, see diagram 10.2.
- (6) Unclip the controls fascia to reveal the service potentiometer on the rear of the user interface. See diagram 10.3.
- (7) Turn on the mains electrical supply and turn on the gas service cock. Switch the boiler on.
- (8) Ensure external controls are calling for heat. The boiler should fire automatically.
- (9) Using an electrical screwdriver, rotate the service potentiometer to the mid point or 3 o'clock position. See diagram 10.3. The fan speed should now reduce to minimum and '12' should be shown flashing on the digital display. Check the CO₂ value. If necessary refer to diagram 10.1 and using a 2mm allen key carefully adjust the offset screw until a CO₂ reading of 10.1% ± 0.2% is achieved. Turning the offset screw clockwise increases the CO₂ reading.

(10) After setting combustion, rotate the service potentiometer fully anti-clockwise so that the display indicates the water temperature. Check that the CO₂ combustion remains between 9.8% and 10.8% CO₂. Further adjustment should not be necessary, however if required, carefully adjust the gas valve throttle (see diagram 10.1) until this is achieved.

(11) Remove analyser probe from the test point and replace the cap. Refit the control panel.

(12) **IMPORTANT:** Fit the LPG conversion label supplied in the documentation pack to the inner front panel alongside the data label. Refit the inner door and outer door.



G31 BURNER % CO ₂			
CHECK (case on)	SETTING (case off)	Throttle TURNS	CO/CO ₂
9.2 to 10.2	10.1 ± 0.2	5 1/2	0.004

11 Servicing

IMPORTANT NOTES:

1. To ensure the continued efficient and safe operation of the boiler it is recommended that it is checked and serviced at regular intervals. The frequency of servicing will depend upon the particular installation and usage, but in general once a year should be enough.
2. It is the Law that any servicing is carried out by a **competent person** 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 centre pages of this document.

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 11.5.
- 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.

NOTE: Safe combustion can only be verified by measuring CO/CO2 ratio. This must not exceed the value shown in Table 3.

COMBUSTION CHECK AND SETTING THE AIR/GAS RATIO VALVE

- Remove the front casing panel, see diagram 11.2 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 10.1.

G20 BURNER % CO ₂		
CHECK (case on)	SETTING (case off)	CO/CO2
8.9 to 9.5	8.8 to 9.2	0.004

G31 BURNER % CO ₂		
CHECK (case on)	SETTING (case off)	CO/CO2
10.0 to 10.6	10.1 ± 0.2	0.004

Table 3

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.

With the power off and the appliance cold, unclip the controls fascia and hinge down to reveal the potentiometers on the rear of the user interface, see diagram 10.2.

Take care not to allow the fascia to drop down and damage the wiring. Turn on the electrical supply.

Ensure external controls are calling for heat. The boiler should fire automatically.

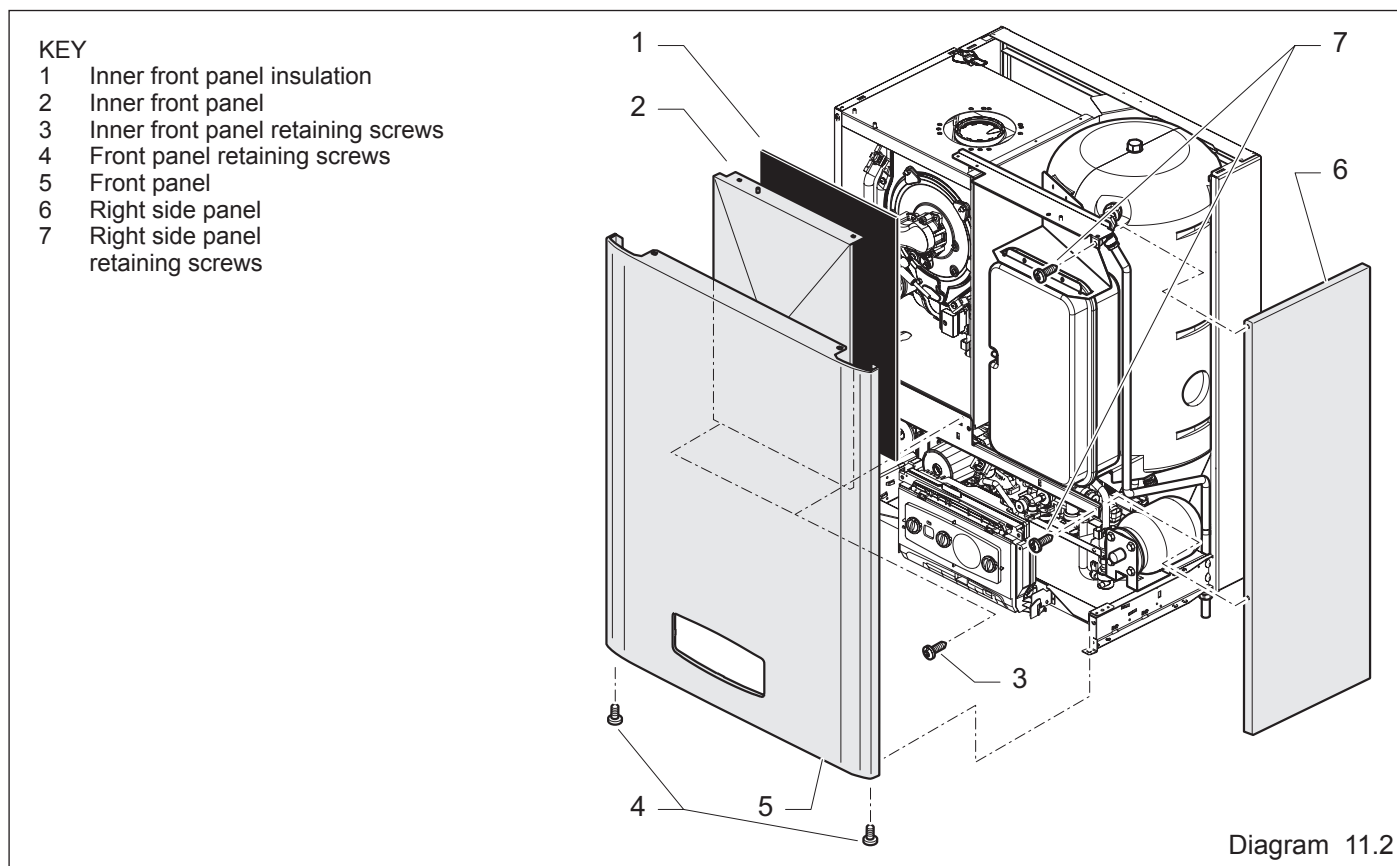
Allow the boiler to fire for at least 60 seconds and then, referring to diagram 10.2, rotate the service potentiometer fully clockwise the appliance will operate at maximum rate. Wait until the CO2 value is stable and check that the value is within the range specified in Table 3.

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 be necessary to adjust the combustion rate of the appliance.

NOTE: Adjustment is made by turning the gas valve throttle 1/8 of a turn, waiting 1 minute to allow the appliance to stabilise before checking or making further adjustments.

Refer to diagram 10.6 and rotate the "throttle" (anti-clockwise to increase) to the required CO2, see Table 3. On completion, rotate the service potentiometer fully anti-clockwise to resume normal control.

11 Servicing



2. Minimum Rate Check and Adjustment.

Now check the minimum gas rate CO₂ setting as follows:
With the service potentiometer in the fully anti-clockwise position and appliance running, turn the service potentiometer clockwise to the mid-point or 3 O'clock position. The appliance will now run at minimum rate.

Wait until the CO₂ value is stable and check that the value is within the range specified in Table 3. 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 $\frac{1}{8}$ 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 Table 3 and diagram 10.6.

On completion, return the service potentiometer to the fully anti-clockwise position.

3. Re-check CO₂ and check the CO/CO₂ Combustion Ratio.

Re-check the maximum and minimum CO₂ values to ensure that they are still within limits.

Check that the CO/CO₂ combustion ratio does not exceed the value in Table 3 (*note add value into the table = 0.004).

If the CO/CO₂ setting exceeds the value stated then a complete service will be necessary – Refer to section 11.1.

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.

11.1 Servicing

NOTE: If the Combustion and Gas rate checks did not require adjustment then it will not be necessary to service the Combustion Block inclusive of the Burner and Heat Exchanger. Continue with the appropriate sections of the servicing.

All routine servicing requirements can be achieved by the removal of the front panels, see diagram 11.2.

Before commencing with a service or replacement of parts. The boiler should be isolated from the electrical and gas supplies, see diagram 7.1 position of the gas service isolation valve.

11.2 Casing Panels

Front panel

Remove the 2 front panel retaining screws (4)
Remove the front panel (5)

Right side panel

Remove the front panel (5)
Remove the 2 right side panel retaining screws (7)
Remove the right side panel (6)

Inner front panel

Remove the inner front panel retaining screws (3)
Remove the inner front panel (2)

11 Servicing

11.3 Draining of the appliance

Heating circuit, see diagram 11.3.

Turn on the drain cock (1) provided at the system low point. Provide an air intake by opening a radiator bleed screw. In order to drain only the water in the boiler, first shut off the heating flow and return isolating valves.

Domestic Hot Water circuit, see diagram 11.4.

Turn off the water cock of the system. Install a drain hose and unscrew the bleed valve located under the storage vessel. Create an air intake by turning on a hot water tap.

11.4 Hydraulic Block

Heating return filter, see diagram 11.5.

Close both shut off isolating valves (2) located on the heating return.

Loosen the pipe fitting end, then relieve the heating return filter (1) and clean it.

Cold water filter, see diagram 11.6.

Turn off the cold water main inlet.

Relieve the filter retaining clip (5).

Remove the cold water filter (6) and clean it.

Foaming filter, see diagram 11.6.

The "foaming" filter improves the heating circuit gas purging operation.

Turn off the heating flow and return isolating valves, and then drain the boiler.

Relieve the filter retaining clip (8) located under the pump.

