

Instructions for Use Installation and Servicing

To be left with the user

XTRAMAX

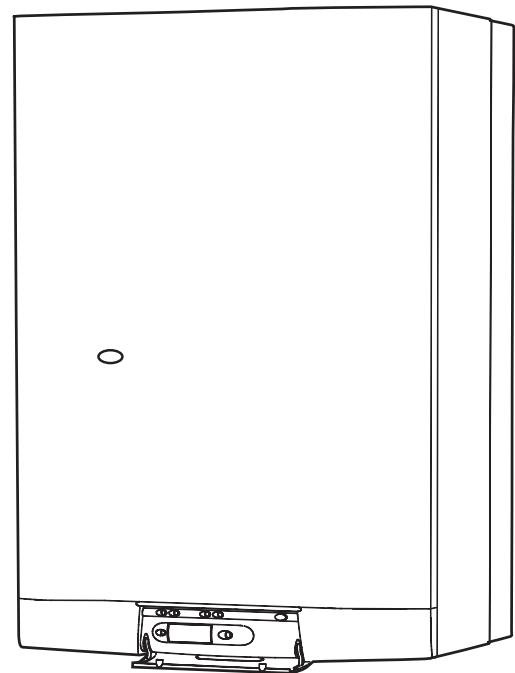
G.C. No. 47-047-15

Unvented Hot Water Storage
Fanned Flue Combination Boiler



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

This is a Cat II_{2H3+} Appliance



9080

The instructions consist of three parts, User, Installation and Servicing Instructions, which include the Guarantee Registration Card. 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.

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 shorter, for labour.

The second year of the parts guarantee, from the beginning of the 13th month onwards after installation, 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 from the manufacturer.

We recommend you complete and return as soon as possible your guarantee registration return literature, supplied in the document envelope.

If your guarantee registration return literature is missing you can obtain a copy by telephoning the Heatcall Customer Service number 01773 828100.

REGISTER YOUR GLOW-WORM APPLIANCE

CALL 0208 247 9857

HEATCALL

Customer Services:

Tel: (01773) 828100

One Contact Local Service

Fax: (01773) 828070

Hepworth Heating Ltd.,
Nottingham Road, Belper, Derbyshire. DE56 1JT
General/Sales enquiries:

Tel: (01773) 824141 Fax: (01773) 820569

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Important Information

Gas safety (Installation and use) Regulations

In your interests and that of gas safety, it is the law that ALL gas appliances are installed and serviced by a competent person in accordance with 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, from Hepworth Heating Ltd.

Any alteration not approved by Hepworth Heating Ltd., could invalidate the certification, boiler warranty and may also infringe the current issue of the Statutory Requirements. The requirements are: The installation of this boiler must be carried out by a competent person in accordance with the current rules in force in the countries of destination at the time of installation. Manufacture's instructions supplied. Manufacture's instructions must not be taken as overriding statutory requirements.

Mandatory WARNING for EEC countries

This appliance is designed, approved and inspected to meet the requirements of the Intended market. The data label indicates where the product was manufactured and the **country** for which it is intended.

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 0086.

Product/production certified by: Notified body 0086.

The CE mark on this appliance shows compliance with:

1. Directive 90/396/EEC on the approximation of the laws of the Member States relating to appliances burning gaseous fuels.
2. Directive 73/23/EEC on the harmonization of the Laws of the Member States relating to the 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

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

INSULATION PADS/CERAMIC FIBRE

These can cause irritation to skin, eyes and the respiratory tract.

If you have a history of skin complaint you may be susceptible to irritation. High dust levels are usual only if the material is broken.

Normal handling should not cause discomfort, but follow normal good hygiene and wash your hands before eating, drinking or going to the lavatory.

If you do suffer irritation to the eyes or severe irritation to the skin seek medical attention.

The insulation is composed of non-combustible material.

Electrical Supply

WARNING: This boiler must be earthed.

All system components shall be of an approved type and shall be connected in accordance with the current issue of BS7671 and any applicable local regulations.

All external wiring between the appliance and the electrical supply and earthing requirements shall comply with the current IEE Regulations.

Connection of the boiler and system controls to the mains supply must be through a common isolator and must be fused 3A, maximum. This method of connection must be by a fused double pole isolating switch, with a minimum contact separation of 3mm on both poles. The switch should be readily accessible and preferably adjacent to the appliance. It should supply the appliance only and be easily identifiable as so doing.

Alternatively, an unswitched shuttered socket outlet and 3A fused 3 pin plug, both to the current issue of BS1363 may be used provided that 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).

Manual Handling Guidance

During the appliance installation it will be necessary to employ caution and assistance whilst lifting as the appliance exceeds the recommended weight for a one man lift.

In certain situations it may be required to use a mechanical handling aid.

Take care to avoid trip hazards, slippery or wet surfaces.

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 Hepworth Heating Ltd.

Important Information

Heating System Controls

The heating system must be controlled as described in the relevant part of the current issue of :

Building Regulations, approved document L1, 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.
- 3) The domestic heating and hot water guide to the building regulations 2001.

Thermostatic radiator valves may be installed, however they must not be fitted in a room where the room thermostat is located.

Gas leak or fault

If a gas leak or fault exists or is suspected, turn the boiler off and consult the local gas supply company or your installation/service company.

Air in the heating system

Persistent air in the heating system may indicate leaks in the system or corrosion taking place. Call your Installation/Service company.

Draining and filling

Caution: The boiler is installed as part of a sealed system which must only be drained and filled by a competent person.

If the boiler is to be out of use for any long periods during severe weather conditions, it is recommended that the whole system, including the boiler, be drained to avoid the risk of freezing.

If in doubt, consult your servicing company.

Protection Against Freezing

The appliance has a built in frost protection programme as long as the electricity and gas are left switched on.

This device operates the burner and system pump when the temperature inside the boiler falls below 6°C.

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

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. Make sure that, if fitted, the immersion heater in the cylinder is switched off.

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 Introduction

The **XTRAMAX** boiler is a wall mounted modulating combination boiler with electronic ignition providing central heating and stored hot water.

The boiler is of the **II_{2H3+}** category for use with Natural Gas (G20) as distributed in the United Kingdom, or Butane (G30), Propane (G31) with the appropriate conversion kit.

The boiler has a fan assisted balanced flue which both discharges the products of combustion to and draws the combustion air from the outside of the room.

The boiler is suitable for horizontal top outlet flue connection and can be fitted with horizontal flue, vertical flue or twin-pipe flue. Refer to flue options guide for further information, this is available from your nearest stockist.

Both the central heating and domestic hot water temperature are user adjustable.

Domestic hot water demand always has priority over heating demand.

The 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.

The boiler can be installed against either an external wall or on an adjacent inside wall, that is, the flue system will pass directly to the rear or to either side to the terminal fitted on the outside wall face.

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

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

These instructions should be carefully followed for the safe and economical use of your boiler.

Note: The boiler serial number is marked on the data label attached to the rear of the control box. The 'Operating the Appliance' section describes how to safely use the boiler.

Accessories

A range of accessories are available.

For further information contact your supplier.

Flue options

There are various flue systems to choose from, for detailed information refer to flue options guide, which is available from your nearest stockist.

Appliance Safety Devices

Air flow rate safety device

If the flue is obstructed, even partially, the built in safety system will turn the boiler OFF, the fan will continue to run. The boiler will be ready to operate when the fault has been cleared.

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.

In case of power supply failure

The boiler no longer operates. As soon as power supply is restored, the boiler will be automatically restarted.

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 light the boiler when the temperature of the boiler water falls below 6°C.

When the temperature reaches 16°C, the boiler stops.

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

Heating safety valve

CAUTION: A heating safety valve with a discharge pipe is fitted to this boiler.

The valve **MUST NOT BE TOUCHED** except by a qualified registered person. If the valve discharges at any time, switch the boiler off and isolate it from the electrical supply. Contact your installation/service company.

Temperature pressure/ relief valve

CAUTION: A domestic hot water pressure relief valve, with a discharge pipe is fitted to this boiler.

The valve **MUST NOT BE TOUCHED** except by a qualified registered person. If the valve discharges at any time, switch the boiler off and isolate it from the electrical supply. Contact your installation/service company.

Service and Maintenance

Servicing and Maintenance

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, refer to guarantee registration on the front cover of this literature.

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 Heatcall (Glow-worm's own service organisation) using the telephone number on the 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.

All CORGI Registered Installers carry a CORGI ID card, and have a registration number. Both should be recorded in your benchmark Logbook. You can check your installer is CORGI registered by calling CORGI direct on: 01256 372300.

Cleaning

WARNING: This appliance contains metal parts (components) and care should be taken when handling and cleaning with particular regard to edges of sheet metal parts to avoid any possibility of personal injury.

The boiler casing can be cleaned with a damp cloth, followed by a dry cloth to polish.

Do not use abrasive or solvent cleaners.

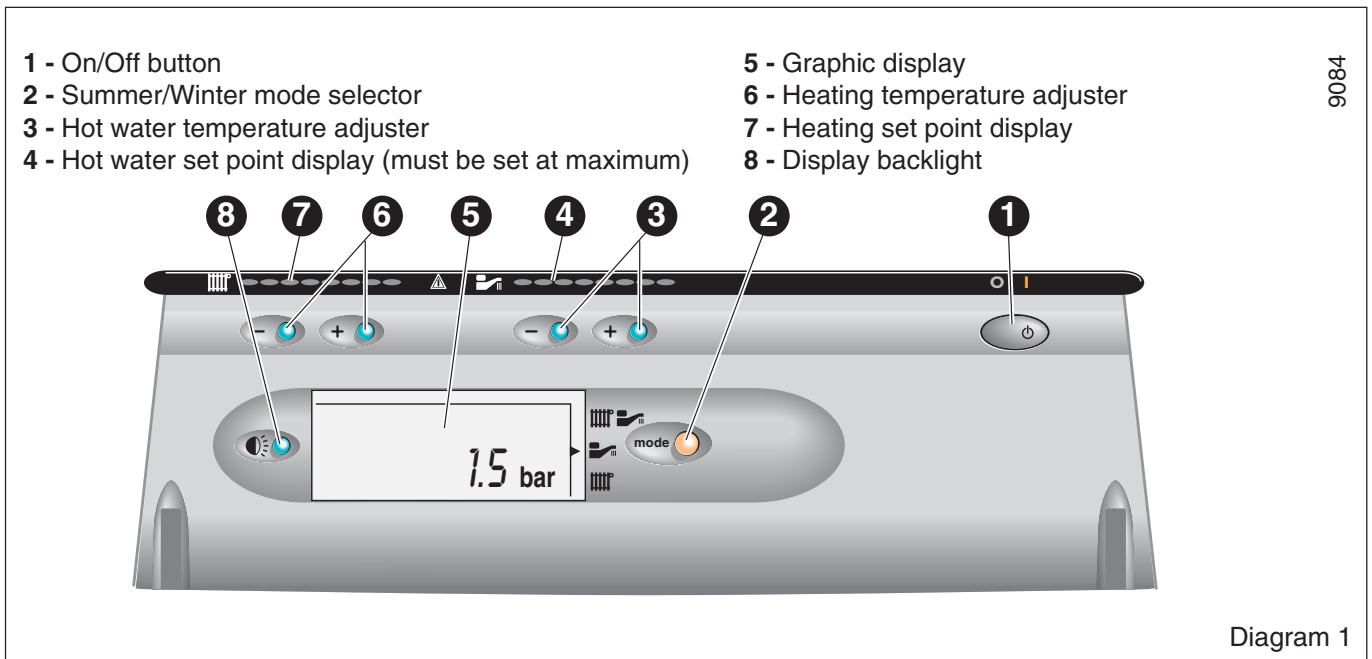
Boiler casing

CAUTION. Do not remove or adjust the casing in any way, as incorrect fitting may result in faulty operation. If in doubt, consult your installation/service company.

Operating the Appliance

Controls

The control panel, located at the lower front of the boiler casing, **see diagram 1**, allows the boiler to be started, shut down, controlled and monitored during use.



The appliance incorporates a visual display that indicates fault conditions, should they occur.

In the event of a fault, the display will indicate, by means of pictograms and/or letters and numbers, exactly in which area the fault lies.

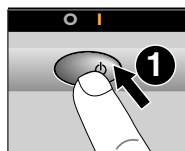
Should the boiler fail to operate, the most likely fault is that the gas supply to the boiler has not been turned on or that there is no pressure in the heating system. These are indicated as follows :

No gas supply

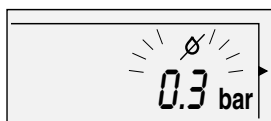


This will be indicated on the display as a pictogram of a spark. To rectify this, proceed as follows:

- Switch off the boiler at the On/Off push button.
- Rectify the gas supply problem.
- Restart the boiler by pressing the On/Off button.



Insufficient system pressure



This will be indicated on the display as a flashing warning indicating the system pressure is low. To rectify this the system must be re-filled, refer to '**Section 13 Commissioning**'.

Other faults

These are indicated on the display by a fault code and a telephone symbol. Further information on the fault codes can be found in the '**Section 18 Fault Finding**'.

Operating the Appliance

Lighting the boiler :

Make sure that:

- The boiler is connected to the electrical supply.
- The gas service cock is open.

Then follow the instructions below :

- 1 Press the On/Off button (1)

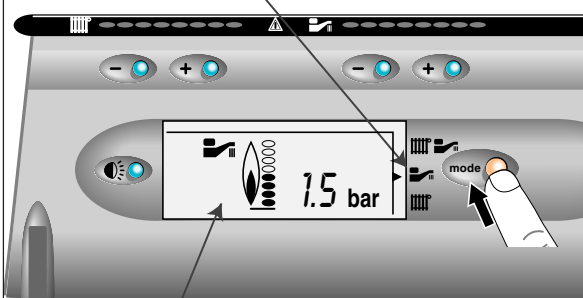
The pressure must be between 1 and 2 bar. If not, the system must be filled by a competent person.



To stop the boiler : Press button (1)

Setting to the SUMMER position (Hot water only)

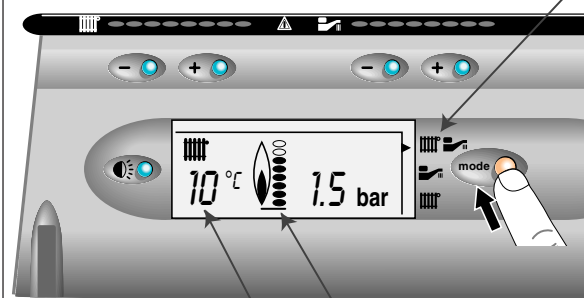
Press the **mode** button to select the **summer** symbol



The flame symbol appears when the boiler is running

Setting to the WINTER position (Heating + hot water)

Press the **mode** button to select the **winter** symbol



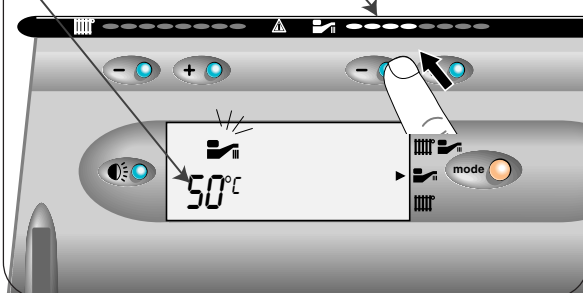
The actual temperature of the heating system

Illuminates when the boiler lights

Adjusting the hot water temperature

The domestic hot water must be set at max 60°C. Press + or - to adjust the maximum temperature of the hot water.

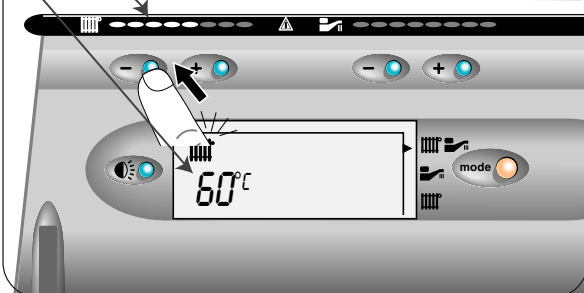
Visual indication of set temperature



Adjusting the heating temperature

Press + or - to adjust the maximum temperature of the heating (38°C to 87°C)

Visual indication of set temperature



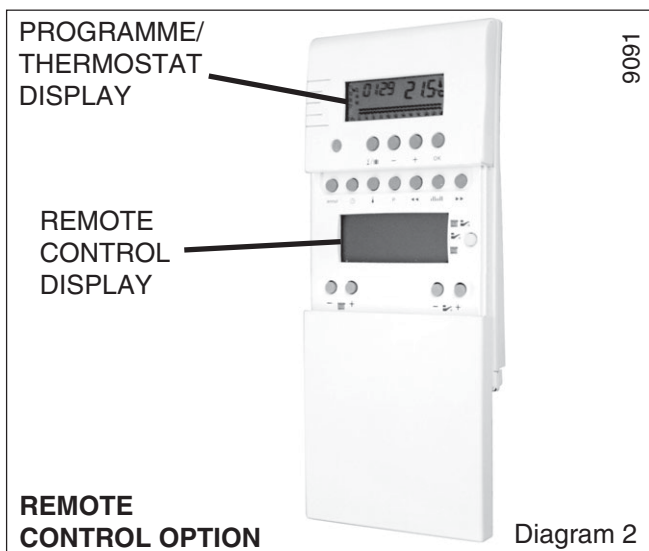
To obtain domestic hot water, open a hot water tap. Hot water always has priority over central heating.

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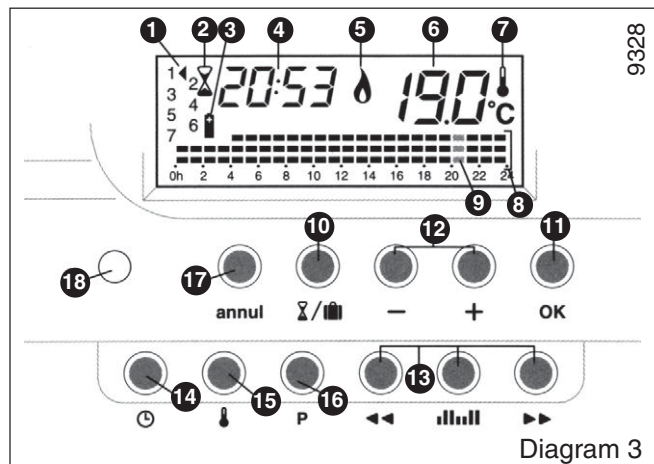
Xtracom Remote Control

Xtracom programmable, roomstat and boiler remote control panel part No. A20077.



Clock Timer and Thermostat Controls:

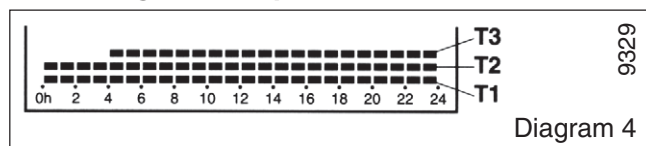
- 1 - Days of the week
- 2 - Override indicator
- 3 - Low Battery indicator
- 4 - Time display
- 5 - Heating in operation
- 6 - Programme temperature
- 7 - Room temperature
- 8 - Programme display
- 9 - Current programme status
- 10 - Override / Timed Override button
- 11 - OK/Enter button
- 12 - Plus and Minus modification buttons
- 13 - Manual programme setup buttons
- 14 - Time set button
- 15 - Temperature settings button
- 16 - Programme set button
- 17 - Cancel/Stand-by button
- 18 - Boiler Fault LED



Setting the Time

- Press button 14. ⌚
- Press + or - to set the correct hour.
- Press OK.
- Press + or - to set the correct minutes.
- Press OK.
- Press + or - to set the correct day (1 = Mon. 7= Sun).
- Press OK, the clock will start.

Presetting the Temperatures T1, T2 and T3



The programmes use three temperature settings which you can adjust.

Recommended first use settings are:-

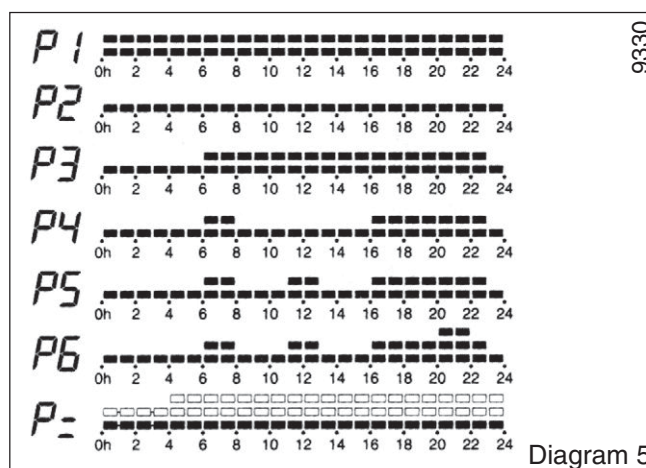
T1=16°, T2=19°, T3=21°

If the radiators in your installation are equipped with thermostatic valves, the highest temperature you can set on T3 is determined by the highest setting on the radiator thermostatic valves.

e.g. If the highest radiator thermostat valve setting is 21°C then you must set T3, 2 or 3°C higher, 24°C.

- Press button 15 T1 is displayed.
- Press + or - to set desired temperature.
- Press OK, T2 is displayed.
- Press + or - to set desired temperature.
- Press OK, T3 is displayed.
- Press + or - to set desired temperature.
- Press OK.

Weekly Programming



There are 6 preset (P1 to P6) programmes and one manual (P=) programme which can be assigned to each day of the week (1 to 7), the Factory default setting is P3 on all days. (Programmes P1 to P6 can not be changed).

