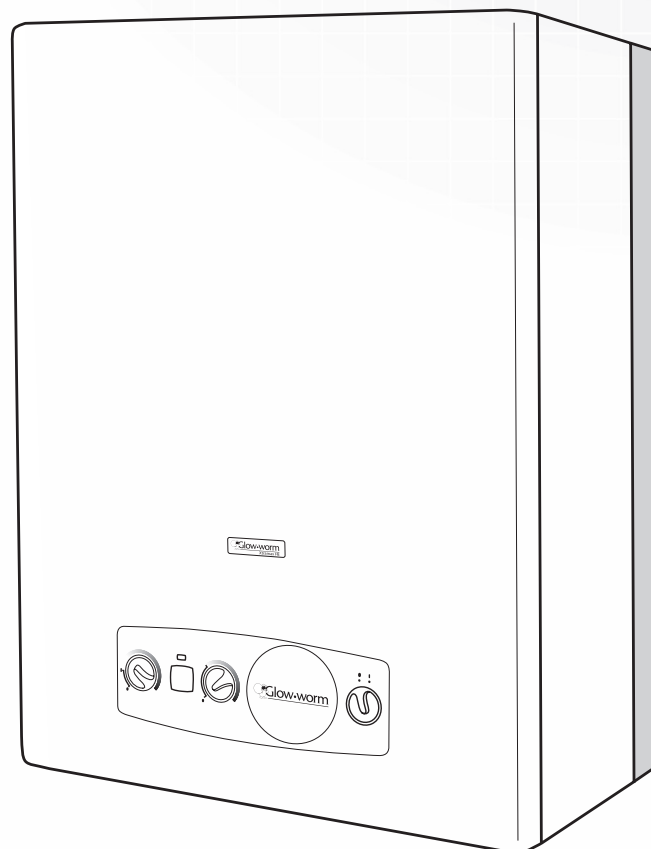


INSTALLATION AND SERVICING

Xtramax HE

G.C. No. 47-047-29



**High Efficiency
Condensing Combination
Boiler**



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

www.glow-worm.co.uk

www.high-efficiency.info

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. In addition this product is guaranteed for 12 months from the date of installation or 18 months from the date of manufacture, whichever is the shorter, for 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 CORGI registered gas installer, 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.

For customer service call:

01773 828100

Technical helpline: 01773 828300

For General and Sales enquiries:

Tel. 01773 824639

Fax: 01773 820569

**To register your Glow-worm appliance
call:**

0800 0732142



The code of practice for the installation,
commissioning & servicing of gas central heating

The instructions consist of two parts, Installation and Servicing Instructions.

The instructions are an integral part of the appliance and must, to comply with the current issue of the Gas Safety (Installation and Use) Regulations, be handed to the user on completion of the installation.

| CONTENTS | DESCRIPTION | SECTION | PAGE |
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Important Information

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.

Gas Category

This boiler is for use on G20 natural gas, but may be adjusted for use on G31 propane.

Gas Safety (Installation and Use) Regulations

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

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.

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.

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.

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 6891.

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

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 may be used, 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).

IMPORTANT NOTE

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

General Information

General Notes and Warnings

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

Please read these instructions and follow them carefully for the correct installation and economical use of your boiler.

The installation and the commissioning of the appliance has to be carried out by a skilled professional who is responsible for the compliance of the installation and the commissioning according to current regulations.

You also have to call on a skilled professional for the maintenance and the repairing of the appliance as well as for any gas adjustment.

Glow-worm has specially designed different accessories for your appliance depending on your installation.

If you want to have a detailed list, please contact your supplier or visit our website www.glow-worm.co.uk.

Please keep this manual as well as any document enclosed with it safe for future reference.

We accept no liability in case of damage due to the non-compliance of the instructions of the present manual.

SAFETY WARNING:

- Do not use or store any explosive material or easily flammable (for example, petrol, paint, etc.) in the room where the appliance is situated.
- Never switch off the safety devices and do not try to handle these devices as this could lead to a malfunction.

Do not change:

- The appliance,
- The appliance environment,
- Water, air, gas and electric supply,
- Flue system.
- Never carry out by yourself maintenance or repairing operations on the appliance.

In case of a water leakage, immediately close the cold water inlet of the appliance and call a skilled professional to repair the leakage.

- Do not break sealed mechanisms.
- Do not modify the technical conditions close to the appliance, as these are very important as far as the appliance safety is concerned.

For example: the minimum clearances of the external sides.

SAFETY WARNING:

- A heating safety valve with a discharge pipe and a domestic hot water pressure relief valve with a discharge pipe are fitted to this appliance. The valves must not be touched except by a skilled professional.

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

SAFETY WARNING:

- We advise you to be very careful when adjusting hot water temperature: water can be very hot when releasing from the draw off tap.

Water Treatment

In the case of an existing system, 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 restorer or Salamander corrosion guard cleaner. For long-term corrosion protection, after flushing, an inhibitor suitable for stainless steel 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.

Compartment or Cupboard Installations

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.

Clearances

If fixtures are positioned close to the boiler, space must be left as shown in diagram 2.1.

Condensate Drain

The condensate drain, see section 8.2, must not be modified or blocked.

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. It is normal and not a fault indication.

Cleaning

The boiler casing can be cleaned using a mild liquid detergent with a damp cloth, then a dry cloth to polish.

Do not use any form of abrasive or solvent cleaner as you may damage the paintwork. Do not use any aerosols, solvents, abrasive cleaner, detergents with chlorine, paint, glue, etc. near the appliance. Under unfavourable conditions, these substances can be very corrosive even for the flue.

Electrical Supply

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: If you have a sealed water system contact your installation/servicing company as draining, refilling and pressurising MUST be carried out by a competent person.

Appliance Safety Devices

Electrical Supply Failure Reset Switch

The boiler will not work without an electrical supply. Normal operation of the boiler should resume when the electrical supply is restored. Reset any external controls, to resume normal operation of the central heating. If the boiler does not resume normal operation turn the mains reset switch off and on. If the boiler does not resume normal operation after this 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.

Safety Discharge Valve

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

Frost protection

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

Maintenance and Servicing

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** 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 IMPORTANT NOTICE

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

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

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

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

1.2 Statutory Requirements

In GB the installation of the boiler must be carried out by a competent person as described in the following regulations:

The manufacturer's instructions supplied.

The Gas Safety (Installation and Use) Regulations.

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

The Water Fittings Regulations or Water byelaws in Scotland.

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

The Current I.E.E. Wiring Regulations.

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

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

In 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.

In 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 references:

1) GIL 59, 2000: Central heating system specification (CheSS) and

2) GPG 302, 2001: Controls for domestic central heating system and hot water. BRECSU.

1.3 Gas Supply

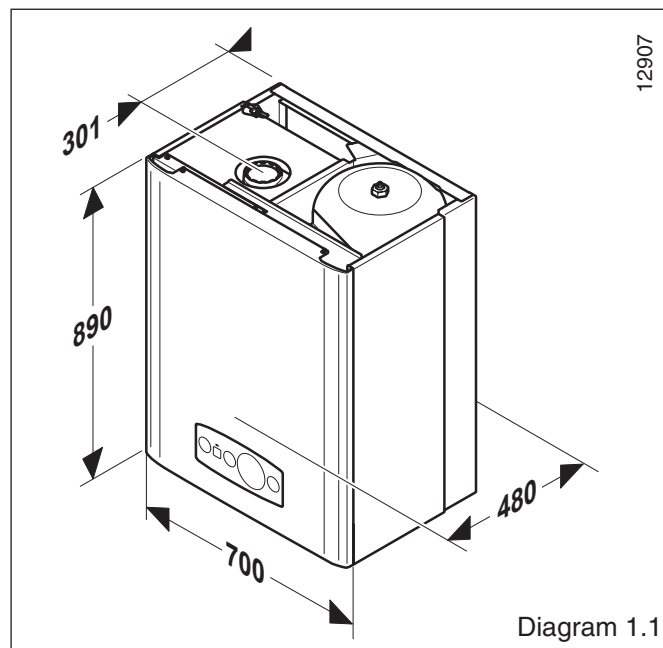
The gas installation must be in accordance with the relevant standards.

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 soundness using the pressure drop method and suitable leak detection fluid, purge in accordance with the above standard.



1.4 Technical Data

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

See diagrams 1.1, Table 1, Table 1 continued and Table 2.

1.5 Condensate Drain

A plastic drain pipe must be fitted to the flexible pipe supplied to allow discharge of condensate to a drain.

Condensate should, if possible, be discharged into the internal household draining system. If this is not practical, discharge can be made externally into the household drainage system or a purpose designed soak away, see section 8.2 for more details.

1 Technical Information

TABLE 1

Boiler type C13, C33, C53

| Description | Unit | Xtramax HE |
|---|-------|-------------|
| Gas category | | II2H3P |
| 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 |
| Specific flow rate (D) (T 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 |

1 Technical Information

TABLE 1 (continued)

| 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 |

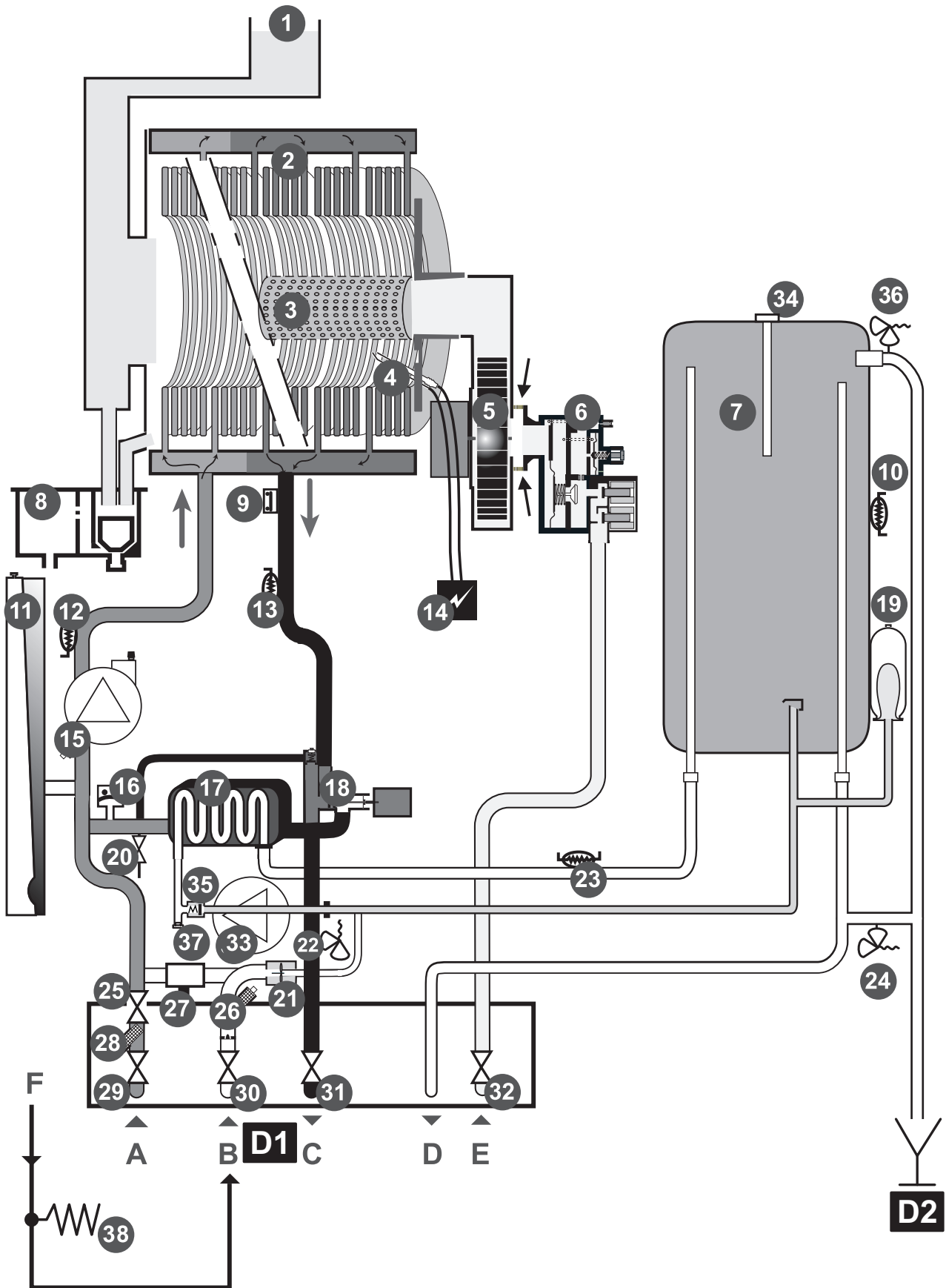
TABLE 2

| 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

SCHEMATIC DIAGRAM



1 Technical Information

SCHEMATIC DIAGRAM KEY

| | | | |
|----|---|----|--|
| 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 | A | Heating return |
| 16 | Water pressure sensor | B | Cold water inlet |
| 17 | Domestic plate to plate heat exchanger | C | Heating flow |
| 18 | Three way valve | D | Domestic hot water outlet |
| 19 | Domestic expansion vessel | D1 | Discharge from HTG safety valves |
| 20 | Drain cock | D2 | Discharge from temp / press and expansion valve (to tundish) |
| 21 | Flow switch | E | Gas |
| 22 | Heating discharge safety valve | F | Cold water supply |
| 23 | DHW temperature sensor | | |
| 24 | DHW discharge safety valve | | |

2 Boiler Location and Ventilation

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.