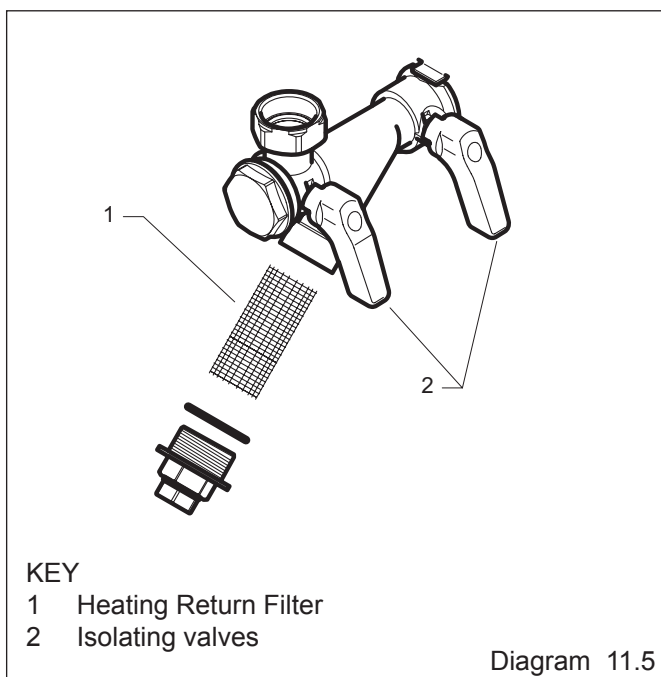
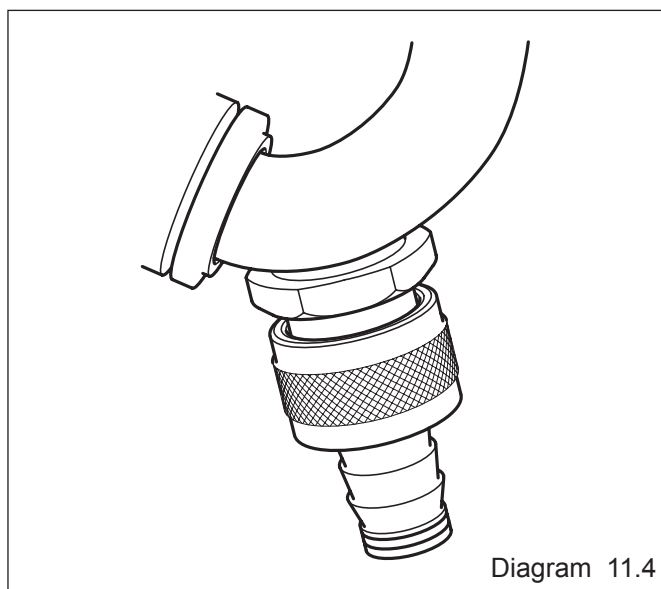
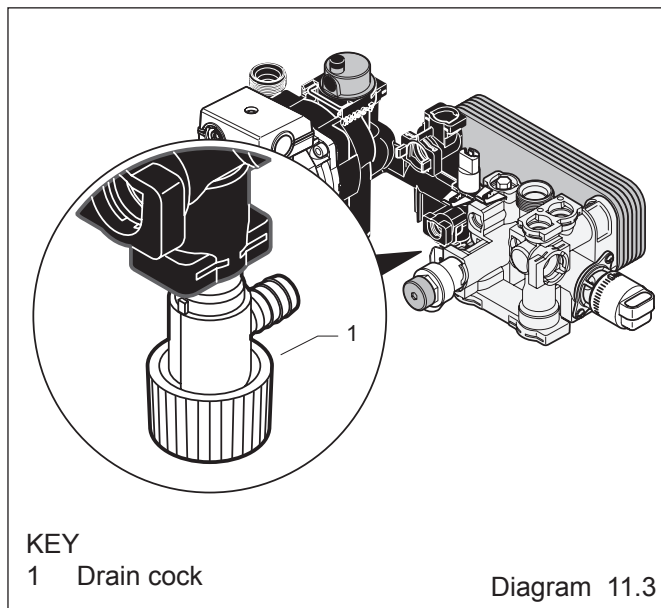
Relieve the "Foaming" filter (9).

Clean and put back in place, and then correctly position the lock pin.

11.5 Storage Anode Protection, refer to diagram 11.7.

Remove the anode from the DHW storage vessel.

Check the diameter and if below the specified dimension, it must be replaced.



