

INSTALLATION COMMISSIONING AND SERVICING INSTRUCTIONS

WALL HUNG RSF GAS FIRED CONDENSING COMBINATION BOILER

Greenstar CDi Compact

FOR SEALED CENTRAL HEATING SYSTEMS AND MAINS FED DOMESTIC HOT WATER



The appliances are for use with:
Natural Gas or L.P.G. (Cat.II 2H 3P type C13, C33 & 53)

Natural Gas: 28CDi Compact GC number 47-406-44
32CDi Compact GC number 47-406-46
36CDi Compact GC number 47-406-48

L.P.G.: 28CDi Compact GC number 47-406-45
32CDi Compact GC number 47-406-47
36CDi Compact GC number 47-406-49



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1 KEY TO SYMBOLS AND SAFETY INSTRUCTIONS

1.1 KEY TO SYMBOLS


WARNINGS

| | |
|---|---|
|  | Warnings in this document are identified by a warning triangle printed against a grey background. Keywords at the start of a warning indicate the type and seriousness of the ensuing risk if measures to prevent the risk are not taken. |
|---|---|

The following keywords are defined and can be used in this document:

- **NOTE** indicates a situation that could result in damage to property or equipment.
- **CAUTION** indicates a situation that could result in minor to medium injury.
- **WARNING** indicates a situation that could result in severe injury or death.
- **DANGER** indicates a situation that will result in severe injury or death.

IMPORTANT INFORMATION

| | |
|---|---|
|  | This symbol indicates important information where there is no risk to people or property. |
|---|---|

ADDITIONAL SYMBOLS

| Symbol | Explanation |
|--------|---|
| ▶ | Step in an action sequence |
| → | Cross-reference to another part of the document |
| • | List entry |
| - | List entry (second level) |

Table 1

SYMBOLS USED IN THIS MANUAL







| | |
|---|----------------------------|
|  | Domestic Hot Water |
|  | Central Heating |
|  | Hot Water Storage Cylinder |
|  | Domestic Cold Water Supply |
|  | Electrical Supply |
|  | Gas Supply |

Table 2 Commonly used symbols

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE STARTING INSTALLATION.

| |
|---|
| These instructions are applicable to the Worcester appliance model(s) stated on the front cover of this manual only and must not be used with any other make or model of appliance. |
| These instructions apply in the UK and Ireland only and must be followed except for any statutory obligations. |
| This appliance must be installed by a GAS SAFE registered, competent person. Failure to install correctly could lead to prosecution. |
| If you are in any doubt, contact the Worcester Technical helpline (0844 892 3366). |
| Please leave these instructions with the completed BENCHMARK CHECKLIST, (or a certificate confirming compliance with IS 813, Eire only) and the user manual with the owner or at the gas meter after installation or servicing. |
| Distance learning and training courses are available from Worcester. |
| The BENCHMARK CHECKLIST can be found in the back of this Installation manual. |

| | |
|--------|---|
| Ø | Diameter |
| NG | Natural Gas |
| LPG | Liquid Petroleum Gas |
| CH | Central Heating |
| DHW | Domestic Hot Water |
| DCW | Domestic Cold Water |
| PRV | Pressure Relief Valve |
| NTC | Negative Temperature Coefficient (sensor) |
| IP | Ingress Protection |
| RCD | Residual Current Device |
| TRV | Thermostatic Radiator Valve |
| ECV | Emergency Control Valve |
| WRAS | Water Regulations Advisory Scheme |
| SEDBUK | Seasonal Efficiency of Domestic Boilers in the United Kingdom |

Table 3 Abbreviations use in this manual

1.2 SAFETY PRECAUTIONS

IF YOU SMELL GAS

A gas leak could potentially cause an explosion. If you smell gas, observe the following rules.

- ▶ Prevent flames or sparks:
 - Do not smoke, use a lighter or strike matches.
 - Do not operate any electrical switches or unplug any equipment.
 - Do not use the telephone or ring doorbells.
- ▶ Turn off the gas at the meter.
- ▶ Open windows and doors.
- ▶ Warn your neighbours and leave the building.
- ▶ Prevent anyone from entering the building.
- ▶ Well away from the building: call the National Gas Emergency Service on 0800 111 999.

BOILER OPERATION:

This boiler must only be operated by a responsible adult who has been instructed in, understands, and is aware of the boiler's operating conditions and effects.



Benchmark places responsibilities on both manufacturers and installers. The purpose is to ensure that customers are provided with the correct equipment for

their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons and that it meets the requirements of the appropriate Building Regulations.

The Benchmark Checklist can be used to demonstrate compliance with Building Regulations and should be provided to the customer for future reference.

The guarantee of this product is dependant on the Benchmark checklist being completed and the actions undertaken.

Installers are required to carry out installation, commissioning and servicing work in accordance with the Benchmark Code of Practice which is available from the Heating and Hotwater Industry Council who manage and promote the scheme.

Visit centralheating.co.uk for more information.

HEALTH AND SAFETY

The appliance contains no asbestos and no substances have been used in the construction process that contravene the COSHH Regulations (Control of Substances Hazardous to Health Regulations 1988).

COMBUSTION AND CORROSIVE MATERIALS

Do not store or use any combustible materials (paper, thinners, paints etc.) inside or within the vicinity of the appliance.

Chemically aggressive substances can corrode the appliance and invalidate any guarantee.

FITTING AND MODIFICATIONS

Fitting the appliance and any controls to the appliance may only be carried out by a competent engineer in accordance with the current Gas Safety (Installation and Use) Regulations.

Flue systems must not be modified in any way other than as described in the fitting instructions. Any misuse or unauthorised modifications to the appliance, flue or associated components and systems could invalidate the guarantee. The manufacturer accepts no liability arising from any such actions, excluding statutory rights.

SERVICING

Advise the user to have the system serviced annually by a competent, qualified Gas Safe registered engineer. Approved spares must be used to help maintain the economy, safety and reliability of the appliance.

IMPORTANT

The service engineer must complete the Service Record on the Benchmark Checklist after each service.

INSTALLATION REGULATIONS

Current Gas Safety (Installation & Use) Regulations:

All gas appliances must be installed by a competent person in accordance with the above regulations.

Failure to install appliances correctly could lead to prosecution.

The appliance must be installed in accordance with, and comply to, the current: Gas Safety Regulations, IEE Regulations, Building Regulations, Building Standards (Scotland) (Consolidation), Building Regulations (Northern Ireland), local water by-laws, Health & Safety Document 635 (The Electricity at Work Regulations 1989) and any other local requirements.

BUILDING REGULATIONS PART L 1A 2010

If the installation is in a new build property or is a first time installation in an existing property, heating systems must conform to current building regulations Part L1a.

All new heating systems in dwellings must have at least two heating zones. Each of these zones will be operated separately by both time and temperature controls.

The exception to this are single storey, open plan dwellings where the living area is more than 70% of the total useable floor area. Then this type of dwelling can be controlled as one zone.

All radiators must have TRVs fitted, where reasonable, in all rooms except bathrooms and rooms with thermostats.

BUILDING REGULATIONS PART L 1B 2010 - BOILER REPLACEMENT

For boiler replacement on an existing system, it is not necessary to zone the system, compliance with the zone requirements can be achieved by a single room thermostat or programmable room thermostat.

BRITISH STANDARDS

Where no specific instruction is given, reference should be made to the relevant British Standard Codes of Practice.

BS 7074:1 Code of practice for domestic and hot water supply

BS 6891 Installation of low pressure gas pipe work up to 35mm (R1½)

BS 5546 Installation of gas hot water supplies for domestic purposes

EN 12828 Central heating for domestic premises

BS 5440:1 Flues and ventilation for gas appliances of rated heating not exceeding 70kW (net): Flues

BS 5440:2 Flues and ventilation for gas appliances of rated heating not exceeding 70kW (net): Air Supply

BS 7593 Treatment of water in domestic hot water central heating systems

BS 6798 Installation of gas fired boilers of rated input up to 70kW (net)

Irish Standards

The relevant Irish standards should be followed, including:

- ECTI National rules for electrical installations
- IS 813:2002 for Domestic Gas Installations.

LPG Installations

An appliance using L.P.G. must not be installed in a room or internal space below ground level unless one side of the building is open to the ground.

Timber framed building:

Where the boiler is to be fitted to a timber framed building the guidelines laid down in BS5440: Part 1 and IGE "Gas Installations in Timber Frame Buildings" should be adhered to.