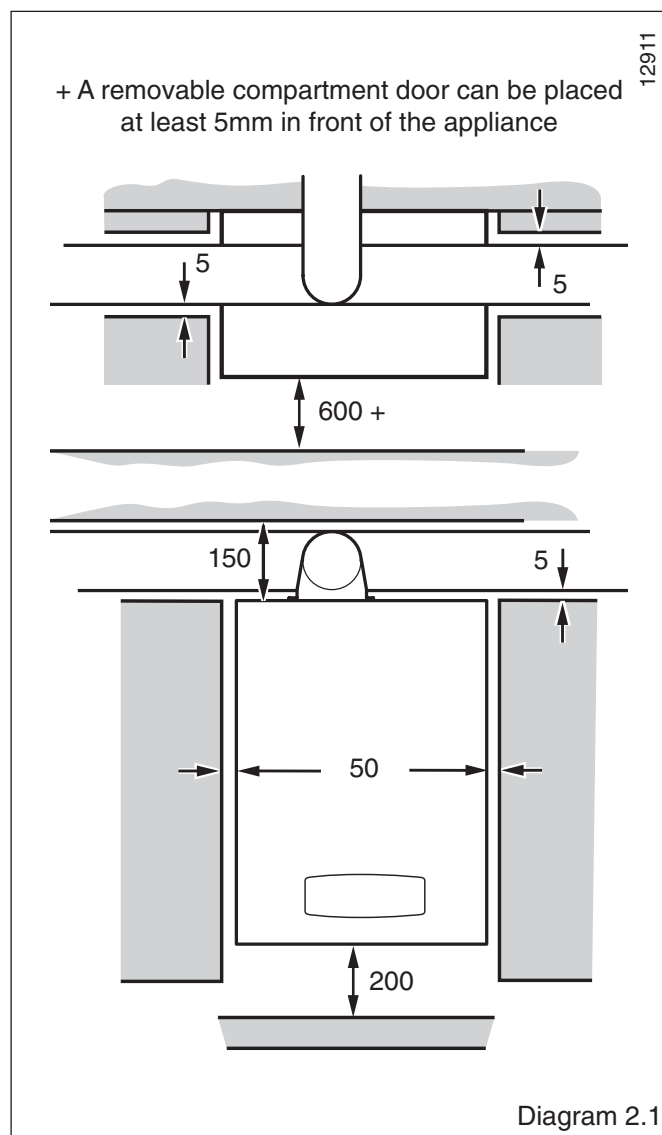
2.4 Room Ventilation

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

2.5 Cupboard or Compartment Ventilation

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

Leave existing air vents.



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.

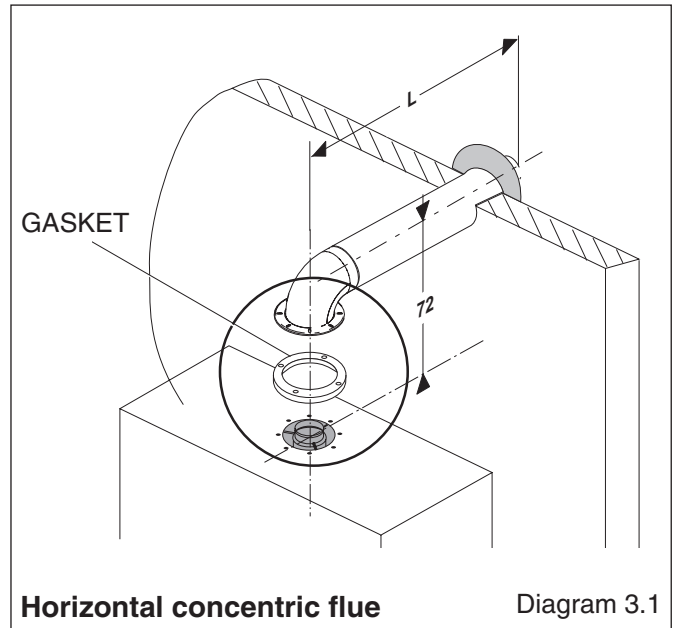
Vertical Concentric Flue - The maximum permissible vertical flue length is 5.5 metres plus 1 90° elbow. This can be achieved by the use of The concentric flue accessories, however, for every 90° or 45° elbows used the flue length MUST be reduced by 1 metre.

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

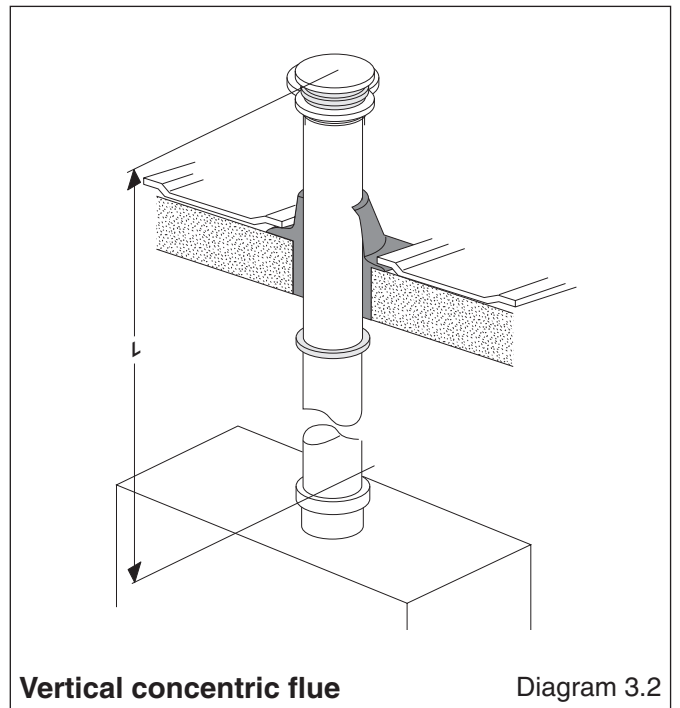
Additional accessories are available.

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



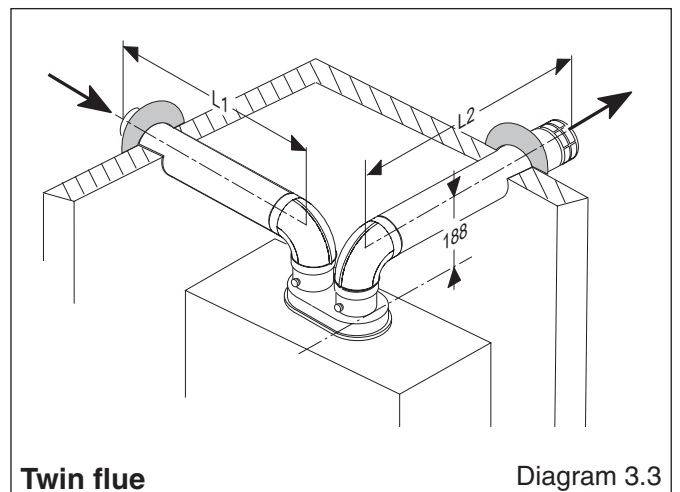
Horizontal concentric flue

Diagram 3.1



Vertical concentric flue

Diagram 3.2



Twin flue

Diagram 3.3

3 Flue Location and Ventilation

3.4 Terminal Position

The minimum acceptable siting dimensions for the terminal from obstructions, other terminals and ventilation openings are shown in diagram 3.5. 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 3.5 . 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).

3.5 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 3.6.

A suitable guard is manufactured by: -

Tower Flue Components

Morley Rd.

Tonbridge

Kent

TN9 1RA.

Size: 280mm x 280mm x 270mm.

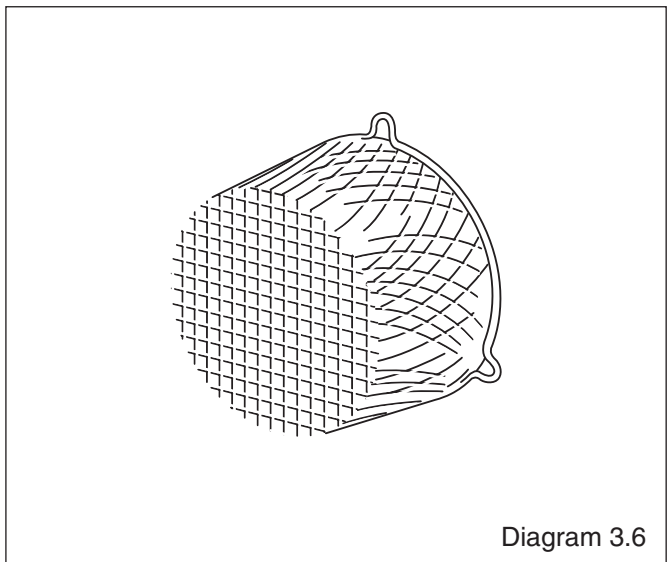


Diagram 3.6

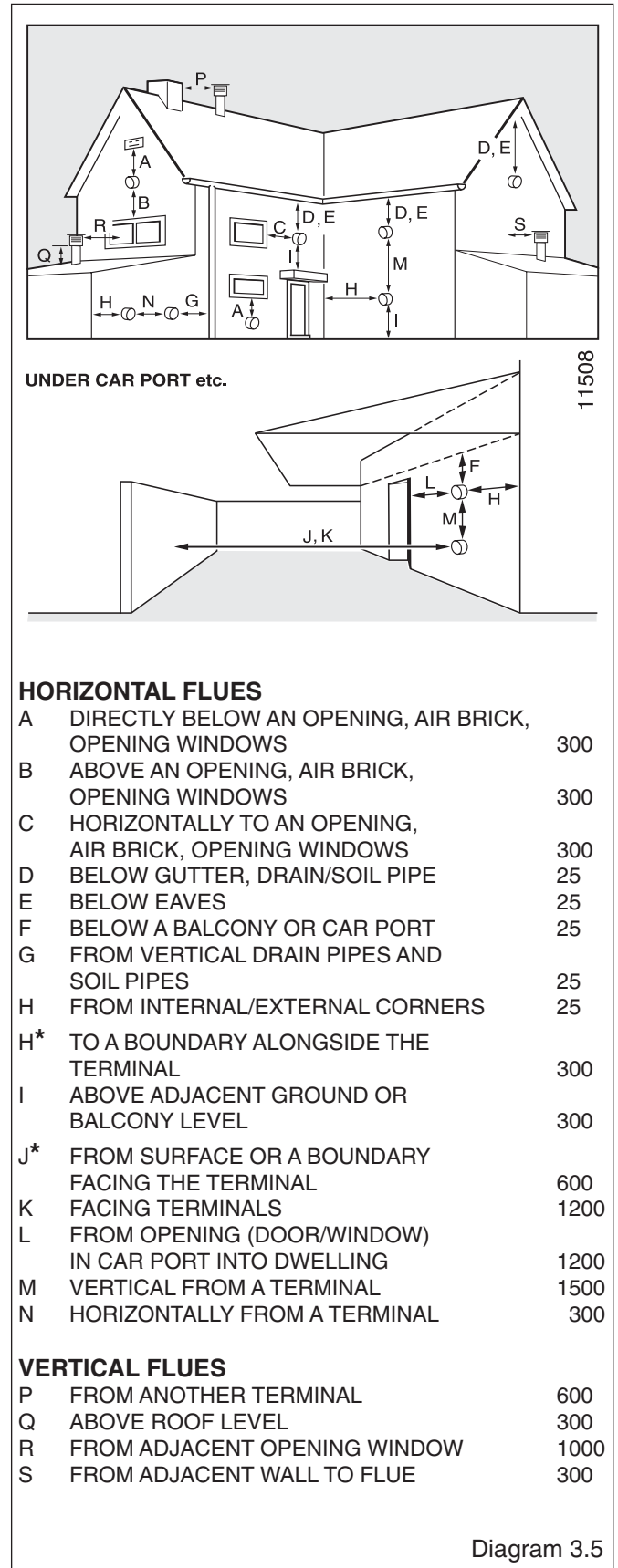


Diagram 3.5

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 Health and Safety Manual Handling requirements, two persons shall be required to lift the appliance.

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, on page 5.

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.

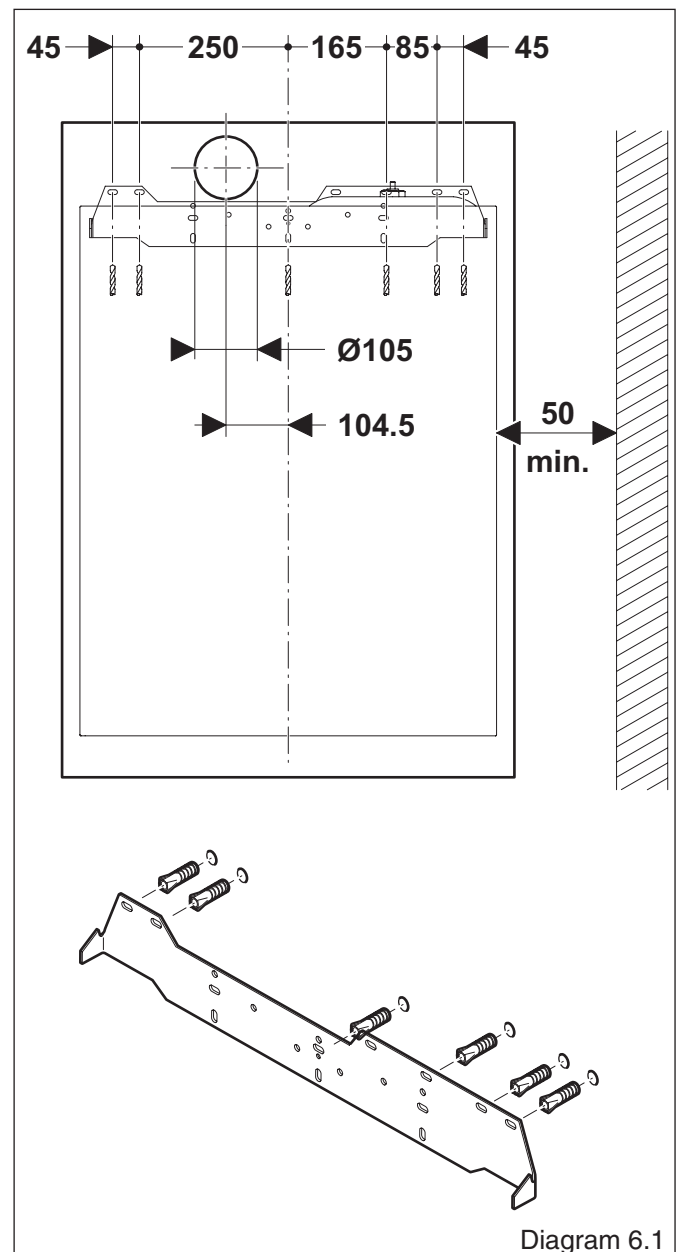


Diagram 6.1

7 Gas / Water & Appliance Connection

7.1 Gas Connection, refer to diagram 7.1

Before connection check supply of local gas.