11 Servicing

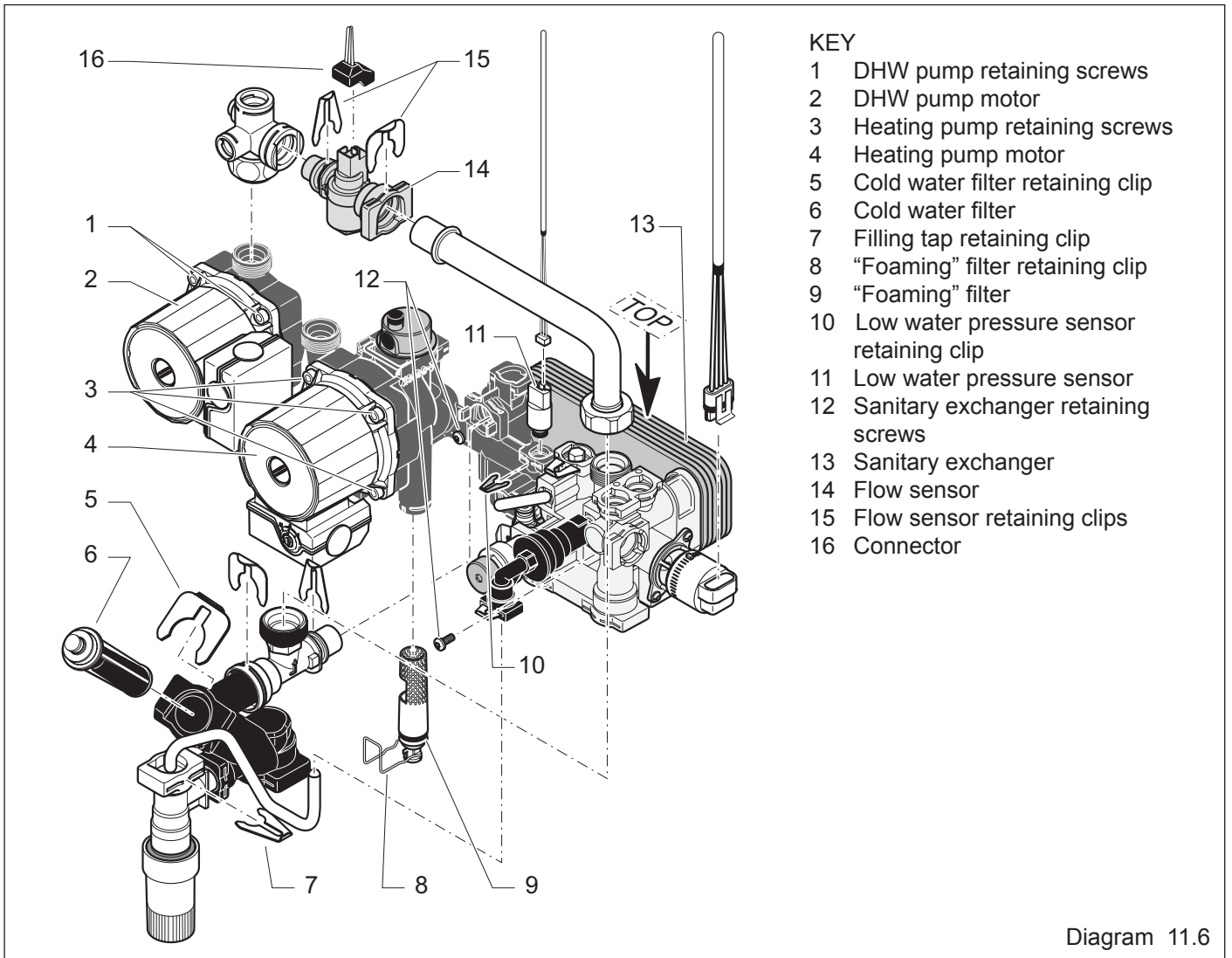


Diagram 11.6

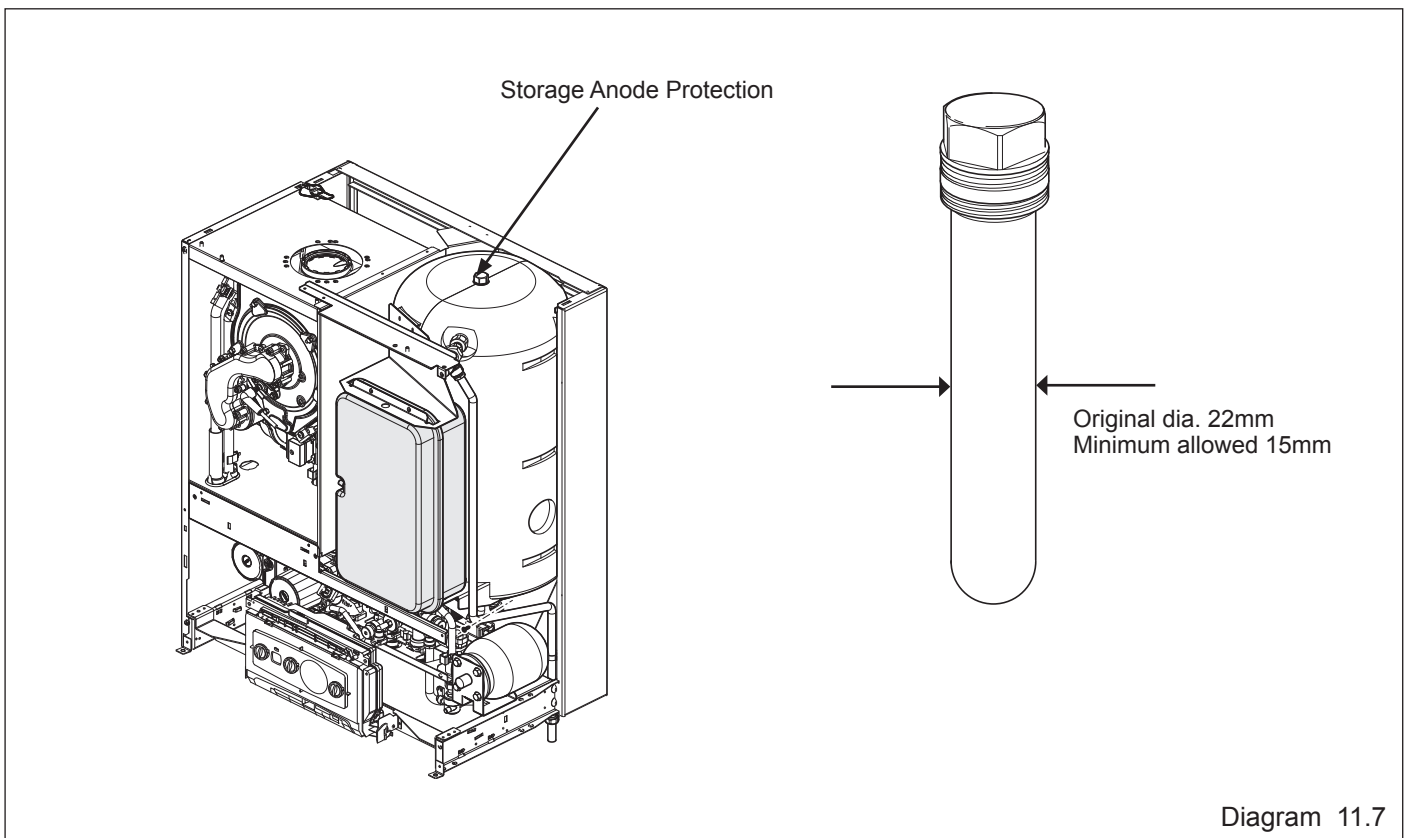


Diagram 11.7

11 Servicing

11.6 Combustion Block, refer to diagram 11.8.

Ignition and control electrode

Remove the ignition and control electrode connector (8).
Remove the 2 ignition and control electrode retaining screws (9).
Remove the ignition and control electrode (7).
Clean both ends of the electrode with a dry cloth if necessary.
Inspect the tips for damage.
Clean away any debris and check the spark gap is 3.5 to 4.5 mm.
Check the electrode gasket for signs of damage and replace if necessary.

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 service cock.
Remove the two gas pipe retaining clips (29), one located below gas valve (35) and the other one located on the underside of the boiler chassis.
Pull sealing grommet down gas pipe.
Push the gas pipe upwards further into gas valve connection and then rotate anti-clockwise until the gas pipe end is over the large hole in boiler chassis. Withdraw the gas pipe from gas valve connection and remove.
NOTE: When replacing ensure that the sealing grommet, situated below the gas valve is correctly re-seated.
Disconnect the gas valve connector (28).
Disconnect the fan connector (12).
Remove the five heat exchanger retaining nuts (17).
Gently remove the fan (33), gas valve (35) and burner assembly from the heat exchanger (31).
Clean the burner with a soft brush taking great care not to damage the front insulation. DO NOT use wire or sharp instruments to clean the holes of the burner.
Inspect the burner for any signs of damage.
Remove and discard the burner door seal and replace with new, see diagram 11.9.
NOTE: Removal of the burner is not necessary during a normal service, but if it is removed it will require a new gasket, see diagram 11.10.

Heat exchanger

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

Remove the 2 mixing arm retaining screws (23) bolted on the fan (33).
Remove the 5 heat exchanger retaining nuts (17).
Remove the "burner + mixing arm" unit from the heat exchanger.
Remove loose debris from combustion chamber using a soft brush and vacuum cleaner. Carefully flush by spraying water removing any remaining debris through the condensate trap

NOTE: Make sure that the water is kept away from electrical components. Ensure that the Condensate trap is operating correctly.

11.7 Combustion Check

With the appliance operational connect the CO₂ combustion analyser to the test point, see diagram 10.2.

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

Check the burner %CO₂, at maximum rate. The values are shown in the table and if the reading falls within the range, disconnect the analyser, fit the test point cap and return to functional checks - gas rate.

If adjustment is required remove the front and inner casing panels, see diagram 11.2. Taking care not to touch any internal components, proceed as described in section 10.1

11.8 Gas Rate Adjustment

This appliance incorporates a pre-mix burner and cannot be adjusted, however, it is acceptable to set the combustion rate with a gas analyser as described in section 11.7.

11.9 Inner Casing Panel Seal check

Check the condition of the seal, if worn or damaged remove the seal and thoroughly clean the casing surface before fitting the new seal.

Refit the inner casing panel.

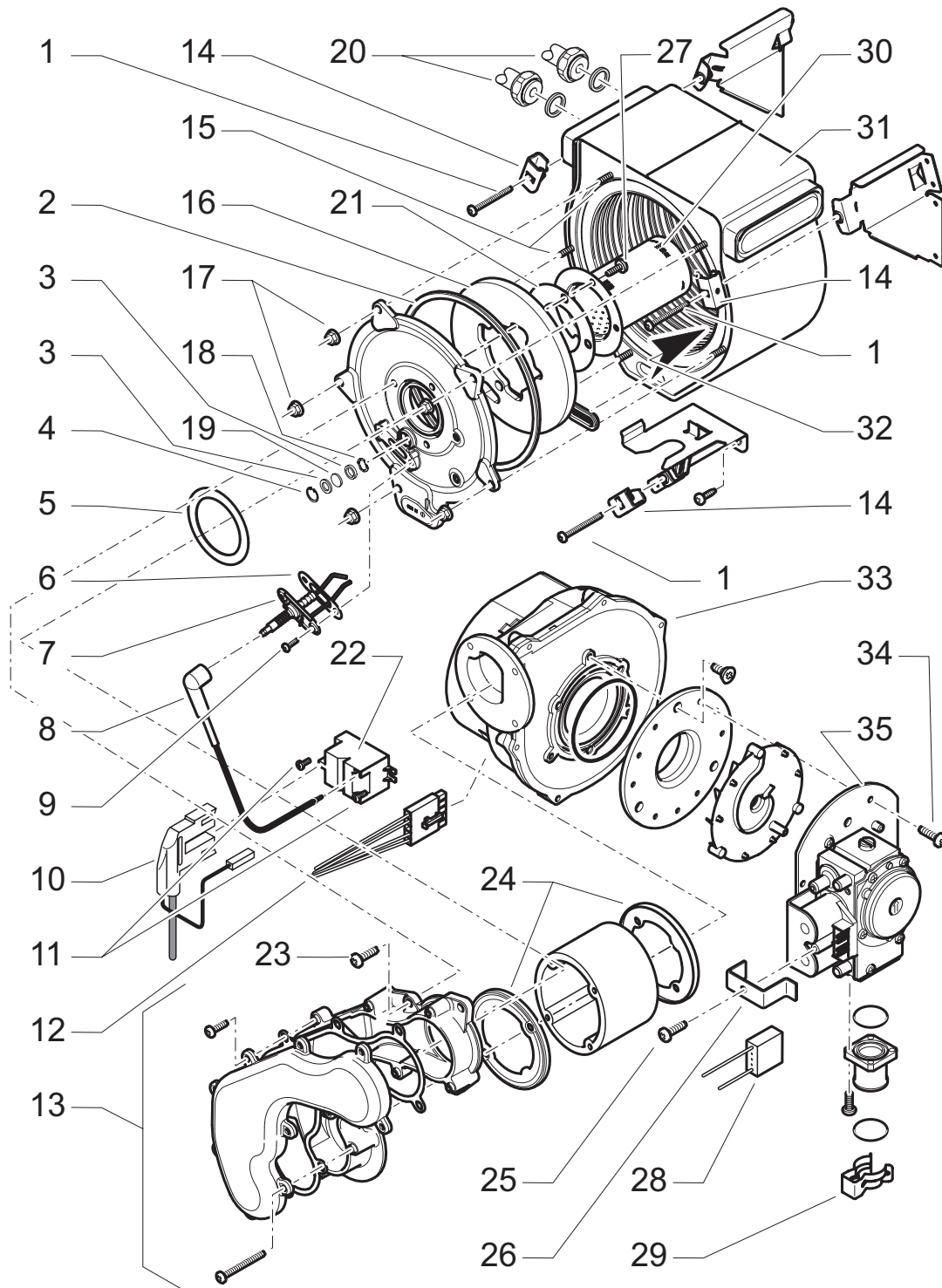
NOTE: Ensure the seal is fitted correctly giving an airtight joint.

11.10 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.