Potable water:

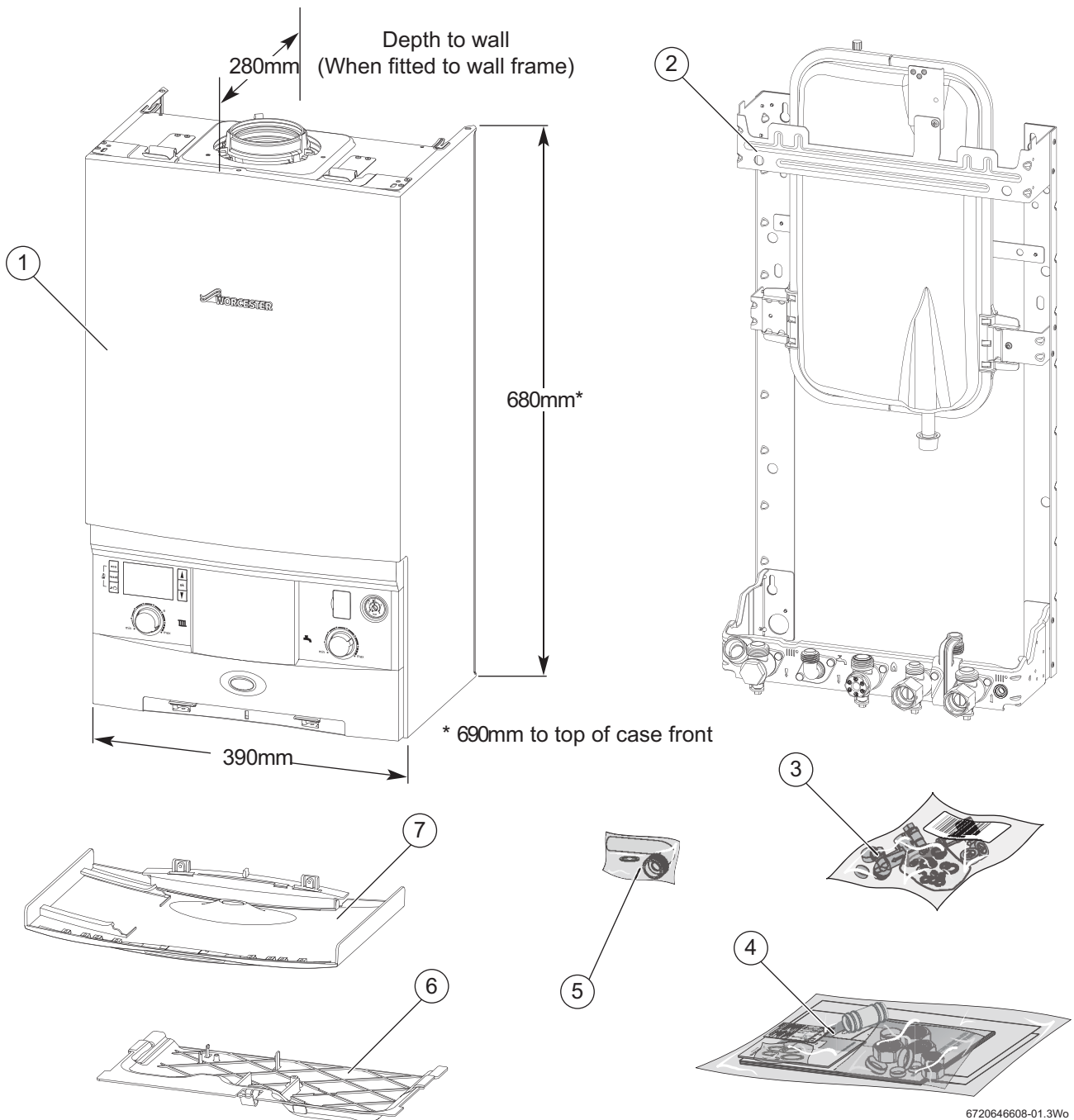
All seals, joints and compounds (including flux and solder) and components used as part of the secondary domestic water system must be approved by WRAS.

CH Water:

Artificially softened water must not be used to fill the central heating system.

2 APPLIANCE INFORMATION

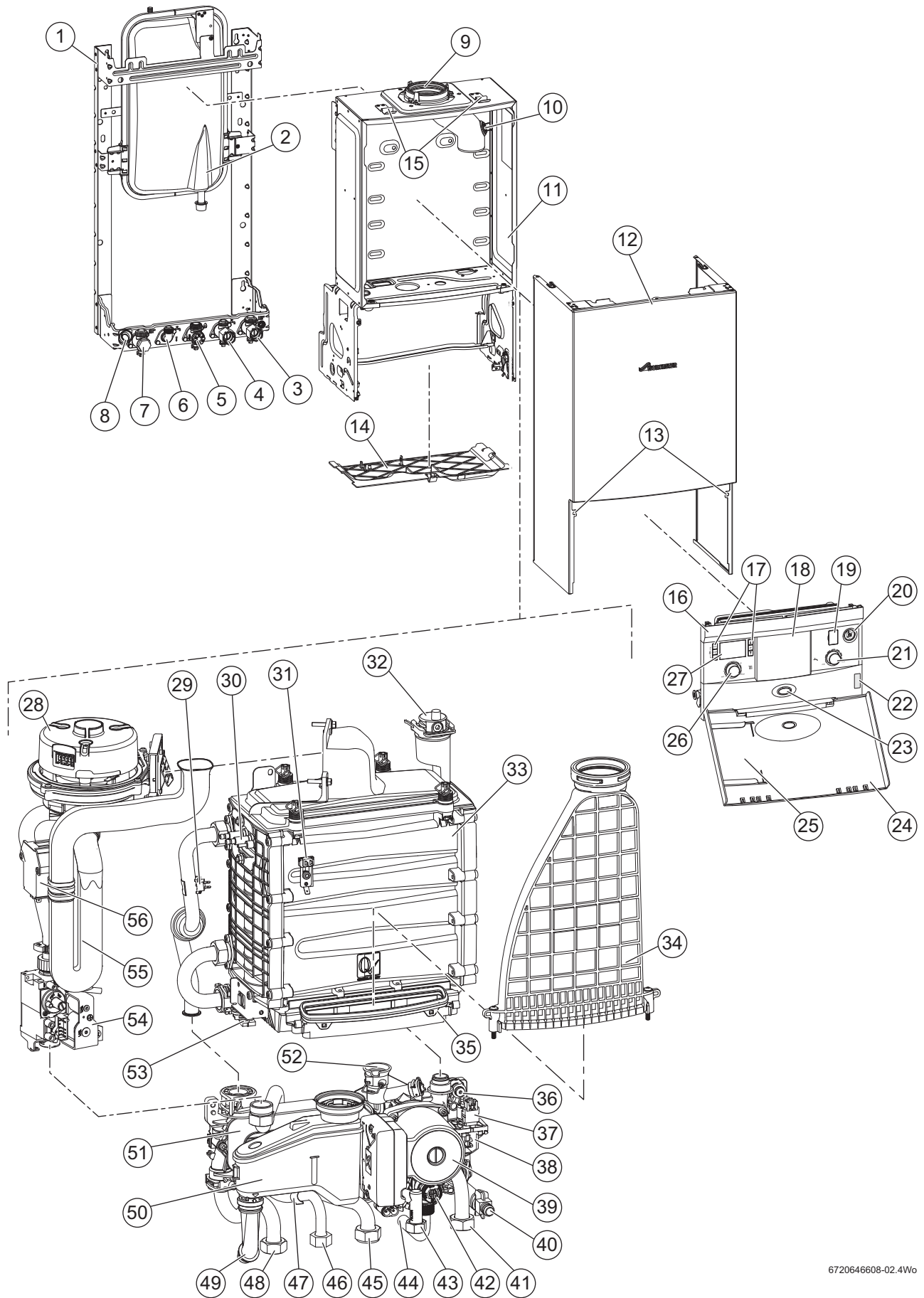
2.1 APPLIANCE



STANDARD PACKAGE

1. Wall hung gas-fired condensing combi boiler for central heating and domestic hot water
2. Wall mounting frame
3. Integral Filling Loop kit
4. Hardware literature pack:
 - Greenstar CDi Compact Installation, Commissioning and Servicing Instructions
 - User guide
 - Boiler fascia guide
 - Wall mounting template
 - Sealing Pack
5. PRV installer connection elbow
6. Bottom panel
7. Fascia panel