- Press button 16 to set day 1 (Monday).
- Press + or - to assign a programme to day 1.
- Press OK

1 Technical Data

Heating

Heating input	adjustable from 12,5 kW to 30,3 kW from 42,650 BTU/H to 103,383 BTU/H
Heating output	adjustable from 10,4 kW to 27,6 kW from 35,484 BTU/H to 94,170 BTU/H
Efficiency	82 %
Maximum heating temperature	87 °C
Expansion vessel effective capacity	8 l
Expansion vessel charge pressure	0,5 bar
Maximum system capacity at 75°C	180 l
Safety valve, maximum service pressure	3 bar
Products outlet diameter	60 mm
Fresh air inlet diameter	100 mm

Hot water

Heating input	adjustable from 12,5 kW to 30,3 kW from 42,650 BTU/H to 103,383 BTU/H
Hot water output, automatically variable	from 10,4 kW to 27,6 kW from 35,484 BTU/H to 94,170 BTU/H
Storage capacity	43 l
Maximum hot water temperature	60 °C
Minimum hot water temperature	37 °C
Specific flow rate (for 35°C temp rise)	11,4 l/min.
Threshold flow rate	1 l/min.
Nominal water flow rate	11,3 l/min.
Temp./pressure relief valve opening pressure	7 bar
Temp./pressure relief valve opening temperature	90 °C
Cylinder heat up time	4 min.
Time to reheat 70% of storage to 60°C	5 min.
Expansion valve setting	6 bar
Expansion vessel charge pressure	3,5 bar
Maximum operating pressure	3,5 bar
Maximum supply pressure	16 bar
Minimum operating pressure	0,7 bar

Weight of appliance when empty	71 kg
Weight of appliance when full	110 kg

Electrical

Electrical supply	230 V
Maximum absorbed power	235 W
Level of protection	IP44
Fuse rating	3A

Natural Gas (G20)

Ø Burner injector	1,20 mm
Inlet pressure	20 mbar
Maxi. Burner pressure	13,8 mbar
Mini. Burner pressure	2,16 mbar
Gas rate maximum	3,20 m³/h
Gas rate minimum	1,32 m³/h

Butane Gas (G30)

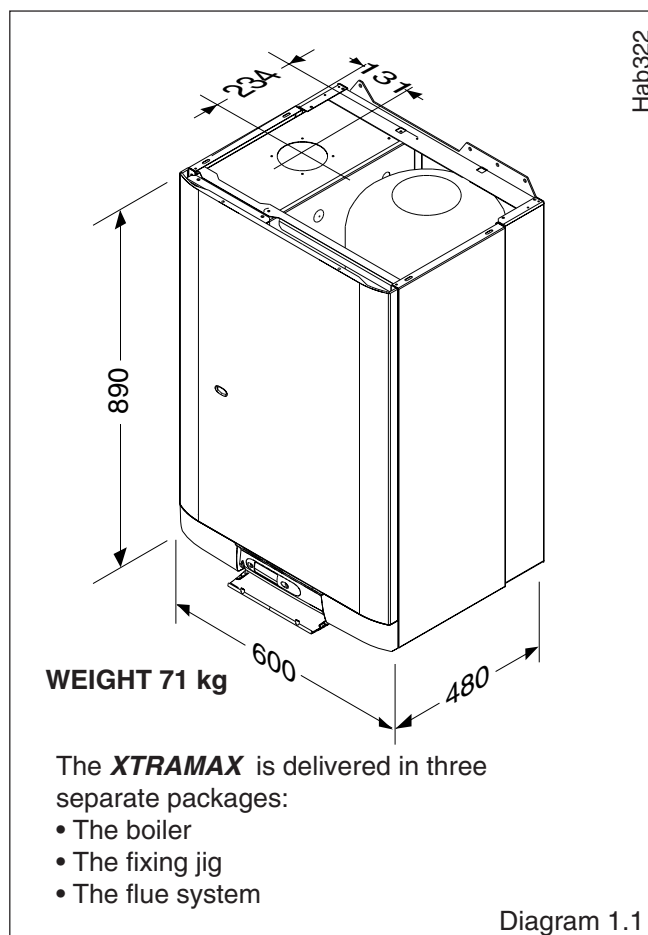
Ø Burner injector	0,77 mm
Inlet pressure	29 mbar
Maxi. Burner pressure	23,8 mbar
Mini. Burner pressure	3,6 mbar
Gas rate maximum	2,39 kg/h
Gas rate minimum	0,99 kg/h

Propane Gas (G31)

Ø Burner injector	0,77 mm
Inlet pressure	37 mbar
Maxi. Burner pressure	30,8 mbar
Mini. Burner pressure	3,6 mbar
Gas rate maximum	2,35 kg/h
Gas rate minimum	0,97 kg/h

The Seasonal Efficiency Domestic Boilers UK (SEDBUK) is, "D" 78.9%.

The value is used in the UK Government's Standard Assessment Procedure (SAP) for energy rating of dwellings. The test data from which it has been calculated have been certified by B.S.I.



2 General Information

IMPORTANT NOTICE.

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

Refer to Manual Handling Operations, 1992 regulations.

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

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

1.1 Sheet Metal Parts

WARNING: When installing the appliance, care should be taken to avoid any possibility of personal injury when handling sheet metal parts.

1.2 Statutory Requirements

The installation of the boiler **MUST** be carried out by a competent person in accordance with the relevant requirements of the current issue of:

Manufacturer's instructions, supplied.

The Gas Safety (Installation and Use) Regulations, The Building Regulations, The Building Standards (Scotland) Regulations (applicable in Scotland), local Water Company Bylaws, The Health and Safety at Work Act, Control of Substances Hazardous to Health, The Electricity at Work Regulations and any applicable local regulations.

Detailed recommendations are contained in the current issue of the following British Standards and Codes of Practice, BS4814, BS5440 Part 1 and 2, BS5449, BS5546, BS6700, BS6798, BS6891 and BS7074 Part 1 and 2, BS7478, BS7593, BS7671.

Manufacturer's notes must not be taken as overriding statutory obligations.

BSI Certification

This boiler certificated to the current issue of EN 483 for performance and safety.

It is important that no alteration is made to the boiler, without permission, in writing, from Hepworth Heating Ltd.

Any alteration that is not approved by Hepworth Heating Ltd., could invalidate the warranty and could also infringe the current issue of the Statutory Requirements.

1.3 Gas Supply

The gas installation must be in accordance with the current issue of BS6891.

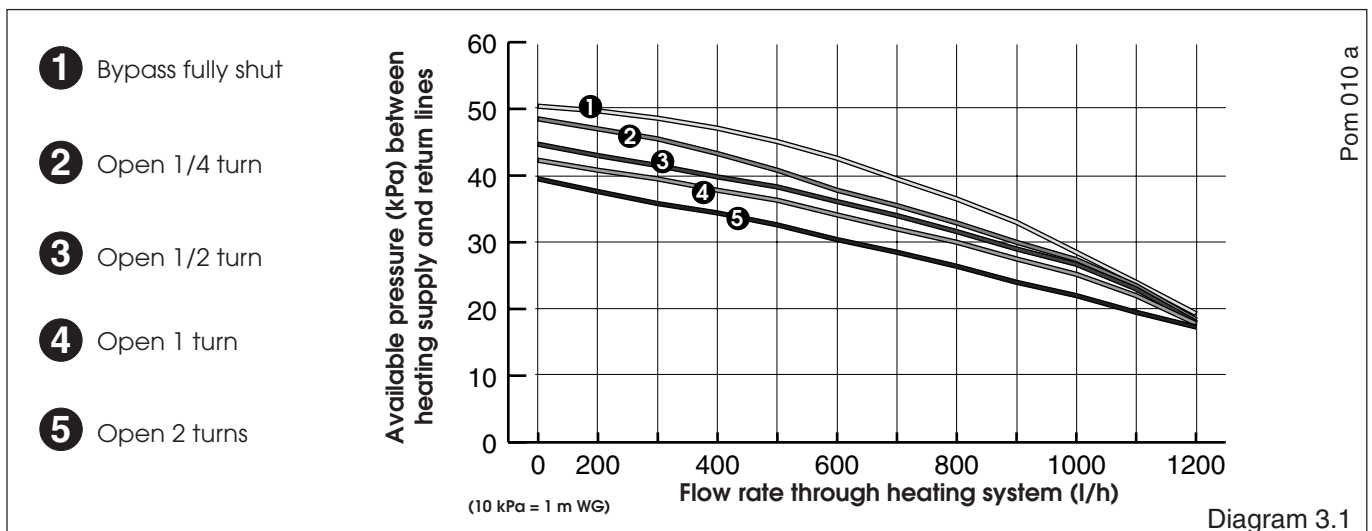
The supply from the governed meter must be of adequate size to provide a steady inlet working pressure of 20mbar (8in wg) at the boiler.

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.

3 Heating System Design

- The **XTRAMAX** is for use **ONLY** with sealed central heating systems.
- Heating surfaces may consist of radiators, convectors or fan assisted convectors.
- The appliance can be piped directly to an underfloor heating system without the need for a mixing bottle. The maximum central heating flow temperature can be set to 53°C on the boiler printed circuit board during commissioning.

- Pipe sectional areas shall be determined in accordance with normal practices, using the output/pressure curve (**diagram 3.1**). The distribution system shall be calculated in accordance with the output requirements of the actual system, not the maximum output of the boiler. However, provision shall be made to ensure sufficient flow so that the temperature difference between the flow and return pipes be less than or equal to 20°C. The minimum flow is 400 l/h.



3 Heating System Design

- The piping system shall be routed so as to avoid any air pockets and facilitate permanent venting of the installation. Bleed fittings must be provided at every high point of the system and on all radiators.
- The total volume of water permitted for the heating system depends, amongst other things, on the static head in the cold condition. The expansion vessel on the boiler is pressurised at 0,5 bar (corresponding to a static head of 5 m w.g.) and allows a maximum system volume of 160 litres for an average temperature of 75°C and a maximum service pressure of 3 bar. This pressure setting can be modified at commissioning stage if the static head differs. An additional expansion vessel can be fitted to the system if required, see **diagram 9.2**.
- Provision shall be made for a drain valve at the lowest point of the system.
- Where thermostatic radiator valves are fitted, not all radiators must be fitted with this type of valve, and in particular, where a room thermostat is installed.
- In the case of an existing installation, it is **ESSENTIAL** that the system is thoroughly flushed prior to installing the new boiler, using a proprietary product such as Fernox or Sentinel. Contact the product manufacturers for specific details.

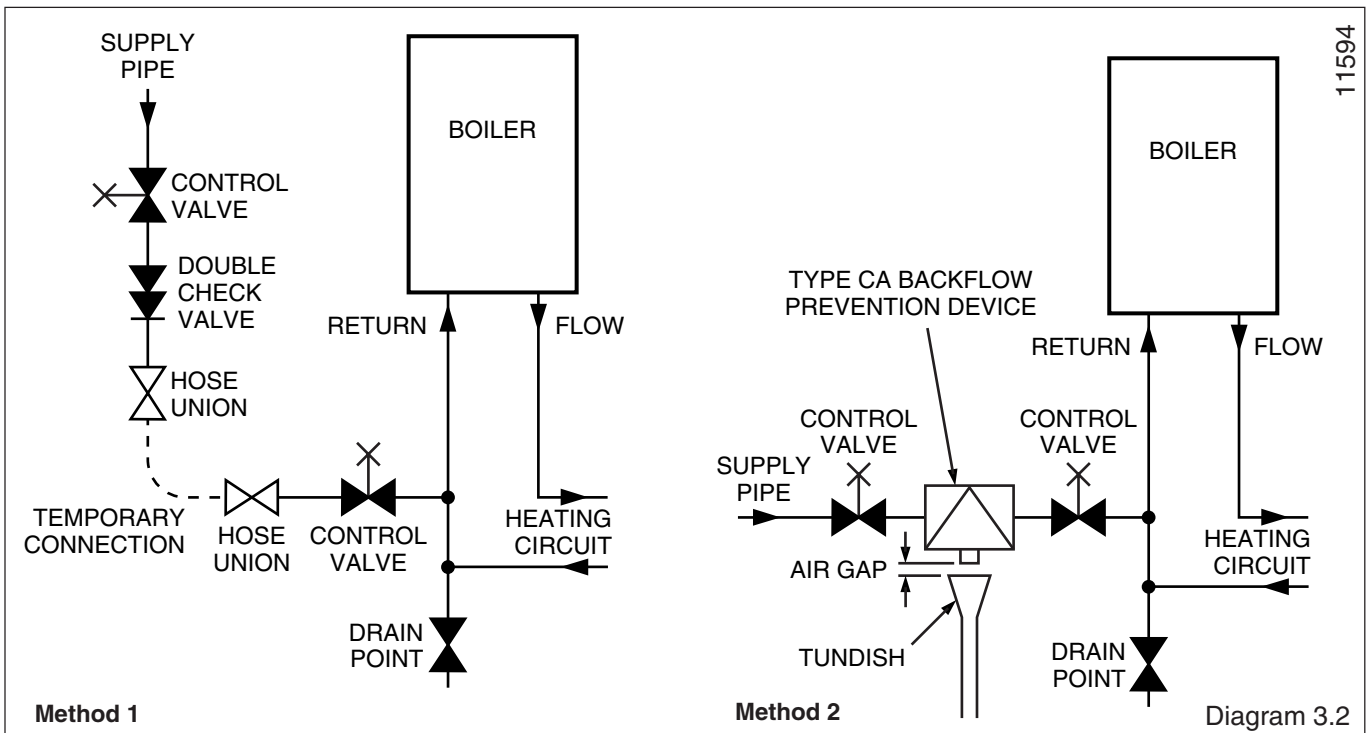
3.1 Bypass

- The boiler is fitted with an adjustable automatic bypass. Ensure that under no circumstances does the flow rate drop below the figure specified, see **diagram 3.1**.
- A bypass is not required on the central heating circuit unless the system controls could allow the boiler to operate when there is no flow.
- Where a bypass has to be fitted, the bypass must be placed at least 1.5 metres away from the appliance, see **diagram 9.2**.

3.2 Filling the system

- Provision for filling the system must be made, the methods are shown in **diagram 3.2**. There must be no permanent connection to the mains water supply, even through a non-return valve.

Note: It is important that fittings used for connection to potable water comply with the water undertakings requirements.



4 Domestic Hot Water System Design

- Copper tubing or plastic Hep₂0 may be used for the domestic hot water system. Unnecessary pressure losses should be avoided.

- A flow restrictor limiting the flow through the boiler to a maximum of 16 l/min is fitted to the boiler.

- The boiler will operate with a minimum supply pressure of 0,7 bar, but under reduced flow rate.

Best operating comfort will be obtained from a supply pressure of 1 bar.

4.1 Hard Water Areas

In areas where the water is 'hard', more than 200mg/litre, it is recommended that a proprietary scale reducer is fitted in the cold water supply to the boiler.

A pressure reducing valve for the cold water inlet supply is provided, this is packed inside the boiler. This valve is a necessary part of the unvented system and **MUST** be fitted to the cold water supply, **see diagram 8.1**.

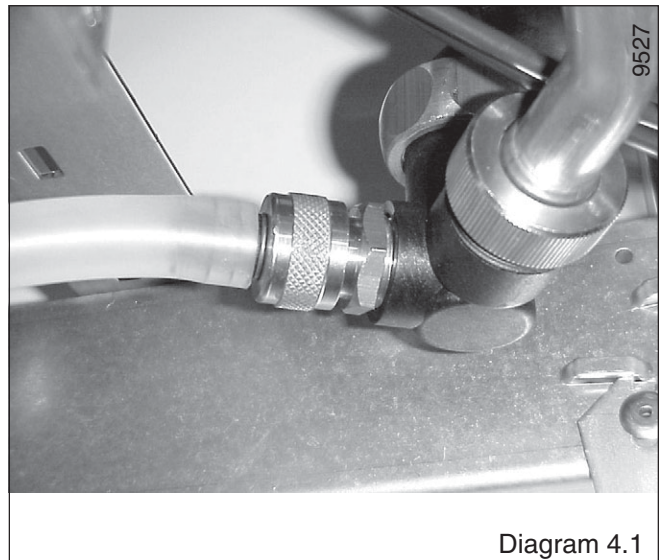


Diagram 4.1

4.2 Domestic hot water drain point

The DHW drain point is located below the DHW pump, see diagram 4.1.

5 Boiler Schematic

- 1 - Domestic thermistor
- 2 - Three way valve
- 3 - Gas control valve
- 4 - Ignition unit
- 5 - Temperature sensor for DHW storage vessel
- 6 - DHW storage vessel
- 7 - Burner
- 8 - Ignition electrode
- 9 - Combustion chamber
- 10 - Heating safety valve (3 bar)
- 11 - Main heat exchanger
- 12 - Air pressure switch
- 13 - Water flow sensor
- 14 - DHW pump
- 15 - Non return valve
- 16 - Bypass
- 17 - Domestic plate to plate heat exchanger
- 18 - Heating pump
- 19 - Heating expansion vessel
- 20 - Heating thermistor
- 21 - Overheat safety thermostat
- 22 - Flame sense electrode
- 23 - Fan
- 24 - Expansion valve (6 bar)
- 25 - Water pressure sensor
- 26 - Domestic expansion vessel (3.5 bar)
- 27 - Temperature pressure/ relief valve (7 bar/90°C)
- 28 - Pressure reducing valve and Check valve.
Max. supply pressure 16 bar. (Supplied)

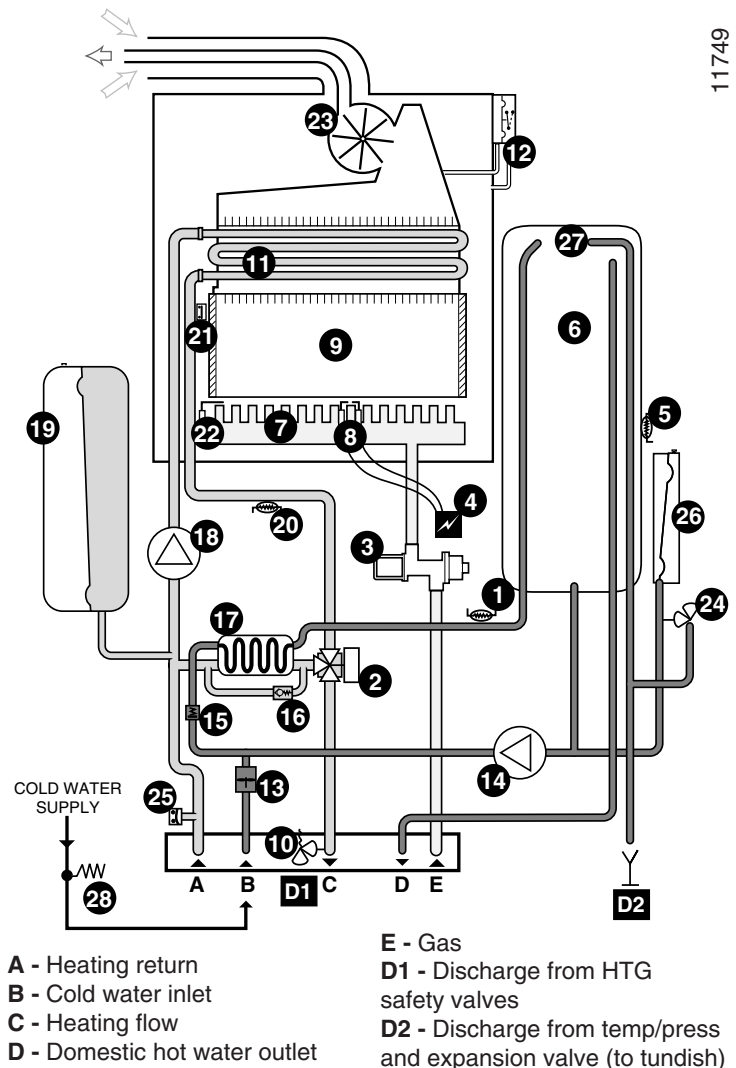


Diagram 5.1

6 Boiler Location, Flue and Ventilation

6.1 Boiler Location

The boiler may be installed in any room although particular attention is drawn to the requirements of the current issue of BS7671 with respect to the installation of a boiler in a room containing a bath or a shower. Any electrical switch or boiler control using mains electricity should be so situated that a person using the bath or shower cannot touch it. The electrical provisions of the Building Standards (Scotland) Regulations are applicable to such installations in Scotland.

The boiler must be mounted on a flat wall, which is sufficiently robust to take its total weight, see Technical Data.

If in doubt, expert advice should be obtained. In the event of the wall being found not suitable, a floor standing kit is available, contact Hepworth Heating for further details.

The boiler is not suitable for fitting outdoors.

Any electrical switch or boiler control using mains electricity must be positioned so that a person using a bath or shower cannot touch it.

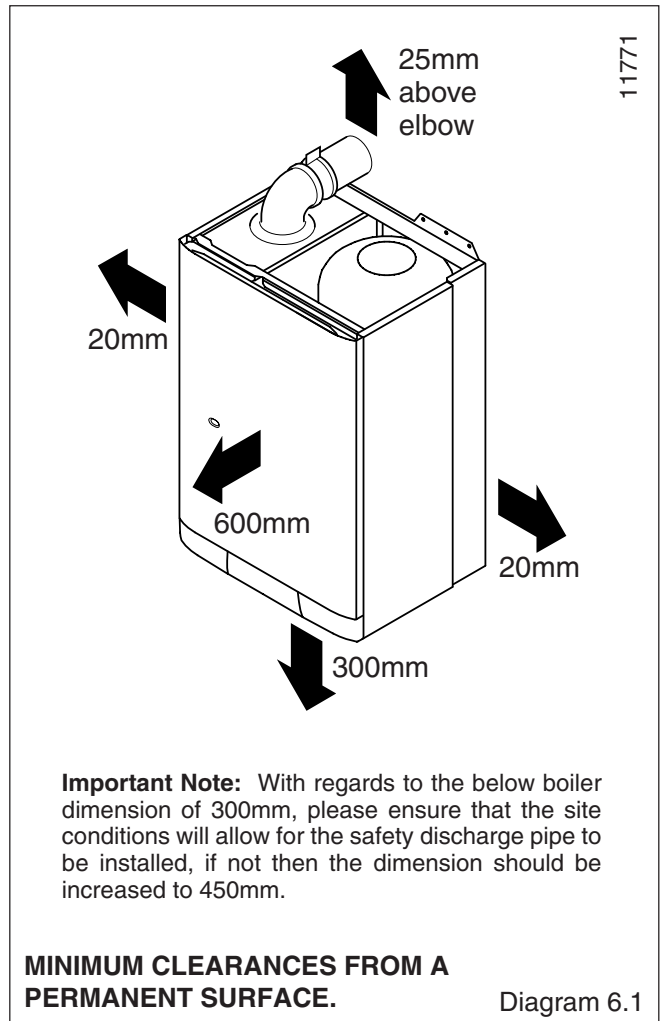
6.2 Clearances

The position of the boiler must be such that there is adequate space for servicing.

The recommended clearances are shown in **diagram 6.1**.

6.3 Cupboard or compartment ventilation

The boiler can be fitted in a cupboard or compartment without the need for permanent ventilation.



6 Boiler Location, Flue and Ventilation

6.4 Terminal position

The minimum acceptable spacings from the terminal to obstructions and ventilation openings are shown in **diagram 6.2**.

The boiler must be installed so that the terminal is exposed to the external air.

Warning:

Do not obstruct the outside terminal of the boiler.

6.5 Terminal guard, see diagram 6.3

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 a minimum of 50mm clearance from any part of the terminal and to be central over the terminal.