11 Servicing



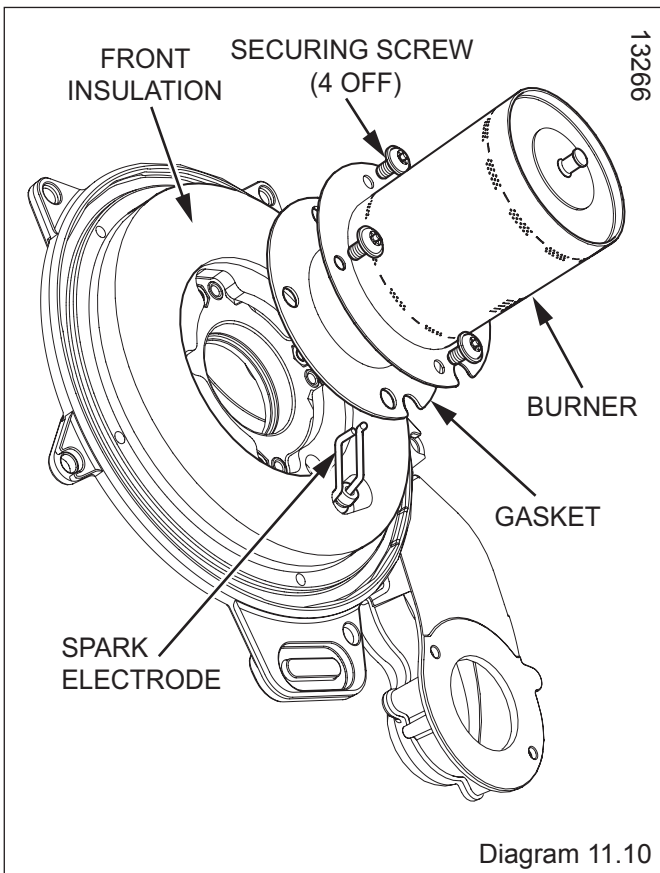
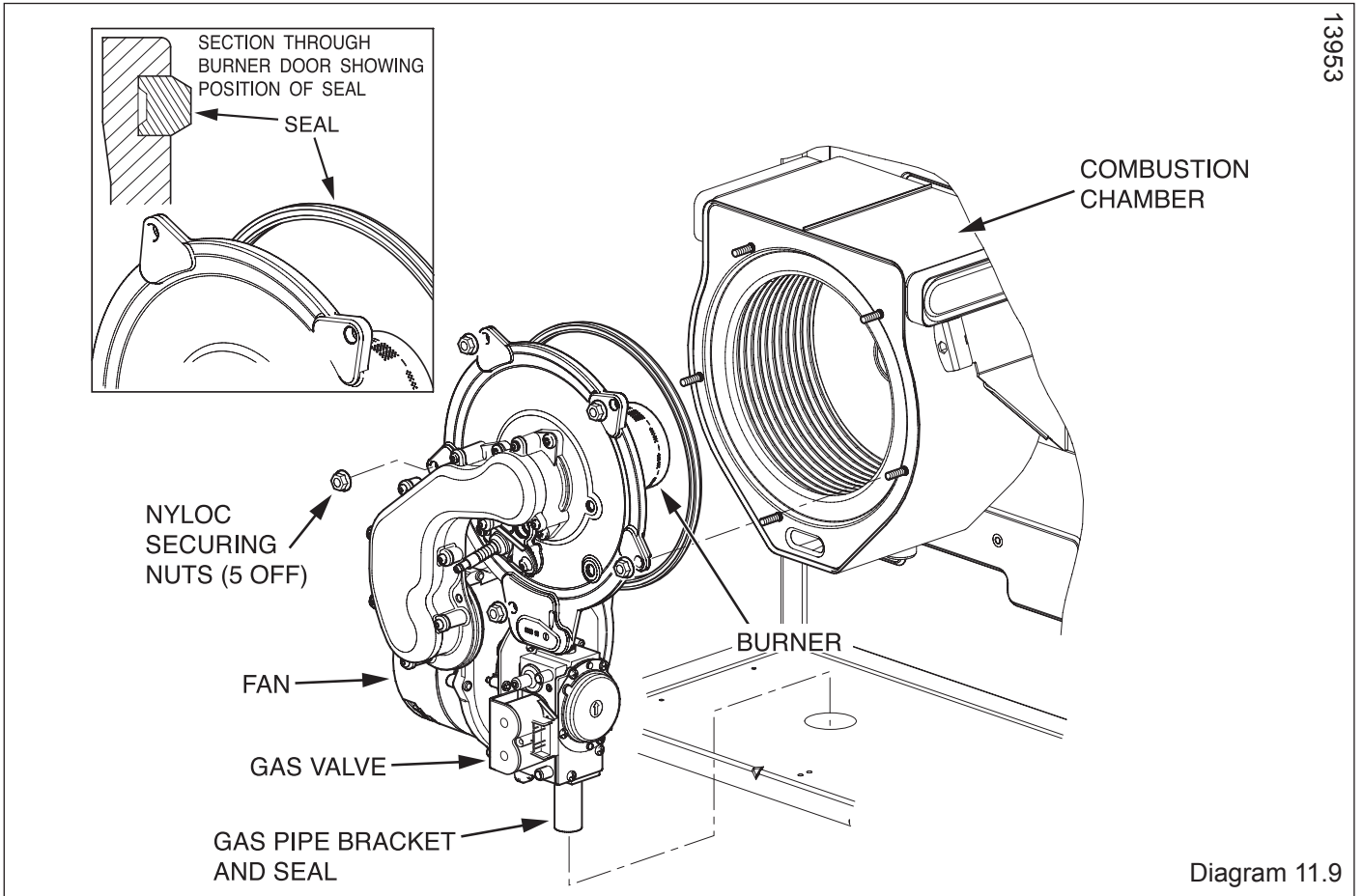
KEY

- | | | |
|---|--|--|
| 1 Heat exchanger retaining screws | 13 Mixing arm | 26 Gas valve connector retaining plate |
| 2 Gasket | 14 Heat exchanger hanging brackets | 27 Burner retaining screws |
| 3 Viewing window gasket | 15 Burner assembly retaining screws | 28 Gas valve connector |
| 4 Viewing window circlip | 16 Insulation | 29 Gas valve retaining clip |
| 5 Gasket | 17 Heat exchanger retaining nuts | 30 Burner |
| 6 Ignition and control electrode gasket | 18 Spring leaf | 31 Heat exchanger |
| 7 Ignition and control electrode | 19 Viewing window | 32 Combustion chamber |
| 8 Ignition and control electrode connector | 20 Heat exchanger hydraulic coupling | 33 Fan |
| 9 Ignition and control electrode retaining screws | 21 Gasket | 34 Fan retaining screws |
| 10 Ignition module harness connector | 22 Ignition module | 35 Gas valve |
| 11 Ignition module retaining screws | 23 Mixing arm retaining screws | |
| 12 Fan connector | 24 Gasket | |
| | 25 Gas valve connector retaining screw | |