Refer also to section 1.2.

Do not subject the gas service cock to heat.

The whole of the gas installation, including the meter, should be inspected, tested for soundness 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 Connections and Appliance Connection, refer to diagram 7.1

Before undertaking any operation, carefully clean the pipes with an appropriate product in order to remove impurities such as filings, welds, different 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 could 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.

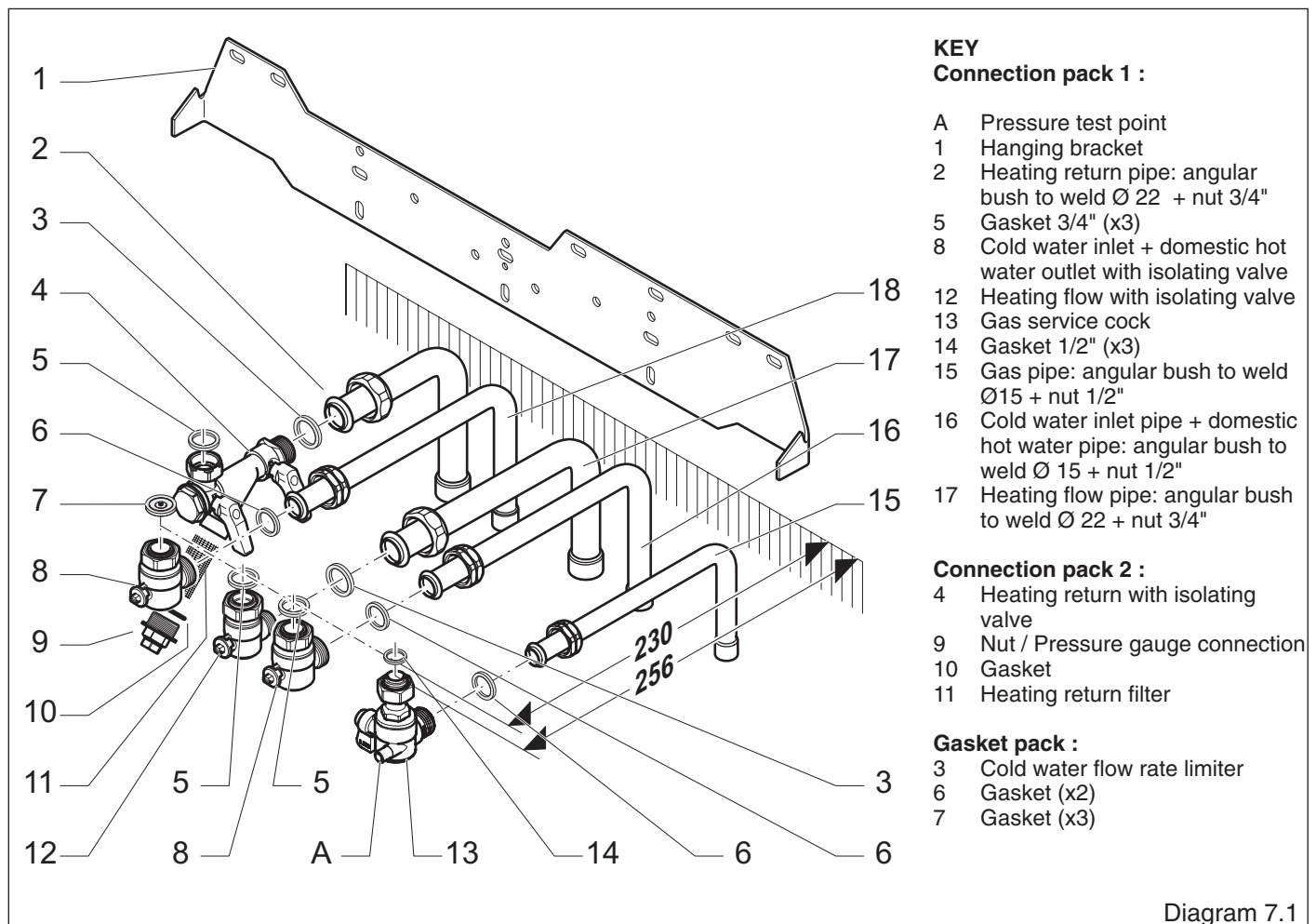


Diagram 7.1

8 Safety Discharge, Condensate & Tundish Connections

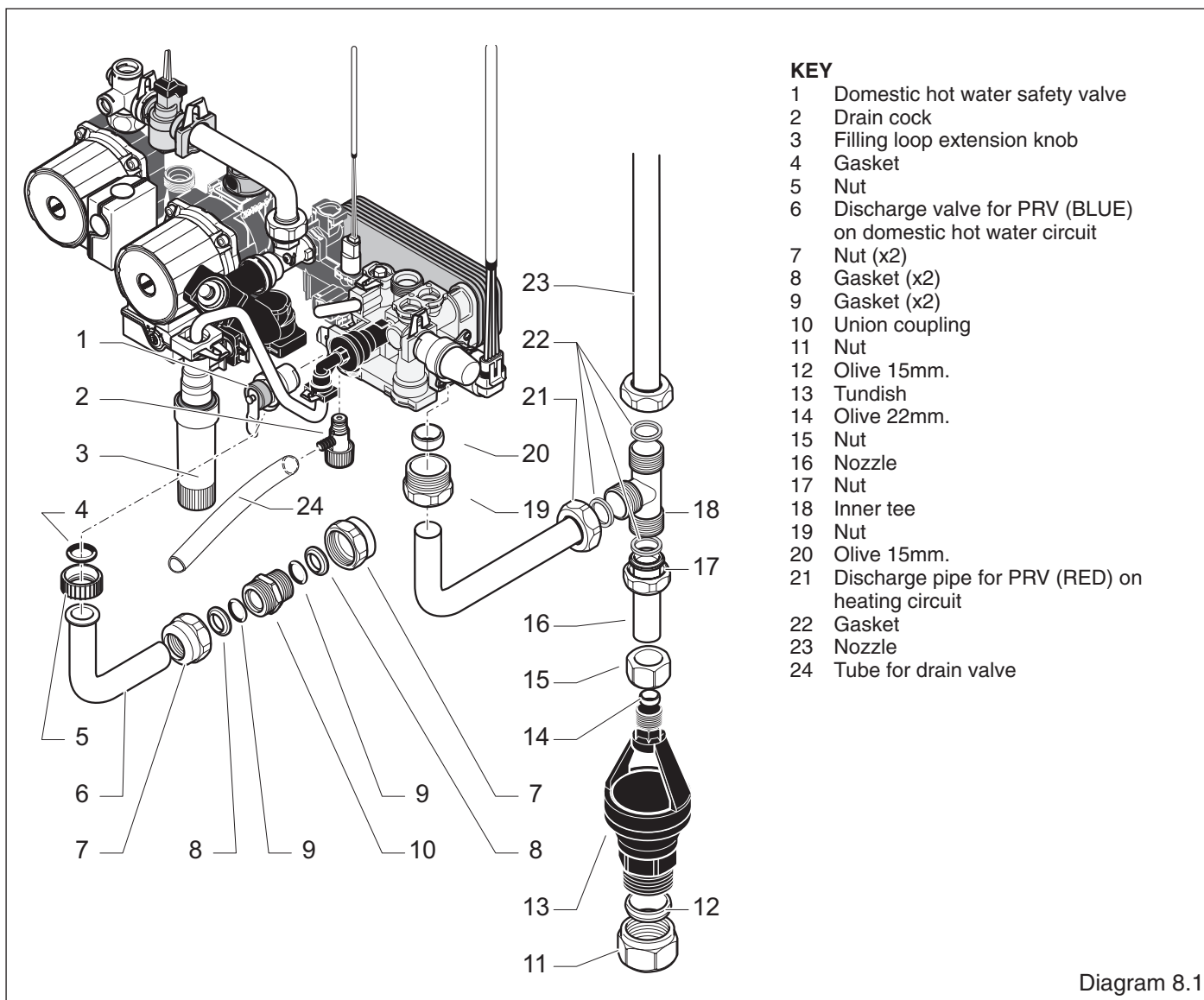


Diagram 8.1

8.1 Safety Discharge Valve, refer to diagram 8.1

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.

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.

8.2 Condensate Drain Connection, refer to diagram 8.2

Connect the flexible pipe to a discharge system leading to the sewer in compliance with the instructions below: Use the condensate drain flexible connection pipe supplied (2). Ensure there is a continual fall of 2.5° (44 mm/m).

(Do not use copper pipes).

Condensate should, if possible be discharged into the household internal drainage system.

If this is not practicable, discharge can be allowed into the external household drains or a purpose designed soak away, refer to diagram 8.4.

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.

8 Safety Discharge, Condensate & Tundish Connections

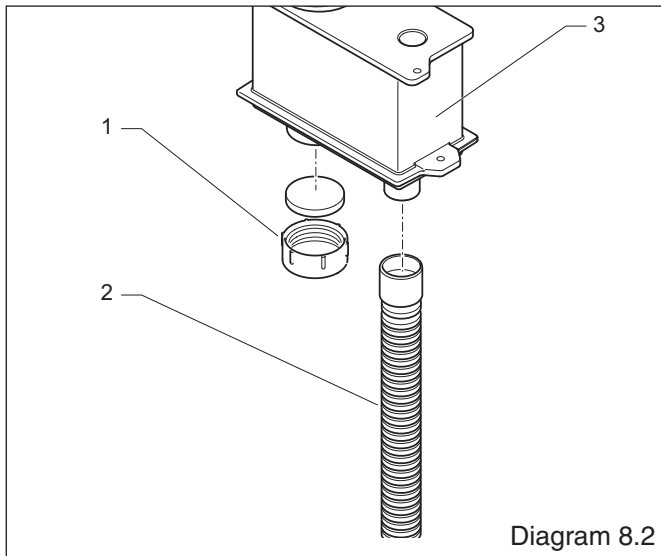


Diagram 8.2

8.3 Tundish discharge, refer to diagram 8.3.

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 (see chapter Block diagram).

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.

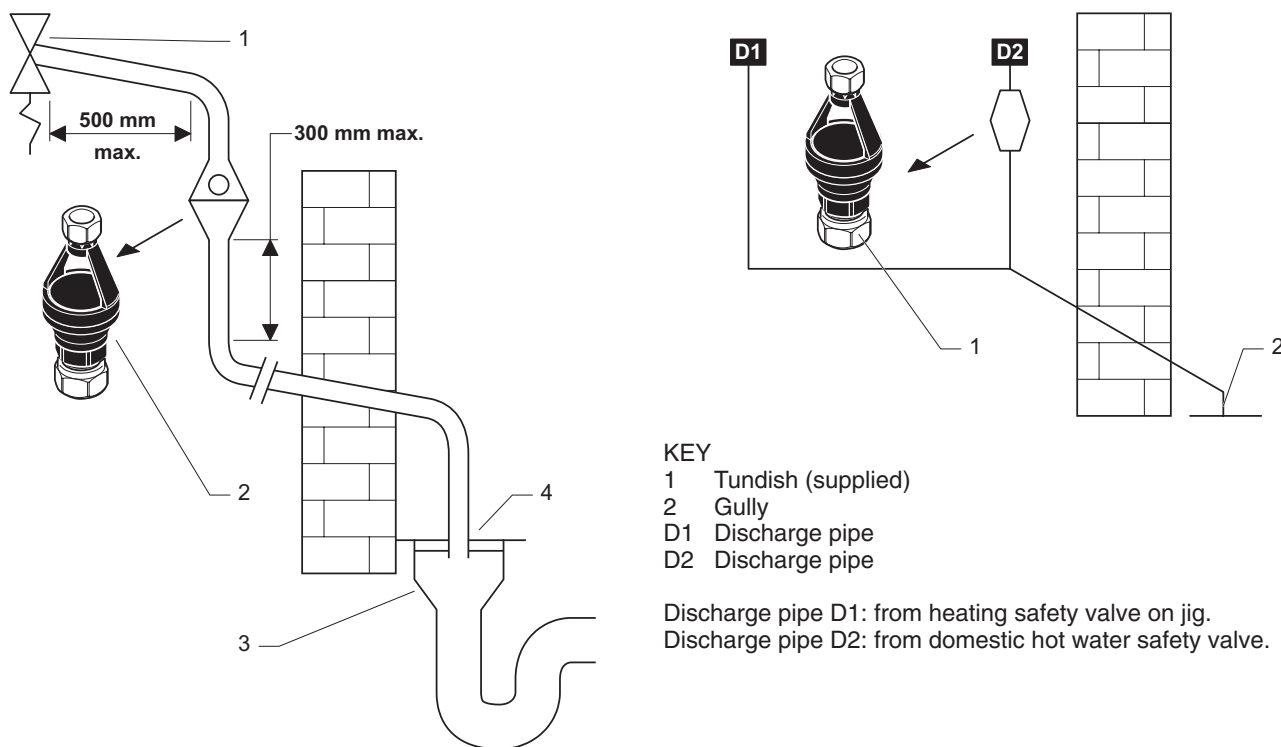
Do not interrupt the mains supply with a time switch or programmer.

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 Safety Discharge, Condensate & 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 up to 18 m up to 27 m | 0.8 m 1.0 m 1.4 m |
| G 3/4" | 22 mm | 28 mm 35 mm 42 mm | | 1.0 m 1.4 m 1.7 m |
| G 1" | 28 mm | 35 mm 42 mm 54 mm | | 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.