2.2 LAYOUT



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Fig. 1 Main boiler components

| | | | |
|----|--|----|---|
| 1 | Wall mounting frame | 29 | Flow temperature sensor (NTC) |
| 2 | Expansion vessel | 30 | Electrode assembly |
| 3 | CH return isolating valve | 31 | Maximum safety sensor (NTC) |
| 4 | DCW mains isolating valve | 32 | Auto air vent |
| 5 | Gas isolating valve | 33 | Aluminium Silicon Heat exchanger |
| 6 | DHW outlet connection | 34 | Flueway |
| 7 | CH flow isolating valve | 35 | Sump assembly |
| 8 | Condensate drain connection | 36 | Pressure gauge connection point |
| 9 | Flue connector | 37 | Diverter valve actuator (stepper motor) |
| 10 | Flue overheat thermostat | 38 | Diverter valve body |
| 11 | Main superstructure | 39 | Modulating pump |
| 12 | Case | 40 | Drain point |
| 13 | Case retaining screws | 41 | CH return connection to isolating valve |
| 14 | Bottom panel | 42 | PRV |
| 15 | Case retaining clips | 43 | DCW in connection to isolating valve |
| 16 | Control panel | 44 | PRV Connection pipe |
| 17 | Control panel menu buttons | 45 | Gas pipe from isolating valve |
| 18 | Blank for optional programmer | 46 | DHW outlet pipe |
| 19 | Diagnostic port - Worcester service engineer | 47 | DHW temperature sensor (NTC) |
| 20 | Pressure gauge | 48 | CH flow pipe to isolating valve |
| 21 | DHW temperature control | 49 | Condensate siphon drain pipe |
| 22 | Boiler identification label | 50 | Condensate siphon |
| 23 | Operation/fault indicator (blue) | 51 | DHW Plate heat exchanger |
| 24 | Control panel flap | 52 | Expansion vessel connection |
| 25 | Boiler fascia guide location | 53 | Return temperature (NTC) |
| 26 | CH temperature control | 54 | Gas valve |
| 27 | Boiler display | 55 | Combustion air inlet |
| 28 | Fan | 56 | Ignition transformer |

Table 4 Boiler components

BOILER FEATURES

- High pressure die-cast aluminium heat exchanger
- Low NOx emissions
- Fixed gas valve settings
- Direct burner ignition
- Zero pressure governor gas valve with fully modulating fan
- Display for boiler status and access to diagnostics, system and commissioning parameters
- Digital control system
- Memory retention after power interruption
- Low electrical power consumption during operation and stand-by modes
- Modulating pump
- Condensing in CH and DHW modes
- Three star Hot Water Comfort measured to EN13203 Part 1 in comfort mode with DHW pre-heat ON
- Eco mode, to use gas on demand
- Plate type DHW heat exchanger
- Ability to pre-plumb condensate drain, CH flow, DHW Outlet, Gas, DCW In, PRV and CH Return connections
- Syphonic condensate trap
- Galvanised steel wall mounting frame
- Standard wall frame provides vertical pipe route behind the boiler
- Compatible with all Worcester standard and intelligent controls
- Condensfit II flue systems 60/100 and 80/125 mm allows plume re-direction as standard and ability to attach plume management kits

2.3 TECHNICAL DATA

| DESCRIPTION CDi Compact | UNIT | Natural gas | | | L.P.G. | | |
|---|-------------------|-------------|---------|---------|---------|---------|---------|
| | | 28kW | 32kW | 36kW | 28kW | 32kW | 36kW |
| Domestic Hot Water | | | | | | | |
| Minimum heat input | kW | 7.15 | 7.15 | 7.15 | 7.15 | 7.15 | 7.15 |
| Maximum rated heat output | kW | 28 | 32 | 36 | 28 | 32 | 36 |
| Maximum rated heat input | kW | 28.57 | 32.65 | 36.7 | 28.57 | 32.65 | 36.7 |
| Maximum mains inlet pressure (standing pressure) | bar | 10 | 10 | 10 | 10 | 10 | 10 |
| Minimum mains inlet pressure (working) for max. flow | bar | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| Minimum mains inlet pressure (working) for operation | bar | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Minimum required flow to fire the boiler | l/min. | 2 | 2 | 2 | 2 | 2 | 2 |
| Domestic Hot Water temperature range | °C | 40 - 60 | 40 - 60 | 40 - 60 | 40 - 60 | 40 - 60 | 40 - 60 |
| *Max. Domestic Hot Water flow rate - 40 °C rise ± 15% | l/min. | 10.0 | 11.5 | 12.9 | 10.0 | 11.5 | 12.9 |
| Gas flow rate - Max. 10 minutes from lighting | | | | | | | |
| Natural Gas G20 | m ³ /h | 3.0 | 3.5 | 3.9 | | | |
| Propane Gas (L.P.G.) | kg/h | | | - | 2.2 | 2.5 | 2.8 |
| Central Heating | | | | | | | |
| Maximum rated heat input (net) | kW | 24.34 | 24.34 | 24.34 | 24.34 | 24.34 | 24.34 |
| Maximum rated heat output 40/30 °C | kW | 25.31 | 25.31 | 25.31 | 25.31 | 25.31 | 25.31 |
| Maximum rated heat output 50/30 °C | kW | 25.17 | 25.17 | 25.17 | 25.17 | 25.17 | 25.17 |
| Maximum rated heat output 80/60 °C | kW | 24 | 24 | 24 | 24 | 24 | 24 |
| Maximum flow temperature | °C | 82 | 82 | 82 | 82 | 82 | 82 |
| Maximum permissible operating pressure | bar | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Available pump head at 20 °C system temperature rise | m | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Flue | | | | | | | |
| Flue gas temperature 80/60 °C, rated/min. load | °C | 67/64 | 72/64 | 78/64 | 69/66 | 73/66 | 79/66 |
| Flue gas temperature 40/30 °C, rated/min. load | °C | 48/36 | 51/36 | 52/36 | 50/37 | 52/37 | 54/37 |
| CO ₂ level at max. rated heat output (after 10 minutes) | % | 9.1 | 9.1 | 9.1 | 10.6 | 10.6 | 10.6 |
| CO ₂ level at min. rated heat output (after 10 minutes) | % | 8.5 | 8.5 | 8.5 | 9.6 | 9.6 | 9.6 |
| NOx class | | 5 | 5 | 5 | 5 | 5 | 5 |
| NOx rating | mg/kWh | 35 | 35 | 35 | 46 | 46 | 46 |
| Condensate | | | | | | | |
| Maximum condensate rate | l/h | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| pH value, approx. | | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| Electrical | | | | | | | |
| Electrical power supply voltage | a.c. V | 230 | 230 | 230 | 230 | 230 | 230 |
| Frequency | Hz | 50 | 50 | 50 | 50 | 50 | 50 |
| Maximum power consumption - running | W | 104 | 115 | 129 | 104 | 115 | 129 |
| Maximum power consumption - stand-by | W | <1 | <1 | <1 | <1 | <1 | <1 |
| General data | | | | | | | |
| Appliance protection rating | IP | X4D | X4D | X4D | X4D | X4D | X4D |
| Appliance protection rating with mechanical or RF mechanical timer or FW100 module fitted | IP | IP20 | IP20 | IP20 | IP20 | IP20 | IP20 |
| Permissible ambient operating temperatures | °C | 0 - 50 | 0 - 50 | 0 - 50 | 0 - 50 | 0 - 50 | 0 - 50 |
| Nominal capacity of appliance | litre | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| **Noise output level (Max central heating) | dBA | 45.5 | 45.5 | 45.5 | 45.5 | 45.5 | 45.5 |
| Total packaged weight | kg | 43.1 | 43.1 | 43.1 | 43.1 | 43.1 | 43.1 |
| Total boiler weight | | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 | 39.5 |
| Lift weight | kg | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 |
| SEDBUK 2009 | Band | 89.8 | 89.8 | 89.8 | 91.9 | 91.9 | 91.9 |

Table 5 Technical data




* Greenstar CDi Compact boilers are fitted with a flow regulator set to achieve a 40°C temperature rise. This ensures comfortable bathing during the colder winter months.




** All Worcester Greenstar boilers are tested in an acoustic chamber to sound level and there may some differences in situ dependant on installation site i.e. corners of rooms, fabric of property walls.


3 PRE-INSTALLATION

3.1 CLEANING PRIMARY SYSTEMS

 **CAUTION:**

- ▶ ISOLATE THE MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

 **NOTICE:** All the following pre-installation sections must be read and requirements met before starting the boiler or flue installations.

 **NOTICE:**


- ▶ Debris from the system can damage the boiler and reduce efficiency. Failure to comply with the guidelines for the use of water treatment with the appliance will invalidate the appliance guarantee and contravene the Building Regulations.
- ▶ It is recommended that you fit a primary water cleanser to the system. Worcester recommends fitting a filter that will help remove both magnetite and non-magnetic debris.

BEFORE CLEANING THE SYSTEM:

- ▶ Ensure that the system and pipe work is in good working order.
- ▶ **Where possible keep the existing boiler/circulating pump in place when flushing the system.**

FOLLOW THE GUIDANCE OF BS7593:

Treatment of water in domestic hot water central heating and also the flushing guidelines below.