Diagram 11.8

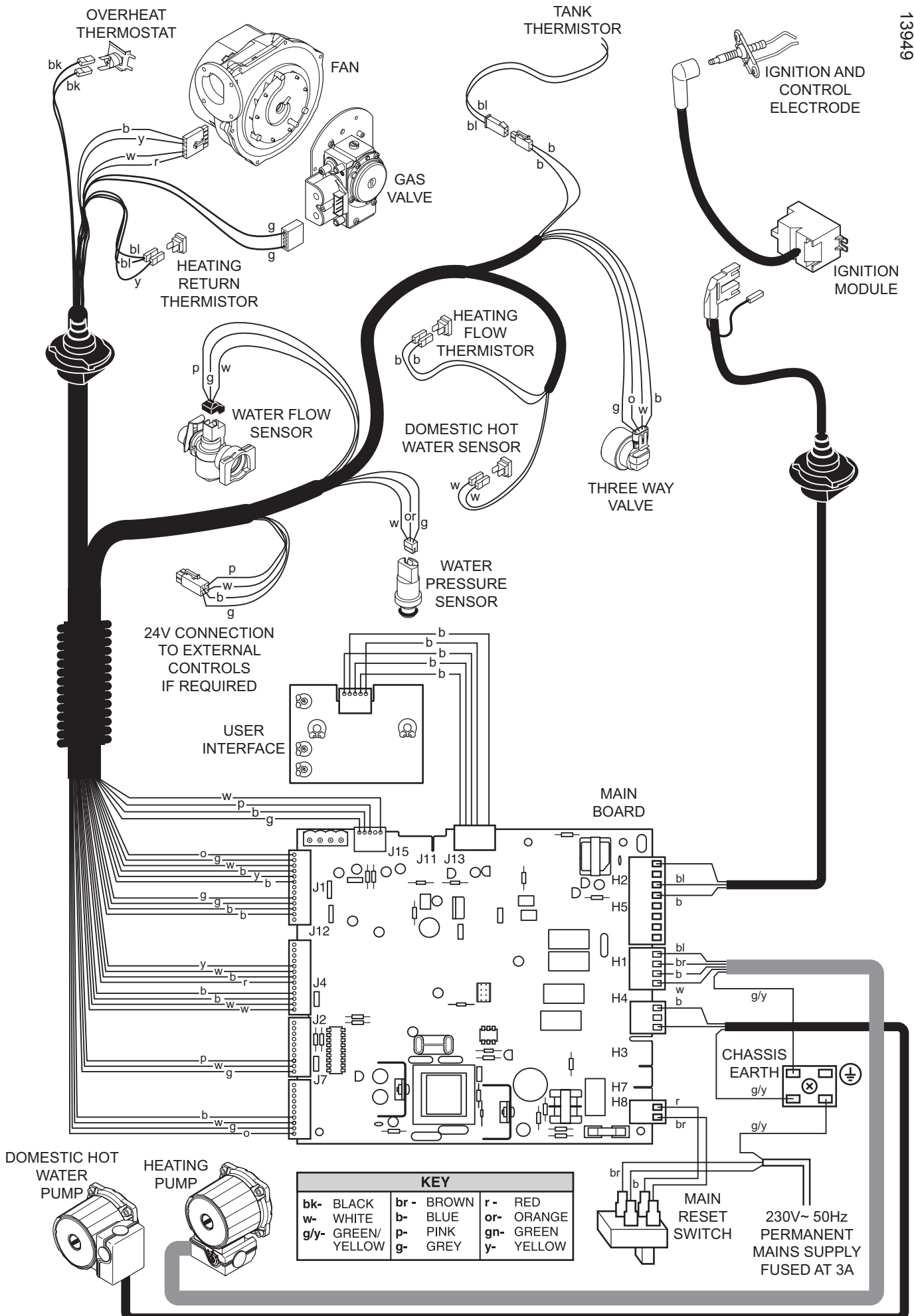
11 Servicing

13953



12 Fault Finding

13949



12 Fault Finding

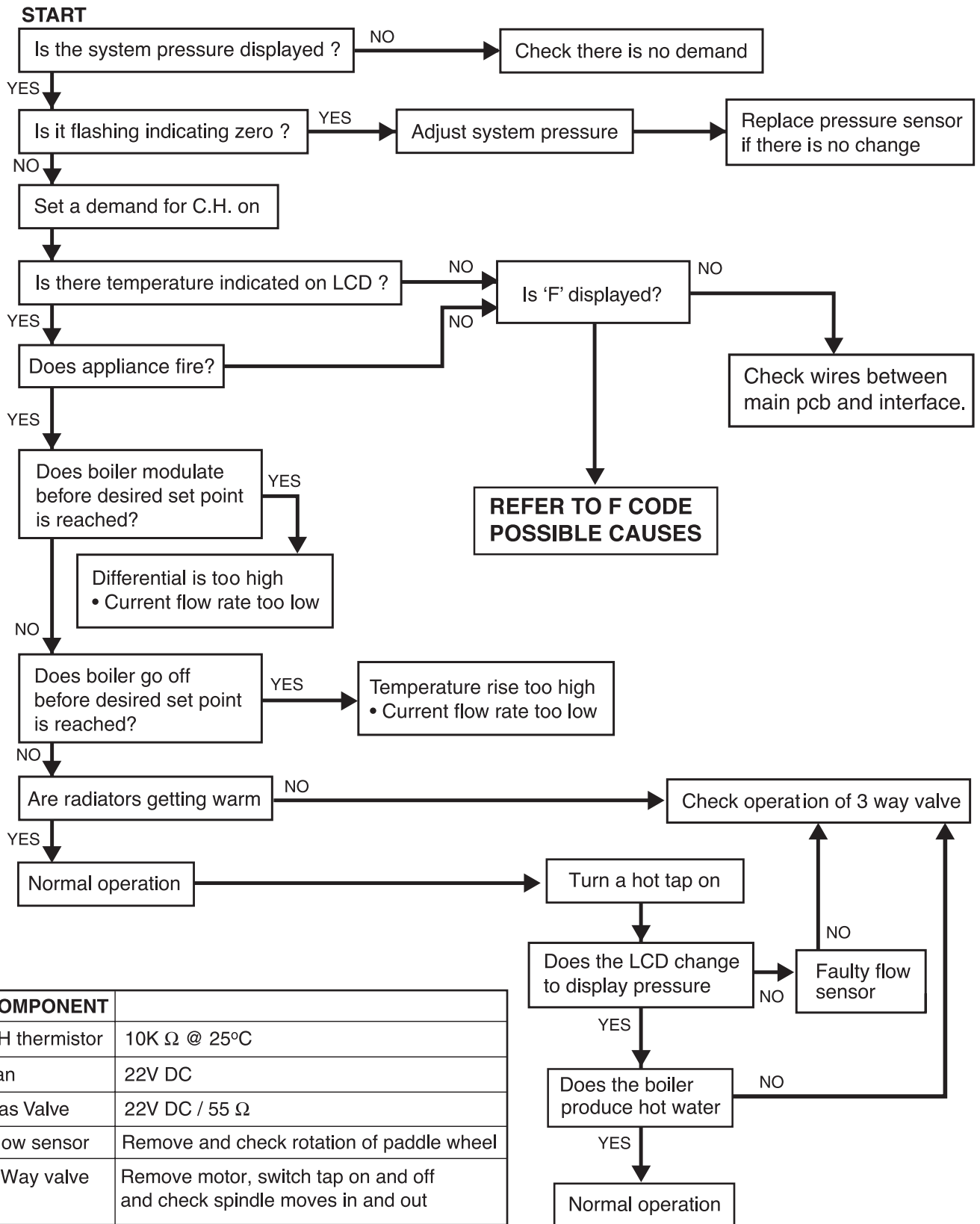
You will find the list of some fault codes in the operating instructions.

The faults described in this chapter should be carried out by a skilled professional and if need be by Glow-worm's After Sales Service.

Important: a central heating system cannot operate efficiently if it is not filled with water and if the air it contains at first has not been completely removed. If those requirements are not fulfilled, some noise originated by the water boiling inside the boiler and noise of water chute inside the radiators could appear.

Code	Description	Possible cause
F1, F4	Ignition fault, boiler failed to light	No gas / Insufficient gas Incorrect gas valve adjustment Electrode ignition lead defect Electronic igniter defective Check air inlet duct Check connections to igniter unit Condensate blocked
F5	Overheat fault	Overheat stat operated Maximum temperature exceeded Check thermistor connections Air in system with thermistor at maximum setting Faulty overheat stat connection
F6	Central heating flow thermistor fault	Thermistor cable defective/broken Thermistor faulty Check that thermistor attached correctly to pipe
F7	DHW thermistor fault	
F8	Tank thermistor fault	
F9	Water pressure sensor fault	Faulty sensor connection Check wiring
F10	Central heating return thermistor fault	Thermistor cable defective/broken, thermistor faulty Check that thermistor attached correctly to pipe
F11	User interface connection fault	Check wiring between mainboard and user interface
F12	Main board connection fault	
F13	Main board connection fault	Check connection and wires
F14	Central heating flow $T^{\circ} > 95^{\circ}\text{C}$	System fault / Possible pump failure Check thermistor on flow
F16	Flame detection fault (flame presence for more than 5 seconds after burner stopped)	Gas valve defective
F17	Power supply is less than 170V	Check electrical supply / polarity
F18	User interface fault	Faulty user interface
F19	Central heating thermistor unplugged	Thermistor cable defective/broken, thermistor faulty Check that thermistor attached correctly to pipe
F20	Software incompatibility	Incorrect user interface or main board Incorrect product code
F23	Water circulation fault	Possible pump failure
F26	Maximum delta temperature	Water circulation fault Check central heating flow and return connection

12 Fault Finding



13 Replacement of Parts

13.1 General

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 the boiler should be isolated from the mains electric supply and the gas should be turned off at the service cock on the boiler.

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

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

For replacement of parts the front casing and the inner casing panel of the boiler will need to be removed. To remove refer to section 11 servicing.

13.2 Hydraulic Block, refer to diagram 13.1.

DHW pump or heating

Loosen the 4 pump retaining screws (1)/(3).

Remove the pump motor (2)/(4).

DHW exchanger

Remove both retaining screws (13) accessible from the boiler front face.

Be careful with the direction of reassembly : the word "TOP", printed on the edge of the exchanger (25) will be set upward.

Flow sensor

Turn off the cold water inlet.

Relieve the clips (28).

Remove the connector (29).

Remove the flow sensor (27).

Cold water filter

Relieve the filter retaining clip (5).

Remove the cold water filter (6).

"Foaming" filter

The "foaming" filter improves the heating circuit gas purging operation.

Turn off the heating flow and return insulating valves, and then drain the boiler.

Relieve the filter retaining clip (12) located under the pump.

Relieve the "Foaming" filter (11).

Low water pressure sensor

Relieve the clip (17).

Remove the connector (23).

Remove the low water pressure sensor (22).

Three way valve

Remove the connector (26).

Remove the three way valve (21).

DHW safety valve or heating

Relieve the clips (16)/(19).

Remove the safety valve (15)/(20).

Filling device

Disconnect the drain connection (5) located under the filling device (18).

Relieve the clip (14).

Remove the filling device (18).

Automatic air vent

Remove the retaining clip and remove the automatic air vent (24).

Fit the new automatic air vent and 'O' ring ensuring the vent cap is left loose.

Refill, vent and pressurise the boiler.

Check for leaks.

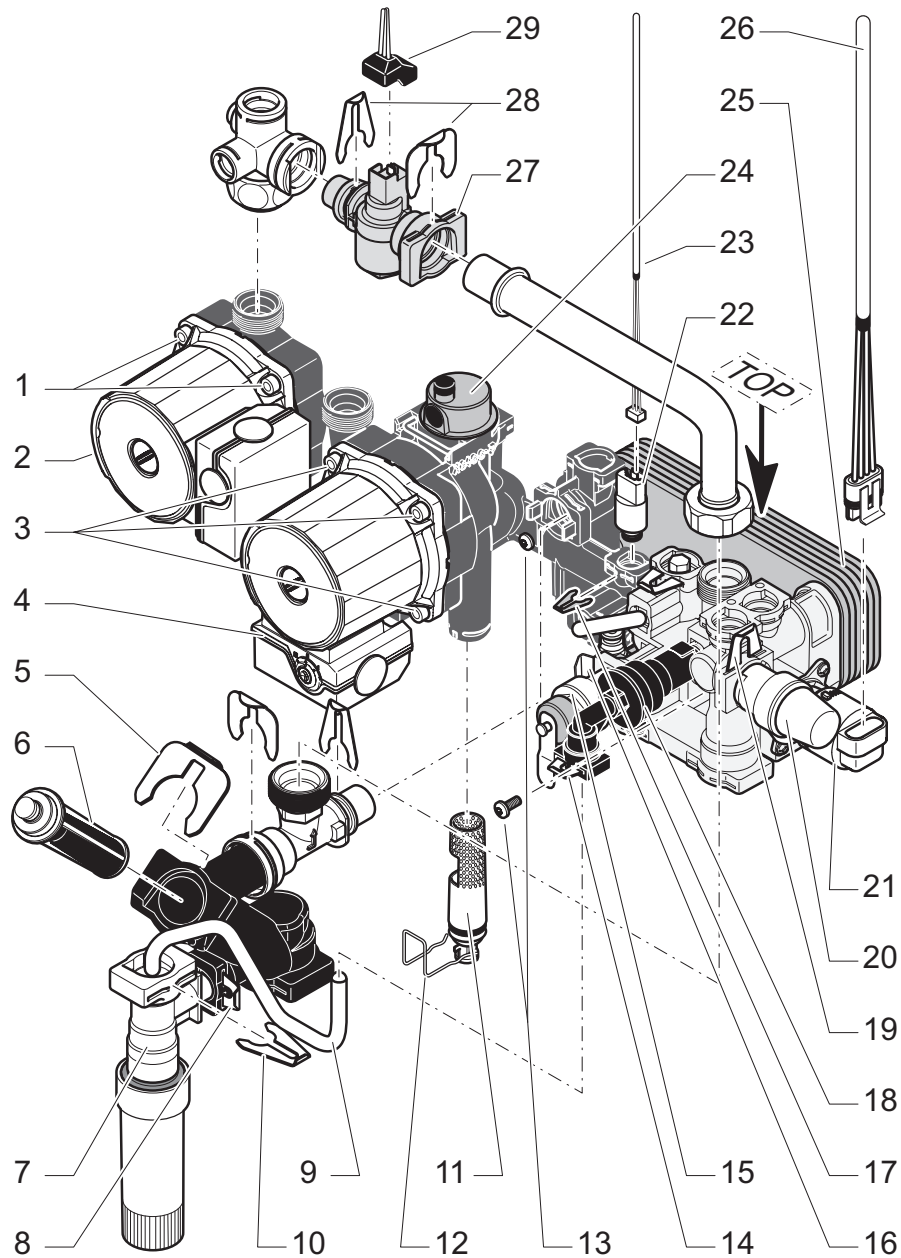
Filling tap

Remove the clips (8)/(10).

Fit new 'O' rings.

After replacing the filling tap, 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.