A suitable terminal guard type K3 can be supplied by:

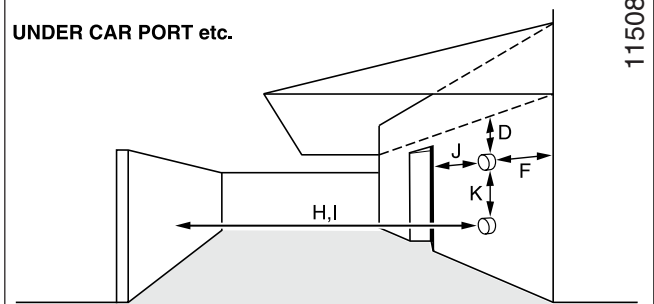
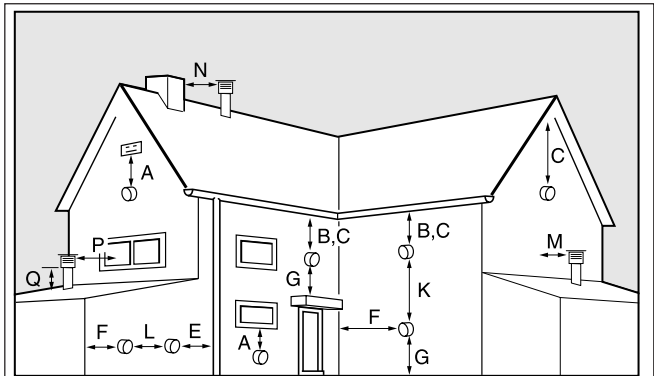
Tower flue components Ltd.
 Morley Road
 Tonbridge
 Kent
 TN9 1RA

6.6 Flue options

There are various flue systems to choose from as follows:

- Horizontal telescopic top flue pack.
- Horizontal top flue pack.
- Horizontal extended flue pack.
- Vertical flue pack.
- Twin flue pack.
- Extensions, 90° and 45° bends.

For detailed information refer to flue options guide. This is available from your nearest stockist.



MINIMUM SITING DIMENSIONS FOR THE POSITIONING OF FLUE TERMINALS MM

HORIZONTAL FLUES

A	DIRECTLY BELOW, ABOVE OR HORIZONTALLY TO AN OPENING, AIR BRICK, OPENING WINDOWS, AIR VENT, OR ANY OTHER VENTILATION OPENING	300
B	BELOW GUTTER, DRAIN/SOIL PIPE	75
C	BELOW EAVES	200
D	BELOW A BALCONY OR CAR PORT	200
E	FROM VERTICAL DRAIN PIPES AND SOIL PIPES	150
F	FROM INTERNAL/EXTERNAL CORNERS OR TO A BOUNDARY ALONGSIDE THE TERMINAL	300
G	ABOVE ADJACENT GROUND OR BALCONY LEVEL	300
H	FROM SURFACE OR A BOUNDARY FACING THE TERMINAL	600
I	FACING TERMINALS	1200
J	FROM OPENING (DOOR/WINDOW) IN CAR PORT INTO DWELLING	1200
K	VERTICAL FROM A TERMINAL	1500
L	HORIZONTALLY FROM A TERMINAL	300

VERTICAL FLUES

M	FROM ADJACENT WALL TO FLUE	300
N	FROM ANOTHER TERMINAL	600
P	FROM ADJACENT OPENING OR WINDOW	1000
Q	ABOVE ROOF LEVEL	300

Diagram 6.2

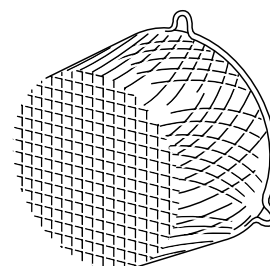


Diagram 6.3

7 Safety Discharge

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	up to 9 m up to 18 m up to 27 m	1.0 m 1.4 m 1.7 m
G 1	28 mm	35 mm 42 mm 54 mm	up to 9 m up to 18 m up to 27 m	1.4 m 1.7 m 2.3 m

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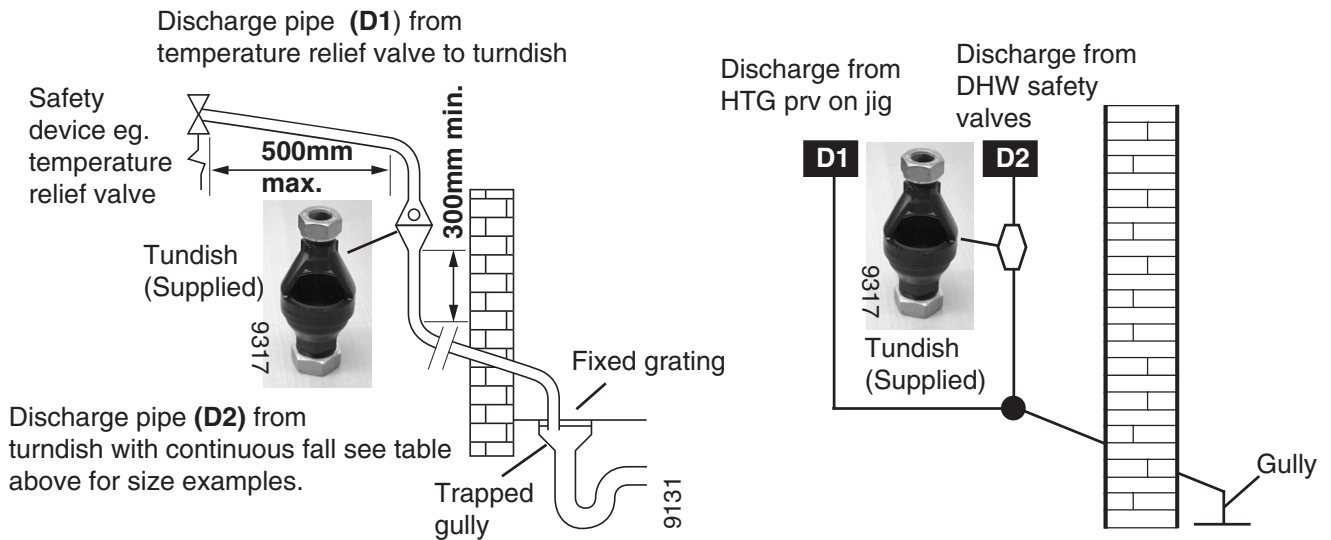
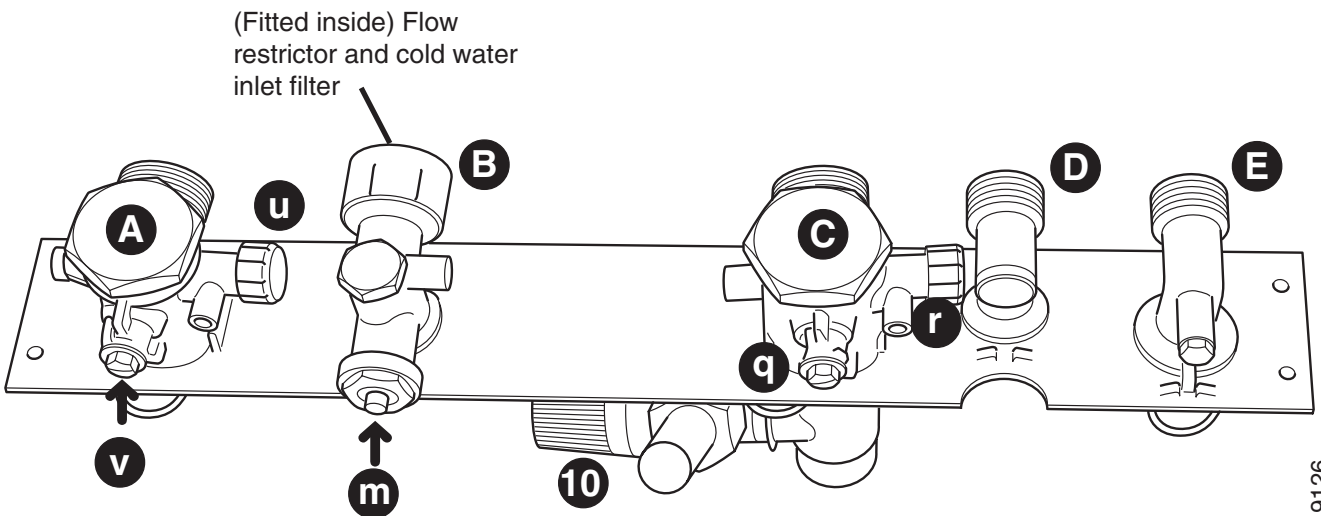


Diagram 7.1

8 Fixing Jig

The fixing jig is made up, from left to right, as follows:

- A** - Heating return fitting with isolating valve (**v**) and drain knob (**u**).
- B** - Cold water inlet fitting with isolating valve (**m**) and factory fitted flow restrictor and filter (not shown).
- C** - Heating flow fitting with isolating valve (**q**) drain knob (**r**) and safety valve (**10**).
- D** - Domestic hot water outlet.
- E** - Gas service cock.



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Diagram 8.1

9 Piping System Installation

9.1 Fixing jig, refer to diagram 8.1

- Remove the contents of the fixing jig pack.
- Secure the left and right hand support brackets to the isolating valve plate with the securing screws (4 off) supplied.

Connect the copper connections supplied, to the fixing jig fittings.

- Heating system connections - Pipe Ø 22mm
- Hot water system connections - Pipe Ø 15mm
- Gas connection - Pipe Ø 22mm
- Tundish connection - Pipe Ø 22mm
- Safety valve discharge - **Diagram 7.1.**

9.2 Cutting the flue hole

- Remove the wall template, follow the instructions given on the wall template.
- Determine the flue application, length and terminal position before starting.
- Position the wall template, taking due regard of the minimum clearances for the selected flue application, **see diagram 9.1.**

Rear hole cutting

- Mark correct position of top rear flue outlet hole from template.

Side hole cutting

- Mark the horizontal centre line for the hole on the rear wall. Extend the horizontal centre line to the side wall and mark the vertical centre line of flue hole as shown in **diagram 9.1.**

Important: When cutting the flue hole and when extending the flue centre line to a side wall, remember that the flue system must have a fall of about 35mm per metre of flue DOWNWARD towards the terminal. There must NEVER be a downward incline towards the boiler.

- Making allowance for the slope of the flue, cut hole in external wall, preferably using a core drill. For installations with internal and external access use a 105 mm diameter core drill.

For installations with internal access only use a 125 mm diameter core drill.

- Reposition the wall template over hole in wall.
- Mark the position of the holes for the hanging bracket and jig.
- Drill, plug and fix the hanging bracket to the wall using suitable screws (not supplied).
- Check that the hanging bracket is level.
- Drill plug and fix the fixing jig to the wall.

9.3 Water connection

Connect the system pipework to the copper connections on the fixing jig observing the correct flow and return format as shown in **diagram 9.2.** Do not subject the isolating valves to heat.

9.4 Safety valve discharge

There are two sets of two safety valves fitted to this appliance. One is located on the jig **diagram 8.1, (10)** heating safety valve 3 bar. The other is located inside the boiler (**diagram 5.1, (27)** temperature pressure/relief safety valve 7 bar/90°C, and **(24)** expansion valve 6 bar.

9.5 Tundish discharge

The internal safety valves, 24 and 27, have been tee'd together and the discharge pipe run so that it exits at the right hand

bottom of the boiler (**diagram 5.1 and 7.1 (D2)**). 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, **see diagram 7.1.**

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:

a. 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. **See table and diagram 7.1.**

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

c. Be installed with a continuous fall.

d. 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:

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

2. downward discharges at a low level; i.e. up to 100 mm 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.

3. 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 onto a roof capable of withstanding high temperature discharges of water and 3m from any plastics guttering systems that would collect such discharges (tundish visible).

4. 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 at 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.

9.6 Domestic hot water supply options

The domestic hot water storage temperature inside the boiler must be set 60° C. It is recommended that the boiler storage temperature is set by the user to the maximum of 60°C - this will ensure a more plentiful supply of hot water.

It may be desirable to provide hot water to separate outlets at different temperatures (for example, to provide a limited temperature to prevent the risk of scalding). To be able to do this, a thermostatic mixing valve is supplied with the Xtramax boiler (factory set to 43°C) and can be fitted during the installation procedure.

9 Piping System Installation

There are 2 options for the domestic hot water supply :

1 - Piping the hot water supply without the use of the mixing valve to provide hot water to all taps at the same temperature.

2 - Piping the hot water supply using the mixing valve (supplied) to provide hot water at boiler hot water "set temperature" to one tap and thermostatically controlled hot water to another tap(s).

To pipe the hot water supply using the mixing valve, refer to **diagram 9.2**. This shows one outlet supplying hot water at the boiler hot water "set temperature" and one hot water outlet at a temperature pre-set at the mixing valve. The mixing valve can be set between 35 and 60°C. It is recommended that the valve is adjusted (and locked) by the installer to the desired temperature.

Note: The thermostatic mixing valve has 22 mm connections, 22x15 mm reducers will need to be fitted.

The connections to the mixing valve are :

H - Hot water supply from boiler

C - Reduced cold water supply

MIX - Thermostatically controlled outlet

Warning : It is strongly recommended that the cold water supply to the mixing valve is taken from the reduced side of the pressure reducing valve (supplied)

Note 1 : The mixing valve is fitted with two in-line strainers, one on the hot inlet and one on the cold inlet. For servicing details of these, refer to the separate instructions supplied with the mixing valve.

Note 2 : The mixing valve incorporates a "rapid fail-safe" device which will automatically close the valve to safety in the event of supply failure on either hot or cold water.

9.7 Gas connection

Gas Safety (Installation and use) Regulations

In your interests and that of gas safety, it is the law that ALL gas appliances are installed and serviced by a qualified registered person in accordance with the above regulations.

• The supply from the governed gas meter must be of adequate size to provide a constant inlet working pressure of 20 mbar (8 in w.g.).

To avoid low gas pressure problems, it is recommended that the gas supply is connected using 22 mm pipe.

• On completion, the gas installation must be tested using the pressure drop method and purged in accordance with the current issue of BS6891.

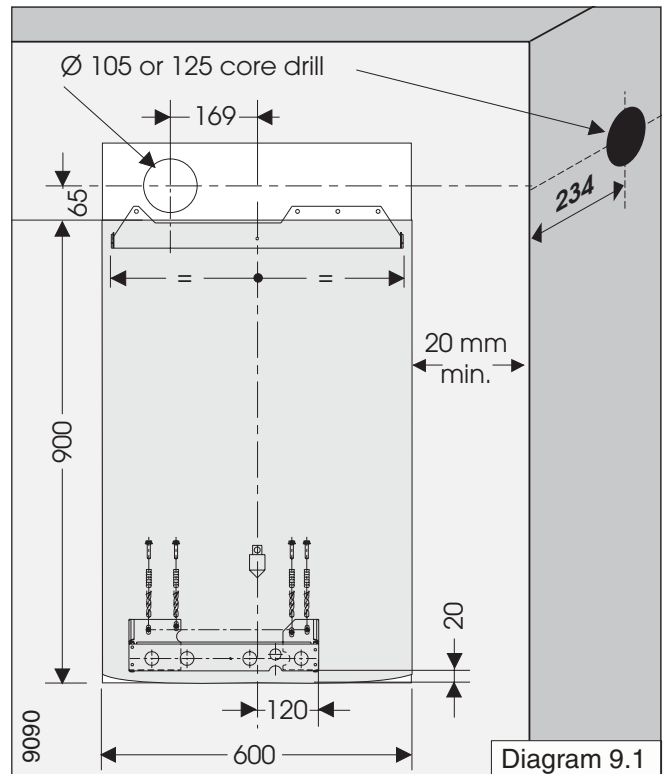


Diagram 9.1

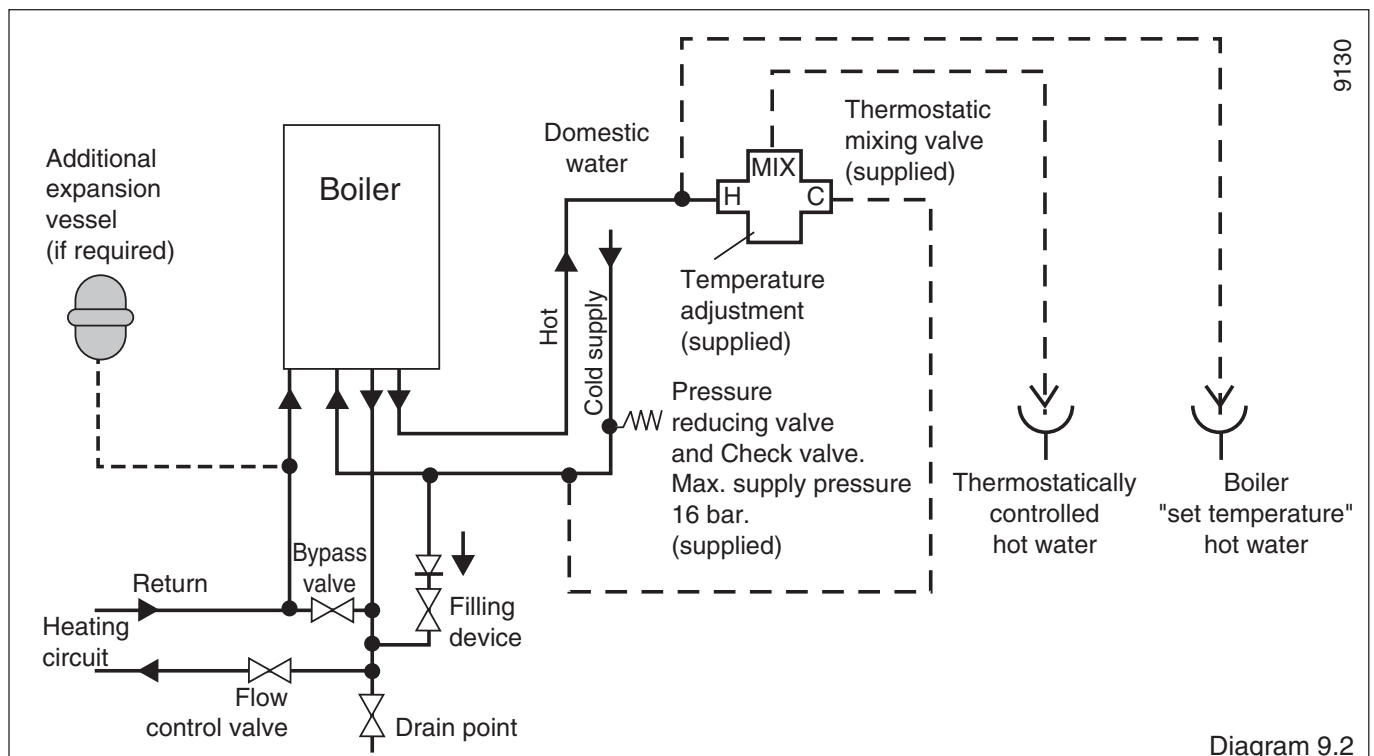


Diagram 9.2

10 Boiler Installation

10.1 Warning to the installer

This installation is subject to building regulation approval, notify the Local Authority of intention to install.

10.2 Installing the boiler

Prior to starting work, the system must be thoroughly flushed using a propriety cleanser such as **Sentinel X300** to eliminate any foreign matter and contamination e.g. metal filings, solder particles, oil, grease etc.

Note. Solvent products could cause damage to the system.

• **IMPORTANT:** With regards to the manual handling operations, 1992 regulations, the following operation exceeds the recommended weight for one man to lift.

- Lay boiler on its back.
- Remove all packaging from around the boiler.
- Remove front panel, put in a safe place to avoid damaging it.
- Ensure the plastic plugs are removed from water and gas pipes. NOTE: There will be some spillage of water.
- Remove transportation timber support bar from bottom rear of boiler.
- If required the boiler can be stood upright supported by extending the legs at the front bottom of the boiler.
- Lift the boiler up and engage boiler upper part onto the hanging bracket.
- Fit the washers between the boiler pipes and the inlet and outlet fittings on the fixing jig and connect the various couplings between the boiler and jig.
- Fit the base panel, hook in at the rear secure with the four self tapping securing screws at the front.

11 Horizontal Telescopic Top Flue Installation

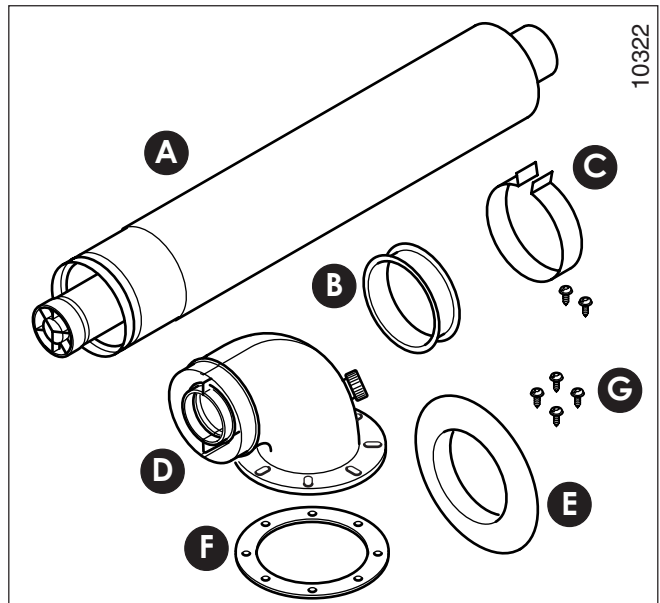
The *Horizontal Telescopic Top Flue*, Kit No. A2004500 is suitable for installations that require a flue length from 425 minimum to 659.5 maximum. If longer flueing is required extensions and bends are available, see note below.

Note: Additional 1 metre extensions, 90° and 45° bends are available. The maximum extended flue is 3.5m. The use of flue bends requires the flue lengths to be reduced by 1m. for 90° and 0.5m. for 45°.

11.1 Horizontal Telescopic Top Flue kit of parts, refer to diagram 11.1.

11.2 Installation of telescopic flue assembly

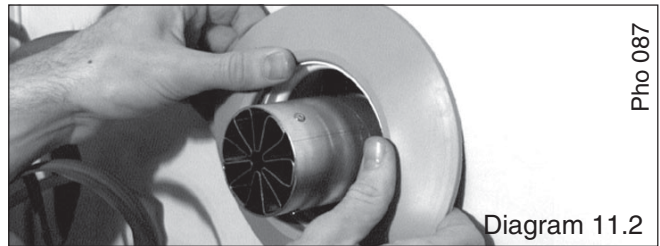
- Carefully pull to remove the elbow (D) from the air duct pipe and flue duct pipe (A).
- Remove the backing from the self adhesive gasket (F) and carefully fit gasket to base of flue elbow.
- Fit the restrictor (a) inside the fan outlet, see diagram 11.3.
- Fit elbow onto boiler and secure with the four screws (G).
- Fit rubber sealing collar (E), see diagram 11.2, into groove at the outer end of the air duct pipe (A).
- Fit air/flue duct pipe assembly, into wall from the outside with rubber sealing collar to the outside.
- Pull pipe assembly inwards to bring rubber sealing collar hard up against external wall.
- If the telescopic flue has been pulled apart care must be taken not to damage the 'O' ring on the flue duct when re-assembling.
- Re-fit the telescopic flue duct pipe to the flue elbow . Secure with the fixing collar seal (B) and fixing collar (C) using the 2 screws provided.