 **NOTICE:** Artificially softened water must not be used to fill the central heating system.

FLUSHING THE SYSTEM

- ▶ Fill the system with cold water and check for leaks.
- ▶ Open all drain cocks and drain the system.
- ▶ Close drain cocks and add a suitable flushing agent **compatible with aluminium** at the correct strength for the system conditions in accordance with the manufacturer's instructions.
The pH value of the system water must be less than 8 or the appliance guarantee will be invalidated.
- ▶ Circulate the flushing agent before the boiler is fired up.
- ▶ Run the boiler/system at normal operating temperature as directed by the manufacturer of the flushing agent.
- ▶ Drain and thoroughly flush the system to remove the flushing agent and debris.
- ▶ It may be necessary to use a power flushing machine to aid the cleansing procedure in some circumstances.
- ▶ Close the drain cocks and refill with fresh water and a suitable inhibitor.
- ▶ Vent any air from the boiler and system.

INHIBITOR

Add a suitable inhibitor or combined inhibitor/anti-freeze, if the system is exposed to freezing conditions, to the heating system in accordance with the DWTA code of practice and manufacturer's guidelines.

 **WARNING:** Sealing agents

- ▶ Normally the addition of sealing agents to the system water is not permitted as this can cause problems with deposits left in the heat exchanger.
- ▶ In cases where all attempts to find a micro leak have failed, Worcester, Bosch Group supports the use of Fernox F4 leak sealer.

WATER TREATMENT PRODUCTS

Suitable water treatment products can be obtained from the following manufacturers:

| | |
|----------|---|
| FERNOX | 0870 601 5000 or www.fernox.com |
| SENTINEL | 0800 389 4670 or www.sentinel-solutions.net |


ARTIFICIALLY SOFTENED WATER

It is possible to have an ion exchange water softener fitted to the cold water system of the property. However, the boiler requires an untreated cold water connection taken from the mains supply, before the water softener, to the primary water filling point of the heating system.

3.2 MAINS SUPPLY

3.2.1 ELECTRICAL SUPPLY

- Supply: 230V - 50 Hz
- Cable: PVC insulated 0.75mm² (24 x 0.2mm) temperature rated to 90 °C.
- External 3A fuse to BS1362.
- The boiler must be earthed.
- This boiler must not be connected to a 3 phase supply.
- IPX4D.

 **NOTICE:** This is reduced to IP20 if the following mechanical timers are fitted;
7 716 192 036 or 7 716 192 037
or FW100 7 716 192 067

- Wiring must comply with the latest edition of BS 7671 (IEE wiring regulations).


3.2.2 GAS SUPPLY

- Boilers using Natural Gas (NG) must be connected to a governed meter.
- Liquid Petroleum Gas (LPG) must be connected to a regulator.
- Installation and connection of the gas supply to the boiler must be in accordance with BS6891.
- Under no circumstance should the size of the gas supply pipe be less than 22mm.
- The meter or regulator and pipe work to the meter must be checked, preferably by the gas supplier.
This is to ensure that the equipment is in good working order and can meet the gas flow and pressure requirements, in addition to the demand from any other appliance being served.

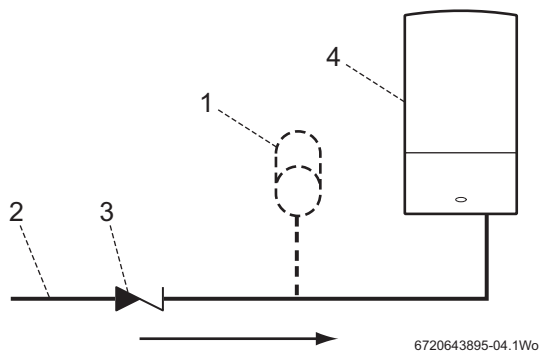
3.2.3 WATER SUPPLY

WATER MAINS PRESSURE:

- Minimum mains water pressure for maximum performance: refer to the Technical data in section 2.3.
- Maximum mains fed water pressure 10 bar.
If necessary fit a pressure reducing valve.

 **NOTICE:** Non return, back flow prevention devices (including those associated with water meters) fitted to the mains water supply can cause a pressure build up which could damage the boiler and other household appliances.

- Where the mains water supply has a non-return, back flow prevention valve fitted, a mini expansion vessel (1) should be connected to the mains water inlet pipe (2) between the non-return valve (3) and the boiler (4) as shown below.



| | |
|---|--|
| 1 | Mini expansion vessel - part no. 7 716 192 105 |
| 2 | Mains water inlet pipe |
| 3 | Non return valve |
| 4 | Boiler |

USE IN HARD WATER AREAS:

Normally there is no need for water treatment to prevent scale formation as the maximum temperature of the DHW heat exchanger is limited by the electronic control.

In areas where temporary water hardness exceeds 200 ppm, consideration may need to be given to the fitting of a scale prevention device. In such circumstances, the advice of the local water authority should be sought.

3.3 WATER SYSTEMS AND PIPE WORK

PLASTIC PIPE WORK:

- Any plastic pipe work must have a polymeric barrier with 600mm (minimum) length of copper pipe before being connected to the boiler.
- Plastic pipe work used for underfloor heating must be correctly controlled with a thermostatic blending valve limiting the temperature of the circuits to approximately 50°C.

PRIMARY SYSTEMS CONNECTIONS/VALVES:

- All system connections, taps and mixing valves must be capable of sustaining a pressure up to 3 bar.
- Radiator valves should conform to BS2767:10.
- All other valves should conform to BS1010.
- Thermostatic radiator valves (TRV's) must be fitted to all rooms except bathrooms and the room in which the room thermostat is fitted.
- A drain cock is required at the lowest point(s) in the system.
- An air vent is required at the high point(s) in the system.



The boiler is equipped with an internal by-pass. The internal bypass is not intended to be a substitute for an external system bypass. An external automatic bypass should be used if the system flow can be significantly adjusted or stopped by zone valves and thermostatic radiator valves (TRV).

SHOWERS/BIDETS:

- If a shower head can be immersed in water or comes closer than 25mm from the top edge of a bath or shower tray spill over level then an anti-siphon device must be fitted to the shower hose.
- Bidets with direct hot and cold mains water can be used (with the approval of the local water authority) and must be the over rim flushing type with shrouded outlets to prevent the fitting of hand held sprays.

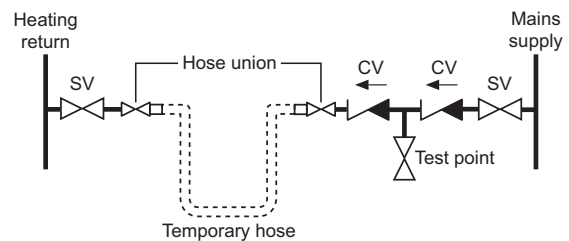
SEALED PRIMARY SYSTEM:



NOTICE: Artificially softened water must not be used to fill the central heating system.

- The CH sealed system must be filled using a WRAS approved filling loop or comply with figure 2 for system fill.
- Where the system volume is more than 100 litres or exceeds 2.65 bar at maximum heating temperature, an extra expansion vessel (2) must be fitted as close as possible to the appliance in the central heating return.
- Pressurise the extra expansion vessel to the same figure as the expansion vessel built into the appliance, (approximately 0.75 bar).
- **Do not use galvanised pipes or radiators.**

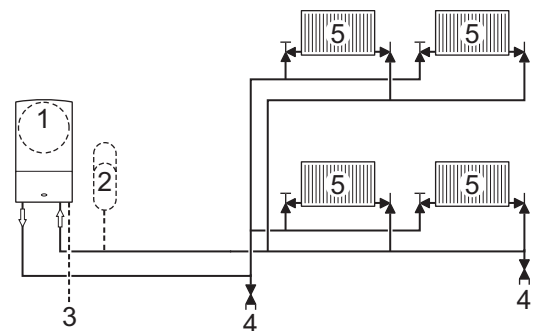
SYSTEM FILL



CV = Check Valve
SV = Stop Valve

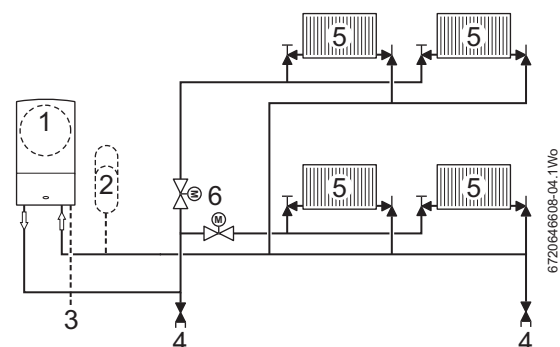
Fig. 2 System fill

TYPICAL SEALED SYSTEM



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Fig. 3 Sealed system



6720646608-04.1Wo

Fig. 4 Sealed system with zone valves

| | |
|---|------------------------------------|
| 1 | Appliance expansion vessel - CH |
| 2 | Extra expansion vessel - CH return |
| 3 | Pressure relief discharge |
| 4 | Drain cock |
| 5 | Radiators |
| 6 | Zone valves |

Table 6 Key to figs. 3 and 4

3.4 CONDENSATE PIPE WORK

NOTICE:

- ▶ Where a new or replacement boiler is being installed, access to an internal “gravity discharge” point should be one of the factors considered in determining boiler location.
- ▶ The condensate pipe must be nominally 22mm Ø plastic pipe.
- ▶ The condensate pipe work must fall at least 52mm per metre towards the outlet and should take the shortest practicable route.
- ▶ Ensure there are no blockages in the pipe run.

| Key to condensate illustrations | |
|---------------------------------|--|
| 1 | Condensate discharge from boiler |
| 2 | Soil and vent stack |
| 3 | Minimum 450mm and up to three storeys |
| 4 | Visible air break at plug hole |
| 5 | Sink or basin with integrated overflow |
| 6 | 75mm sink waste trap |
| 7 | Condensate pump |
| * | Condensate trap of 75mm already incorporated into the boiler |

3.4.1 INTERNAL CONNECTIONS

In order to minimise risk of freezing during prolonged cold spells, the following methods of installing condensate drainage pipe should be adopted, in order of priority.