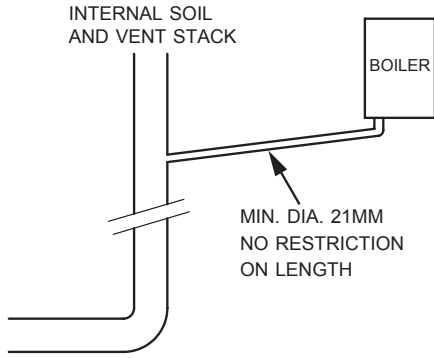
- KEY
- 1 Safety device eg. temperature relief valve
 - 2 Tundish (supplied)
 - 3 Trapped gully
 - 4 Fixed grating

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

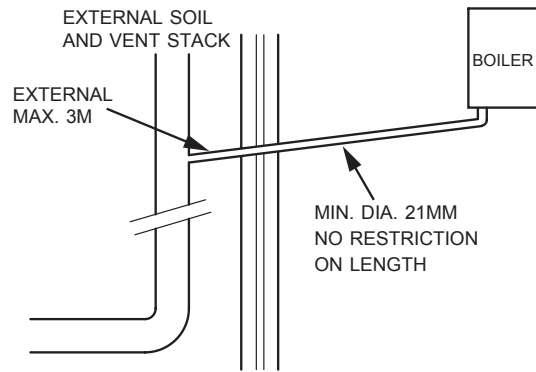
Diagram 8.3

8 Safety Discharge, Condensate & Tundish Connections

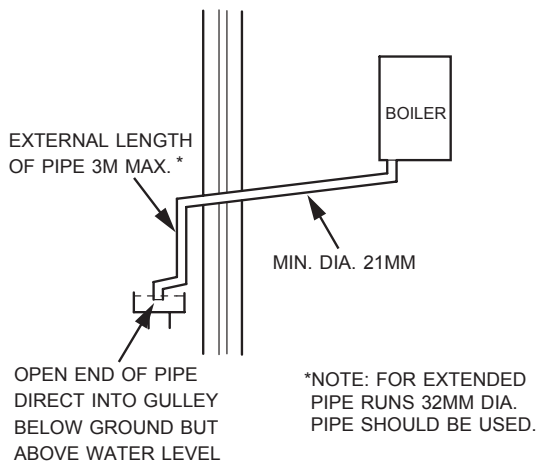
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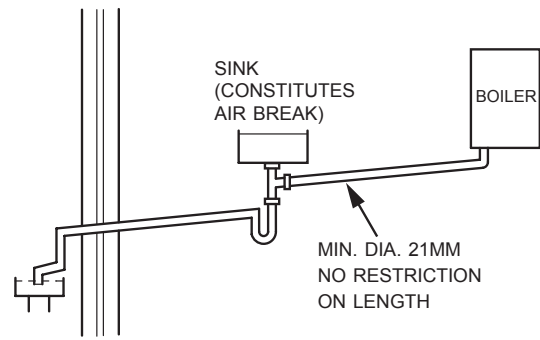
Internal Soil and Vent Pipe



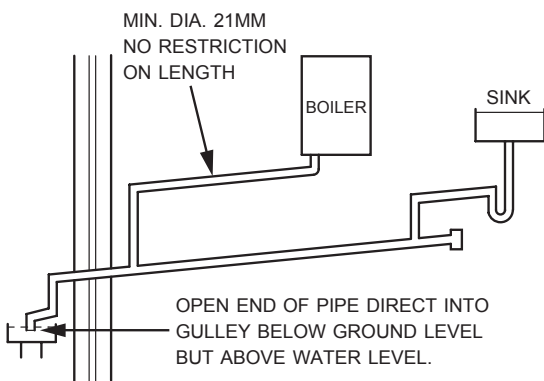
External Soil and Vent Pipe or Rainwater Pipe



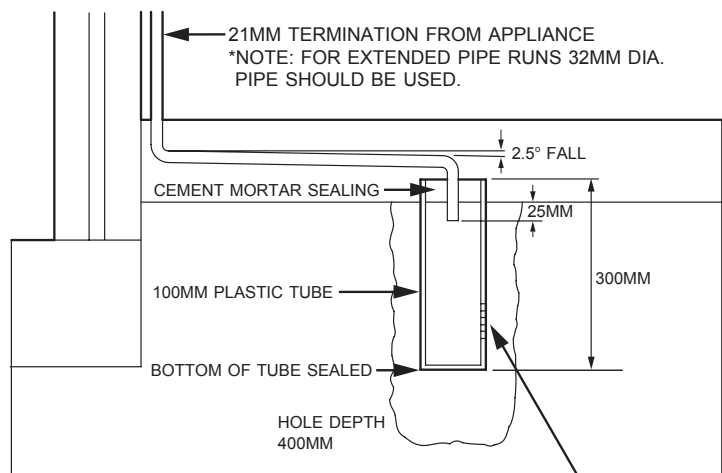
External Termination to a Gulley or Hopper



Internal Termination into Combined Sink Waste



Internal Termination Downstream of Sink Waste



External Termination into Soakaway

2 ROWS OF 3 x 12MM HOLES AT 25MM CENTRES 50MM FROM BOTTOM OF TUBE. HOLES TO FACE AWAY FROM HOUSE.

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

9 Electrical Connection

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 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.

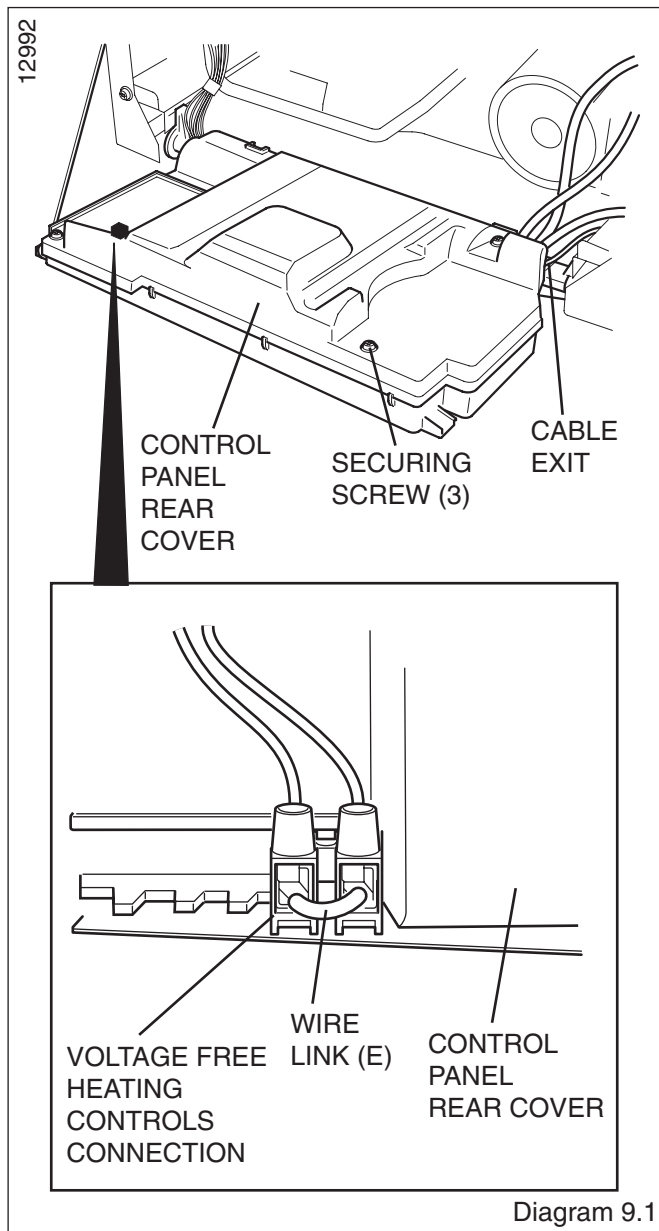
9.3 Voltage Free System Controls

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.

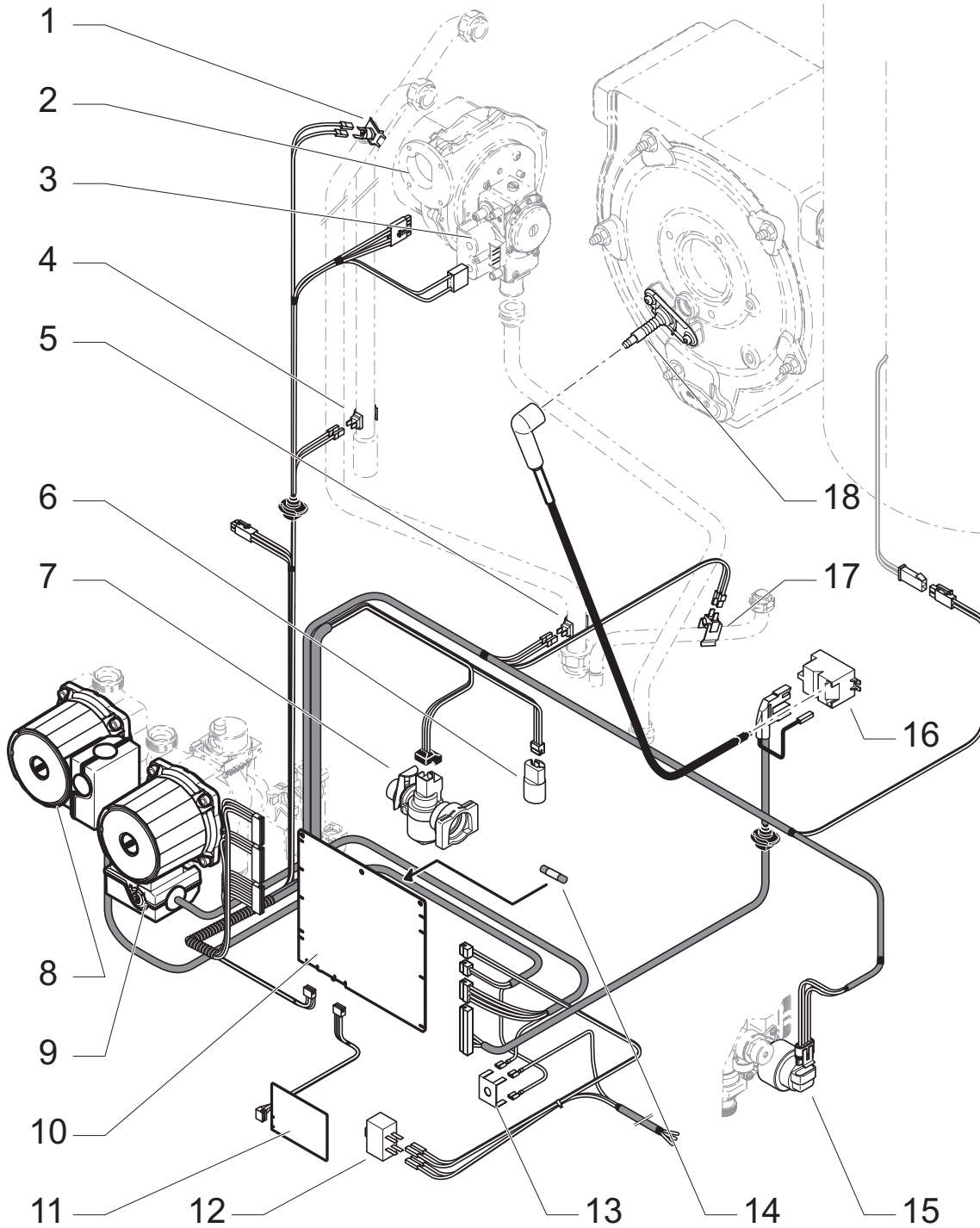
System heating controls e.g. Room thermostat, should be fitted in accordance with the rules in force.

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



9 Electrical Connection

WIRING DIAGRAM



KEY

- 1 Overheat thermostat
- 2 Fan
- 3 Gas valve
- 4 Heating return thermistor
- 5 Heating flow thermistor
- 6 Water pressure sensor
- 7 Water flow sensor
- 8 DHW pump
- 9 Heating pump

- 12 Main reset switch
- 13 Chassis earth
- 14 Fuse
- 15 Three way valve
- 16 Ignition module
- 17 DHW temperature sensor
- 18 Ignition and control electrode

- 10 Main board
- 11 User interface

Diagram 9.2

10 Commissioning

10.1 LPG CONVERSION

NOTE: Steps 10.2 to 10.4 will need to be completed before the appliance can be converted.

The Xtramax HE can be converted to run on LPG-Propane (G31).

This conversion should only be carried out by a competent person.

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

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

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

Ensure that the appliance supply pressure = 37mbar.

- (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% \pm 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) 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.

NOTE: After re-fitting the inner front case, the CO2 values must correspond to that given in table 3.

10.2 Reactivation

After setting and reassembly, restore the maximum heating power to its initial value (20 kW).

Stick the gas data label close to the nameplate.

10.3 Filling the Heating 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 soundness of the complete domestic water system.

10.4 Filling the Heating Circuit

Refer to section 4 to fill the system.

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.

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.