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- The flue kit A2004500 is 659.5 mm long and comprises:
- Telescopic flue assembly A
 - Fixing collar seal B
 - Fixing collar C
 - Elbow D
 - External rubber sealing collar E
 - Gasket F
 - Screws G

Horizontal telescopic Top flue kit Diagram 11.1

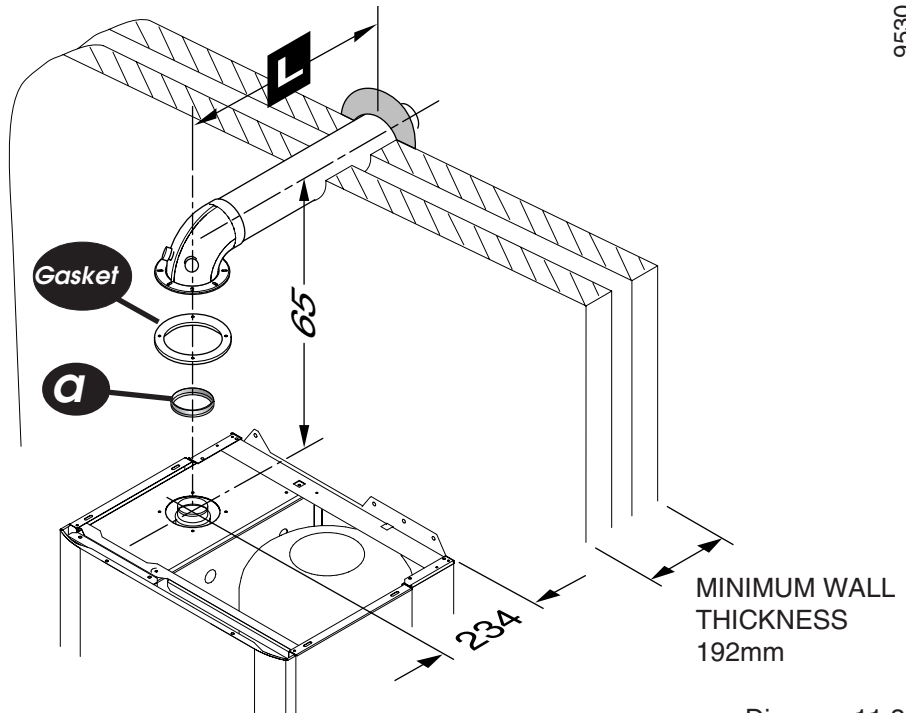


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Diagram 11.2

Horizontal telescopic flue system (rear and side)

The maximum permissible length (L) for the telescopic flue system is 630mm. The restrictor (a) must be fitted to inside the fan outlet.



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Diagram 11.3

11a Horizontal Top Flue Installation

The *Horizontal Top Flue*, Kit No. 86285H is suitable for installations that require a flue length from 190 minimum to 667 maximum (without extensions). If a shorter flue length is required the flue can be cut to suit, see diagrams 11a.1 and 11a.2 for minimum flue length.

Note: Additional 1 metre extensions, 90° and 45° bends are available. The maximum extended flue is 3.5m. The use of flue bends requires the flue lengths to be reduced by 1m. for 90° and 0.5m. for 45°.

11a.1 Top outlet flue - kit 86285H

The boiler is only suitable for top outlet flue connection.

11a.2 Rear flue systems

(Refer to diagram 11a.1). To calculate the length when flueing to the rear measure wall thickness e plus 140 mm for the outer air duct and e plus 231 mm for the inner flue duct measurement.

11a.3 To The Right or Left flue systems

(Refer to diagram 11a.1). To calculate the length when flueing **For right hand applications** measure wall thickness e plus inside of wall to side of boiler a add 350(mm) for the outer air duct and wall thickness e plus inside of wall to side of boiler a add 445(mm) for the inner flue duct measurement.

(Refer to diagram 11a.1). To calculate the length when flueing **For left hand applications** measure wall thickness e plus inside of wall to side of boiler a minus 25(mm) for the outer air duct and wall thickness e plus inside of wall to side of boiler a add 70(mm) for the inner flue duct measurement.

- Refer to **diagram 11a.2 (table)** for cutting lengths of both inner and outer flue pipes for each of the various flue options available.

Important: All flue cutting lengths must be measured from the terminal end of the flue pipes, **see diagram 11a.2.**

When the dimension X measured on site is greater than that given in **diagram 11a.2 (table)**, extensions will be required as necessary.

Important: All cutting lengths should be measured from the push fit joint end of the extension pipe. Do not leave any burrs or sharp edges on the cut ends of the pipes. **Note :** maximum horizontal flue length without bends is 3 m.

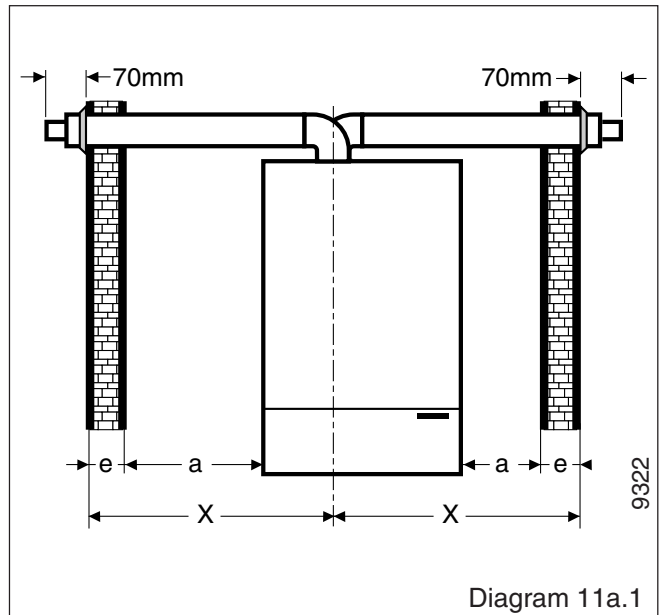


Diagram 11a.1

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AIR DUCT PIPE

Cutting length

FLUE DUCT PIPE

Cutting length

11a.2 Table: Flue cutting lengths (mm)

Rear flue
 Air Duct pipe : $e + 55$, Flue duct pipe : $e + 217$
Note : maximum distance 'x' without extension 770 mm

Right side flue
 Air Duct pipe : $e + a + 290$, Flue duct pipe : $e + a + 452$
Note : maximum distance 'x' without extension 515 mm

Left side flue
 Air Duct pipe : $e + a - 48$, Flue duct pipe : $e + a + 114$
Note : maximum distance 'x' without extension 1087 mm

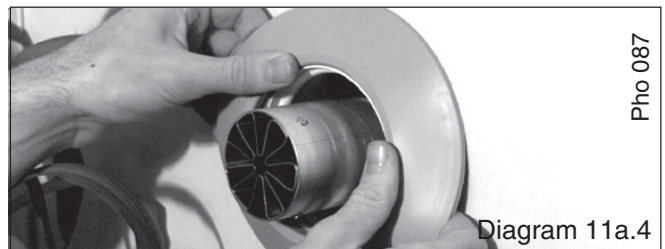
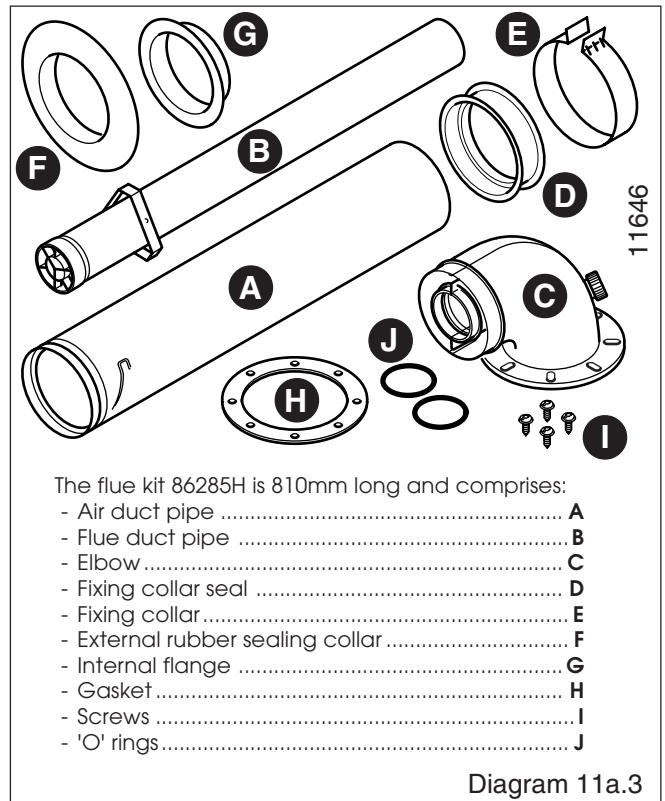
Diagram 11a.2

11a Horizontal Top Flue Installation

11a.4 Installation of flue assembly

Important: If the flue has been cut, ensure that there are no burrs that could damage the 'O' ring.

- For flue systems less than 0,5 m long, leave the restrictor (**a**) fitted in the fan outlet, see **diagram 11a.5**.
- Remove the backing from the self adhesive gasket (**H**) and carefully fit gasket to base of elbow (**C**).
- Fit both 'O' rings (**J**) into the flue elbow (**C**), one at the inlet, one at the outlet. By necessity, they are a loose fit, apply a small amount of silicone grease to each 'O' ring when fitting.
- Fit elbow onto boiler and secure with the four screws (**I**).
- Fit rubber sealing collar (**F**), see **diagram 11a.3**, into groove at the outer end of pipe (**A**).
- Insert flue duct pipe (**B**) into inner end of air duct pipe (**A**), rotate flue duct pipe to locate into groove inside air duct pipe.
- Fit air/flue duct pipe assembly into wall from outside with rubber sealing collar to the outside.
- Fit internal plastic flange (**G**) onto air duct pipe (**A**).
- Fit the fixing collar seal (**D**) onto the air duct pipe (**A**) ensuring it is the correct way round (the larger diameter onto the pipe).
- Pull air/flue duct pipe assembly inwards to bring rubber sealing collar (**F**) hard up against external wall, while carefully pushing the fixing collar seal onto the elbow ensuring that the flue duct pipe locates into the flue elbow outlet while taking care not to tear the 'O' ring.
- Fit the fixing collar (**E**) around the fixing collar seal (**D**) and secure with 2 screws provided.
- Push the internal plastic flange (**G**) along the air duct pipe (**A**) until engaged against internal wall.



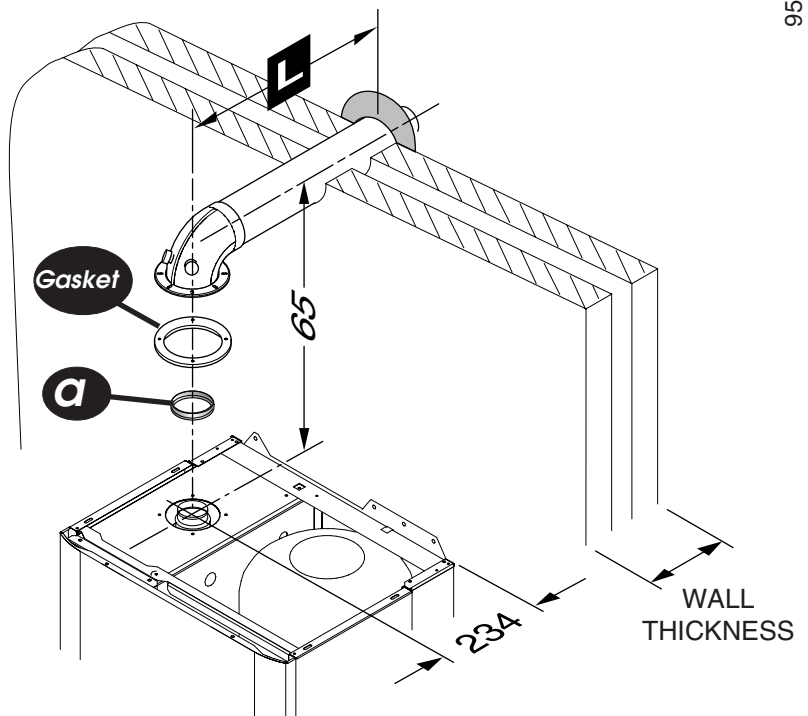
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Concentric flue system

The maximum permissible length (**L**) for the concentric flue system is 3.5 m. For flue systems up to 0,5 m length, the restrictor (**a**) supplied fitted to the boiler, inside the fan outlet, must be left in place. For longer flue systems, the restrictor must be removed. For each 90° flue elbow used, (or two 45° elbows) the maximum permissible length (**L**) must be reduced by 1 metre.



12 Electrical Connection

WARNING: This appliance must be earthed and 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.

The mains electrical supply must be maintained at all times in order to provide domestic hot water.

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 fused at 3A 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 three pin plug fused at 3A and shuttered socket outlet may be used instead of a fused spur box provided that:

- They are not used in a room containing a fixed bath or shower.
- Both the plug and socket comply with the current issue of BS1363.

12.1 Mains Cable

The boiler is supplied with a mains lead attached, **see diagram 12.1**.

Standard colours are Brown - Live, Blue - Neutral, Green and Yellow - Earth.

Important: If a replacement supply cable is required it must be purchased. Part No. S1008600.

12.2 External controls

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

To gain access to the external control connections, unclip side clips and hinge up control panel cover.

The boiler will work for heating without a room thermostat being connected provided that the wire link fitted between the two terminals of the connector (E) is left in place, **see diagrams 12.2 and 12.3**.

Alternatively, a 24V room thermostat can be used but do not make any connection to the compensating resistor, **see diagram 12.2**.

ON NO ACCOUNT must any electrical voltage be applied to any of the terminals of the external controls plug.

12.3 Remote control (F)

For extra control or if the boiler is to be sited in a garage or utility room an optional remote control unit with programmable roomstat can be obtained part number A20077, **see diagram 2**. This is a dual function unit, (a) boiler control (same as boiler fascia), (b) programmable room stat. Full fitting instructions are supplied with the unit.

12.4 Electrical Connections - Testing

Checks to ensure electrical safety must be carried out by a competent person.

After installation of the system, preliminary electrical system checks as below should be carried out.

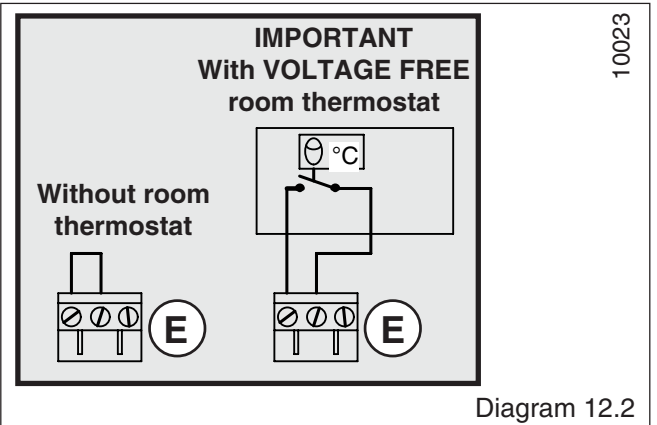
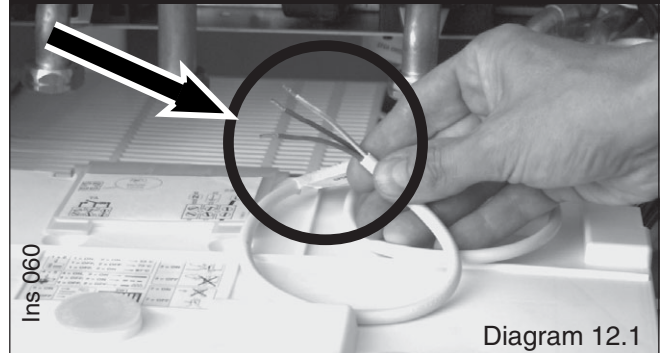
- Test insulation resistance to earth of mains cables.
- Test earth continuity and short circuit of all cables.

- Test the polarity of the mains.

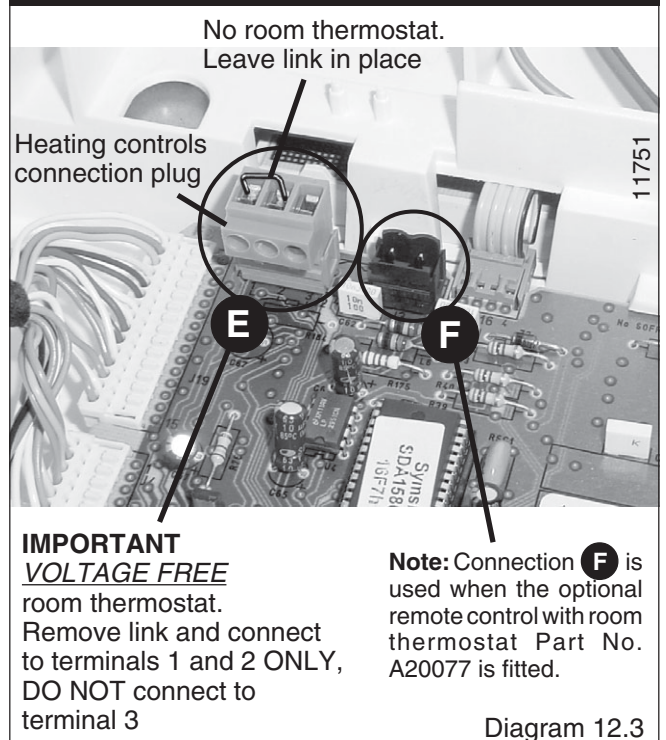
Please ensure the "Benchmark" logbook is completed and left with the user.

Note: For further information, see the building regulations 1991 - Conservation of Fuel and Power - 1995 edition - appendix G, Table 4b.

The boiler is supplied with a mains lead attached. Connect this to the electrical supply.



Leave link in place for no external controls.



13 Commissioning

Please ensure the "Benchmark" logbook is completed and left with the user.

The commissioning and first firing of the boiler must only be done by a competent person.

Gas installation

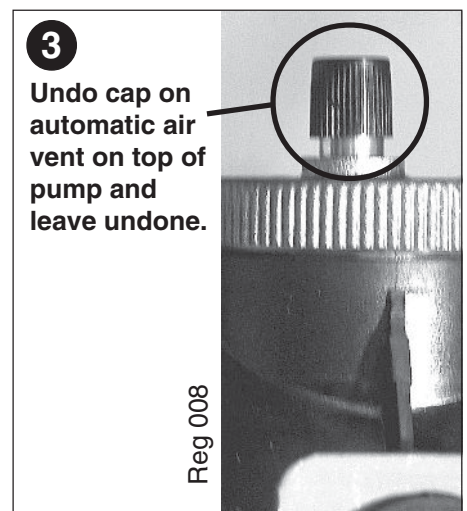
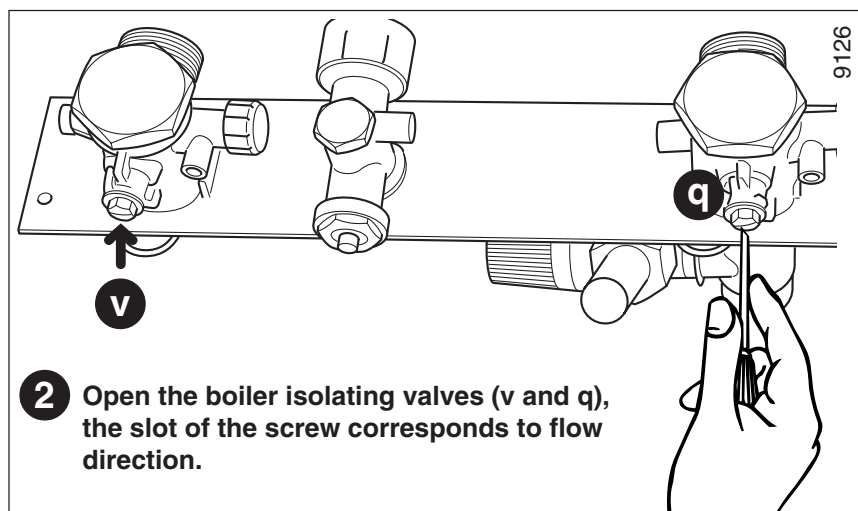
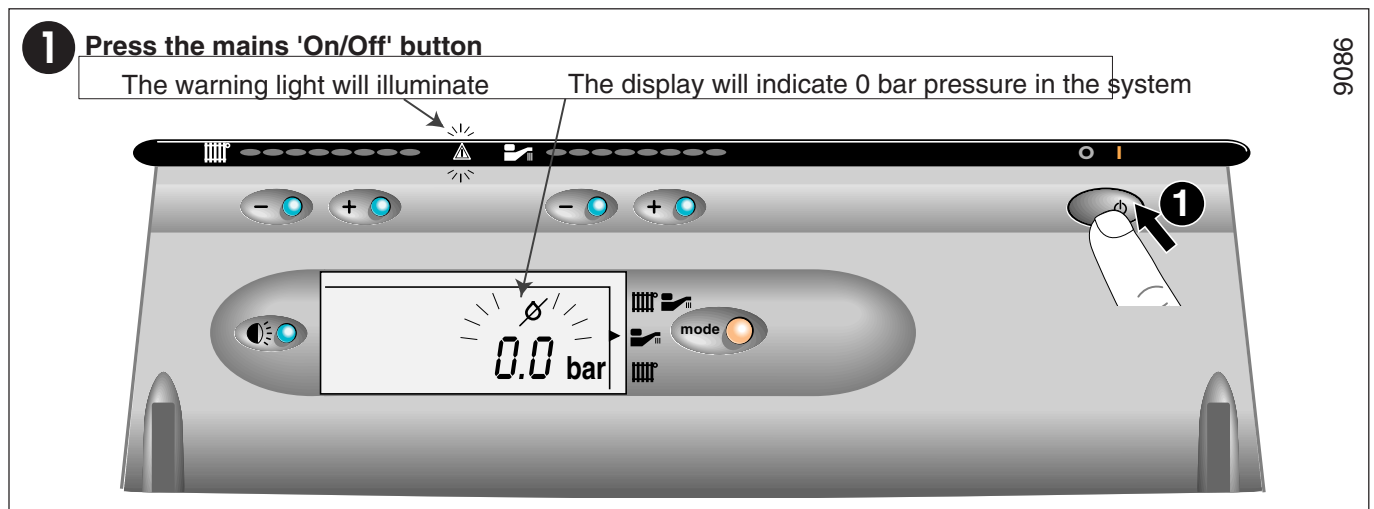
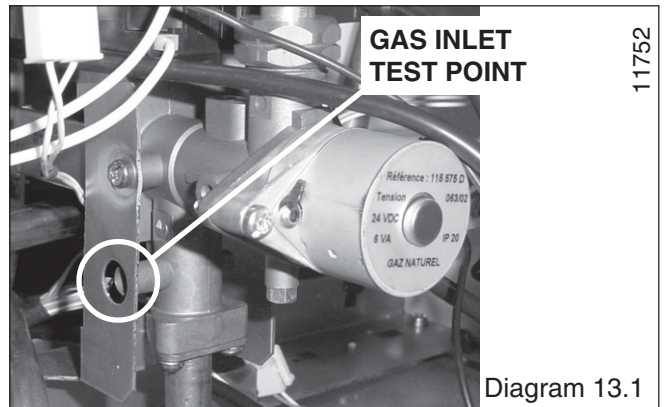
It is recommended that any air is purged from the supply at the gas inlet test point on the gas valve, see **diagram 13.1**.