Wherever possible, the condensate drainage pipe should be routed and terminated so that the condensate drains away from the boiler under gravity to a suitable internal foul water discharge point such as an internal soil and vent stack. A suitable permanent connection to the foul waste pipe should be used.

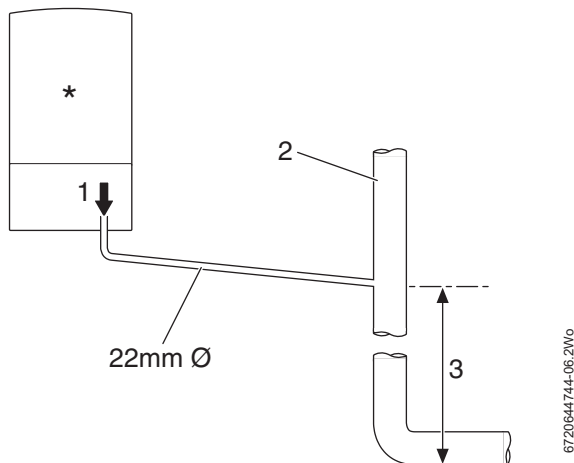


Fig. 5 Disposal to soil vent stack

Alternatively if the first option is not possible an internal kitchen or bathroom waste pipe, washing machine waste pipe etc. can be used. Ensure that the condensate drain pipe is connected “down stream” of the waste trap.

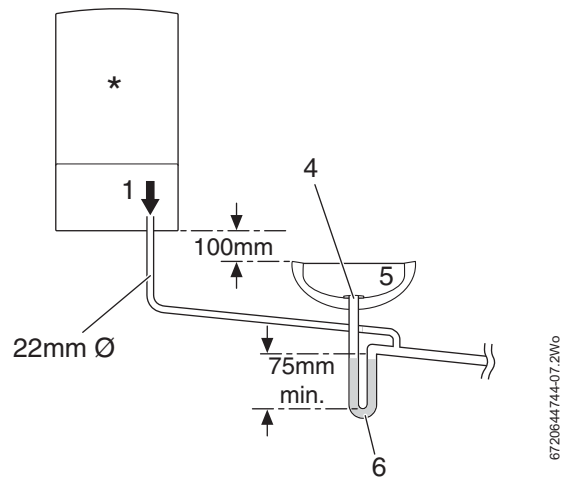


Fig. 6 Disposal to a waste pipe

CONDENSATE PUMP

Where “gravity discharge” to an internal termination is not physically possible, or where very long internal runs would be required to reach a suitable discharge point, condensate should be removed using a proprietary condensate pump, of a specification recommended by the boiler or condensate pump manufacturer.

The pump outlet pipe should discharge to a suitable internal foul water discharge point such as an internal soil and vent stack, internal kitchen or bathroom waste pipe, washing machine waste pipe etc. A suitable permanent connection to the foul waste pipe should be used.

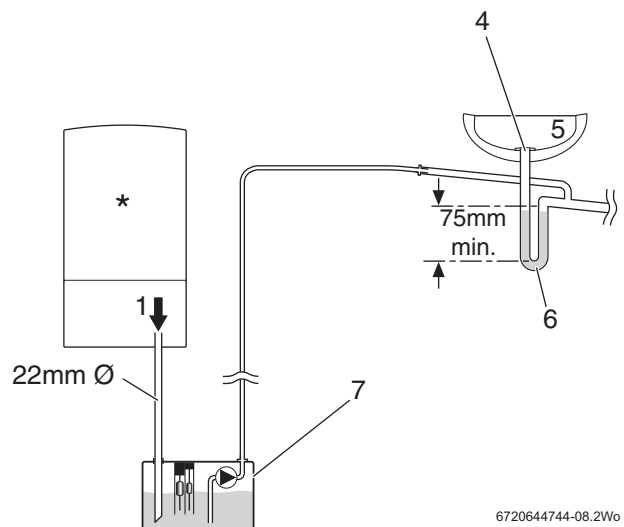


Fig. 7 Condensate pump disposal

3.4.2 EXTERNAL CONNECTIONS

NOTICE: Freezing conditions

- ▶ When the position of the boiler prevents internal routing, we recommend installing a CondenseSure siphon to significantly reduce the risk of freezing.
- ▶ Pipe work length should be kept to a minimum and the route as vertical as possible.
- ▶ Weather proof insulation must be used, if not using a CondenseSure siphon.

NOTICE: Condensate waste

- ▶ Care should be taken when siting a soak-away to avoid obstructing existing services.

| Continued - Key to condensate illustrations | |
|---|--|
| 8 | PVCu strap on fitting |
| 9 | 100mm Ø minimum plastic pipe |
| 10 | Drainage holes |
| 11 | Limestone chippings |
| 12 | Bottom of sealed tube |
| 13 | Insulate and increase pipe size |
| 14 | Pipe work transition |
| 15 | External air break |
| 16 | Air gap |
| 17 | External rain water pipe into foul water |
| 18 | 43mm 90° male/female bend |
| * | Condensate trap of 75mm already incorporated into the boiler |

If no other discharge method is possible then the use of an externally run condensate drainage pipe terminating at a suitable foul water discharge point, or purpose-designed soak away, may be considered. If this method is chosen then the following measures should be adopted:

- ▶ Use a CondenseSure siphon to help prevent the condensate freezing.
- ▶ The external run be kept as short as possible and not exceed 3 metres.
- ▶ The pipe should be run internally as far as possible before going externally and the pipe diameter should be increased to 32mm before it passes through the wall to the exterior. The pipe should be insulated using suitable waterproof and weather resistant insulation, if not using a CondenseSure siphon.
- ▶ The external pipe should take the shortest and least exposed route to the discharge point, and should "fall" as steeply as possible away from the boiler, with no horizontal runs in which condensate might stand.
- ▶ The use of fittings, elbows etc. should be kept to a minimum and any internal "burrs" on cut pipe work should be removed so that the internal pipe section is as smooth as possible.

FITTING AN EXTERNAL AIR BREAK

- Refer to figure 8 when a rain water down pipe is used to dispose of condensate.
- An air break must be installed in the 43mm pipe work, between the boiler condensate outlet and the drainpipe, outside the property, to avoid flooding during adverse weather conditions.

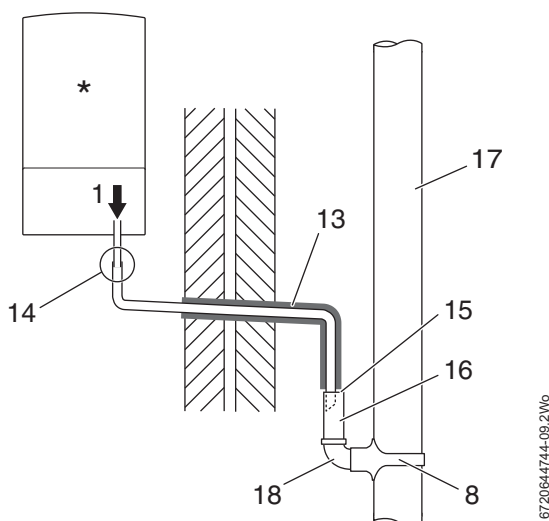


Fig. 8 Disposal into a rainwater down pipe

i Condensate drainage pipe can be run above or below ground.

Where the pipe terminates over an open drain or gully, the pipe should terminate below the grating level, but above water level, in order to minimise "wind chill" at the open end.

The use of a drain cover (such as those used to prevent blockage by leaves) may offer further protection from wind chill.

Pipe drainage will be improved if the end is cut at 45° as opposed to a straight cut.