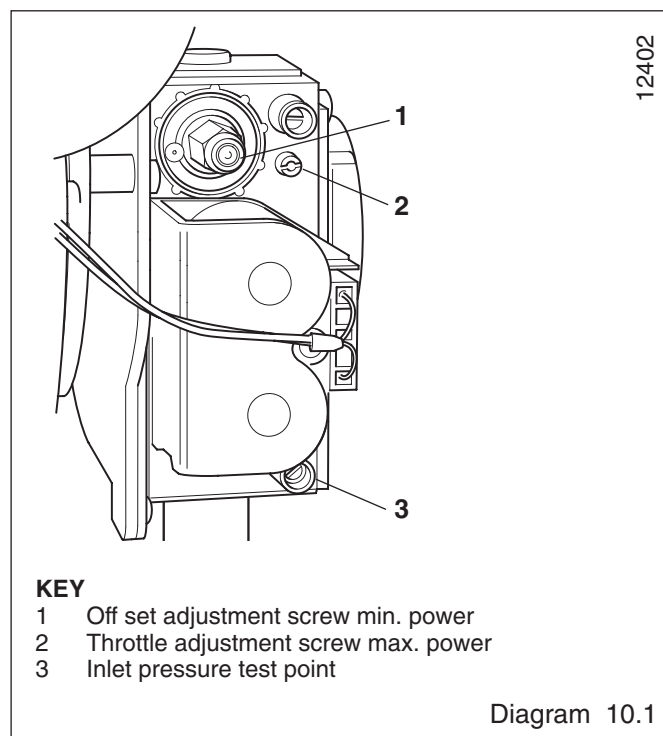
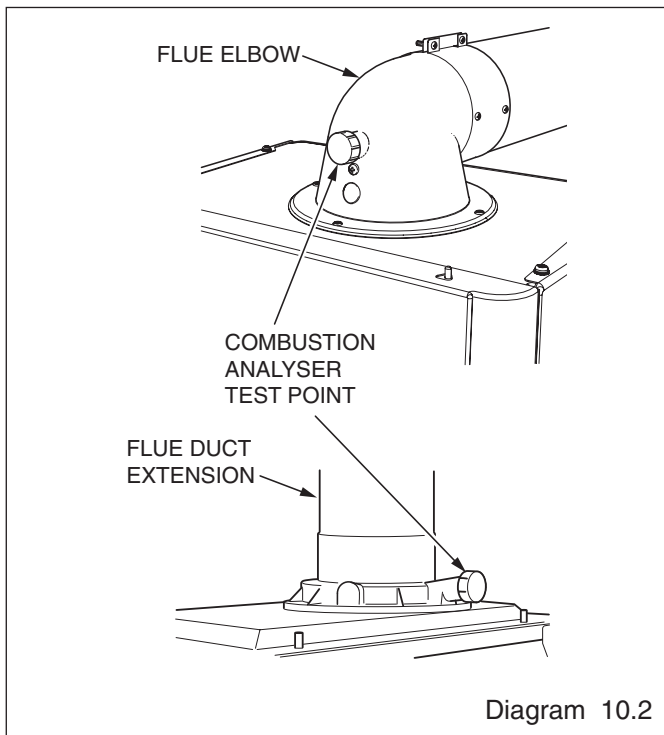


TABLE 3

| Gas changing adjustment | Unit | G20 | G31 |
|-------------------------------|------|-------------|--------------|
| Heating output max. hot water | kW | 34.2 | |
| Heating output min. heating | kW | 8 | |
| CO2 case off | % | 9 +/- 0.2 | 10.1 +/- 0.2 |
| CO2 case on | % | 9.2 +/- 0.3 | 10.3 +/- 0.3 |

10 Commissioning



The system pressure is displayed on the controls panel fascia of the appliance, see diagram 1 of the User Instructions.

Open the auto air vent on the pump as well as the automatic bleeders of the system.

Open the blue filling loop valve situated under the boiler until you obtain a 2 bars pressure on the indicator.

Bleed each radiator to remove the air, re-tighten bleed screws. Leave the cap on the pump auto air vent open.

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.

Re-fill system as necessary.

Check the heating system and boiler connections for water soundness.

10.5 Preparation for Lighting

Isolate the boiler from the mains electrical supply.

Test for gas soundness and purge air from the gas supply. Turn on the gas service cock.

10.6 Initial Lighting

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.

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.

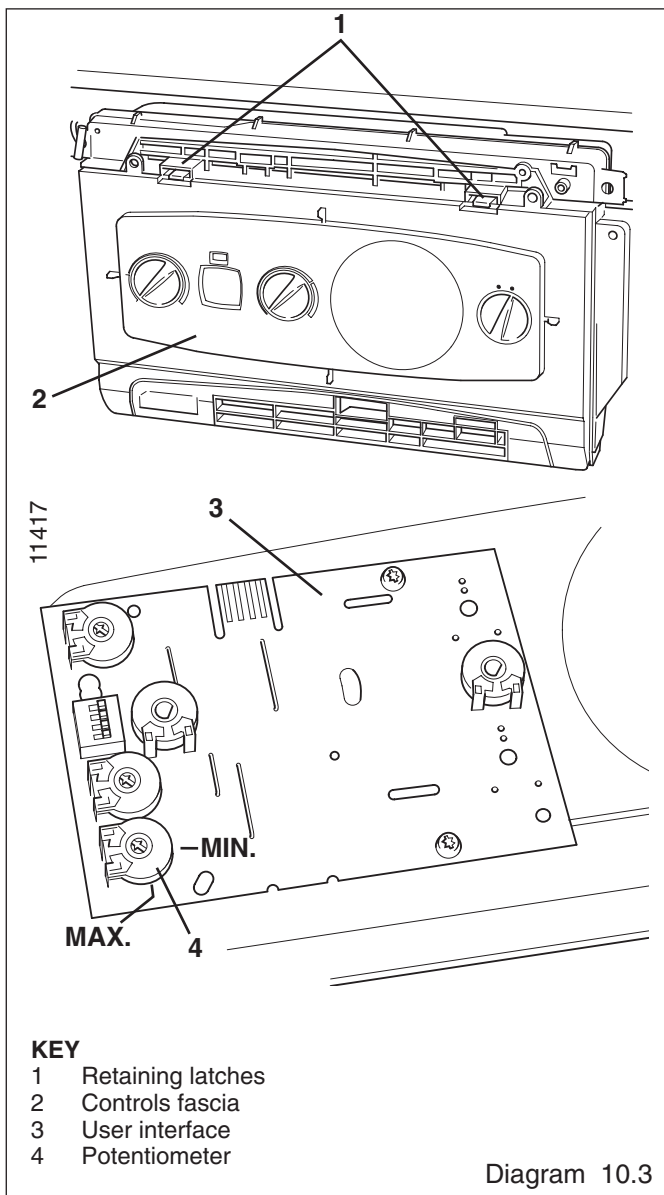
NOTE: If the appliance is operated above MINIMUM on initial lighting, there is a possibility that the overheat thermostat will trip and "F5" will be displayed on controls fascia, this is due to air not having been completely purged. See diagram 9.1 for main reset switch.

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.

NOTE: After first power up the firing sequence for central heating changes. After one minute stabilisation time the boiler will ramp slowly to full rate rather than going immediately to full rate. This is an adaptive feature to cope with small system requirements.



- KEY**
- 1 Retaining latches
 - 2 Controls fascia
 - 3 User interface
 - 4 Potentiometer

10 Commissioning

10.7 Testing - Natural Gas ONLY

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

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

Turn taps off and disconnect pressure gauge.

10.8 Testing - 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 10.3.

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 10.2.

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.

10.9 User Controls and Options

Reminder, leave these instructions and the 'Benchmark' logbook with the user.

The mains reset on/off switch is used to restart the boiler after a fault condition has occurred, i.e. ignition failure, low water pressure or high water temperature.

The central heating water temperature and hot water temperature control knobs allow the user to set the temperatures in each mode.

NOTE: If there is no demand the digital display shows the water pressure.

Temperature Display

The digital display normally shows the operating temperature of the unit when there is a central heating demand.

Holiday Mode

Normal mode uses the domestic hot water and central heating temperatures selected.

By turning the central heating water temperature and hot water temperature control knobs to minimum setting the holiday mode is set up. However, frost protection and pump exercise programme remain active. By doing this the DHW will operate and DHW will set at maximum temperature. To resume normal operation after a holiday period, return the control knobs to their original position.

10.10 Control / Commissioning

Once the appliance is installed, check whether it runs:

Start the appliance according to the indications of the operating instructions and check whether it runs.

Check the appliance for leaks (gas and water) and eliminate any leakage found.

Check that the ignition is correct and that the flames of the burner are uniform.

Check that the flue exhausts properly.

Check the whole control and safety devices, their setting and their operating state.

10.11 Spare parts

In order to guarantee a long-lasting operating of the parts of the appliance and keep it in good condition, only original spare parts from Glow-worm should be used when repairing and servicing the appliance.

Only use original spare parts.

Make sure that these parts have been correctly assembled with regards to their position and basic sense.

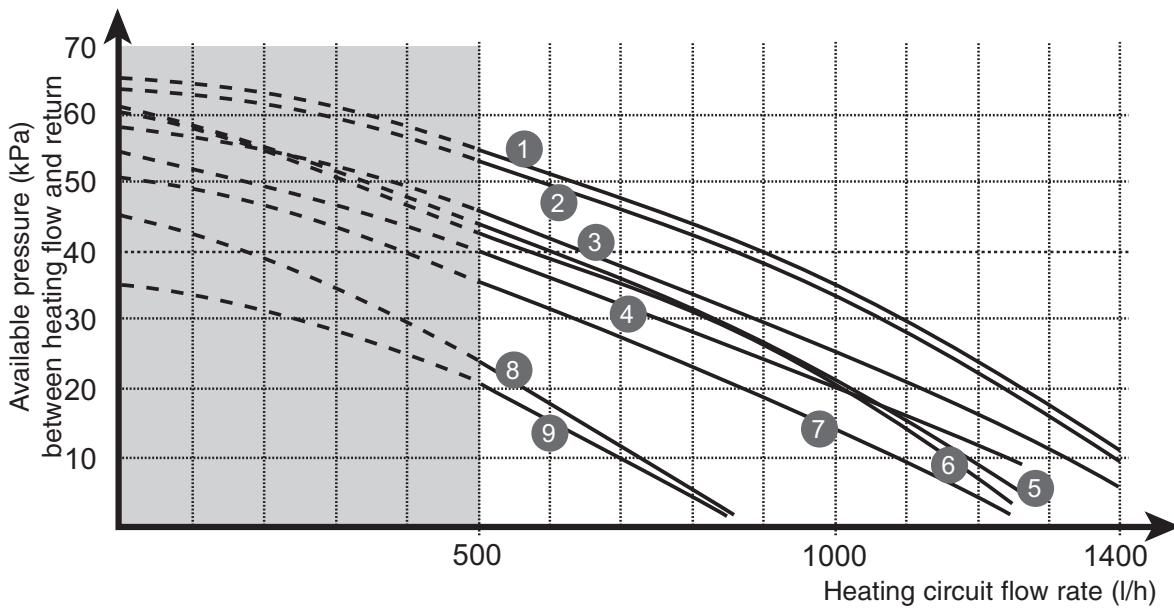
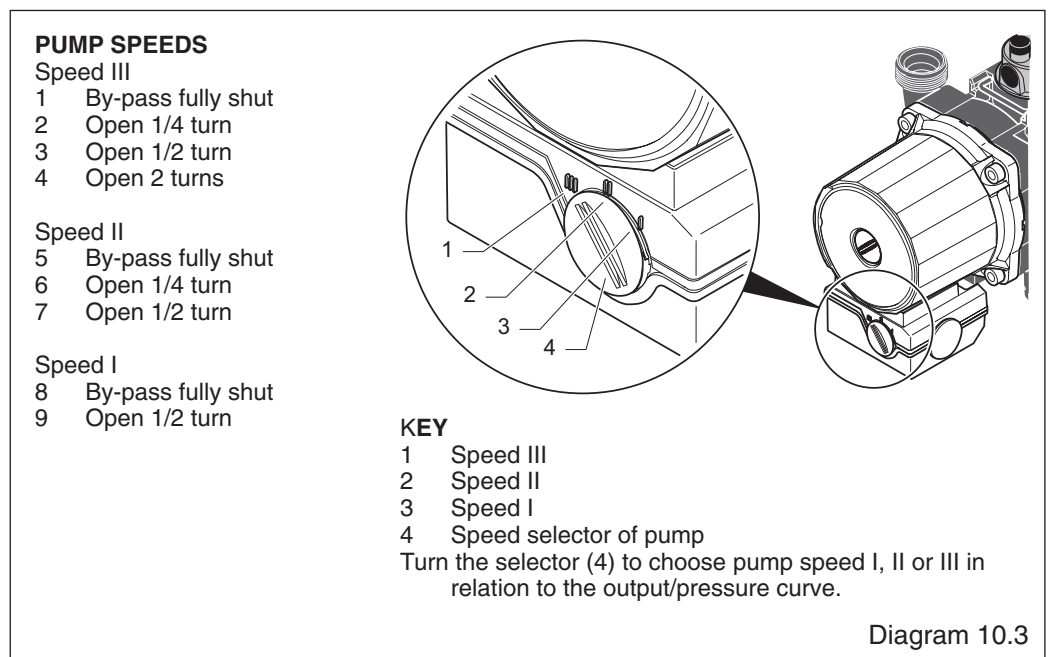
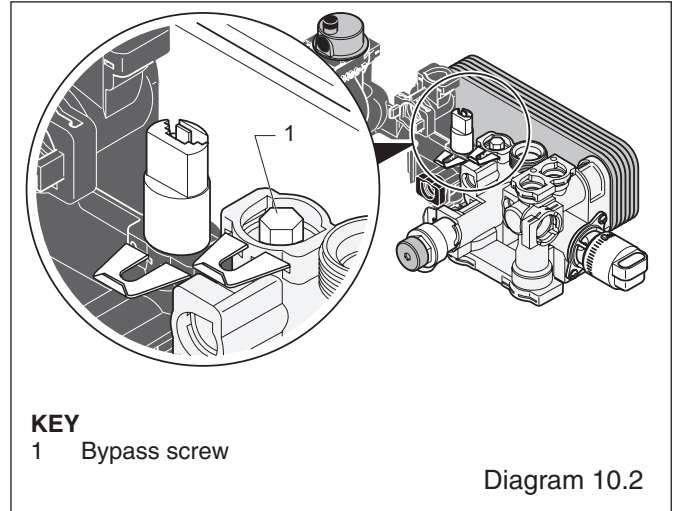
10.12 Completion

Adjust the boiler temperature control and any system controls to their required settings. In addition it is necessary to complete the "Benchmark" logbook.

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

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

10 Commissioning



Output/pressure curve

Diagram 10.4

11 Instructions to User

11.1 Instruct the User

Instruct and demonstrate the lighting procedure and advise the user on the safe and efficient operation of the boiler.

Instruct on and demonstrate the operation of any heating system controls.

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

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

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

The user shall not interfere with or adjust sealed components.