Filling the system 1 to 8

Air in pipes

Important: A central heating system can not operate correctly unless it is filled with water and air bled from the system. If these conditions are not met the system may be noisy.

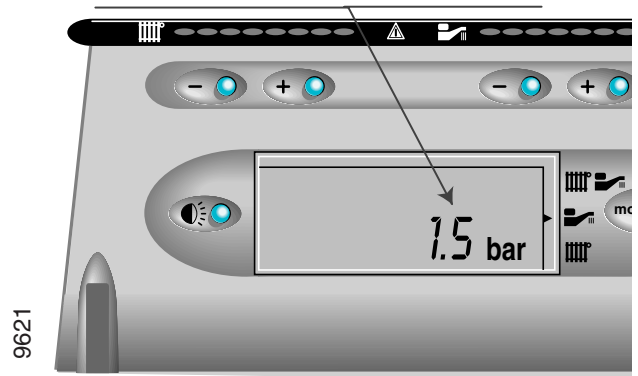
Bleed the air in the radiators and adjust the pressure if system requires. If the system requires filling too often this may be due to minor leaks or corrosion in the system. Call a qualified service engineer.



13 Commissioning

- 4** Open the system filling loop and fill the system until the pressure indicated on the display is between 1 and 2 bar.

The pressure must be between 1 and 2 bar



9621

- 5** Bleed each radiator to remove the air, re-tighten bleed screws.



Ins 061a

- 6** Leave the cap on the pump auto air vent open.



Reg 008

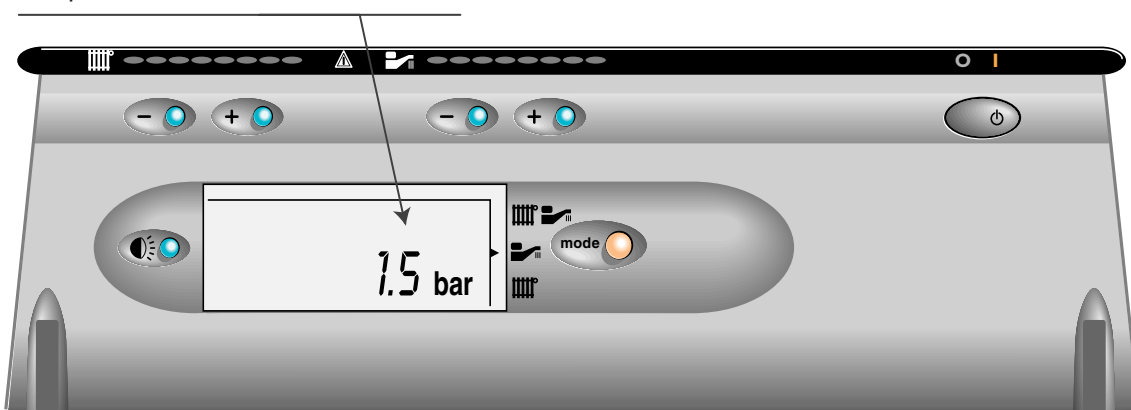
- 7** Open various hot water taps to bleed system.



Ins 062a

- 8** Make sure the display indicates a system pressure of between 1 and 2 bar. Re-fill system as necessary.

The pressure must be between 1 and 2 bar



9085

- Adjust heating temperature to maximum .
- Check that any external controls, if fitted, are calling for heat (set room thermostat to maximum).
- Allow the temperature to rise to the maximum value, with all radiator valves open. The temperature rise will cause release of the gases contained in the water of the central heating system.
- Gases driven towards the boiler will be automatically released through the automatic air vent.
- The gases trapped at the highest point of the system must be released by bleeding the radiators. Check the burner gas rate required, ten minutes from lighting. Refer to Data Label on electrical controls box. Should there be any doubt about the gas rate it should be checked at the meter.

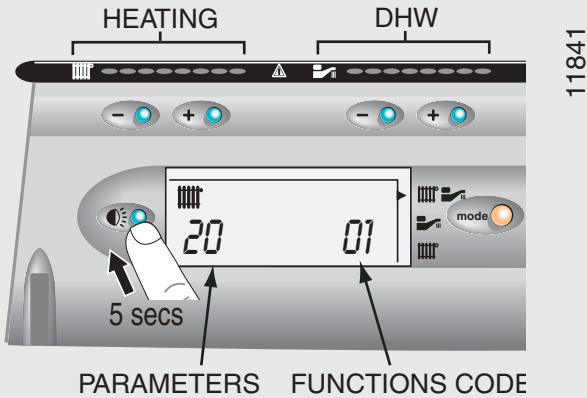
On reaching maximum temperature, the boiler should be turned off and the system drained as rapidly as possible whilst still hot.

- Refill system to a pressure of between 1 and 2 bar and vent as before.
- Restart boiler and operate until a maximum temperature is reached. Shut down boiler and vent heating system. If necessary, top up heating system and make sure that a pressure of at least 1 bar is indicated when system is COLD.

Flush the domestic hot water system by opening the hot water taps for several minutes.

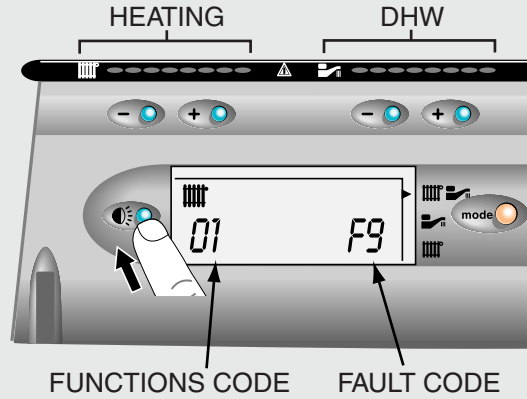
13 Commissioning

OPERATING PARAMETERS MODE



11841

FAULT HISTORY MODE



11842

- Press the display light button and keep pressed for 5 seconds and this will give you access to both the **operating parameters** or **fault history** modes. Each press of the display light button accesses each function in turn.

Operating Parameters

The heating + and - buttons allow you to select which particular parameter to adjust.

The domestic hot water + and - buttons scroll through the functions as follows:

- 01 - Heating output settings
- 02 - Fan settings
- T - Maximum heating temperature settings
- P - Pump settings
- E - External sensor settings
- 01 - Service use only
- 02 - Service use only
- 03 to 18 - Service use only

Fault History

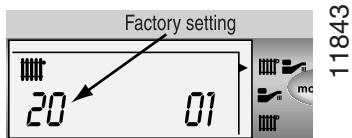
The domestic hot water + and - buttons scroll through the last 10 faults recorded and are numbered F9 to F0.

Note : The display will revert back to normal if no changes are made after 1 minute or if the display light button is again pressed for more than 5 seconds.

Setting the heating output parameter 01

The maximum heating output of the boiler is adjustable between the maximum and minimum values given in the Technical Data section.

- Use the heating + and - button to set the desired heating output in kW.



11843

Note : Adjustment of the heating output does not affect the hot water output.

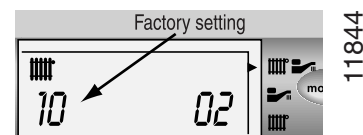
For kW conversion refer to table:

kW.....Btu/hr	kW.....Btu/hr	kW.....Btu/hr
10.....34,120	12.....40,940	14.....47,770
16.....54,590	18.....61,420	20.....68,240
22.....75,060	24.....81,890	26.....88,710
28.....95,540		

Setting the flue parameters 02

This adjustment is made to ensure the boiler operates at maximum efficiency with longer flue lengths.

- Select a parameter between 0 and 10 according to the table and diagram below :-



11844

Horizontal concentric flue system (C12)		Vertical concentric flue system (C32)	
setting	flue length	setting	flue length
0	0,3m	0	0,5m
1	0,6m	1	1m
2	1m	2	2m
3	1,2m	3	3m
4	1,5m	4	4,5m
5	2m	5	6m
6	2,2m	6	7m
7	2,5m	7	8m
8	3m	8	9m
9	3,2m	9	10m
10	3,5m	10	11,5m

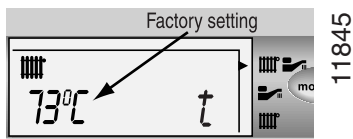
13 Commissioning

Setting the maximum heating temperature parameter T

This can be set to one of three values:

50°C , 73°C and 87°C .

For example, 50°C can be used for underfloor heating.

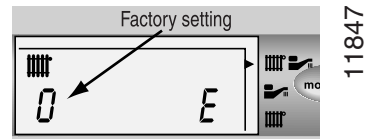


Remote control parameter E

Two options are available:

0 - no remote control

1 - With remote control



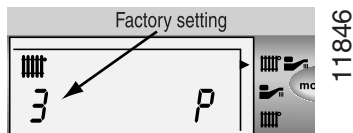
Pump operation parameter P

This can be set to one of three values:

1 - Intermittent (with burner)

2 - Permanently on

3 - Intermittent (with room thermostat)



Reminder - Leave these instructions and the "Benchmark" logbook with the user.

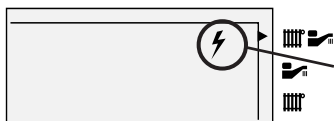
14 Safety Devices

The XTRAMAX incorporates a visual display that indicates fault conditions, should they occur.

In the event of a fault, the display will indicate, by means of pictograms and/or letters and numbers, exactly in which area the fault lies.

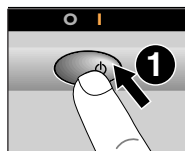
Should the boiler fail to operate during Commissioning, the most likely fault is that the gas supply to the boiler has not been turned on or purged sufficiently or that there is no pressure in the heating system. These are indicated as follows :

14.1 No gas supply

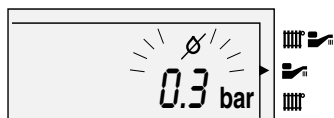


This will be indicated on the display as a pictogram of a spark. To rectify this, proceed as follows:

- Switch off the boiler at the On/Off push button.
- Rectify the gas supply problem.
- Restart the boiler by pressing the On/Off button.



14.2 Insufficient system pressure



This will be indicated on the display as a flashing warning indicating the system pressure is low. To rectify this the system must be re-filled, refer to 'Section 13 Commissioning'.

14.3 Other faults

These are indicated on the display by a fault code and a telephone symbol. Further information on the fault codes can be found in the 'Section 18 Fault Finding'.

General safety devices

14.4 Air flow rate safety device

If an obstruction, even partial, of the flue occurs, for any reason whatsoever, the built in safety system of the boiler will turn the boiler OFF and the fan will continue to run.

The boiler will be ready to operate when the fault has been cleared.

14.5 Overheat safety

In case of boiler overheating, the overheat thermostat will turn the boiler off. The thermostat, located on the heat exchanger flow pipe, will need to be manually reset, **see diagram 17.4**.

14.6 In case of power supply failure

The boiler no longer operates.

As soon as power supply is restored, the boiler will be automatically restarted.

14.7 Frost protection

The appliance has a built in frost protection device that protects the boiler from freezing. If the boiler is to be left and there is a risk of frost, ensure that the gas and electrical supplies are left connected. The frost protection device will light the boiler when the temperature of the boiler water falls below 6°C . When the temperature reaches 16°C , the boiler stops.

Note : This device works irrespective of any room thermostat setting and will protect the complete heating system.

15 Changing Gas Type

Should it become necessary to change the gas type, a modification kit will be required.

This modification must only be carried out by a suitably qualified engineer.

Conversion natural Gas (G20) to G30/G31 Part No. 86631.

16 Settings

Bypass

The XTRAMAX boiler has a built-in bypass, **see diagram 16.1**.

The boiler is supplied with the bypass open half a turn. It should not be necessary to adjust the bypass, but if required ensure that under no circumstances does the flow rate fall below the figures specified, **refer to diagram 1.1**. (turn clockwise to close the valve).

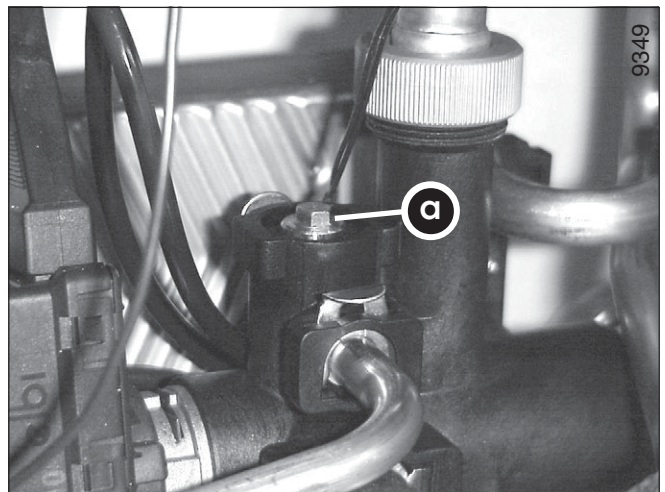


Diagram 16.1

17 Routine Cleaning and Inspection

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 conditions and usage, but in general once a year should be enough.

It is the law that any servicing is carried out by a qualified registered person.

All parts are replaced in reverse order to removal.

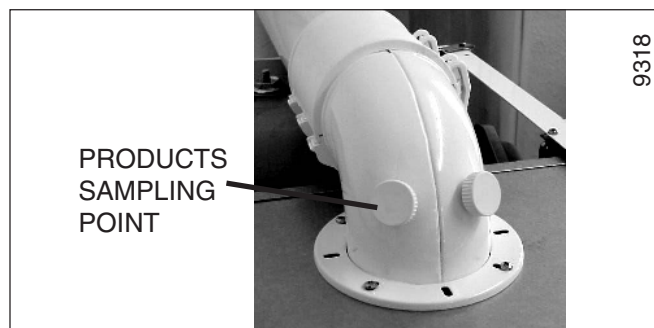
17.1 Products of combustion check

Note: To obtain a products of combustion reading, unscrew the left hand sampling point cap on the flue elbow, located on top of boiler.

Connect the analyser tube onto sampling point.

Switch on the electrical supply and gas supply, then operate the boiler.

On completion of the test switch off the electrical supply and the gas supply, remove analyser tube and replace sampling point cap.



17.2 Service Check and Preparation.

- Operate boiler and check for any faults that need to be put right.
- Isolate boiler from the gas and electrical supplies.
- On completion check all gas-carrying parts for soundness with leak detection fluid.
- Remove boiler casing as follows:

17.3 Front panel

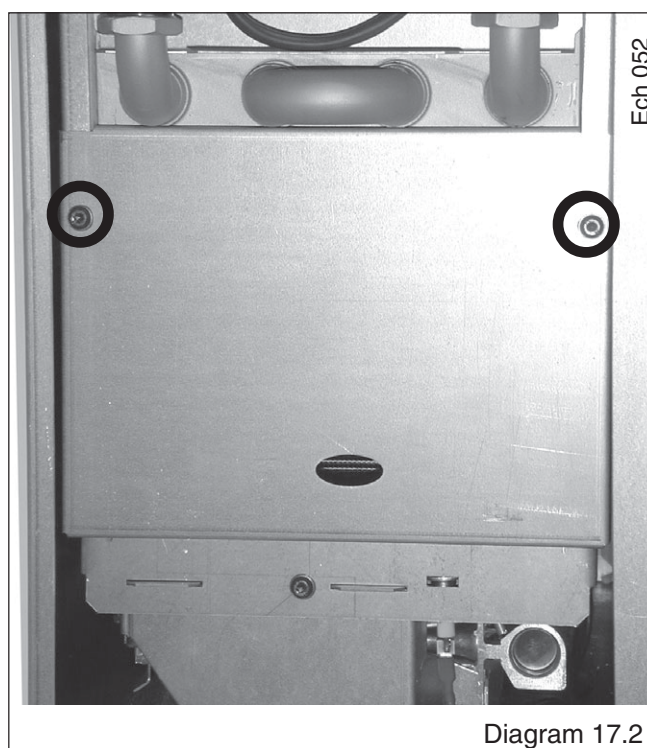
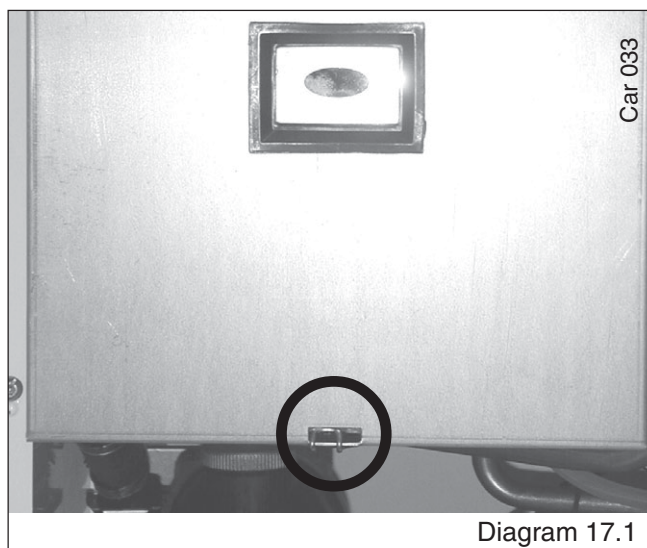
- Unscrew and remove the two front panel retaining brackets from the top of the boiler.
- Remove panel by lifting up and forward.

17.4 Sealed chamber cover

- Unclip the toggle clip holding the sealed chamber cover, **see diagram. 17.1.**
- Lift cover up and off boiler.

17.5 Control panel

- Lift control panel up and lower forwards to gain access to lower part of boiler.



17.6 Side panels (For ease of access if required)

- Unscrew and remove the four screws securing lower grille onto boiler. Unhook grille from rear of boiler and remove.
- Remove three screws from front of each side panel.
- Lift each panel up and then forward to remove.

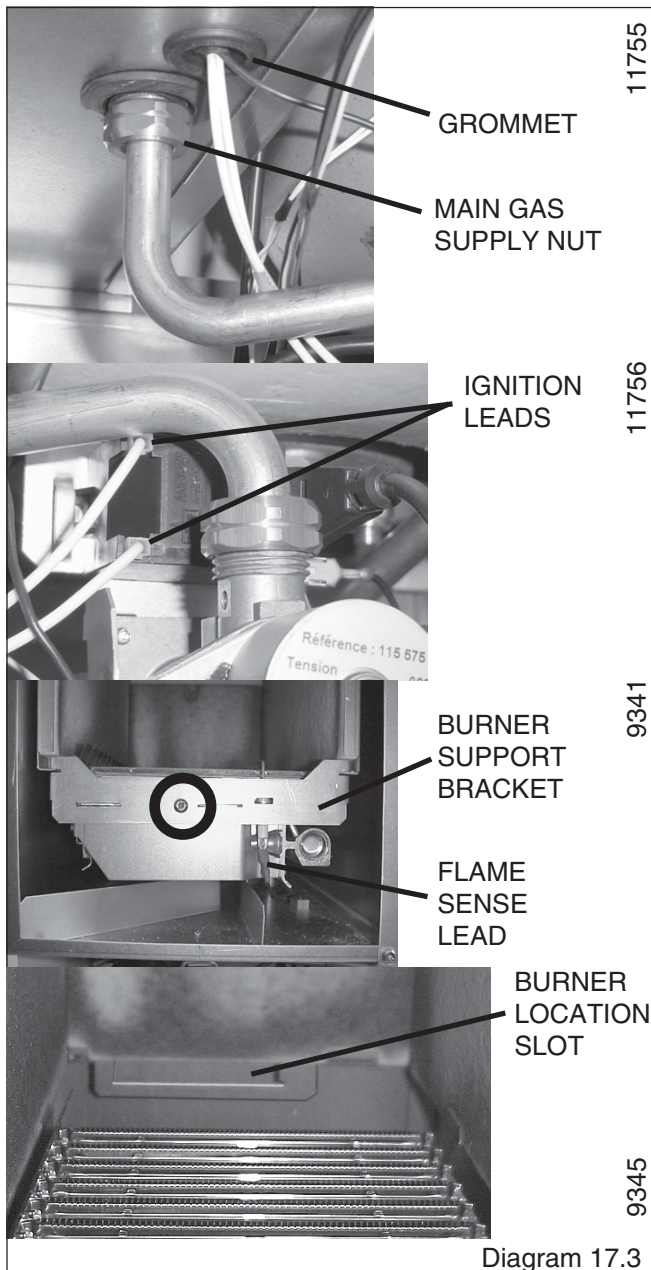
17.7 Combustion chamber cover

- Unscrew the two screws securing combustion chamber cover to combustion chamber, **see diagram 17.2.**
- Remove combustion chamber cover from boiler.