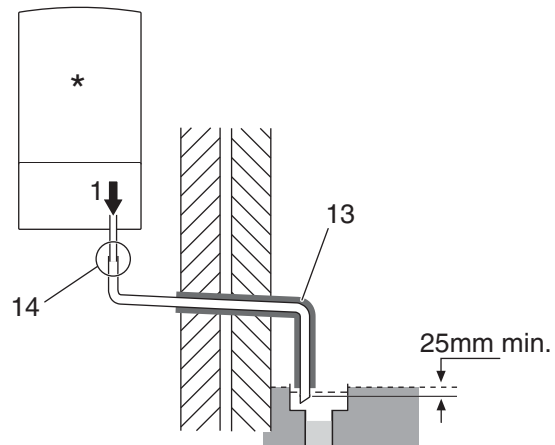


Fig. 9 External disposal

CONDENSATE SOAK AWAY

- The condensate drainage pipe may be run above or below the ground to the soak away. The examples shown on this page run above ground.
- The soak away must use a 100mm Ø plastic tube with two rows of three 12mm holes on 25mm centres and 50mm from the bottom of the tube. The holes must face away from the house.
- The tube must be surrounded by at least 100mm of limestone chippings to a depth of 400mm.

i Minimum hole size for the condensate soak away must be 400mm deep by 300mmØ.

In situations where there are likely to be extremes of temperature or exposure, the use of a proprietary trace-heating system for external pipe work, incorporating an external frost thermostat, should be considered. If such a system is used, the requirement to use 32mm pipe does not apply. However, all other guidance above and the instructions for the trace heating system, should be closely followed.

NOTICE: Unheated internal areas.
▶ Internal pipe runs in unheated areas such as lofts, basements and garages should be treated as external runs and consideration should be given to using a CondenseSure siphon.

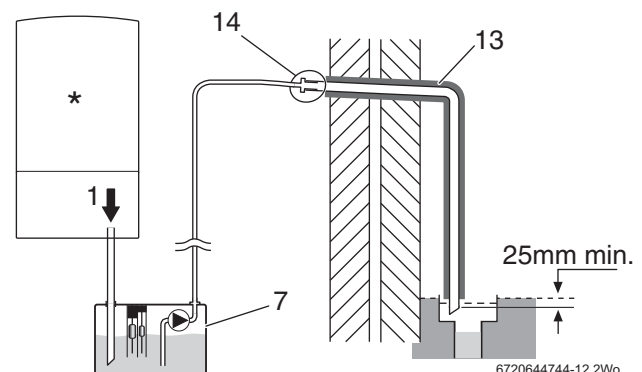


Fig. 10 Condensate pump to external disposal

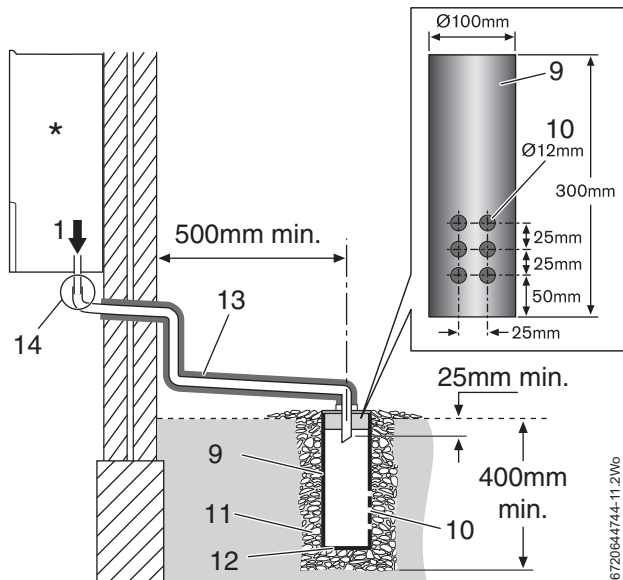


Fig. 11 Soak away

3.5 PRESSURE RELIEF PIPE WORK



NOTICE:

- ▶ The pressure relief valve is a safety device for the boiler and if activated may discharge boiling water or steam through the relief valve drain pipe.
- ▶ Care should be taken when siting the outlet pipe so that it does not cause an obstruction or discharge above a window, entrance or other public access where it could cause a hazard.

- The pressure relief drain pipe (1) from the boiler should be at least 15mm diameter copper pipe and run downwards, away from any electrical equipment or other hazard, preferably to an external drain or soak away.
- The pressure relief drain pipe (1) should be finished with a partial bend, near the outlet to face the external wall (as shown) to help prevent freezing.

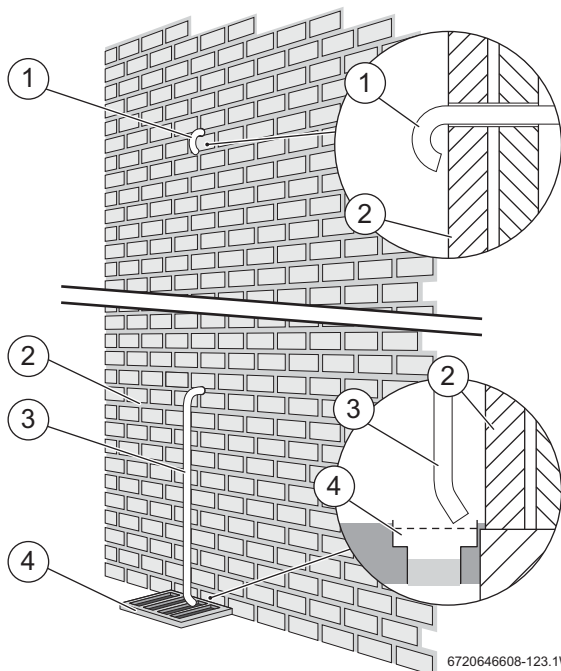


Fig. 12 Pressure relief pipe work

- [2] Outside wall
- [1, 3] PRV drain pipe
- [4] External drain

3.6 BOILER LOCATION AND CLEARANCES

3.6.1 INSTALLATION

This boiler is only suitable for installing internally within a property at a suitable location onto a fixed, rigid surface at least the same size as the boiler and capable of supporting the boiler weight.

NOTICE:
No surface protection is required against heat transfer from the boiler

3.6.2 INSTALLATION AND SERVICING CLEARANCES

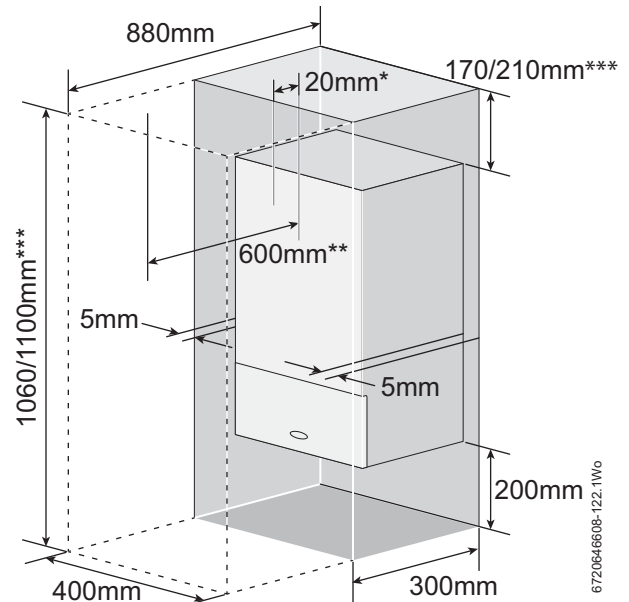


Fig. 13 Unventilated compartment

- [*] Minimum clearance to removable door
- [**] Minimum clearance required for servicing
- [***] Height for either 60/100 flue or 80/125 flue

3.6.3 COMPARTMENTS

Follow the requirements of BS6798 and BS5440 Part 2 and note:

- Minimum clearances must be maintained.
- An access door is required to install, service and maintain the boiler and any ancillary equipment.
- If fitting the boiler into an airing cupboard use a non-combustible material to separate the boiler from the airing space. The material can be perforated up to a maximum hole size of 13mm.

3.6.4 BATHROOMS

A boiler fitted with a mechanical timer or RF mechanical timer (receiver) or FW100 controller may only be installed outside the shaded area.

A boiler with any other timer fitted (or blanking panel) can also be installed in zone 2.

Additional RCD (Residual Current Device) protection may be required. Consult the latest version of BS7671 (IEE wiring regulations).