It is the Law that any servicing is carried out by a **competent person**.

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

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

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

12 Servicing

12.1 IMPORTANT NOTES:

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.

It is the Law that any servicing is carried out by a competent person. 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.

12 Servicing

12.2 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).

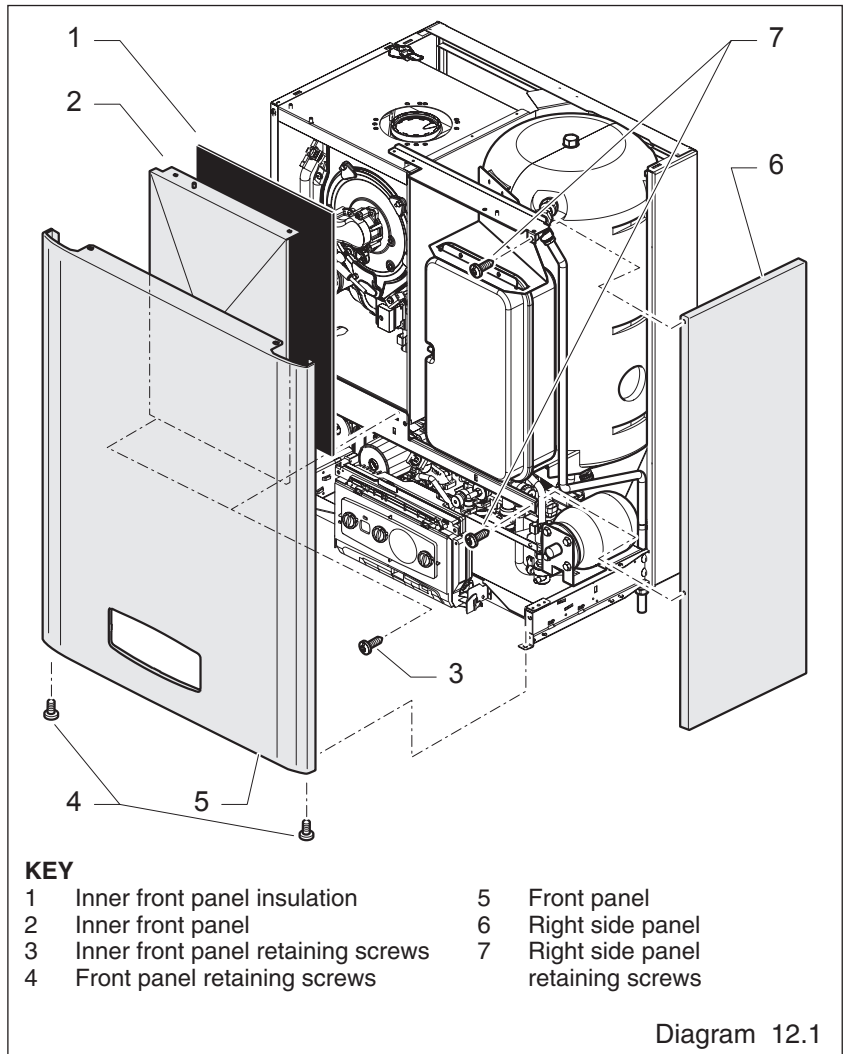
Remove the right side panel retaining screws (7).

Remove the right side panel (6).

Inner front panel

Remove the inner front panel retaining screws (3).

Remove the inner front panel (2).



12 Servicing

12.3 Draining of the appliance

Heating circuit, see diagram 12.2

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 12.3

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.

12.4 Hydraulic Block

Heating return filter, see diagram 12.4

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 12.5

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 12.5

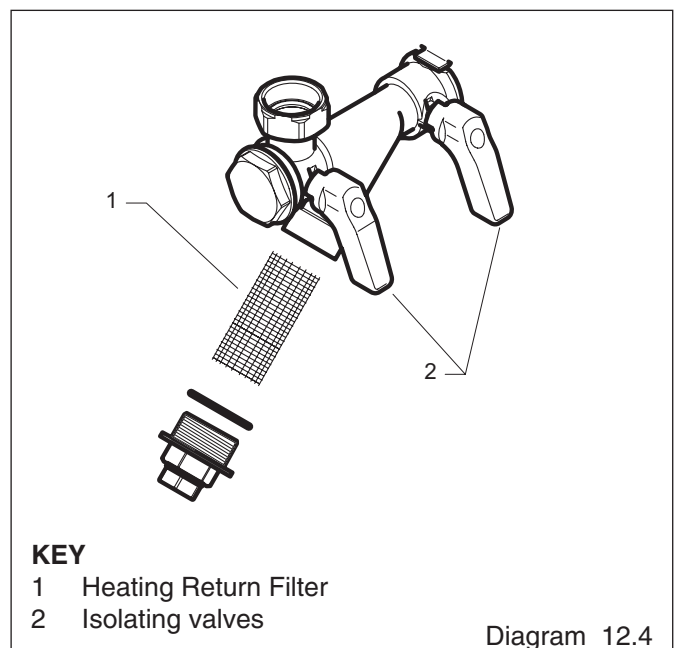
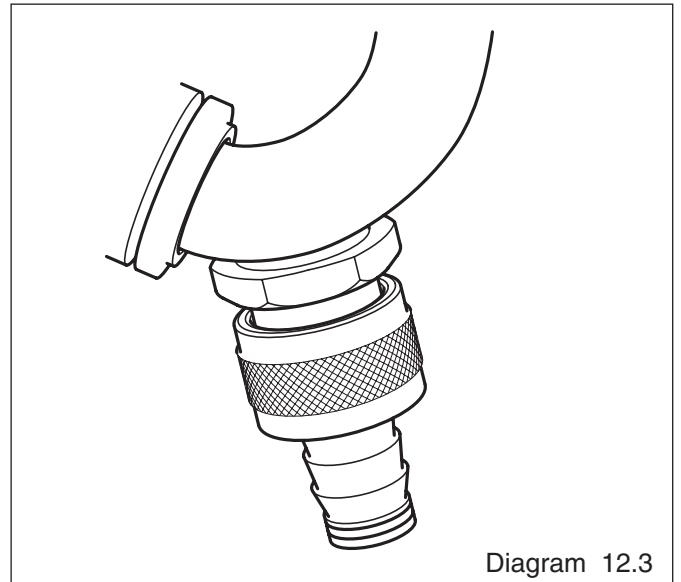
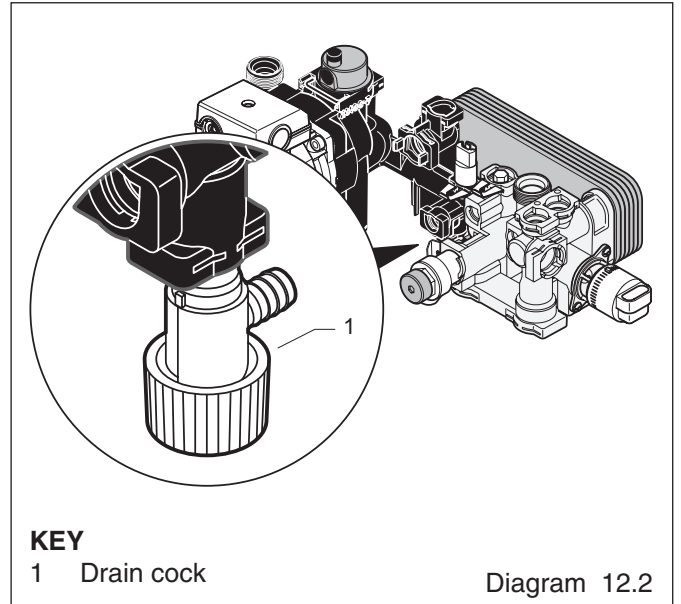
The "foaming" filter improves the heating circuit gas purging operation.

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

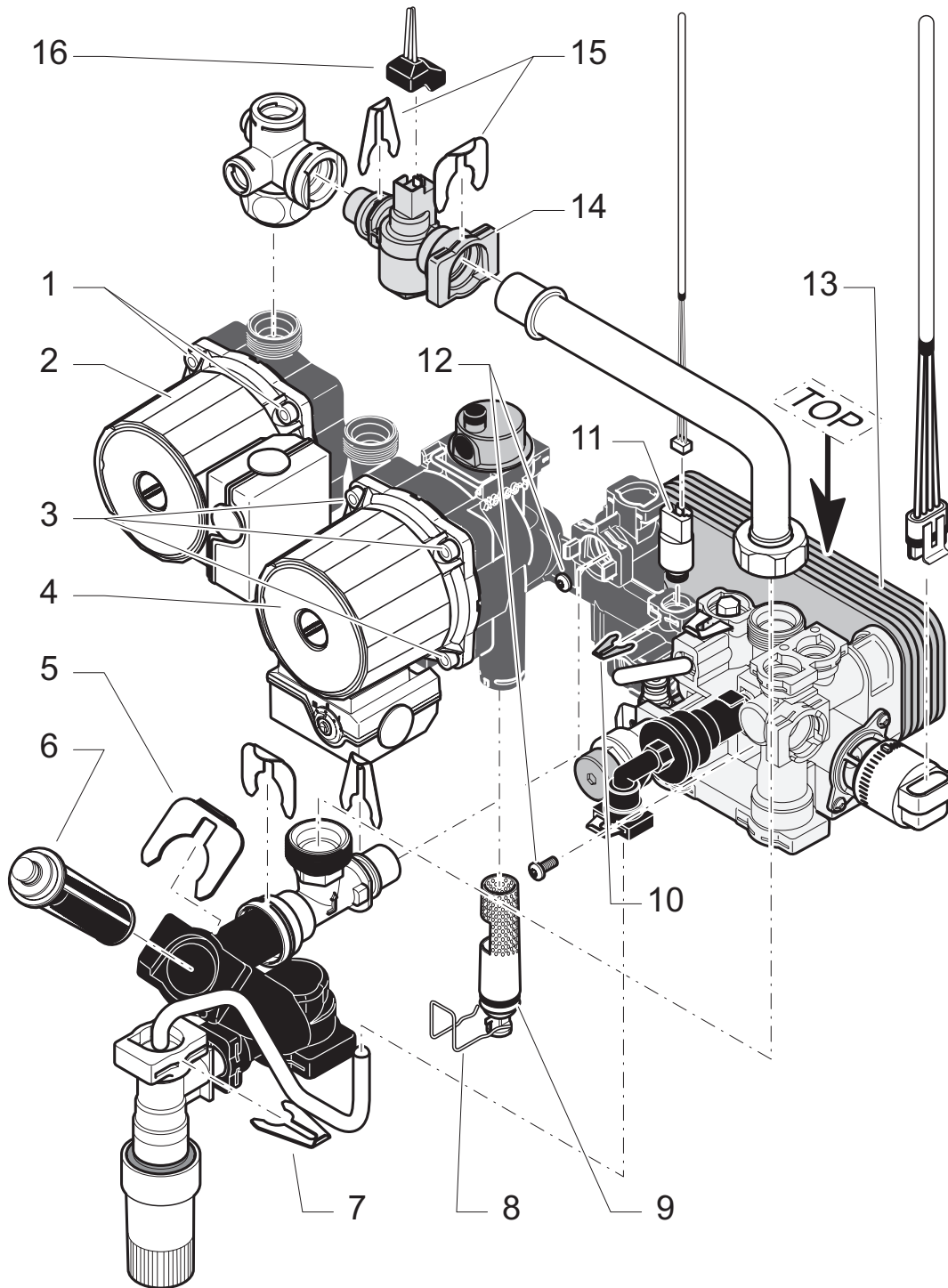
Relieve the filter retaining clip (8) located under the pump.

Relieve the "Foaming" filter (9).

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



12 Servicing



KEY

- | | |
|------------------------------------|---|
| 1 DHW pump retaining screws | 9 "Foaming" filter |
| 2 DHW pump motor | 10 Low water pressure sensor retaining clip |
| 3 Heating pump retaining screws | 11 Low water pressure sensor |
| 4 Heating pump motor | 12 Sanitary exchanger retaining screws |
| 5 Cold water filter retaining clip | 13 Sanitary exchanger |
| 6 Cold water filter | 14 Flow sensor |
| 7 Filling tap retaining clip | 15 Flow sensor retaining clips |
| 8 "Foaming" filter retaining clip | 16 Connector |

Diagram 12.5

12 Servicing

12.5 Condense Trap, refer to diagram 12.6

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.

Clean flexibles and remove potential wastes.

Clean the float (2) located inside the condensate trap.

Rinse the condensate trap to clean it.

Reassemble the unit taking care to correctly place the seals.

WARNING: do not connect the condensate trap to copper pipe.

12.6 Combustion Block, refer to diagram 12.7

Ignition and controle electrode

Remove the ignition and controle electrode connector (8).

Remove the 2 ignition and controle electrode retaining screws (9).

Remove the ignition and controle 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

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.

Inspect the sealing rings and replace if necessary.

Removal of the burner is not necessary during a normal service.

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 from the heat exchanger.