13 Replacement of Parts



KEY

- | | | | |
|----|--------------------------------------|----|--|
| 1 | DHW pump retaining screws | 16 | Heating safety valve retaining clip |
| 2 | DHW pump motor | 17 | Low water pressure sensor retaining clip |
| 3 | Heating pump retaining screws | 18 | Filling device |
| 4 | Heating pump motor | 19 | DHW safety valve retaining clip |
| 5 | Cold water filter retaining clip | 20 | DHW safety valve |
| 6 | Cold water filter | 21 | Three way valve |
| 7 | Filling tap | 22 | Low water pressure sensor |
| 8 | Filling tap retaining clip | 23 | Low water pressure sensor connector |
| 9 | Filling device nozzle | 24 | Automatic air vent |
| 10 | Filling tap retaining clip | 25 | DHW exchanger |
| 11 | "Foaming" filter | 26 | Three way valve connector |
| 12 | "Foaming" filter retaining clip | 27 | Flow sensor |
| 13 | DHW exchanger retaining screws | 28 | Flow sensor retaining clips |
| 14 | Filling device nozzle retaining clip | 29 | Flow sensor connector |
| 15 | Heating safety valve | | |

Diagram 13.1

13 Replacement of Parts

13.3 Combustion Block, *refer to diagram*

13.2.

Mixing arm

Remove the 2 mixing arm retaining screws (23) bolted on the fan (33) and the burner door.

Remove the mixing arm (13).

Fit the new mixing arm and the new gaskets in the reverse order.

Burner

Remove the mixing arm (13).

Remove the 5 heat exchanger retaining nuts (17).

Remove the burner retaining screws (27) and remove the burner (30).

Fit the new burner and the new gasket in the reverse order.

Heat exchanger

Remove the 2 mixing arm retaining screws (23) bolted on the fan (33).

Remove the 5 heat exchanger retaining nuts (17).

Remove the "burner + mixing arm" unit of the heat exchanger.

Remove the heat exchanger retaining screws (1) and relieve the heat exchanger retaining plates (14).

Relieve the 2 heat exchanger hydraulic coupling (20).

WARNING: There will be water in the heat exchanger (31).

Remove condense pipe connector from bottom of heat exchanger.

Carefully remove the heat exchanger (31) out.

Fit the new heat exchanger in the reverse order.

Gas valve

Relieve the gas valve retaining clip (29).

Relieve the 4 gas nozzle retaining screws located under the gas valve (35).

Remove the screw (25) and the retaining plate (26) from the gas valve connector.

Remove the gas valve connector (28).

Remove the fan retaining screws (34).

Remove the gas valve (35).

Fit the new gas valve and the new gasket in the reverse order.

When re-fitting the gas valve take care as it can be fitted more than one way.

After re-fitting check the combustion CO₂ and adjust if necessary, refer to section 10.1 of commissioning and 11.7 of servicing.

Fan

Remove the mixing arm (13).

Remove the fan retaining screws (34).

Relieve the fan connector (12).

Relieve the fan (33).

Fit the new fan and the new gasket in the reverse order.

Ignition module

Remove the ignition and control electrode connector (8) from the ignition module (22).

Remove the ignition module harness connector (10).

Remove the 2 ignition module retaining screws (11).

Fit the new ignition module in the reverse order.

Ignition and control electrode

Remove the connector from the ignition and control electrode connector (8).

Remove the 2 ignition and control electrode retaining screws (11).

Fit the new ignition and control electrode and the new gasket in the reverse order.

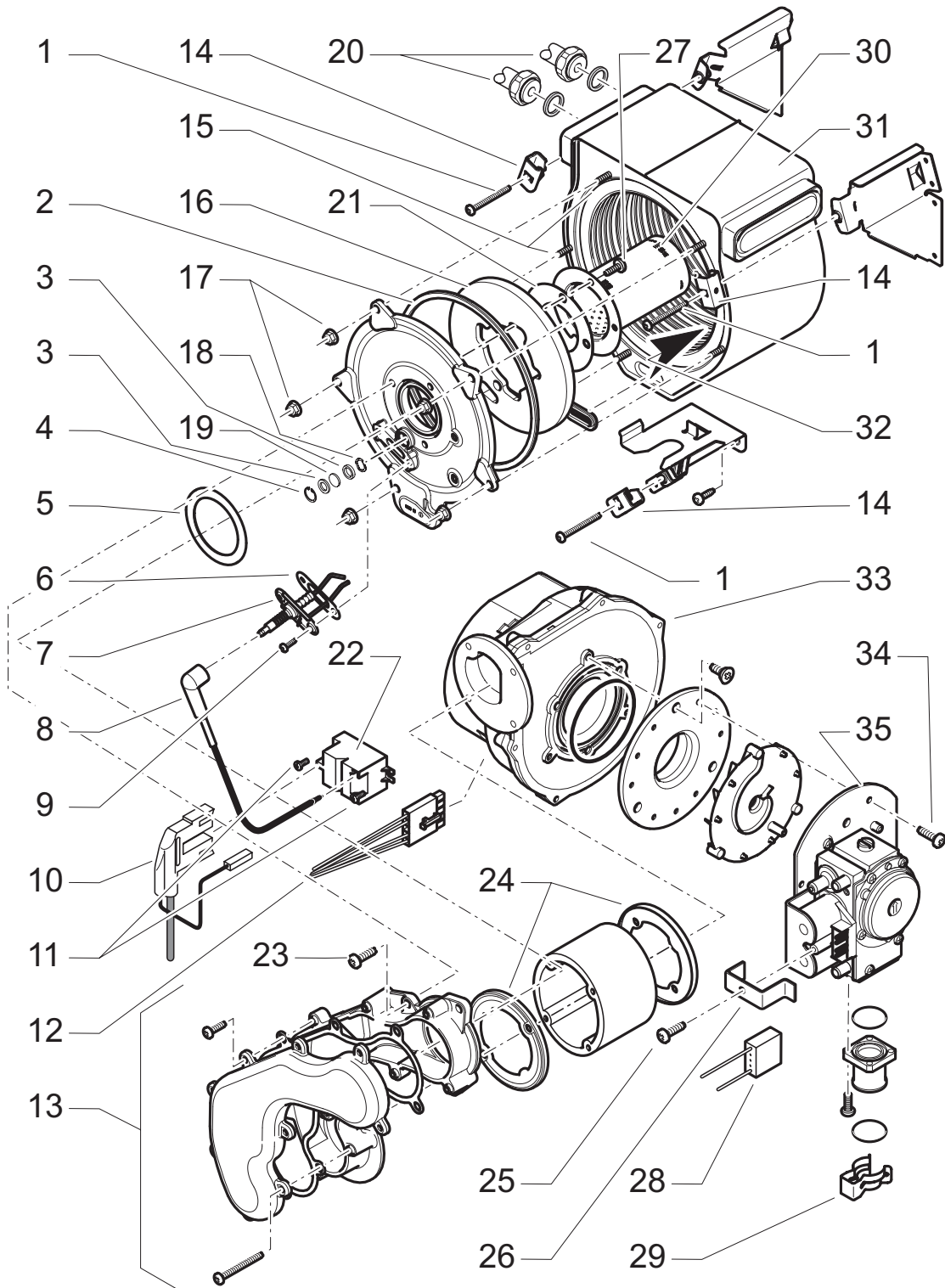
Viewing window

Remove the circlip (4).

Remove the gaskets (3) (18), the viewing window (19) and the spring leaf (18).

Fit the new viewing window and the new gaskets in the reverse order.

13 Replacement of Parts



KEY

- | | | |
|---|--------------------------------------|--|
| 1 Heat exchanger retaining screws | 13 Mixing arm | 25 Gas valve connector retaining screw |
| 2 Gasket | 14 Heat exchanger hanging brackets | 26 Gas valve connector retaining plate |
| 3 Viewing window gasket | 15 Burner assembly retaining screws | 27 Burner retaining screws |
| 4 Viewing window circlip | 16 Insulation | 28 Gas valve connector |
| 5 Gasket | 17 Heat exchanger retaining nuts | 29 Gas valve retaining clip |
| 6 Ignition and control electrode gasket | 18 Spring leaf | 30 Burner |
| 7 Ignition and control electrode | 19 Viewing window | 31 Heat exchanger |
| 8 Ignition and control electrode connector | 20 Heat exchanger hydraulic coupling | 32 Combustion chamber |
| 9 Ignition and control electrode retaining screws | 21 Gasket | 33 Fan |
| 10 Ignition module harness connector | 22 Ignition module | 34 Fan retaining screws |
| 11 Ignition module retaining screws | 23 Mixing arm retaining screws | 35 Gas valve |
| 12 Fan connector | 24 Gasket | |

Diagram 13.2

13 Replacement of Parts

13.3 DHW storage vessel, refer to diagrams 13.3 and 13.4.

Heating expansion vessel

Relieve the heating expansion vessel coupling (6).

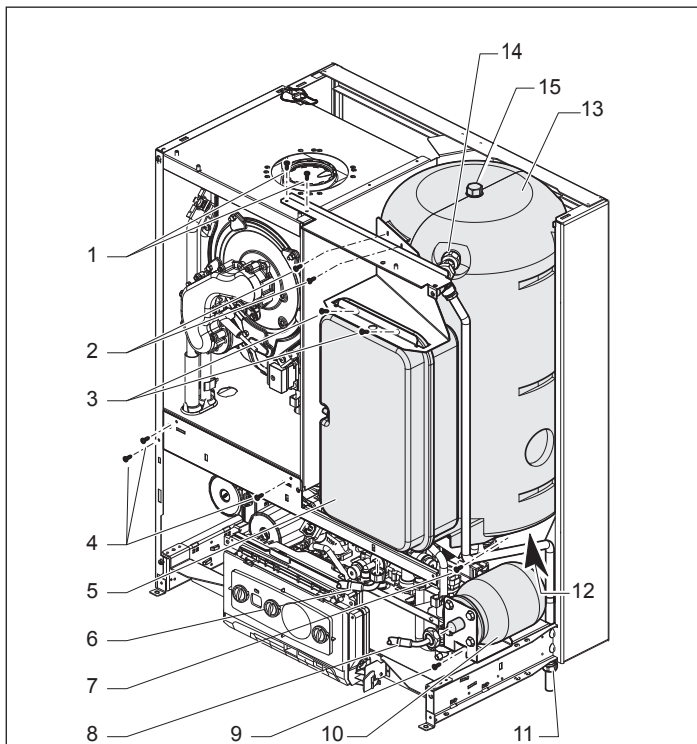
Loosen the screws (2) and (3) of the hanging bracket and remove it.