17 Routine Cleaning and Inspection

17.8 Burner, refer to diagram 17.3.

- Undo main gas supply nut from under the sealed chamber.
- Note: The washer between main burner and main burner gas supply must be kept for use on reassembly.
- Pull off ignition leads from ignition unit.
 - Pull off flame sense lead from flame sense electrode.
 - Unscrew and remove burner support bracket securing screw and remove bracket.
 - Remove burner from boiler by lifting up and pulling forwards easing the leads through the grommet, taking care not to damage insulation.
 - Clean burner by washing in soapy water. Dry thoroughly before refitting.
 - When refitting burner ensure that rear of burner locates into location slot and the injector locates correctly through the grommet.
- Note: To gain access to injectors for removal, refer to **Section, 20.24 in Replacement of Parts.**

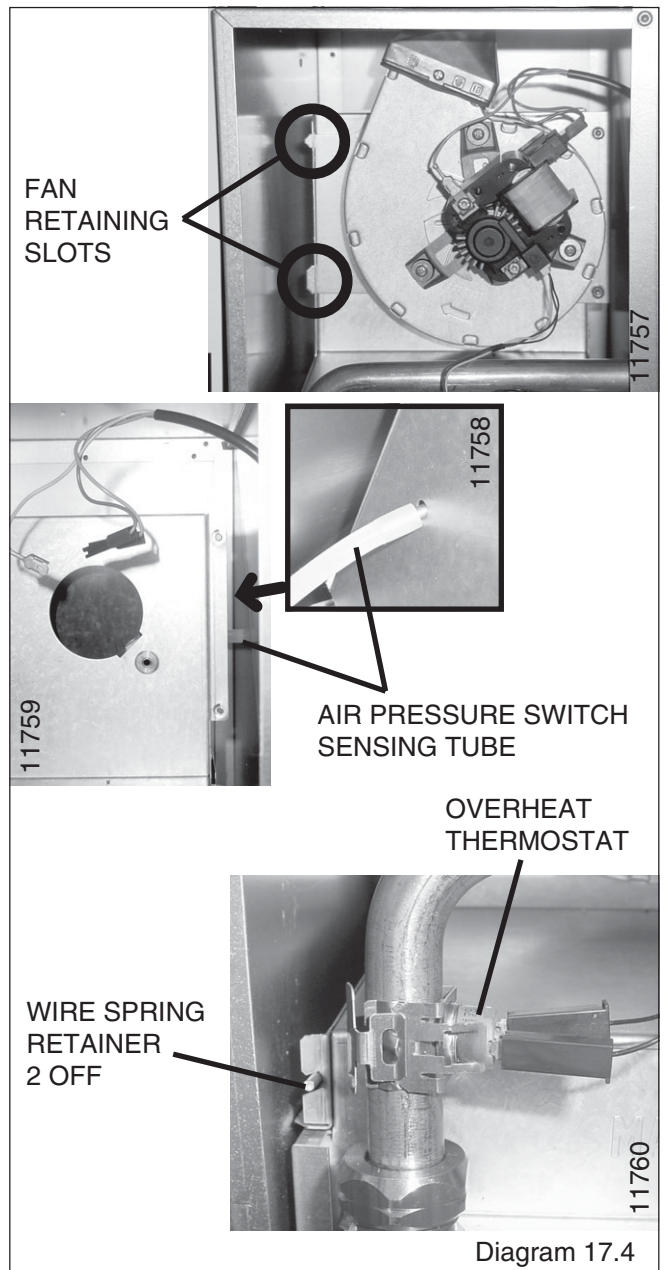


17.9 Heat exchanger, refer to diagram 17.4.

- Disconnect electrical connections from fan.
- Unscrew and remove two fan retaining screws from the right hand side edge of fan mounting plate.
- Remove fan with mounting plate attached by pulling forward and out of boiler.
- Remove air pressure switch sensing tube at rear of flue hood.
- From front of boiler carefully unclip wire spring retainers from side of flue hood.
- Remove the overheat thermostat by unclipping from the heating return pipe.
- Lift flue hood clear of heat exchanger and examine for debris.
- Using a soft brush or vacuum clean as required.

DO NOT USE ANY TOOL LIKELY TO DAMAGE PAINTED FINISH OF HEAT EXCHANGER.

Note: When re-fitting fan, make sure that the two lugs on the fan mounting plate engage in the flue hood



17 Routine Cleaning and Inspection

17.10 Spark and Sense Gaps

- Check that the spark and sense gaps as shown in **diagram 17.5**.

17.11 Domestic hot water discharge (Annual Check)

Refer to **diagram 5.1**. Open expansion valve (24) and temperature/pressure release valve (27) and check that the discharge outlet is not blocked (D2) and that the valves close, check the pressure reducing valve and strainer and clean if necessary, check the air pressure in the domestic expansion vessel (26) and recharge if required.

17.12 Reassembly of parts removed for servicing

All parts are replaced in reverse order to removal.

17.13 Flue system

- Check externally to make sure that flue is not blocked
- Inspect flue system to make sure that all fittings are secure.

17.14 Operation of fan

- Switch on electrical supply and turn on gas.
- Light burner by opening a hot water tap.
- Check that fan operates when burner lights and stops when it goes out.

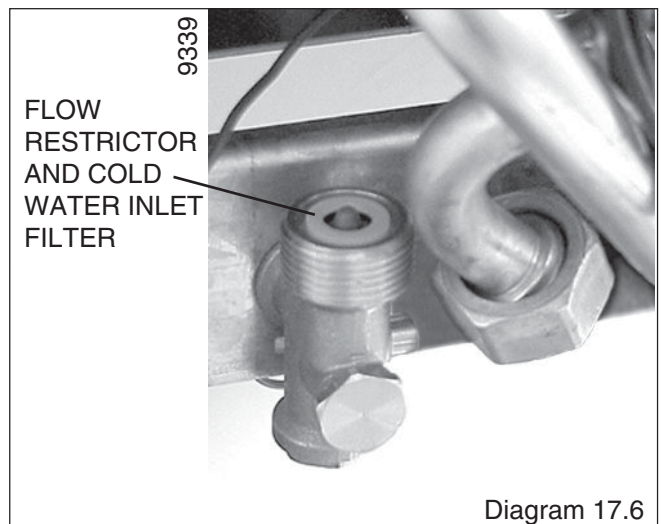
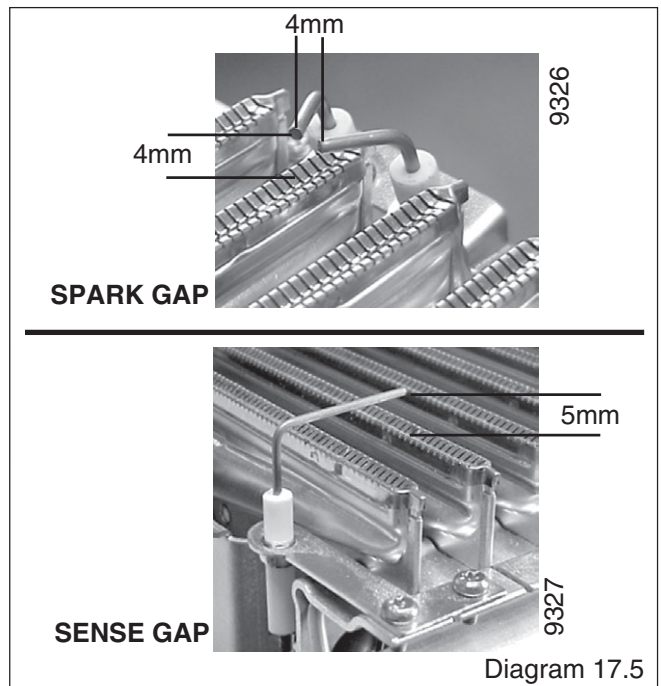
17.15 Cold water inlet filter

Drain down domestic hot water circuit of boiler only, as follows:

- Close isolating valve/throttle (**m**) on cold water isolating cock, **see diagram 8.1**.

Note: This valve is closed when screwed fully clockwise.

- Drain DHW boiler circuit, **refer to Section 4.2**.
- Undo connecting nut from boiler cold water inlet connection.
- Clean and inspect filter, replace if necessary, **see diagram 17.6**.
- With both filter and restrictor in place, reconnect connecting pipe to inlet connection and tighten.
- Fully open isolating valve/throttle on cold water inlet and check for leaks.



18 Fault Finding

WARNING. Always isolate the boiler from the electrical supply before carrying out any electrical replacement work.

On completion of a fault finding task that has required the disconnection and making of electrical connections, the check for earth continuity, polarity and resistance to earth must be carried out.

If any gas-carrying components are disturbed, removed or replaced it will be necessary on completion to check for gas soundness with leak detection fluid.

Before trying to operate the boiler make sure that :

- All gas supply cocks are open and that the gas supply has been purged of air.

- The heating system pressure is at least 1 bar.
- There is a permanent mains supply to the boiler.
- The fuse on the PCB is intact.

Preliminary electrical system checks, as outlined in a multimeter instruction book, are the first checks to be carried out during a fault finding procedure.

Should there be any doubt about the voltage supply to any of the components, it is possible to carry out a simple electrical test to ensure all is operational in that area.

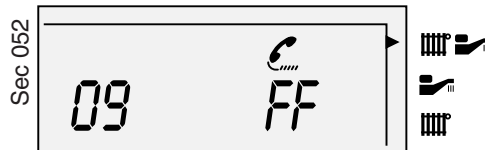
To carry out the electrical test, gain access to the main Printed Circuit Board (PCB), as described previously, and measure the voltages according to table 2.

Table 2

Voltage	Measured value	Measuring point
230 Volt	230 V AC	Between terminals H8.1 and H8.2
24 Volt	maximum 33V DC	Between terminals B2.4 and B2.7
15 Volt	15V ± 0.5V	Between terminals B2.4 and B2.2
Display	5V ± 0.5V	Between terminals B2.4 and B4.2

The **XTRAMAX** has an on-board fault diagnostic system. Should a fault occur on the boiler, the warning

LED at the top of the user display will illuminate and the LCD display will indicate the precise area where the fault has occurred.



A fault code is displayed on the left hand side of the LCD display, whilst at the same time, the letters appear with a telephone symbol.

Thermistor values

The following table applies to the central heating, domestic hot water and storage vessel thermistors:

Temperature (°C)	Resistance (Ω)
0	32565
5	25345
10	19875
15	15700
20	12500
25	10000
30	8060
35	6535
40	5330
45	4370
50	3605
55	2989
60	2490
65	2085
70	1755
75	1480
80	1260
85	1070
90	920
95	785
100	680















System pressure sensor






The resistance of the sensor at various pressures is as follows:

0 bar	between 280 Ω and 320 Ω
1 bar	between 195 Ω and 220 Ω
3 bar	between 93 Ω and 143 Ω

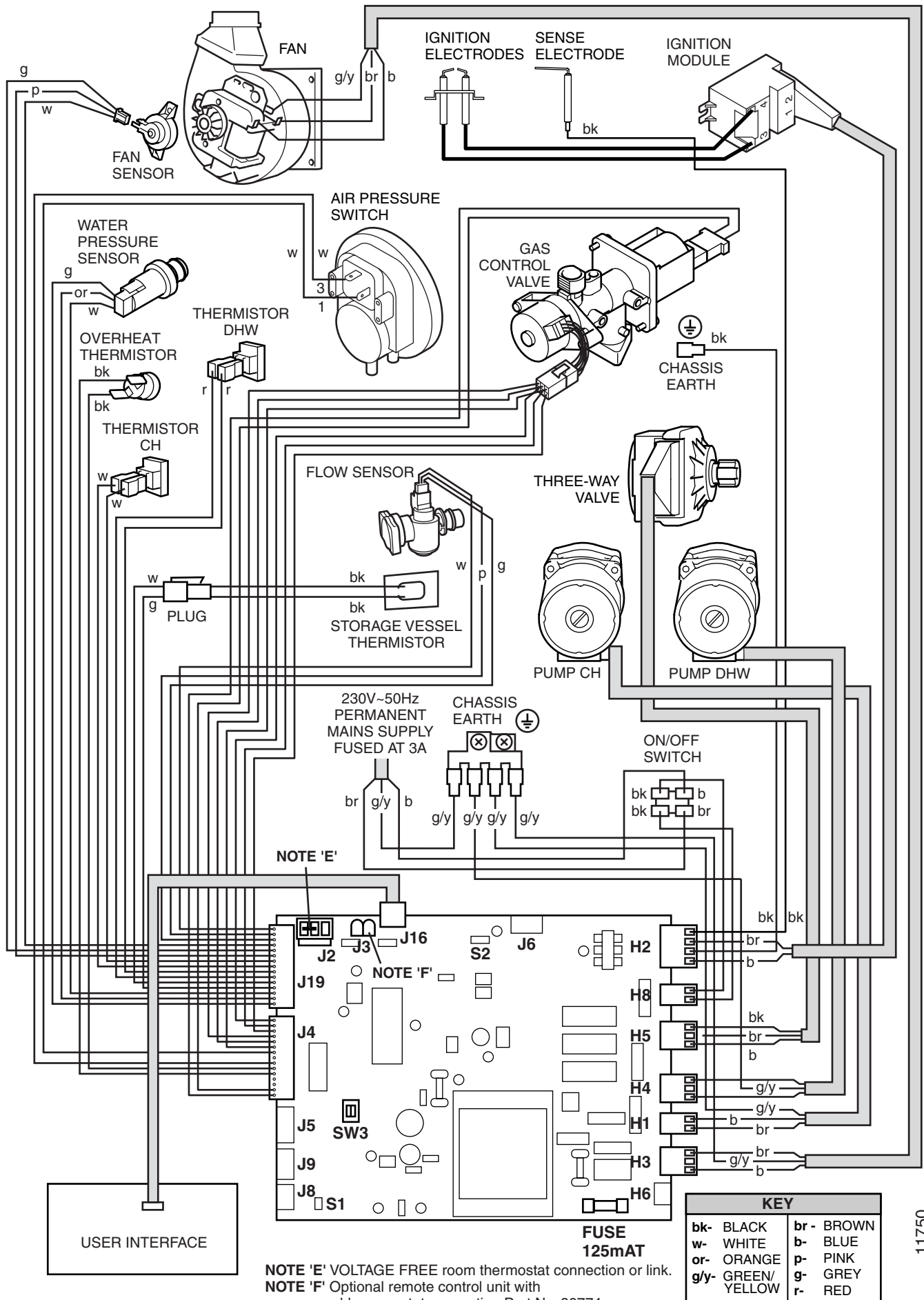
18 Fault Finding

TO AID FAULT FINDING REFER TO DIAGRAMS 5.1 and 19.1.

CODE	TYPE OF FAULT	DISPLAY SYMBOL	CHECK
00	NO FAULT		NO FAULT
02	AIR FLOW SAFETY	 FF	THIS SYMBOL IS NOT INSTANTANEOUS BUT IF IT APPEARS AFTER 40 SECONDS, CHECK <ul style="list-style-type: none"> • THE FLUE SYSTEM FOR A BLOCKAGE, EXCESS LENGTH. • CHECK THE AIR PRESSURE SWITCH. • CHECK THE ELECTRICAL CONNECTIONS.
04	NO IGNITION Note: MAX. IGNITION TIME = 7 SECONDS		IF THE BURNER LIGHTS AND GOES OUT AFTER 7 SECONDS. <ul style="list-style-type: none"> • CHECK THE ELECTRODE AND ITS CORRECT CONNECTION. • CHECK IGNITION. • CHECK THERE IS MORE THAN 40V BETWEEN LIVE AND EARTH. IF THE BURNER DOES NOT LIGHT, CHECK <ul style="list-style-type: none"> • THE GAS TAP ON THE INSTALLATION IS OPEN. • THE GAS CONTROL VALVE. • CHECK THE IGNITION. IF NO SPARK IS PRESENT THEN <ul style="list-style-type: none"> • CHECK THE IGNITER AND CONNECTIONS
05	OVERHEATING LOOP	 FF	<ul style="list-style-type: none"> • PUMP BLOCKED OR ITS CONDENSER OUT OF SERVICE. • ISOLATING COCKS CLOSED ON JIG. • DEFECTIVE OVERHEAT THERMOSTAT. • BLEED OUT AIR. • CHECK THE ELECTRICAL CONNECTIONS.
06	HEATING THERMISTOR ON FLOW PIPE	 FF	<ul style="list-style-type: none"> • CIRCUITS OPEN OR SHORT CIRCUIT. • CHECK RESISTANCE OF THE THERMISTOR. (12500 ohms AT 20°C. 1750 ohms AT 70°C). • UNCLIP THE THERMISTOR FROM THE PIPE, IF THE BOILER RE-LIGHTS WHEN THE THERMISTOR IS OPEN CIRCUIT. REPLACE THE THERMISTOR.
07	DOMESTIC THERMISTOR ON DHW PIPE		
08	TEMPERATURE ON STORAGE VESSEL		
09	LOSS OF WATER PRESSURE SENSOR.	 FF	<ul style="list-style-type: none"> • SENSOR IN SHORT CIRCUIT OR HAS ISOLATION FAULT. • CHECK THE ELECTRICAL CONNECTIONS.
12	USER INTERFACE	 FF	<ul style="list-style-type: none"> • INTERFACE MAY BE DAMP. DRY IT OUT OR REPLACE.
13	MAIN CONTROL BOARD (PCB)	 FF	THIS FAULT MAY BE INTERMITTENT. <ul style="list-style-type: none"> • SWITCH (OFF), WAIT APPROXIMATELY 5 SECONDS, SWITCH (ON). • IF FAULT PERSISTS. REPLACE MAIN CONTROL BOARD (PCB).
14	TEMPERATURE LIMITER. CONTROLLED BY THE HEATING THERMISTOR ON FLOW PIPE.	 FF	<ul style="list-style-type: none"> • CHECK HEATING THERMISTOR (MAY BE UNCLIPPED) OR THREE WAY VALVE FAULTY. • FAULTY PUMP. • LOW HEATING FLOW RATE.
15	STEP MOTOR FAILURE	 FF	<ul style="list-style-type: none"> • MOTOR CONNECTION OR MOTOR FAILURE.
16	GAS LEAK THROUGH THE SAFETY ELECTRIC VALVES	 FF	<ul style="list-style-type: none"> • CHECK THE SAFETY ELECTRIC VALVE
17	NETWORK VOLTAGE TOO LOW	 FF	<ul style="list-style-type: none"> • CHECK THE SAFETY ELECTRIC VALVE
20	COMMUNICATION FAULT	 FF	THIS FAULT MAY BE OCCASIONAL AND CAUSED BY ELECTROMAGNETIC INTERFERENCE, OTHERWISE <ul style="list-style-type: none"> • CHECK THE MAIN CONTROL BOARD (PCB).
21	LACK OF WATER IN PRIMARY CIRCUIT		<ul style="list-style-type: none"> • PERFORM WATER TOPPING - UP

OTHER FAULTS NOT DISPLAYED BY FAULT CODE			
	NO HEATING		THERE IS DEMAND BY THE ROOM TEMPERATURE THERMOSTAT. <ul style="list-style-type: none"> • CHECK THE CONNECTIONS. IF FAULT PERSISTS, REPLACE MAIN CONTROL BOARD (PCB).
	NO HEATING. NO DISPLAY OF RADIATOR SYMBOL. 		<ul style="list-style-type: none"> • CHECK THAT CONTACT 1 IS ON 1. OR MEASURE A RESISTANCE < 10 ohms BETWEEN B5.1 AND B5.2. • CHECK ROOM THERMOSTAT CONNECTIONS OR MEASURE A RESISTANCE < 50 ohms BETWEEN B3.1 AND B3.2.
	WATER NOT HOT ENOUGH, OR UNEVEN FLOW FROM TAP. THERE IS A HOT WATER DEMAND.		<ul style="list-style-type: none"> • CHECK THREE WAY VALVE. • CHECK THREE WAY VALVE MOTOR (SWITCHING). • CHECK THE DIRECTION OF CLIP ON THREE WAY VALVE (READABILITY OF SYMBOL).  • MEASURE THE MICROFAST[®] RESISTANCE = 1000 ohms BETWEEN H4.1 AND H4.3.
	WATER NOT HOT ENOUGH, OR UNEVEN FLOW FROM TAP. NO DISPLAY OF TAP SYMBOL. 		<ul style="list-style-type: none"> • READ THE VALUE OF FLOW RATE DETECTOR ON CODE 07 OF INFO MENU. IT WILL READ HOT WATER OUTPUT (L/MIN.)(x10) VALID RANGE 00,,199 NOTE: DIVIDE THE VALUE BY 10. IF = 0 THE DETECTOR IS BLOCKED OR THE MAIN CONTROL BOARD (PCB) HAS FAILED.
	THE BURNER COMES ON WHEN COLD WATER IS DRAWN OFF.		<ul style="list-style-type: none"> • CHECK THAT THE HOT WATER CIRCUIT HAS BEEN BLED PROPERLY (ANY AIR BUFFER MAY ACTIVATE THE FLOW RATE DETECTOR WHEN THE TAPS ARE TURNED ON).

19 Wiring Diagram



11750

Diagram 19.1

20 Replacement of Parts

To drain the domestic hot water circuit (DHW) of the boiler

Close isolating valve/throttle (**m**)

Note: This valve is closed when screwed fully clockwise.

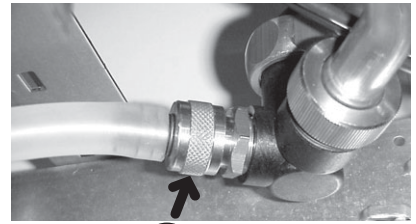
Open the DHW drain point (**z**) located below the DHW pump.

To drain the central heating circuit (CH) of the boiler

Close isolating valves (**q**) and (**v**)

Note: These valves are closed when slots are at right angles to direction of flow.

Open drain valves (**r**) and (**u**)



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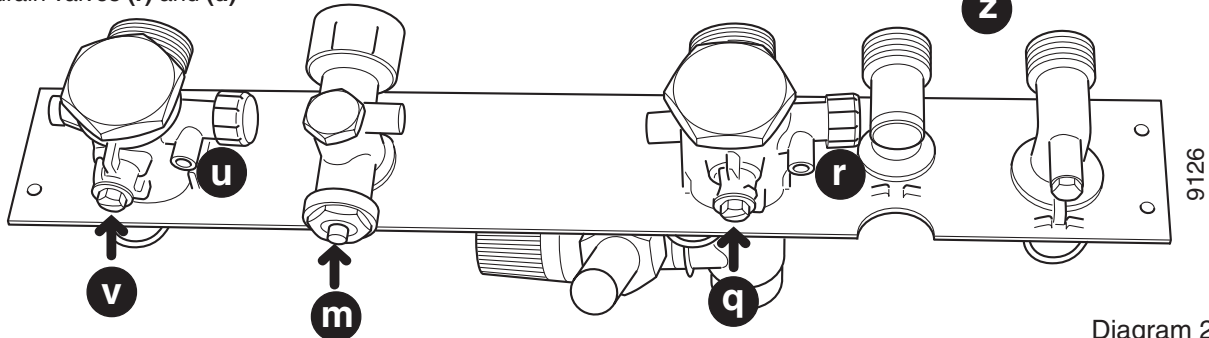


Diagram 20.1

IMPORTANT INFORMATION

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

WARNING: Before commencing the replacement of any component, isolate appliance from electrical supply and turn off gas at service cock.