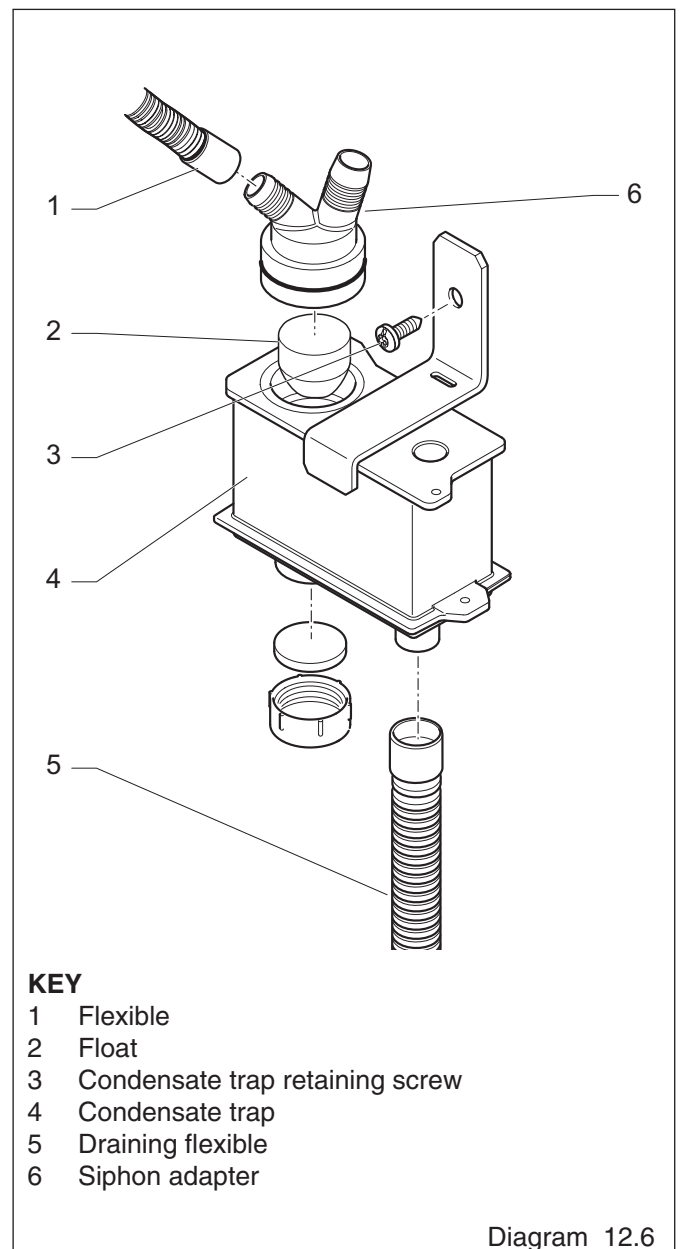
Remove loose debris from combustion chamber using a soft brush and vacuum cleaner. Carefully flush by spraying water removing any remaining debris through the condensate trap (Ensure the water is kept away from electrical components).

Combustion Check.

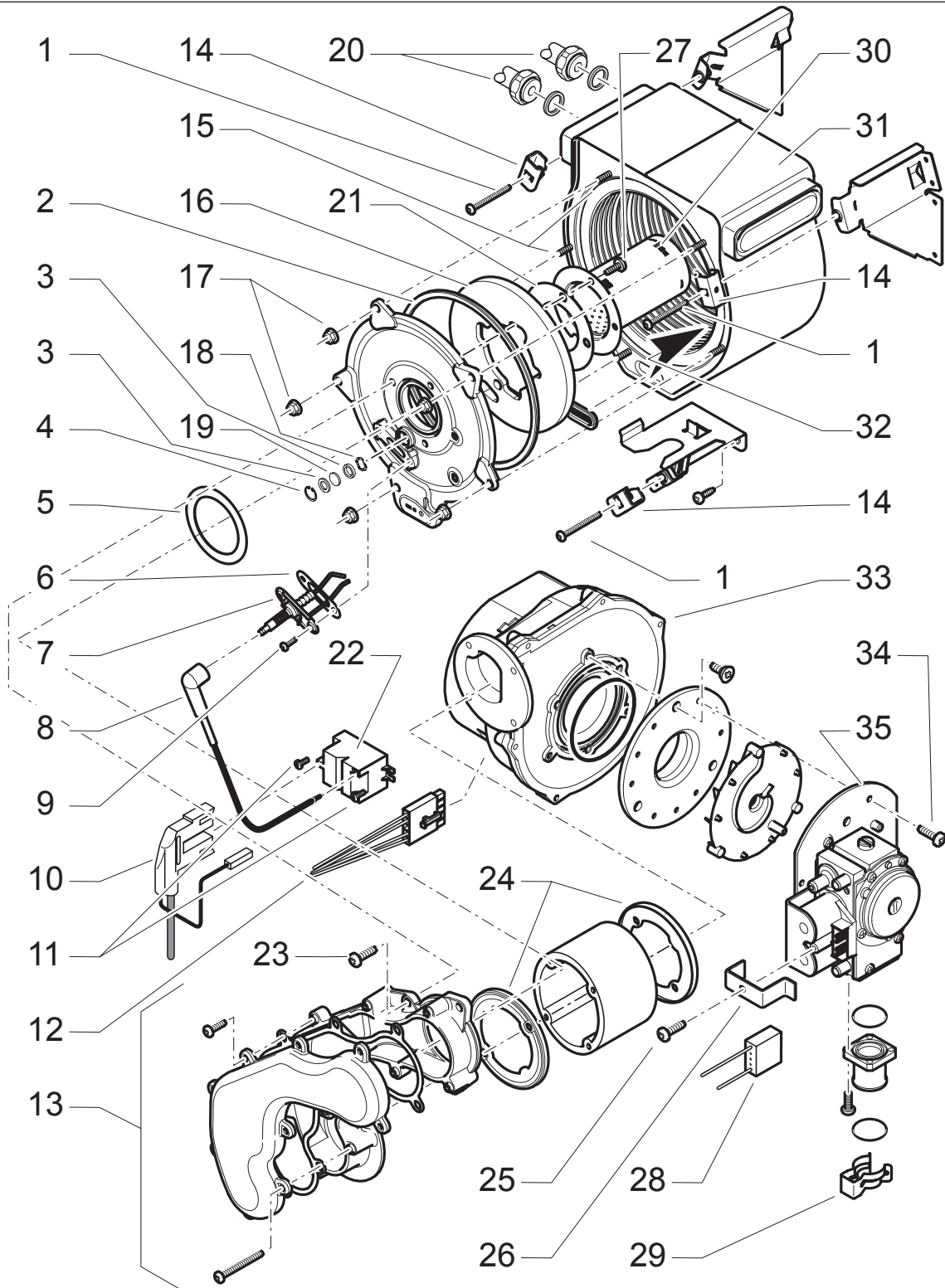
If a gas carrying component has been replaced, the combustion of the appliance should be checked.

Once the appliance has been re-assembled (apart from the front and inner casing panels) connect a CO2 combustion analyser to the test point on the flue adapter (see chapter «Gas conversion»).

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



12 Servicing



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

Diagram 12.7

13 Fault Finding

I

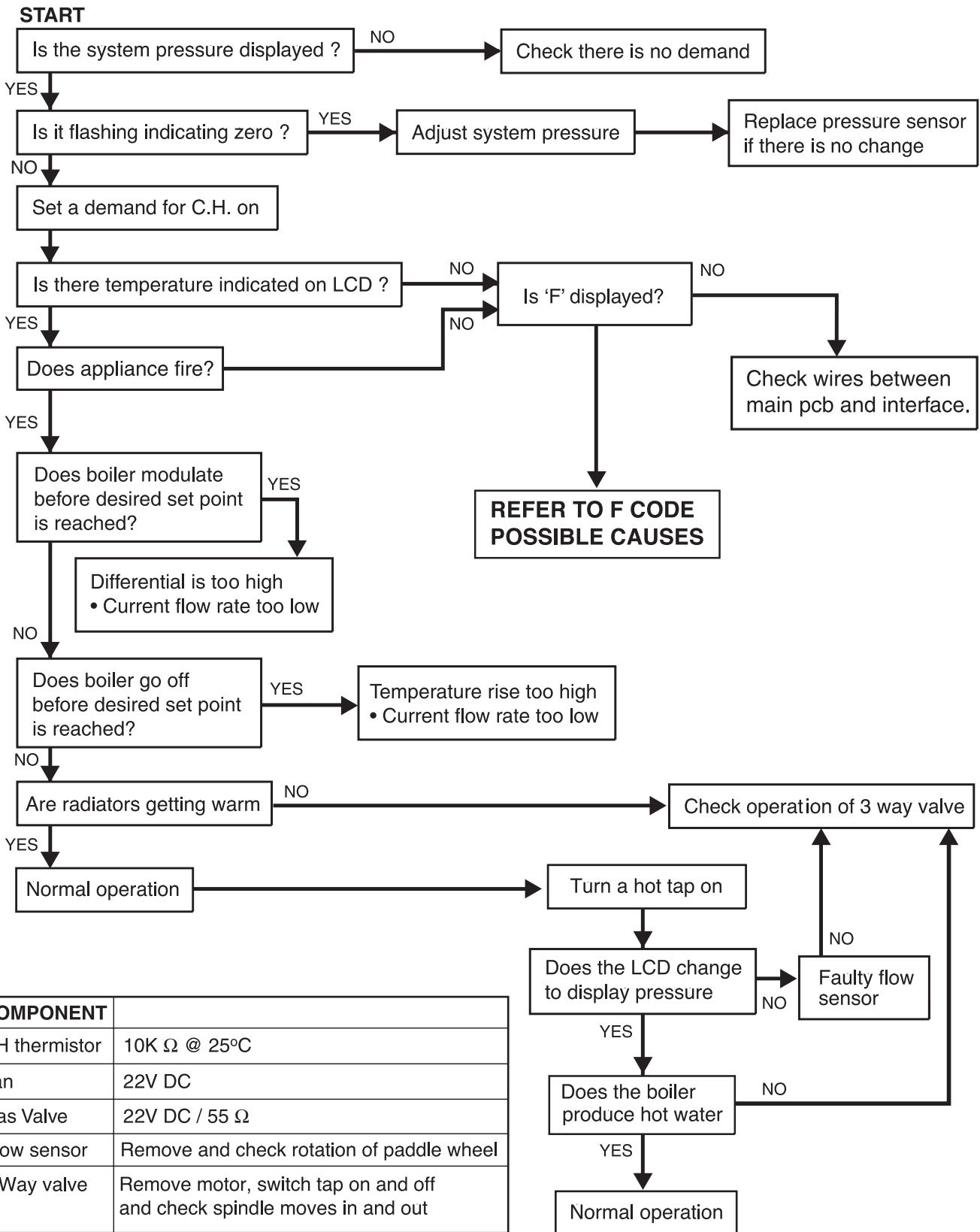
You will find the list of some fault codes in the operating instructions.

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 |
| 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° > 95°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 |

13 Fault Finding



14 Replacement of Parts

14.1 General

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

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 12 Servicing.

14.2 Hydraulic Block, refer to diagram 14.1

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.

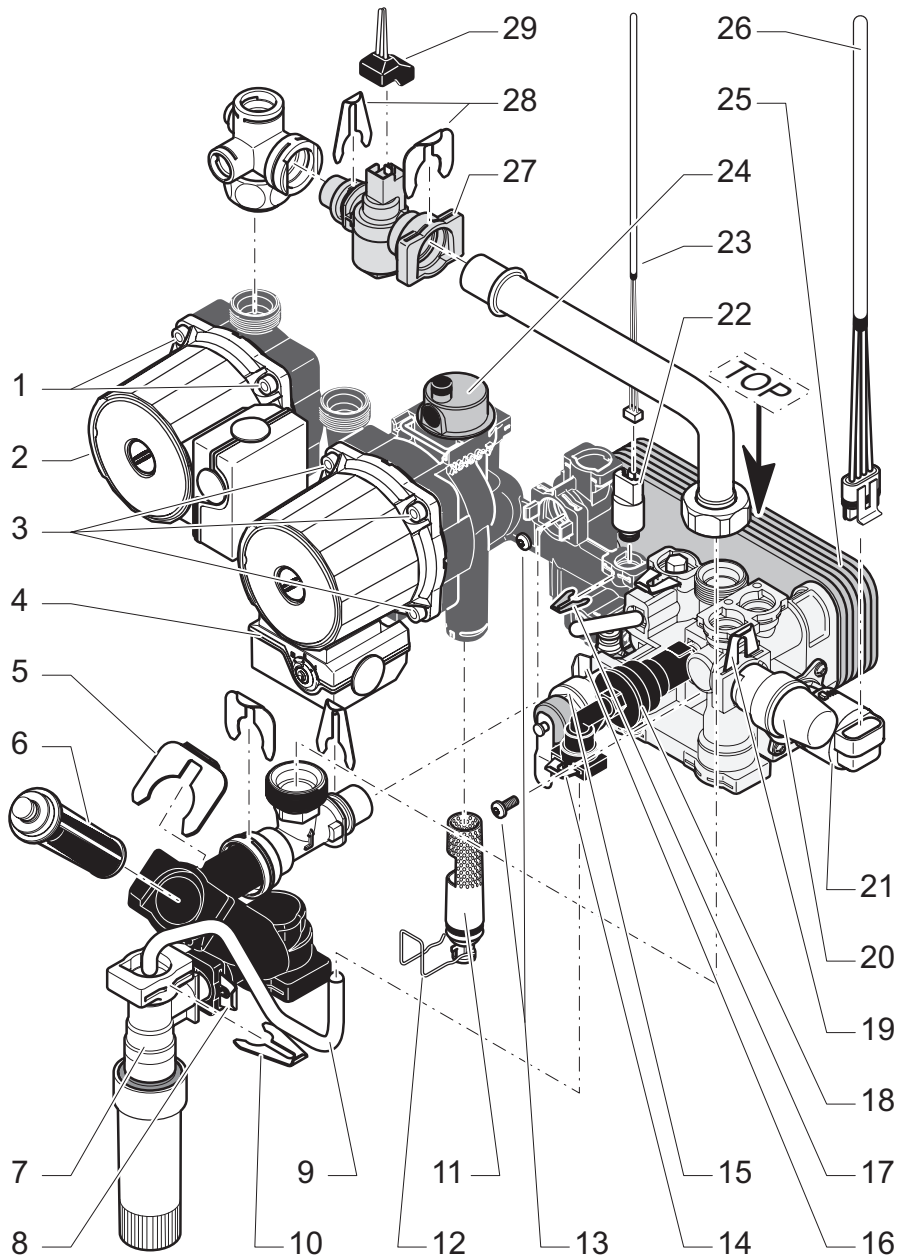
Filling tap

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.

14 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 14.1

14 Replacement of Parts

14.3 Combustion Block, refer to diagram 14.2

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 (see chapter «Gas conversion»).

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.