Remove the heating expansion vessel (5).

Fit the new heating expansion vessel and the new gasket in reverse order.

Refill, vent and pressurise the boiler.

Check for leaks.



KEY

- 1 Hanging bracket retaining screws
- 2 DHW storage vessel retaining screws
- 3 Heating expansion vessel retaining screws
- 4 Tie-rod retaining screws
- 5 Heating expansion vessel
- 6 Heating expansion vessel coupling
- 7 DHW storage vessel retaining screws
- 8 DHW expansion vessel coupling
- 9 DHW expansion vessel retaining screw
- 10 DHW expansion vessel
- 11 Drain nozzle nut
- 12 DHW storage vessel coupling
- 13 DHW storage vessel
- 14 DHW storage vessel coupling
- 15 Storage Anode Protection

Diagram 13.3

13.4 DHW expansion vessel, refer to diagrams 13.3 and 13.4.

Relieve the DHW expansion vessel coupling (8).

Relieve the DHW expansion vessel retaining screw (9).

Remove the DHW expansion vessel (10).

Fit the new DHW expansion vessel and the new gasket in the reverse order.

Refill, vent and pressurise the boiler.

Check for leaks.

DHW storage vessel

Remove the heating expansion vessel (5).

Relieve the DHW storage vessel coupling (12) (14) the drain nozzle nut (11).

Remove the screws (1) (4) and (7), and take off the tie-rod.

Relieve the DHW storage vessel harness.

Relieve the DHW storage vessel (6).

Fit the new DHW storage vessel and the new gasket in the reverse order.

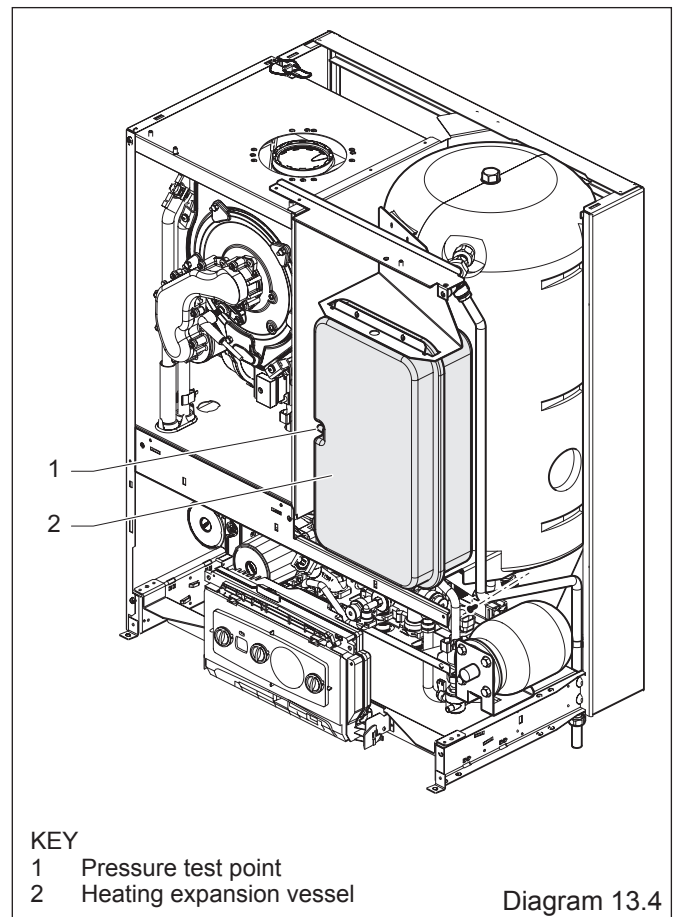
Refill, vent and pressurise the boiler.

Check for leaks.

13.5 Storage Anode Protection

Drain the DHW circuit, refer to section 11.3.

Remove the anode from the vessel and replace with new.



KEY

- 1 Pressure test point
- 2 Heating expansion vessel

Diagram 13.4

13 Replacement of Parts

13.6 Condensate trap, refer to diagram 13.5.

13.5.

Disconnect the connector flexible (5) located under the condensate trap.

Remove the inner front panel.

Loosen both retaining screw (3) of the condensate trap (4).

Remove the condensates recovery equipment by loosening flexibles (1); take care do not spray liquid.

Fit the new condensate trap in the reverse order.

13.7 Access to Switches, User Interface and Programmer

For access, refer to section 13.1.

Release the front of the fascia by carefully prising up the two retaining latches, see diagram 13.6.

Do not allow the front of the fascia to swing down and be loosely held by the electrical connections to the mains/reset switch, user interface and clock. Either remove the connections or support the fascia.

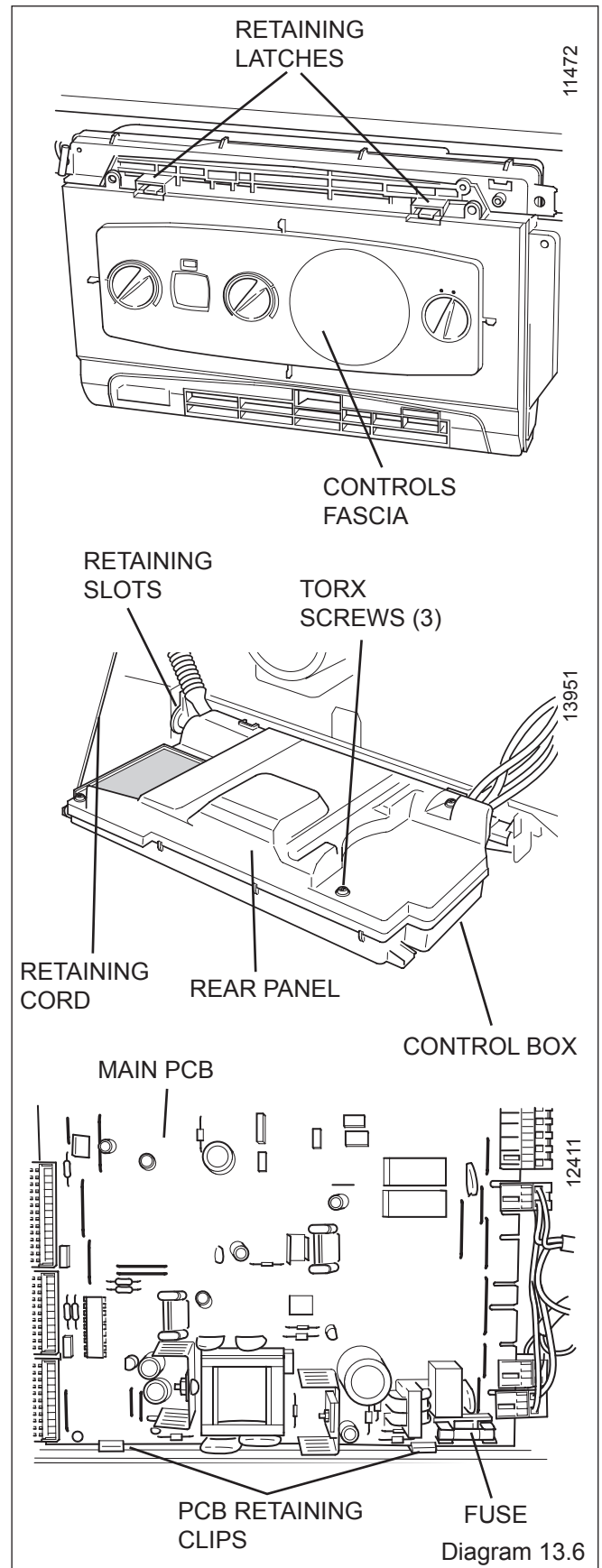
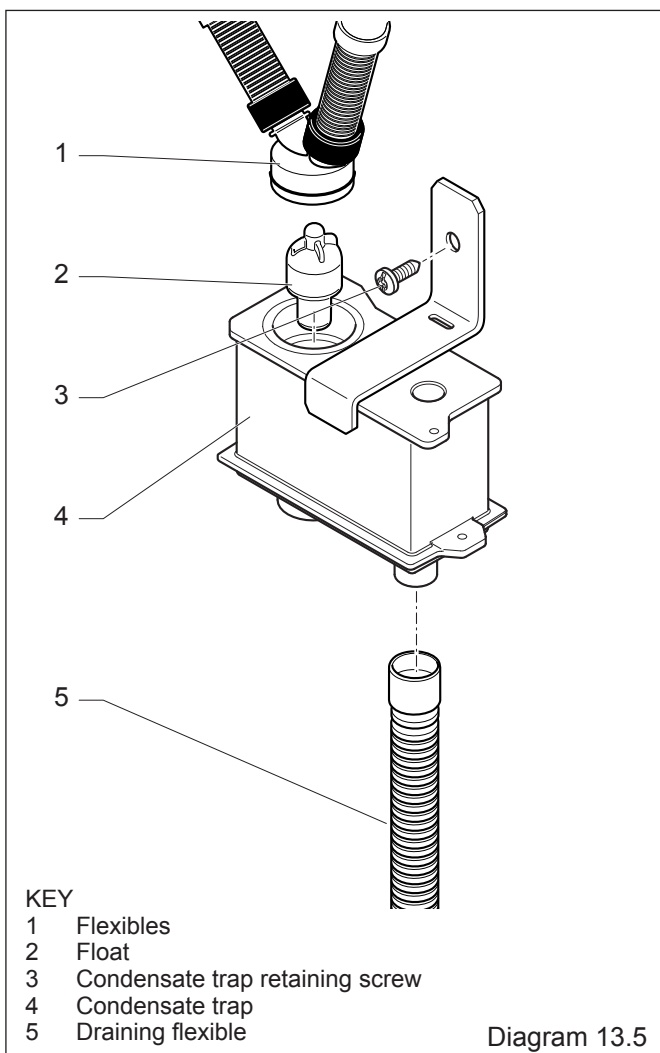
13.8 Mains Reset Switch

Refer to section 13.6 for access.