When replacing components it may be necessary to renew sealing washers, gaskets and 'O' rings. If new ones are supplied with replacement components they must be used.

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

If any gas carrying components are disturbed, removed or replaced, it will be necessary on completion to check for gas soundness with leak detection fluid and if necessary carry out functional test of the controls.

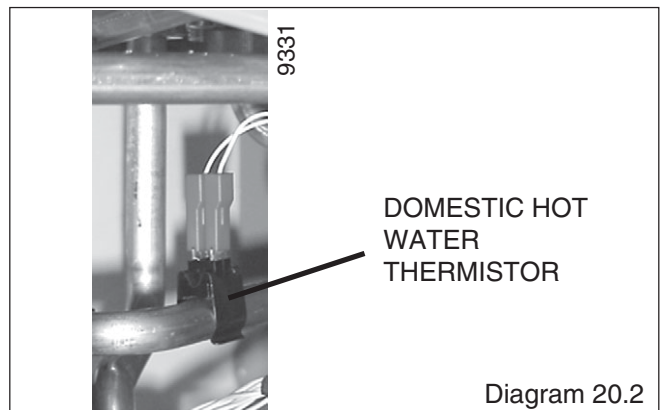


Diagram 20.2

20.1 Domestic hot water thermistor

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Locate domestic hot water thermistor on hot water flow pipe on right hand side of boiler adjacent to gas valve, see **diagram 20.2**.
- Unclip thermistor from pipe.
- Disconnect leads from thermistor.
- Fit leads to replacement thermistor and fit thermistor to pipe. The polarity is not important.

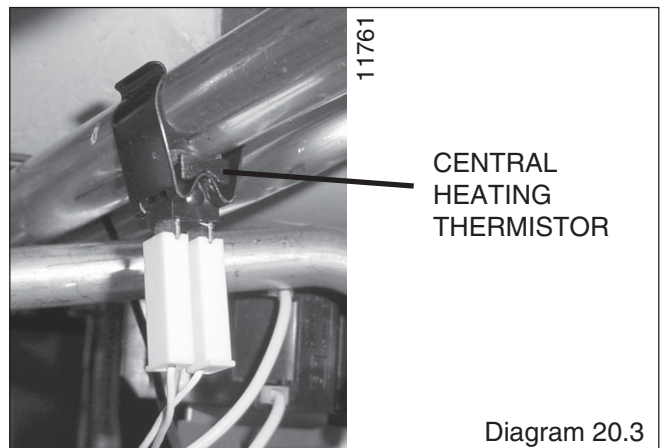


Diagram 20.3

20.2 Central heating thermistor

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Locate central heating thermistor on heating flow pipe on centre of boiler, see **diagram 20.3**.

- Unclip thermistor from pipe.
- Disconnect leads from thermistor.
- Fit leads to replacement thermistor and fit thermistor to pipe. The polarity is not important.

20 Replacement of Parts

20.3 Domestic hot water storage vessel thermistor

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, **refer to Section 17.3**.
- Lower the control panel, **refer to Section 17.5**.
- Unscrew and remove two screws securing right hand side panel to boiler.
- Swing out side panel to gain access to thermistor on right hand side of cylinder.
- Disconnect plug connection to thermistor lead.
- Remove plug of insulation from right hand side of cylinder, **see diagram 20.4**.
- Peel off the self adhesive thermistor, **see diagram 20.4**.
- Fit replacement thermistor.

20.4 Fan, refer to diagram 17.4

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, **refer to Section 17.3**.
- Remove the sealed chamber cover, **refer to Section 17.4**.
- Disconnect electrical connections from fan.
- Unscrew and remove two fan retaining screws at front edge of mounting plate.
- Remove fan with mounting plate attached by pulling forwards out of the boiler.
- Remove fan from mounting plate.
- Fit replacement fan.

Note: When re-fitting, make sure that the two lugs on the fan mounting plate engage in the flue hood.

- Reconnect electrical leads.

20.5 Air pressure switch

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, **refer to Section 17.3**.
- Locate air pressure switch situated outside combustion chamber on top right hand side, **see diagram 20.5**.
- Remove air pressure switch tubes from sensing probe on flue hood and combustion chamber.
- Disconnect air pressure switch electrical connections.
- Undo screws on top of boiler securing air pressure switch to boiler and remove switch.
- Transfer mounting bracket from old air pressure switch to new air pressure switch.
- Fit replacement switch, ensuring that pressure sensing tubes are fitted to correct connections on switch.

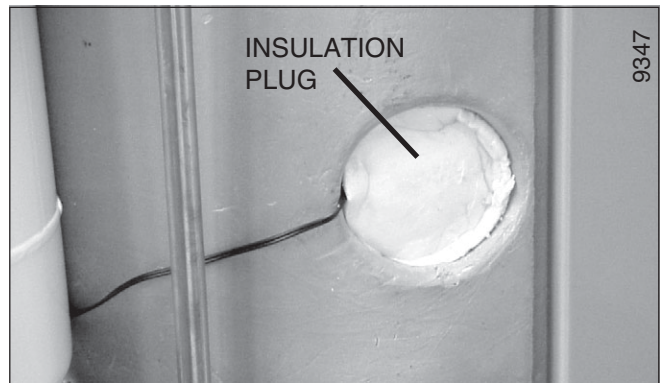


Diagram 20.4

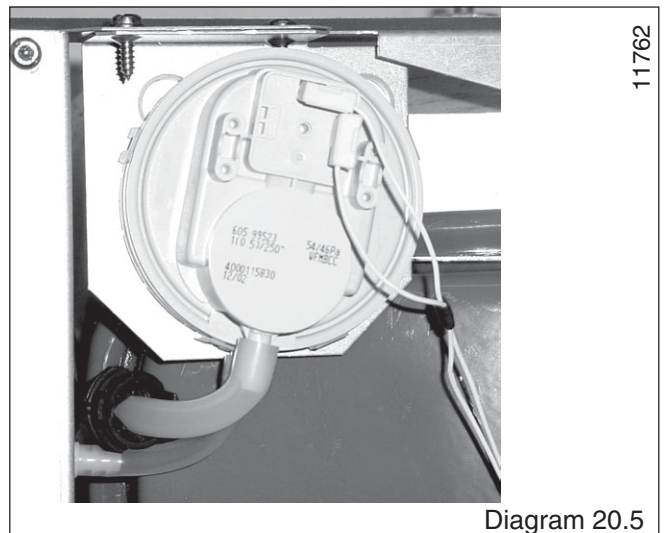


Diagram 20.5

20 Replacement of Parts

20.6 Domestic water flow sensor

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Drain down domestic hot water circuit of boiler only, see **diagram 20.1**.
- Locate flow sensor on cold water inlet pipe to boiler inside controls area, see **diagram 20.6**.
- Carefully pull off electrical connector from flow sensor.
- Pull out slotted metal clip securing cold water inlet pipe to flow sensor and carefully remove from sensor.
- Pull out slotted metal clip securing flow sensor to pump mounting and carefully remove sensor from boiler.
- Fit replacement sensor.

20.7 Printed circuit board (PCB)

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Gain access to rear of control panel.
- Unclip side clips and hinge up control panel cover to gain access to PCB, see **diagram 13.2**.
- Carefully pull off electrical connections to PCB.
- Unclip and lift out PCB.
- Fit replacement PCB, ensure that PCB connections are fully pushed onto replacement PCB. Set the heating temperature option to the same value as the old PCB, refer to **relevant part of Section 13 and diagram 13.3**.

20.8 Central heating pump, refer to diagram 20.7.

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- For ease of access if required remove the left hand side panel, refer to **Section 17.6**.
- Drain down central heating water circuit of the boiler only, see **diagram 20.1**.
- Undo two fixing screws and remove pump retaining bracket from front of pump.
- Undo two jubilee clips securing pump outlet hose connection to pump.
- Slide clips upwards to give access to hose.
- Slide hose along pipe to clear pump outlet.
- Remove pump from pump block by lifting up at front and pulling forward.
- Gain access to the pump electrical connection box and remove cover.
- Disconnect pump cable from pump (avoid straining cables).
- Transfer automatic air vent to replacement pump.
- Re-connect electrical connection.

- Fit replacement pump.
- Open isolating valves on flow and return connections, refill, and pressurise boiler.
- Check for leaks.

20.9 Hot water plate to plate heat exchanger

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Drain down central heating and domestic hot water circuits of boiler only, see **diagram 20.1**.
- Supporting domestic heat exchanger, unscrew and remove two screws securing it onto pump mounting and 3-way valve/bypass housing.
- Remove plate to plate heat exchanger from boiler.
- Fit replacement plate to plate heat exchanger.

Note: Plate to plate heat exchanger mounting screws are offset to ensure correct fitting of replacement.

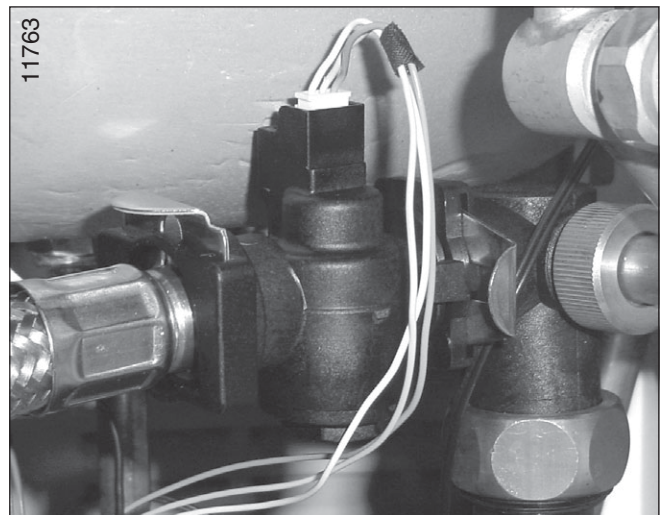


Diagram 20.6

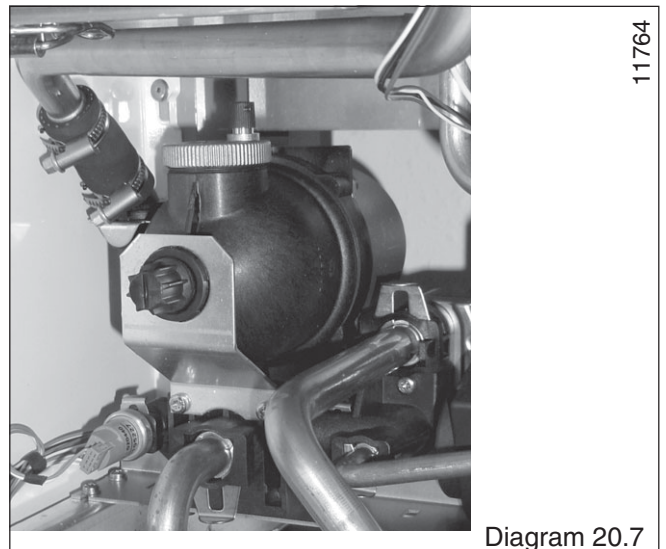


Diagram 20.7

20 Replacement of Parts

20.10 Three-way valve head

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Locate 3-way valve in centre of lower controls area.
- Remove electrical plug from valve head.
- Pull out slotted metal clip from valve body and remove valve head from body.
- Fit replacement valve head.

Note :

1) When refitting clip, ensure that letters OK are as shown, see **diagram 20.8**.

2) It is not necessary to drain boiler to carry out this work.

20.11 Three-way valve/bypass housing

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Drain down central heating and domestic hot water circuit of boiler only, see **diagram 20.1**.

Note: It is not necessary to drain down entire heating system to carry out this work.

- Remove 3-way valve head, refer to **Section 20.10**.
- Remove domestic hot water plate to plate heat exchanger, refer to **Section 20.9**.
- Undo pipe connection from 3-way valve/bypass housing to primary heat exchanger, see **diagram 20.9**.
- Pull out slotted metal clips and remove bypass pipe.
- Pull out slotted metal clip and remove domestic pipe from 3-way valve/bypass housing to storage vessel.
- Remove central heating flow pipe from 3-way valve/bypass housing to fixing jig.
- From underneath boiler, undo two screws securing 3-way valve/bypass housing and lift out of boiler.
- Fit replacement 3-way valve/bypass housing.

20.12 Bypass

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Drain down central heating water circuit of the boiler only, see **diagram 20.1**.

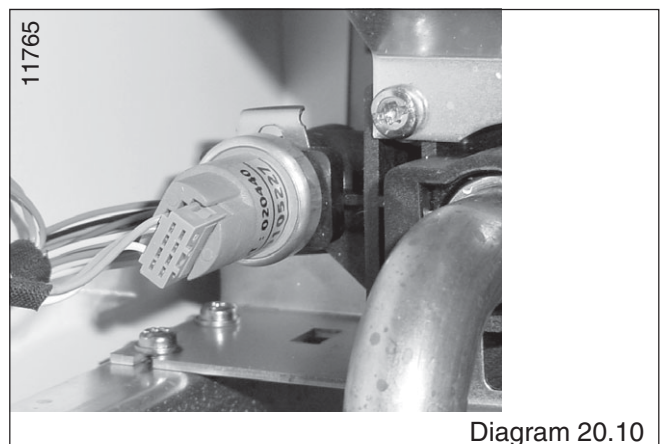
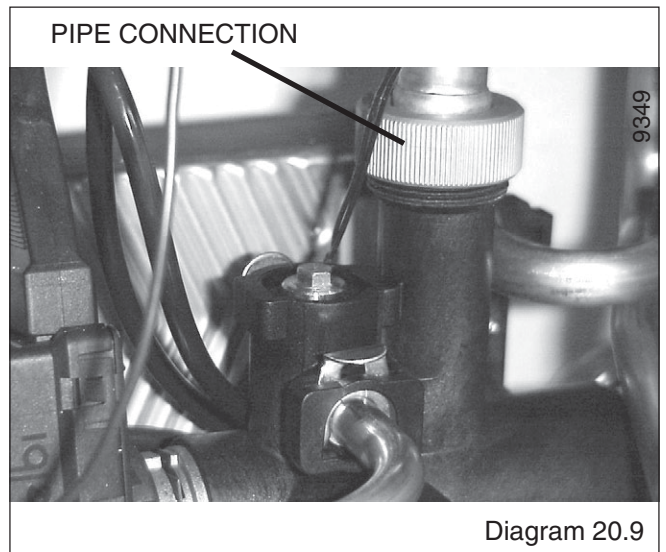
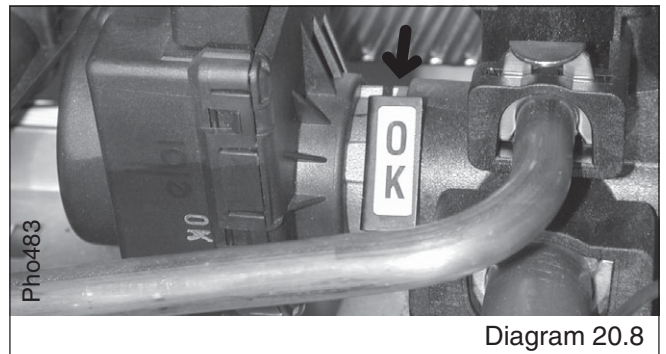
Note: it is not necessary to drain down the entire heating system to carry out this work.

- Pull out slotted metal clips and remove bypass pipe.
- Pull out slotted metal clip securing bypass into bypass housing, remove bypass.
- Fit replacement bypass.

20.13 System water pressure sensor

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Drain down central heating water circuit of the boiler only, see **diagram 20.1**.
- Locate system pressure sensor at front left hand side of boiler, see **diagram 20.10**.
- Remove electrical connections from sensor.
- Pull off slotted metal clip and remove sensor from boiler.
- Fit replacement sensor.



20 Replacement of Parts

20.14 Gas control valve stepper motor, refer to diagram 20.11.

Before starting refer to the front of **Section 20 Important information.**

- Remove the front panel, refer to **Section 17.3.**
- Lower the control panel, refer to **Section 17.5.**
- Locate gas valve stepper motor attached to front of gas valve.
- Disconnect multi-plug from stepper motor.
- Remove screws securing stepper motor onto gas valve body.
- Withdraw stepper motor from gas valve body.
- Fit replacement stepper motor taking care not to damage the 'O' ring.

20.15 Gas Control valve assembly, refer to diagram 20.11.

Before starting refer to the front of **Section 20 Important information.**

- Remove the front panel, refer to **Section 17.3.**
- Lower the control panel, refer to **Section 17.5.**
- Disconnect multi-plug from stepper motor.
- Disconnect electrical connections from spark ignition unit above gas valve assembly.
- Disconnect electrical connection from R/H side of gas control valve assembly mounting bracket.
- Undo main gas supply nut from main burner, see **diagram 17.3.**

Note: The washer must be kept for use on reassembly.

- Undo main gas union nut between gas control valve supply pipe and gas inlet valve.

Note: The washer must be kept for use on reassembly.

- Unscrew and remove screws securing gas control valve mounting bracket to boiler frame.
- Withdraw gas control valve assembly, pipes and bracket, taking care not to strain the electrical connection at the rear of the gas control valve.
- While supporting the gas control valve assembly disconnect the electrical connection at the rear of the gas control valve, see **diagram 20.11.**
- Using the old gas control valve as a guide, transfer gas pipes and bracket from old gas control valve to replacement gas control valve.
- Fit replacement gas control valve assembly into boiler.

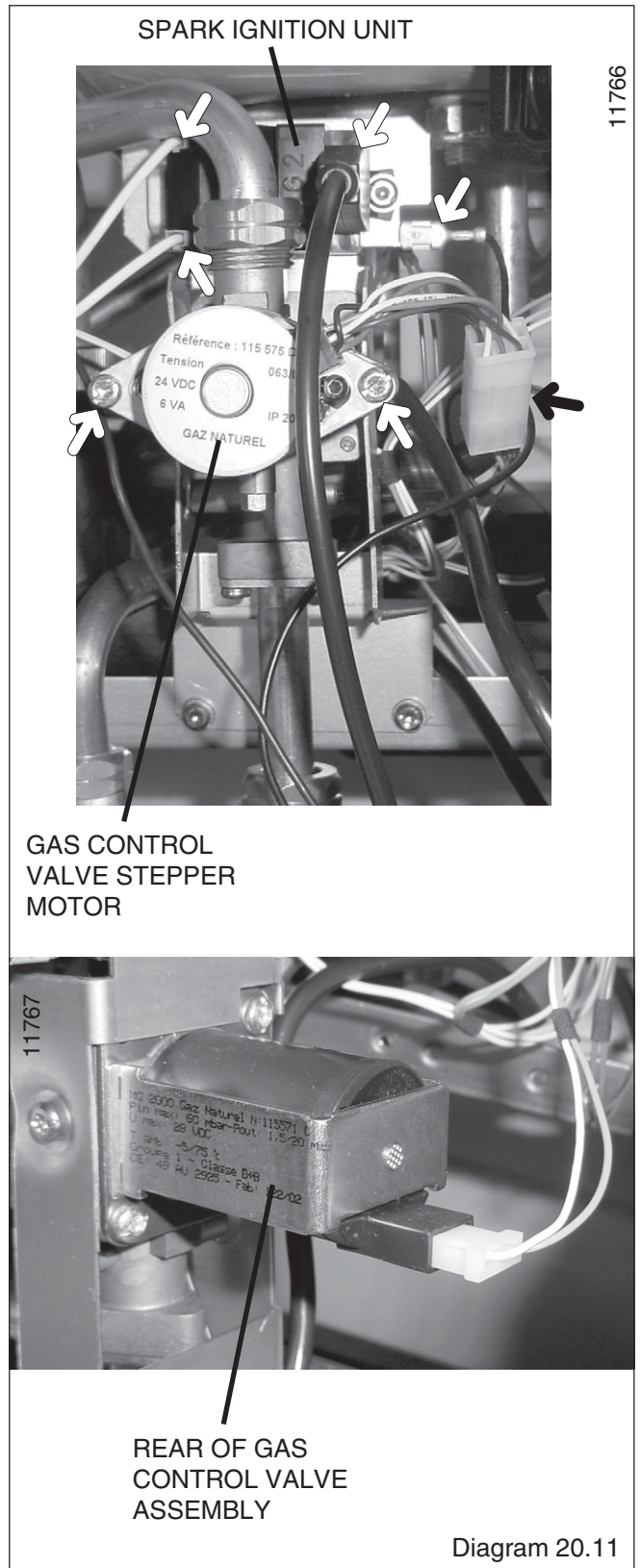


Diagram 20.11

20 Replacement of Parts

20.16 Gas safety valve, refer to diagram 20.11.

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Remove the gas control valve assembly, refer to **Section 20.15**.
- Locate gas safety valve on the rear of the gas control valve.
- Unscrew and remove the 2 screws securing the gas safety valve to the gas control valve.
- Fit replacement gas safety valve taking care not to damage the 'O' ring.
- Refit gas control valve assembly into boiler.

20.17 Spark ignition unit, refer to diagram 20.11.

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Disconnect electrical connections from spark ignition unit.
- Remove screw securing spark ignition unit to gas control valve mounting bracket.
- Fit replacement spark ignition unit.

20.18 Central heating safety valve

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.

If safety valve seating is damaged, it will be necessary to replace safety valve as a complete unit, repair is not possible.

Drain down central heating water circuit of the boiler only, see **diagram 20.1**.

- Disconnect safety valve discharge pipe from safety valve.
- Remove wire clip securing safety valve to fixing jig and remove safety valve, see **diagram 20.12**.
- Fit replacement safety valve.

Note: Apply a small quantity of silicon grease to the safety valve 'O' ring prior to fitting.

20.19 Main heat exchanger

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Remove the sealed chamber cover, refer to **Section 17.4**.
- Lower the control panel, refer to **Section 17.5**.
- Remove the combustion chamber cover, refer to **Section 17.7**.
- Drain down central heating water circuit of the boiler, see **diagram 20.1**.

- Release flue hood as follows:

From front of boiler carefully unclip wire spring retainers from side of flue hood.

- Undo nut securing pipe from heat exchanger to 3-way valve/ bypass housing.
- Whilst supporting heat exchanger, undo nut securing pipe from heat exchanger to central heating pump.
- Slide heat exchanger forwards and remove from boiler taking care not to damage insulation.

DO NOT DAMAGE PAINTED FINISH OF HEAT EXCHANGER

- Fit replacement heat exchanger.