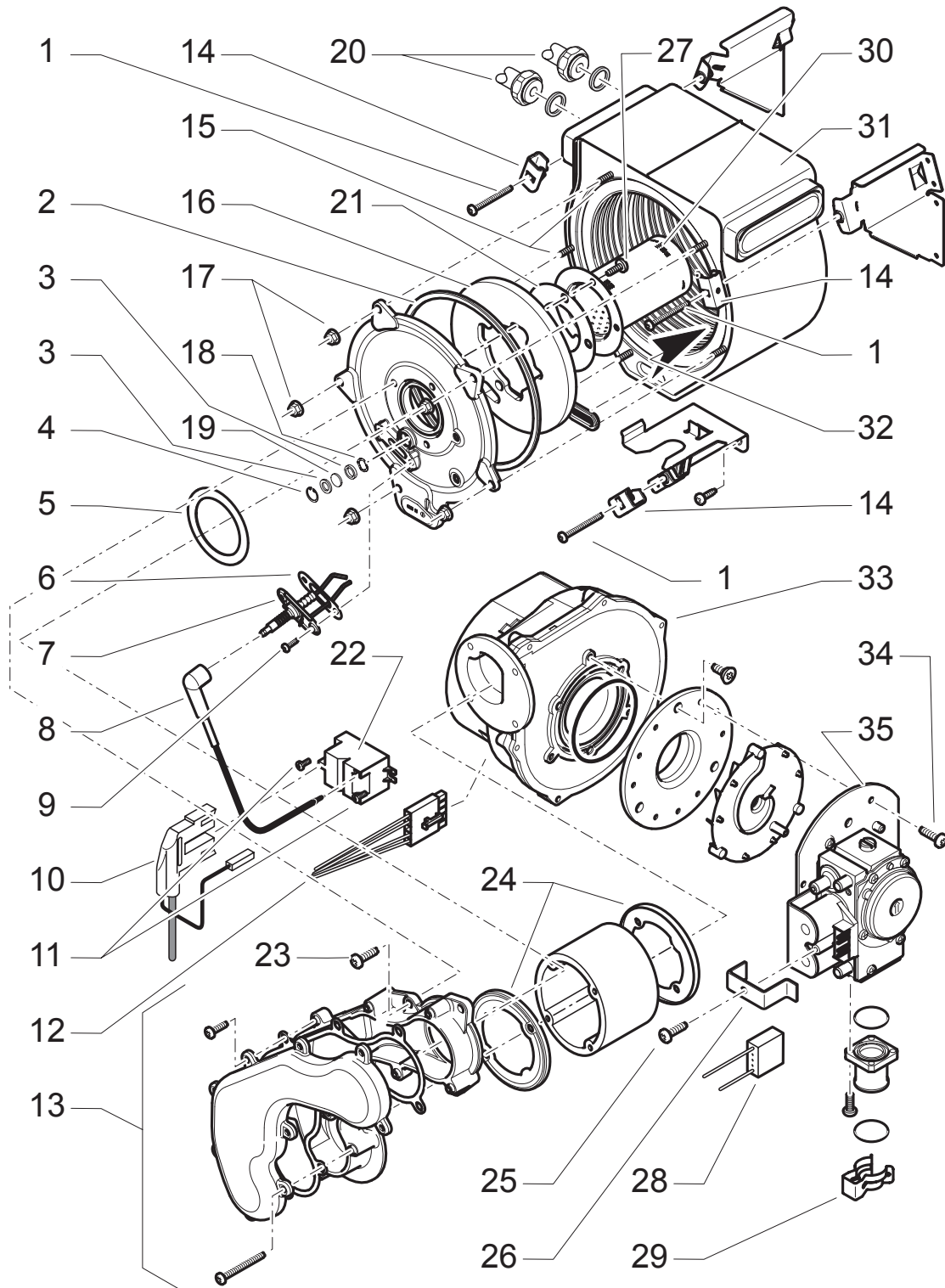
Viewing window

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.

14 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 14.2

14 Replacement of Parts

14.3 DHW storage vessel, refer to diagrams 14.3 and 14.4

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.

14.4 DHW expansion vessel, refer to diagrams 14.3 and 14.4

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.

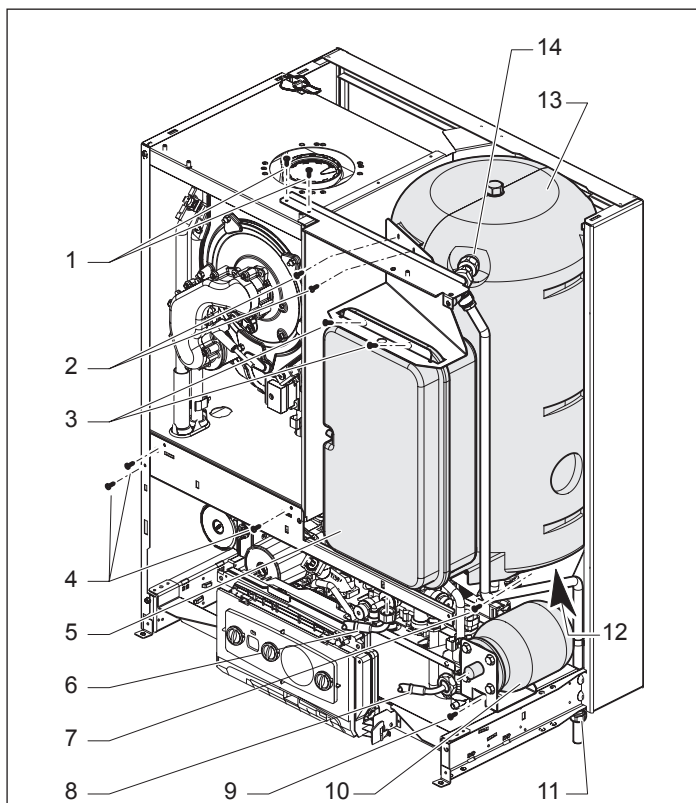
Relieve the DHW storage vessel harness.

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.

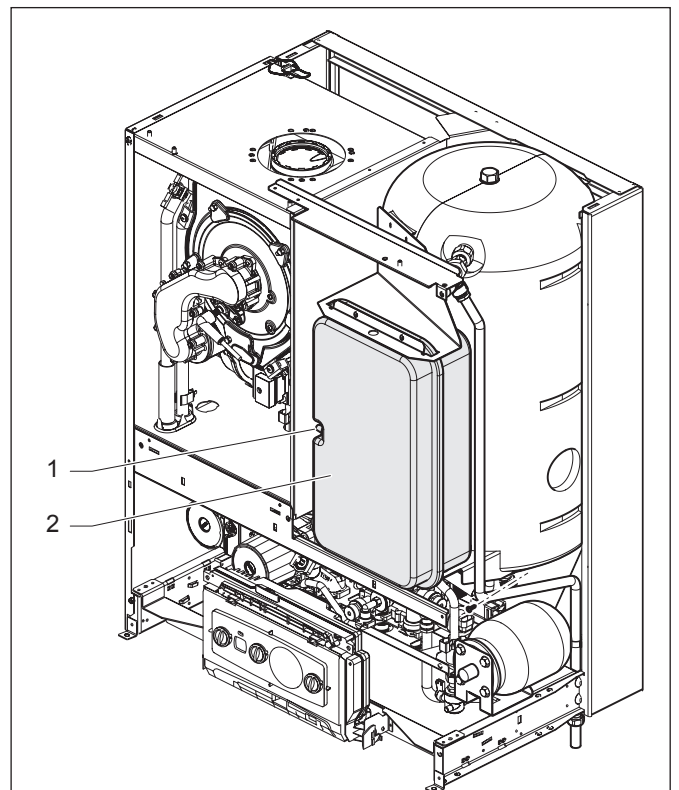
Check for leaks.



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

Diagram 14.3



KEY

- 1 Pressure test point
- 2 Heating expansion vessel

Diagram 14.4

14 Replacement of Parts

14.5 Condensate trap, refer to diagram 14.5

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.

14.6 Access to Switches, User Interface and Programmer

For access, refer to section 14.1.

Release the front of the fascia by carefully prising up the two retaining latches, see diagram 14.6.

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.

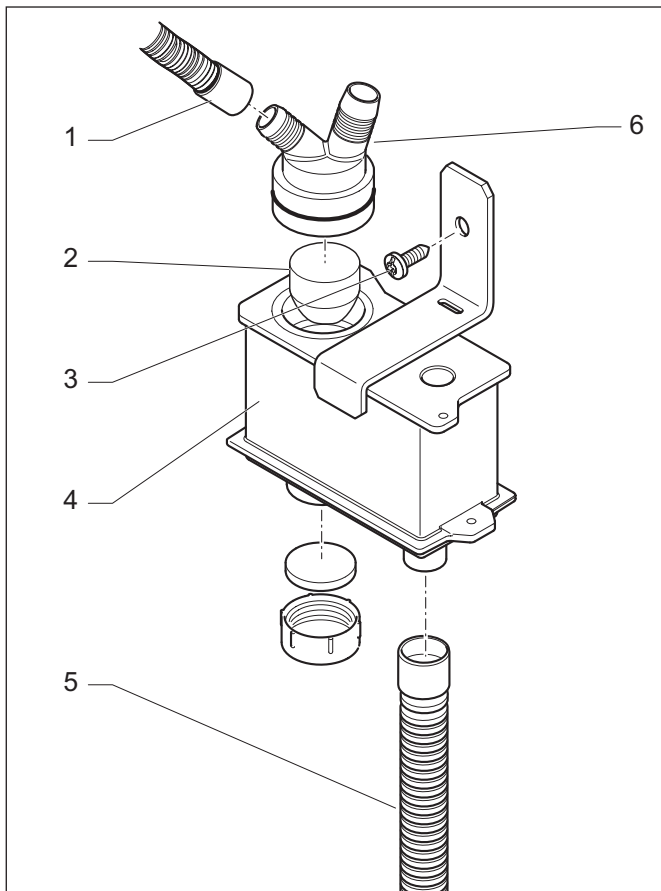
14.7 Mains Reset Switch

Refer to section 14.6 for access.

Remove the switch retaining screw.

Remove switch from housing, see diagram 14.7.

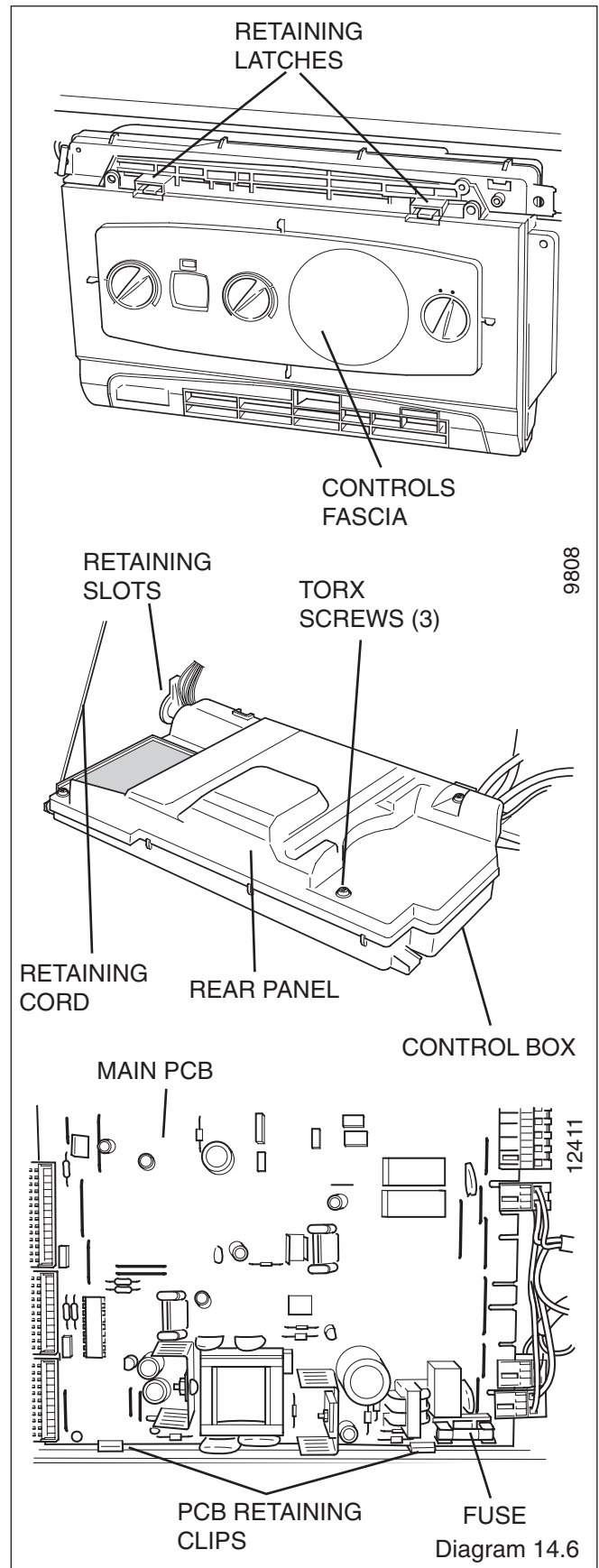
Remove electrical leads.



KEY

- 1 Flexibles
- 2 Float
- 3 Condensate trap retaining screw
- 4 Condensate trap
- 5 Draining flexible
- 6 Siphon adapter

Diagram 14.5



9808

14.9 Mains Reset Knob

Refer to section 14.6 for access.

Remove actuator by springing back retaining clips, see diagram 14.7.

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

14 Replacement of Parts

14.8 Main PCB

For access, refer to section 14.6.

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 14.6.

When refitting the rear panel ensure the leads are not trapped, refer to diagram 14.6

14.9 Control Box

For access, refer to section 14.6.

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 14.6.

14.10 Fuse, Main PCB - Control Box

For access, refer to section 14.6.

The fuse is located at bottom right hand side of the PCB, see diagram 14.6.

14.11 User Interface

Refer to section 14.6 for access.

Remove electrical plug.

Remove the securing screws, see diagram 14.8.

Withdraw the board.

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