2* Without the end wall, zone 2 must extend 600mm from the bath

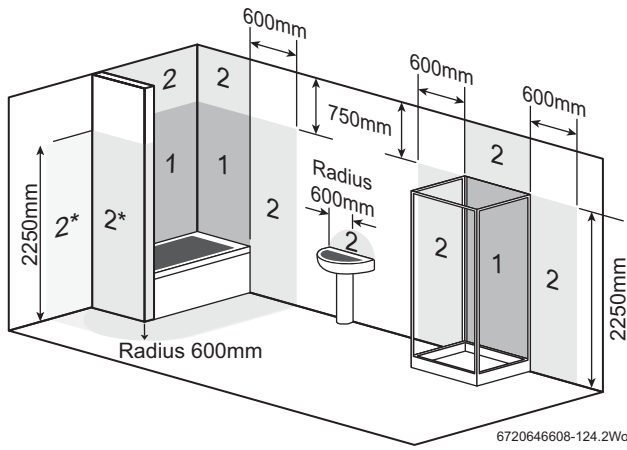


Fig. 14 Bathroom installations

3.7 PLUMBING MANIFOLD

3.7.1 CONNECTIONS

| | |
|----------------|---------------------------|
| Heating System | 22mm compression fittings |
| DHW | 15mm compression fittings |
| Gas | 22mm compression fittings |

Use the fittings supplied in the Hardware literature pack.

i Further guidance on pipe routing can be found printed on the boiler template (supplied with the boiler).

- For further ease of fitting, an optional Vertical Pre-piping Assembly kit is available, comprising four pre-formed copper water pipes. Part number: 7 716 192 713.
- To cover the pipe work under the boiler, down to the counter top, an optional Worcester accessory the Below Boiler Pipe Cover can be used, Part number: 7 716 192 608.

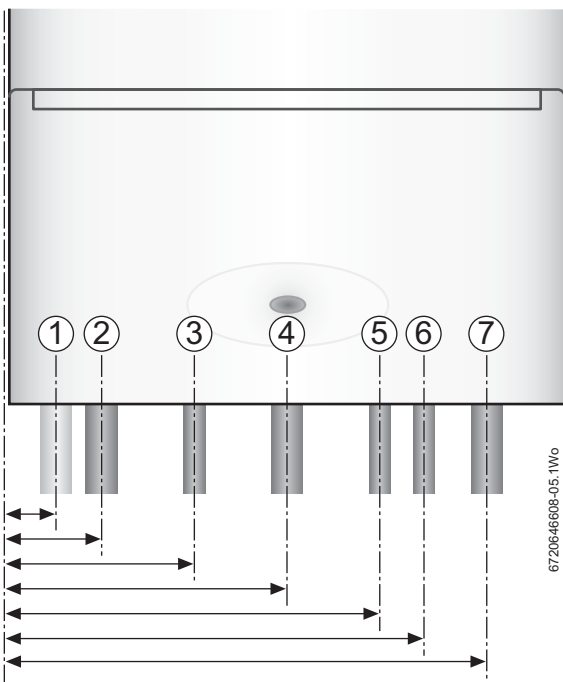


Fig. 15 Pipe dimensions

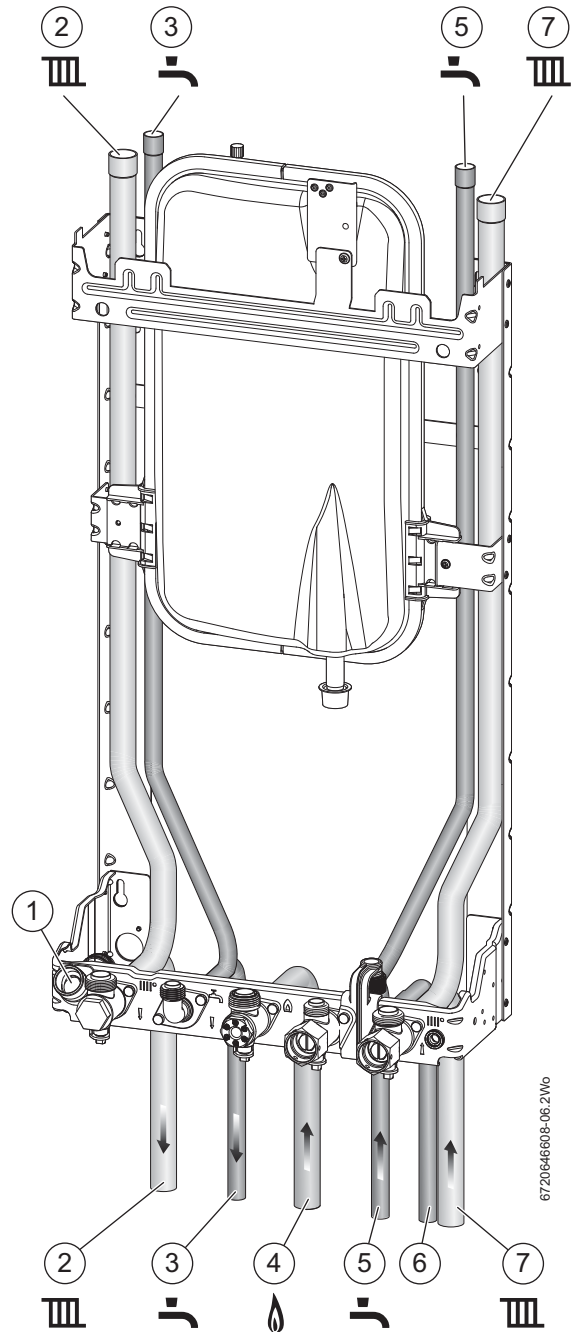



Fig. 16 Plumbing manifold


| No. | Function | From left case edge | Diameter of pipe |
|-----|------------------|---------------------|------------------|
| 1 | Condensate drain | 33mm | 22mm |
| 2 | CH Flow | 65mm | 22mm |
| 3 | DHW Outlet | 130mm | 15mm |
| 4 | Gas | 195mm | 22mm |
| 5 | DCW Mains In | 260mm | 15mm |
| 6 | PRV drain | 291mm | 15mm |
| 7 | CH Return | 325mm | 22mm |

Table 7 Key to figures 15 & 16


3.8 FLUE OPTIONS

 **CAUTION:** Non accessible flue systems:

- ▶ Where a flue system is not going to be accessible, provision must be made for service and inspection.
- ▶ Voids containing concealed flues must have at least one inspection hatch no less than 300mm square.
- ▶ Flue joints within the void must not be more than 1.5 metres from the edge of the inspection hatch.
- ▶ Inspection hatches should be located at changes of direction.
- ▶ If this is not possible, bends should be viewable from both directions.

 **NOTICE:** Effective flue lengths:

- ▶ each 90° bend used is equivalent to 2 metres of straight flue
- ▶ each 45° bend used is equivalent to 1 metre of straight flue

 Plume management kits are available for the 60/100 horizontal flue system, Part number 7 716 191 086. Refer to the manual supplied with the Plume Management kits for complete installation instructions

| Part number | Flue | Description |
|---------------|--------|--|
| 7 716 191 082 | 60/100 | Telescopic horizontal flue assembly |
| 7 716 191 171 | 60/100 | Longer telescopic horizontal flue assembly |
| 7 719 003 702 | 80/125 | Telescopic horizontal flue assembly |
| 7 719 002 430 | 60/100 | Vertical flue assembly |
| 7 719 002 431 | 80/125 | Vertical flue assembly |

Condensfit II

| CDi Compact boilers | | Maximum total flue length L (mm) | |
|---------------------|---|----------------------------------|-----------|
| FLUE TYPE | | 60/100 | 80/125 |
| 1 | Telescopic horizontal flue assembly | 130 - 570 | 405 - 600 |
| | Longer telescopic horizontal flue assembly | 570- 790 | NA |
| 2 | Horizontal flue extension | 6,000 | 15,000 |
| 3 | Horizontal flue with 1 x 90° bend | 4,000 | 13,000 |
| 4 | Horizontal flue with 2 x 90° bends | 2,000 | 11,000 |
| 5 | High level horizontal flue | 6,000 | 15,000 |
| 6 | High level horizontal flue with 2 x 90° bends | 4,000 | 13,000 |
| 7 | High level horizontal flue with 3 x 90° bends | 2,000 | 11,000 |
| 8 | Vertical balanced flue assembly | 6,000 | 15,000 |
| 9 | Vertical balanced flue with 2 x 90° bends | 2,000 | 11,000 |
| 10 | Vertical balanced flue with 2 x 45° bends | 4,000 | 13,000 |