Note: Locate heat exchanger into slot at rear of combustion chamber.

20.20 Central heating expansion vessel

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.

Drain down central heating water circuit of the boiler, see **diagram 20.1**.

Undo pipe coupling on expansion vessel.

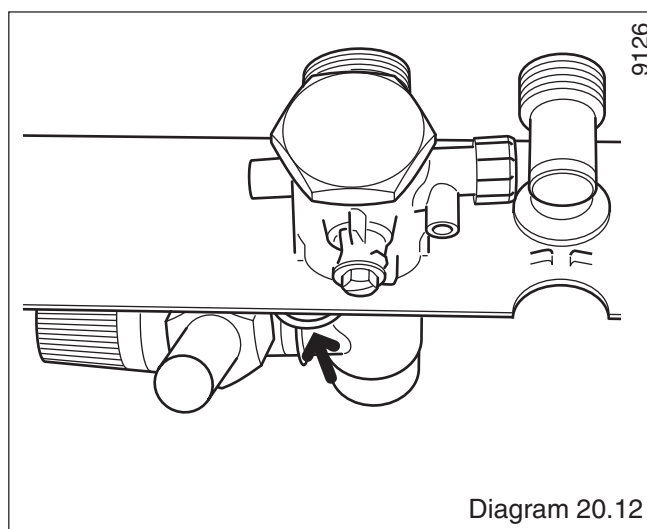
Unscrew and remove expansion vessel retaining nut.

Supporting expansion vessel, unscrew and remove screws securing expansion vessel bracket to boiler.

Lift expansion vessel out of boiler.

Fit replacement expansion vessel.

Note: Check that expansion vessel pressure is correct, see '**Section 1 Technical Data**'.



20 Replacement of Parts

20.21 Overheat thermostat

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, **refer to Section 17.3**.
- Remove sealed chamber cover, **refer to Section 17.4**.
- Locate high limit thermostat on heating flow pipe on left hand side of boiler, **see part of diagram 17.4**.
- Disconnect electrical connection from thermostat
- Unclip thermostat from heating flow pipe.
- Fit replacement thermostat in reverse order to removal. (Use heat sink compound supplied).
- Refit connection to thermostat.

20.22 Combustion chamber insulation

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, **refer to Section 17.3**.
- Remove sealed chamber cover, **refer to Section 17.4**.
- Remove combustion chamber cover, **refer to Section 17.7**.
- Remove main heat exchanger, **refer to Section 20.19**.
- Remove fan and loosen flue hood, **refer to relevant parts of Section 17.9**.

Front panel insulation

- Bend back small retaining lugs, remove the front insulation panel free from retaining lugs on combustion chamber cover.

Rear panel insulation

- Pull rear insulation panel free from retaining lug at rear of combustion chamber by tilting forward.

Side Panels

Note: Rear panel must be removed first.

- Pull out side panels free from retaining lugs at side of combustion chamber by tilting sideways.

20.23 Burner

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, **refer to Section 17.3**.
- Remove sealed chamber cover, **refer to Section 17.4**.
- Lower the control panel, **refer to Section 17.5**.
- Remove combustion chamber cover, **refer to Section 17.7**.
- Remove burner, **refer to Section 17.8**.

Assemble replacement burner, supplied in parts, as follows:

- Fit burner injectors to burner injector bar and tighten.

Note: Make sure that injector size, marked on each injector, is the same as that given in 'Section 1 Technical Data' for the type of gas being used.

- Fit injector bar into burner, secure with retaining rods.
- Fit replacement burner.

Note: To aid in assembling the burner, **refer to Section 20.24**.

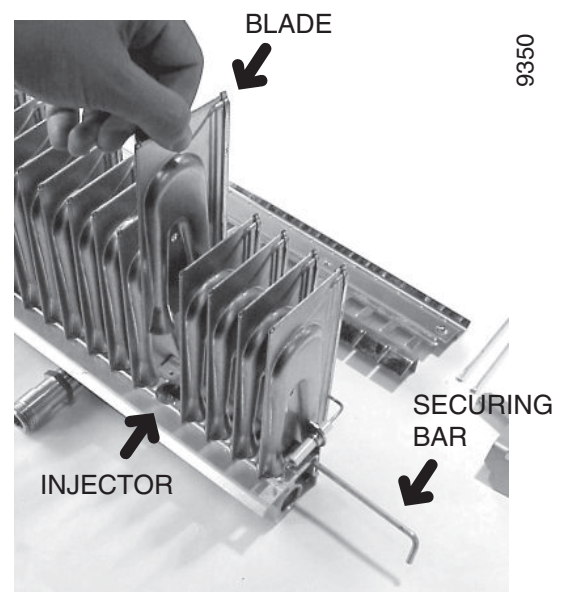
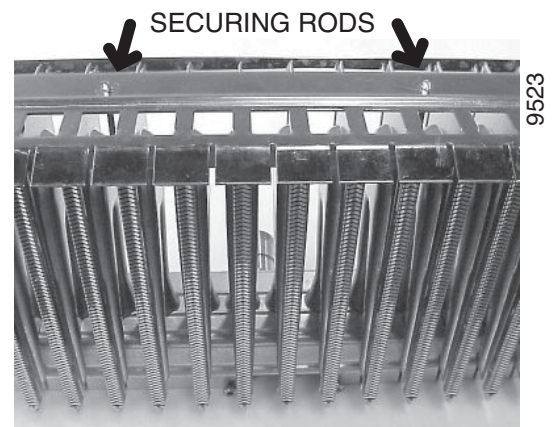
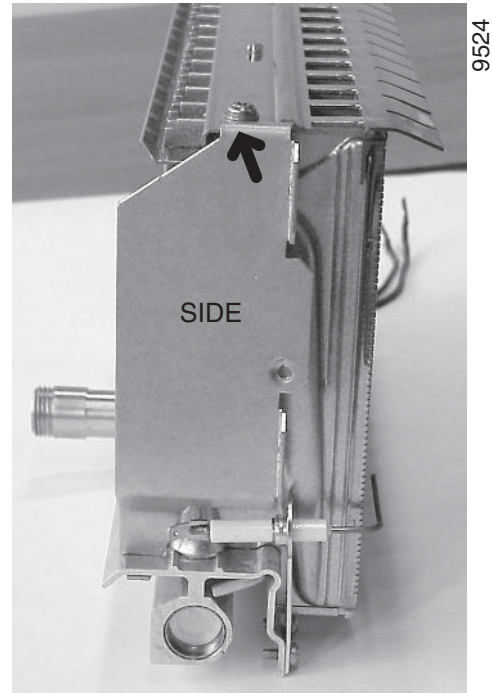


Diagram 20.13

20 Replacement of Parts

20.24 Burner injectors, refer to diagram 20.13.

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Remove sealed chamber cover, refer to **Section 17.4**.
- Lower the control panel, refer to **Section 17.5**.
- Remove combustion chamber cover, refer to **Section 17.7**.
- Remove burner, refer to **Section 17.8**.
- Remove the ignition spark assembly.
- Position the burner on a flat surface and remove side pieces by removing the screws and unhooking the sides.
- Remove the two securing rods.
- Remove the appropriate securing bar and burner blade to access the injector

Note: Make sure that injector size, marked on each injector, is the same as that given in 'Section 1 Technical Data' for the type of gas being used.

- Assemble the burner taking care to engage all parts correctly.
- Refit burner into boiler.

20.25 Ignition electrode

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Remove sealed chamber cover, refer to **Section 17.4**.
- Lower the control panel, refer to **Section 17.5**.
- Remove combustion chamber cover, refer to **Section 17.7**.
- Remove burner, refer to **Section 17.8**.
- Undo and remove screw securing electrode onto burner.
- Fit replacement electrode.
- Refit burner into boiler.

20.26 Flame sense electrode

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Remove sealed chamber cover, refer to **Section 17.4**.
- Lower the control panel, refer to **Section 17.5**.
- Remove combustion chamber cover, refer to **Section 17.7**.
- Remove burner, refer to **Section 17.8**.
- Undo and remove screw securing electrode onto burner.
- Fit replacement electrode.
- Refit burner into boiler.

20.27 User interface board assembly, refer to diagram 20.14.

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Gain access to rear of control panel.

- Unclip side clips and hinge up control panel cover, see **diagram 13.2**.

- Carefully pull off electrical connection from the user interface board to PCB at (J16).

- Remove the two securing screws to release the control panel fascia.

- Remove the two user interface board assembly securing screws to remove the user interface board assembly.

- Fit replacement user interface board assembly.

20.28 Mains power switch, refer to diagram 20.14.

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.

- Lower the control panel, refer to **Section 17.5**.

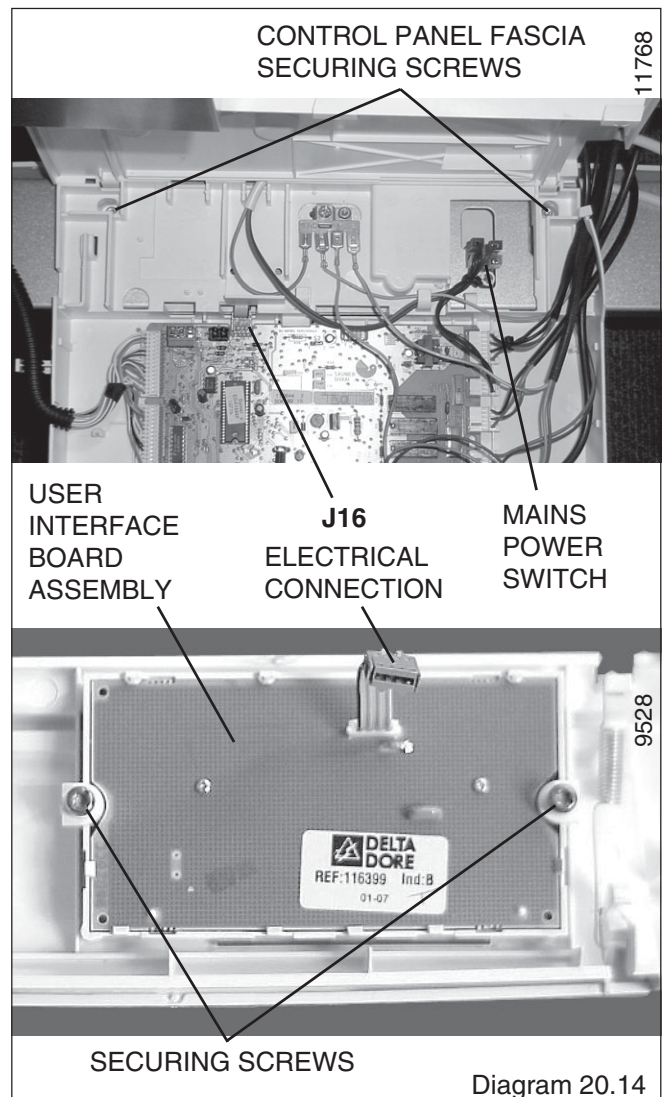
- Gain access to rear of control panel.

- Unclip side clips and hinge up control panel cover, see **diagram 13.2**.

- Remove the mains power switch.

- Carefully pull off electrical connections from the mains power switch.

- Fit replacement mains power switch.



20 Replacement of Parts

20.29 Domestic hot water pump, refer to diagram 20.15.

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Drain down domestic hot water circuit of boiler only, see **diagram 20.1**.
- Remove pump head from pump block by unscrewing and removing the four hex-head retaining screws, remove and support pump head to avoid straining electrical cable.
- Remove cover from the electrical connection box.
- Disconnect pump cable from pump.
- Fit replacement pump head.

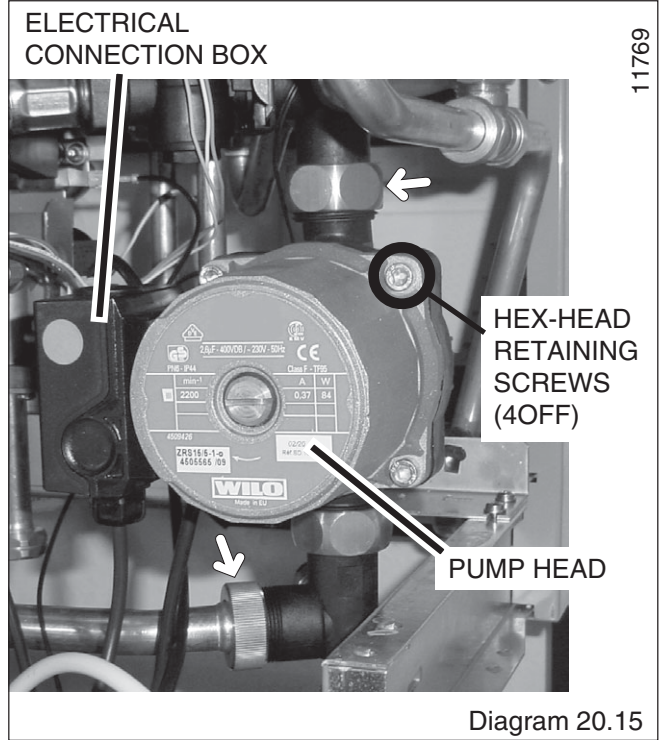


Diagram 20.15

20.30 Domestic Hot water expansion vessel, refer to diagram 20.16.

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Remove R.H. side panel, refer to **Section 17.6**.
- Drain down domestic hot water circuit of boiler only, see **diagram 20.1**.
- Undo pipe coupling on domestic hot water expansion vessel.
- Unscrew and remove domestic hot water expansion vessel retaining nut.
- Remove domestic hot water expansion vessel.
- Fit replacement domestic hot water expansion vessel.

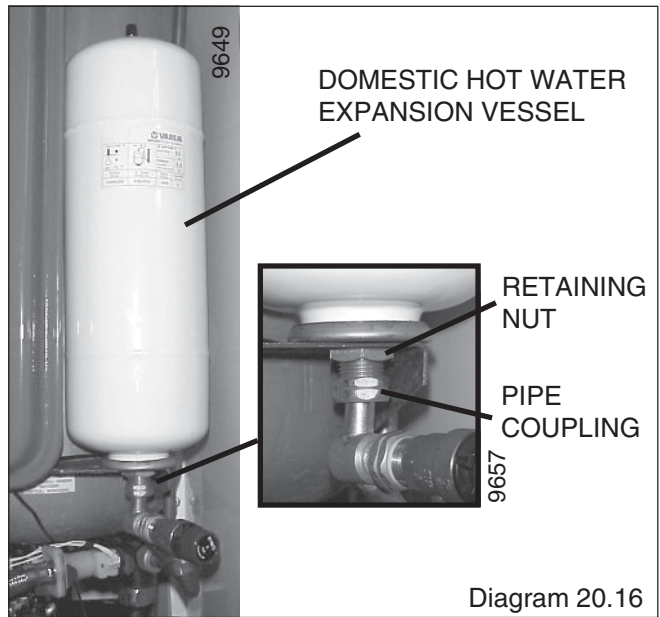


Diagram 20.16

20.31 Temperature pressure relief valve, refer to diagram 20.17.

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Drain down domestic hot water circuit of boiler only, see **diagram 20.1**.
- Undo couplings to remove temperature pressure relief valve.
- Fit replacement temperature pressure relief valve.

20.32 Domestic Hot water expansion valve, refer to diagram 20.18.

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Drain down domestic hot water circuit of boiler only, see **diagram 20.1**.
- Undo couplings to remove domestic hot water expansion valve.
- Fit replacement domestic hot water expansion valve.

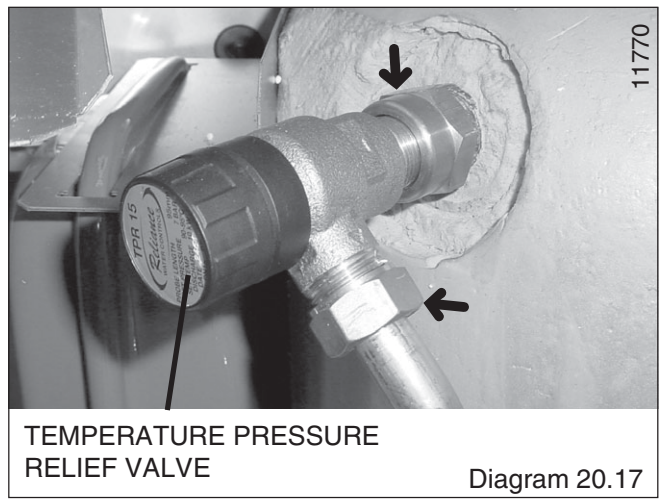


Diagram 20.17

20 Replacement of Parts

DOMESTIC HOT WATER EXPANSION VALVE

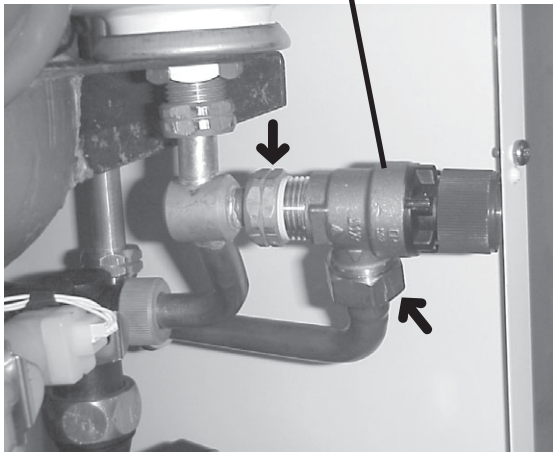
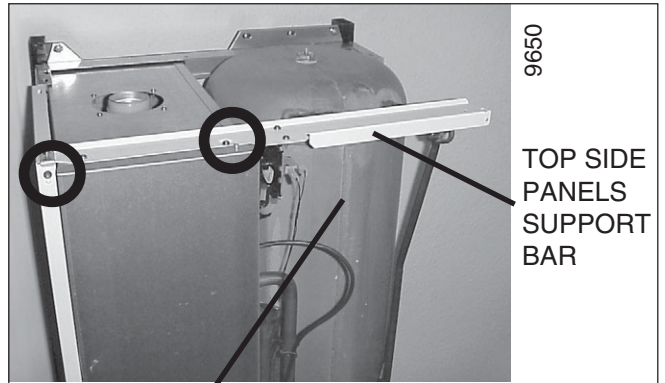


Diagram 20.18

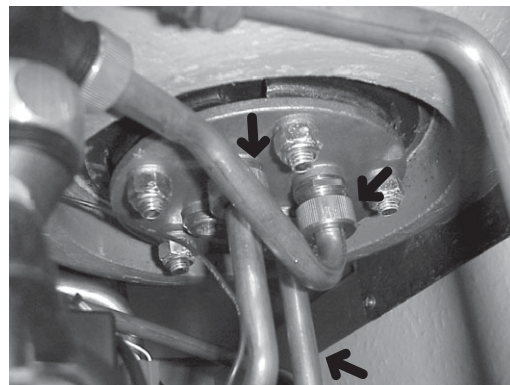
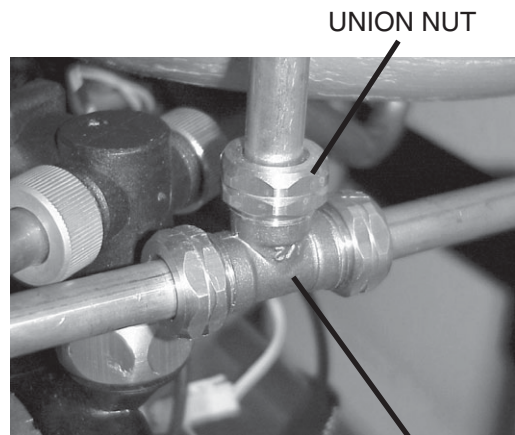
20.33 Domestic Hot water storage vessel, refer to diagram 20.19.

Before starting refer to the front of **Section 20 Important information**.

- Remove the front panel, refer to **Section 17.3**.
- Lower the control panel, refer to **Section 17.5**.
- Remove R.H. side panel, refer to **Section 17.6**.
- Drain down central heating and domestic hot water circuits of boiler only, see **diagram 20.1**.
- Remove central heating expansion vessel, refer to **Section 20.20**.
- Remove domestic hot water expansion vessel, refer to **Section 20.30**.
- Remove air pressure switch, refer to **Section 20.5**.
- Undo and remove the two screws securing the top side panels support bar, remove the bar.
- Disconnect the inline electrical plug connection to the domestic hot water storage vessel thermistor. (The thermistor is located on the right-hand side of the domestic hot water storage vessel).
- Remove top and bottom union nuts to remove the domestic hot water pump (avoid straining electrical cable), see **diagram 20.15**. (The pump is removed to take the weight off the pipework).
- Undo couplings to remove temperature pressure relief valve, see **diagram 20.17**.
- Undo union nut at 'T' piece to remove temperature pressure relief valve over flow pipe.
- Undo the three couplings at the bottom of the domestic hot water storage vessel.
- Remove the two retaining screws from the bottom domestic hot water storage vessel bracket, see **diagram 20.19**.
- Lift vessel up and forward to remove.
- Fit replacement domestic hot water storage vessel.
- Fit replacement domestic hot water storage vessel thermistor, refer to relevant parts of **Section 20.3**.



DOMESTIC HOT WATER STORAGE VESSEL



DOMESTIC HOT WATER STORAGE VESSEL BRACKET

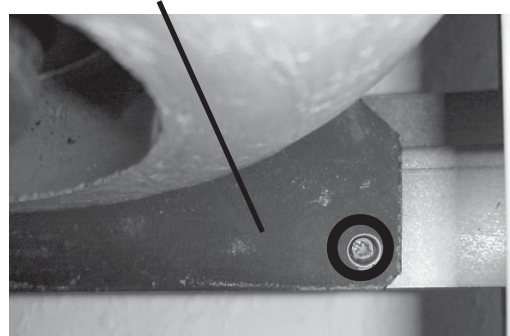


Diagram 20.19

21 Spare Parts

When ordering spare parts, quote the part number and description, stating the appliance model number and serial number from the data badge.

Short parts list

No.	Description	Part No.	G.C. No.
1	Domestic hot water thermistor	57213	E37381
2	Central heating thermistor	57215	E37382
3	Storage vessel thermistor	57250	E37302
4	Fan	57238	E37371
5	Air pressure switch	57237	E37237
6	Domestic water flow sensor	57202	E37368
7	Printed circuit board	57248	E37374
8	Pump	57207	E37411
9	3-way valve head	57206	E37413
10	System pressure sensor	57205	E37360
11	Spark ignition unit
12	Central heating safety valve	57228	E37391
13	Temperature/pressure relief valve	56159
14	Overheat thermostat	57212	E37252
15	Ignition electrode	57358	E37271
16	Flame sense electrode	57195	E37274

Notes

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