Remove the switch retaining screw.

Remove switch from housing, see diagram 13.7.

Remove electrical leads.



13.9 Mains Reset Knob

Refer to section 14.6 for access.

Remove actuator by springing back retaining clips, see diagram 13.7.

Spring back knob retaining clips and push knob out from the back.

13 Replacement of Parts

13.10 Main PCB

For access, refer to section 13.7.

Hinge down the control box.

Remove TORX screws and unhook the rear panel.

Remove the electrical connections to the PCB.

Prise back the two PCB retaining clips and withdraw the PCB, see diagram 13.6.

When refitting the rear panel ensure the leads are not trapped, refer to diagram 13.6

13.11 Control Box

For access, refer to section 13.7.

Remove relevant plugs and connectors.

Withdraw grommets and leads so they are hanging loose.

Unthread the retaining cord and remove the control box by drawing it outwards away from its retaining slots, see diagram 13.6.

13.12 Fuse, Main PCB - Control Box

For access, refer to section 13.7.

The fuse is located at bottom right hand side of the PCB, see diagram 13.6.

13.13 User Interface

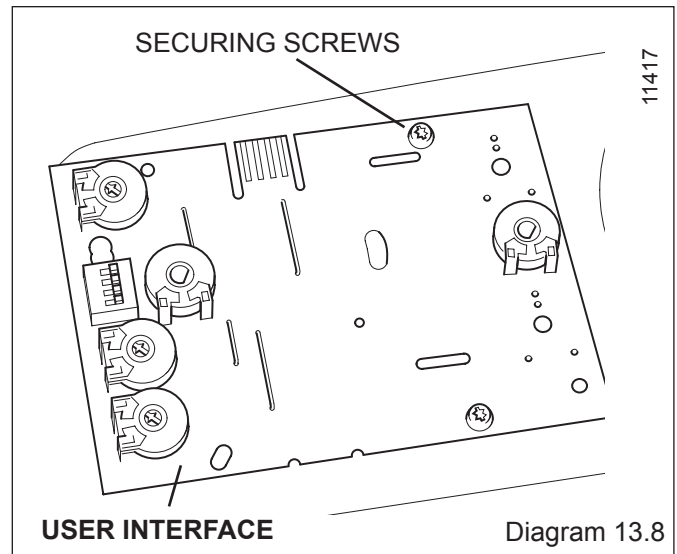
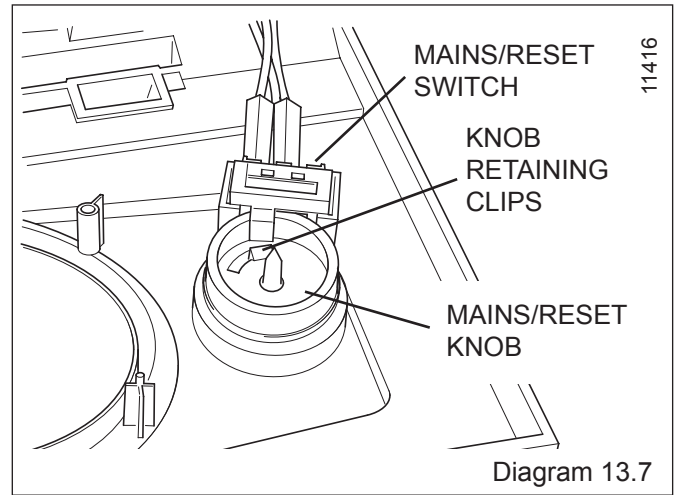
Refer to section 13.7 for access.

Remove electrical plug.

Remove the securing screws, see diagram 13.8.

Withdraw the board.

When replacing the board refer to instructions supplied with replacement PCB on setting it up.



14 Spare Parts

14.1 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 Part No.
1	0020018815	Burner	H49-388
2	0020018814	Burner Gasket	H49-387
3	2000801904	Pressure Relief Valve	E84-000
4	0020018569	Automatic Air Vent	H49-425
5	0020018582	Domestic Hot Water Pump	H49-430
6	0020018567	Heating Pump	H49-423
7	A000035144	Ignition module	H49-421
8	2000801922	User Interface	E91-954
9	0020018607	Main PCB	H49-416
10	0020018828	Fan	H49-409
11	0020018823	Gas Valve	H49-401
12	2000801910	Flow Sensor	E84-014
13	A000024135	Low Water Pressure Sensor	H49-436
14	2000801909	Bypass	E84-016
15	A000035133	3 Way Valve	H49-440
16	2000802748	Domestic Hot Water Safety Valve	H49-439
17	2000801934	Domestic Hot Water Thermistor	E91-995
18	0020018612	Heating Flow Thermistor	H49-420
19	0020018612	Heating Return Thermistor	H49-420
20	0020018608	Overheat Thermostat	H49-417
21	2000802484	Plate to Plate Heat Exchanger	H27-552
22	0020018810	Electrode	H49-383
23	0020018812	Burner Door Seal Kit	H49-385
24	2000801930	Mains Reset Switch	E91957
25	0020018570	Cold Water Filter	H49-441
26	0020018615	Foaming Filter	H49-463
27	2000801907	Filling Tap	E91992
28	A000024237	Tank Thermistor	H49-477
29	0020014726	Storage Anode	-

14 Spare Parts

13952

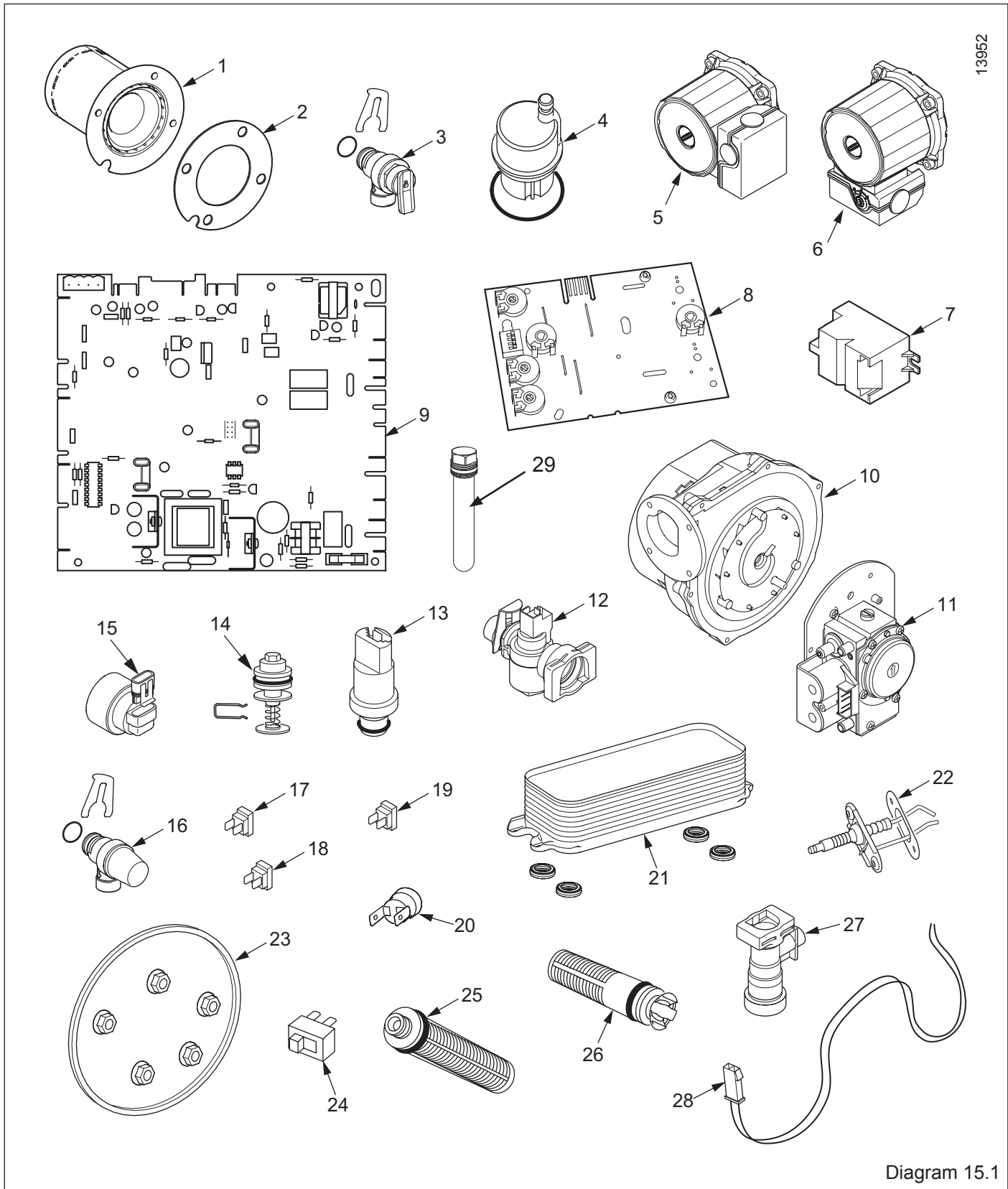


Diagram 15.1

15 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.

16 Declaration of Conformity



EC declaration of conformity

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

Identification of product: Glow worm Xtramax HE

Appliance type: Condensing Wall hung Combination boiler

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

90/396/EEC including amendments "Directive on the approximation of the law of the member states relating to appliances burning gaseous fuels"	Designed and built to CE-type examination certificate: PIN no: CE 1312BP4108
92/42/EEC including amendments "Directive of efficiency relating to boiler burning gaseous fuels"	Designed and built according to European Standards:
73/23/EEC including amendments "Directive on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits"	EN 483 EN 677 EN 625 EN 60335-1 EN 60529 EN 50165 EN 55014 EN 61000-3-2 EN 61000-3-3
89/336/EEC including amendments "Directive on the approximation of the law of the member states relating to electromagnetic compatibility"	

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

Belper, October 2005

Place, Date

Program Manager
S. Keeton

Certification Manager
A. Beardsley

0020025969-04 01.10

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

Glow-worm, Nottingham Road, Belper, Derbyshire. DE56 1JT