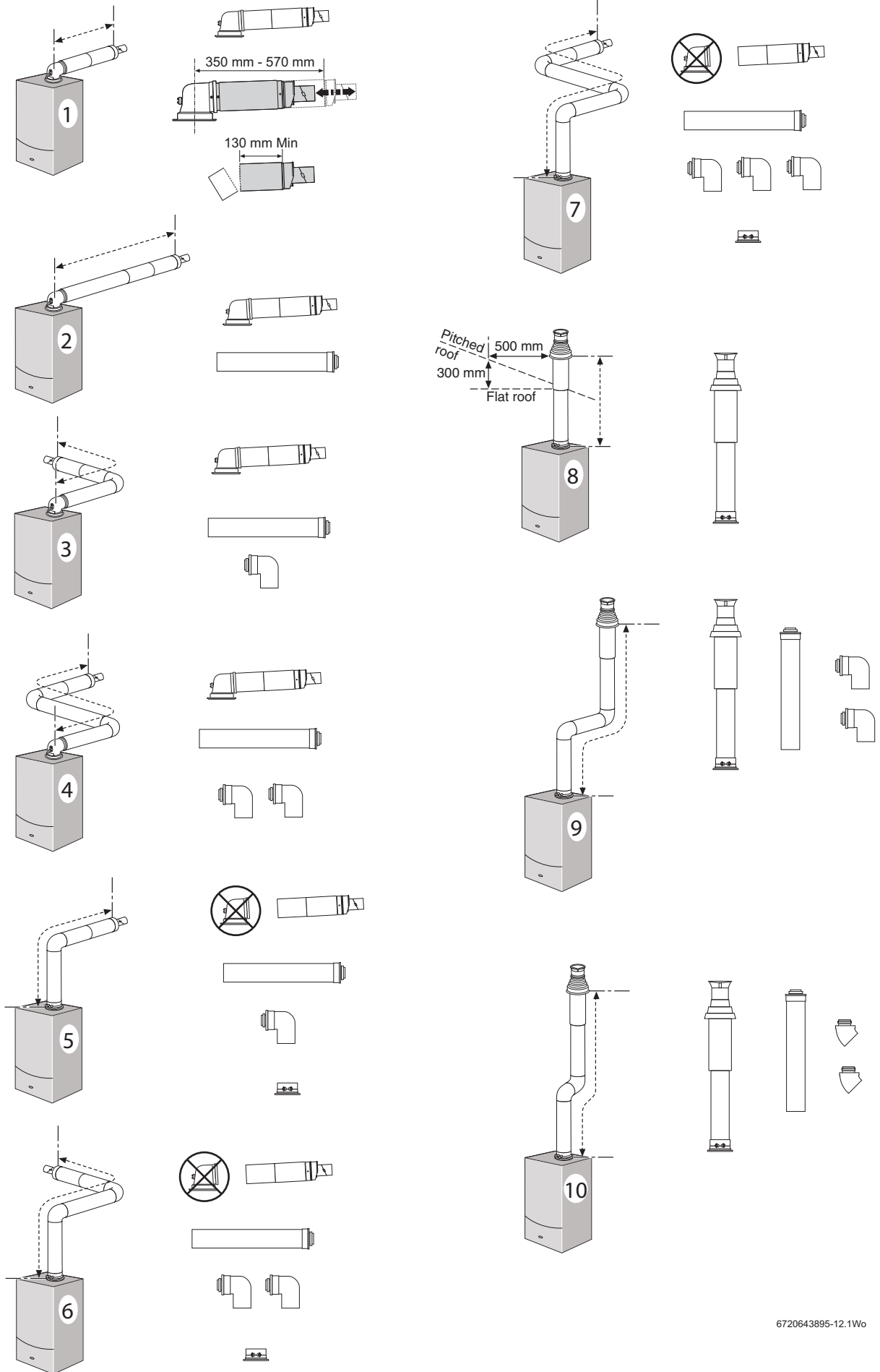
Table 8 Flue options

The flue systems have different maximum flue lengths

The Greenstar series has the option of two horizontal 60/100 RSF (telescopic and longer telescopic) and one horizontal 80/125 RSF (telescopic) flue system and two vertical RSF (60/100 or 80/125) flue systems:

The next page shows various fluing options.

Refer to the Flue options in table 8 for the straight flue lengths required to achieve the maximum flue length.



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3.9 FLUE TERMINAL POSITIONS

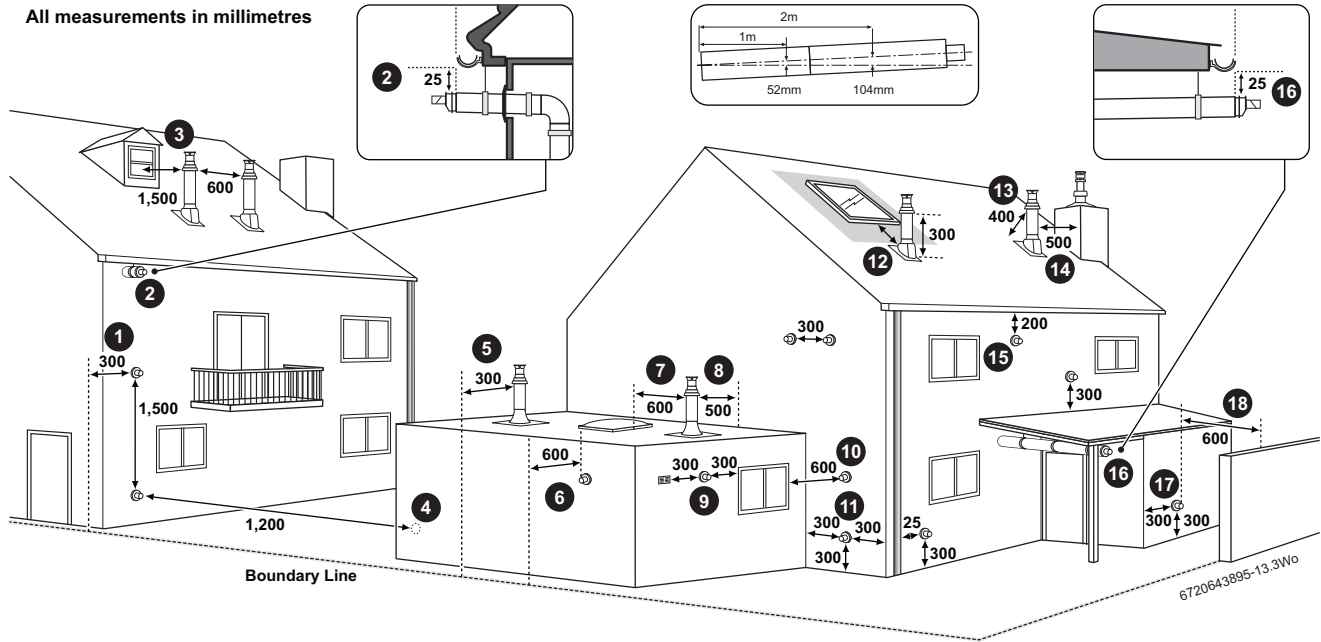


Fig. 17 Flue terminal positions

NOTICE:

- ▶ All measurements are the minimum clearances required.
- ▶ Terminals must be positioned so to avoid combustion products entering the building.
- ▶ Support the flue at approximately one metre intervals and at a change of direction, use suitable brackets and fittings (flue bracket 100mm part number: 7 716 191 177, flue brackets 100mm x 6 part number: 7 716 191 178, flue bracket 125mm part number: 7 716 191 179).

Key to illustration

1. 300mm adjacent to a boundary line.
2. The dimension below eaves, balconies and car ports can be reduced to 25mm, as long as the flue terminal is extended to clear any overhang. Any external flue joints must be sealed with suitable silicon sealant.
3. 1,500mm between a vertical flue terminal and a window or dormer window.
4. 1,200mm between terminals facing each other.
5. Vertical flue clearance, 300mm adjacent to a boundary line, unless it will cause a nuisance. BS 5440:Part 1 recommends that care is taken when siting terminal in relation to boundary lines.
6. 600mm distance to a boundary line, unless it will cause a nuisance. BS 5440:Part 1 recommends that care is taken when siting terminal in relation to boundary lines.
7. 600mm minimum clearance from a skylight to a vertical flue.
8. Vertical flue clearance, 500mm to non-combustible building material, and 1,500mm clearance to combustible building material.
9. 300mm above, below and either side of an opening door, air vent or opening window.
10. 600mm diagonally to an opening door, air vent or opening window.
11. 300mm to an internal or external corner.
12. 2,000mm below a Velux window, 600mm above or to either side of the Velux window.
13. 400mm from a pitched roof or in regions with heavy snow fall 500mm.
14. 500mm clearance to any vertical structure on a roof, 600mm to room sealed flue or 1,500 to an open flue.
15. 200mm below eaves and 75mm below gutters, pipe and drains.

16. The dimension below eaves, balconies and car ports can be reduced to 25mm, as long as the flue terminal is extended to clear any overhang. Any external flue joints must be sealed with suitable silicon sealant.
17. Flue clearance must be at least 300mm from the ground. Terminal guards must be fitted if the flue is less than 2 metres from the ground or if a person could come into contact with the flue terminal.
18. 600mm distance to a surface facing a terminal, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting terminals in relation to surfaces facing a terminal.



Note:

- ▶ Installations in car ports are not recommended.
- ▶ The flue cannot be lower than 1,000mm from the top of a light well due to the build up of combustion products.
- ▶ Dimensions from a flue terminal to a fanned air inlet to be determined by the ventilation equipment manufacturer.

3.10 PLUME MANAGEMENT TERMINAL POSITIONS

All measurements in millimetres

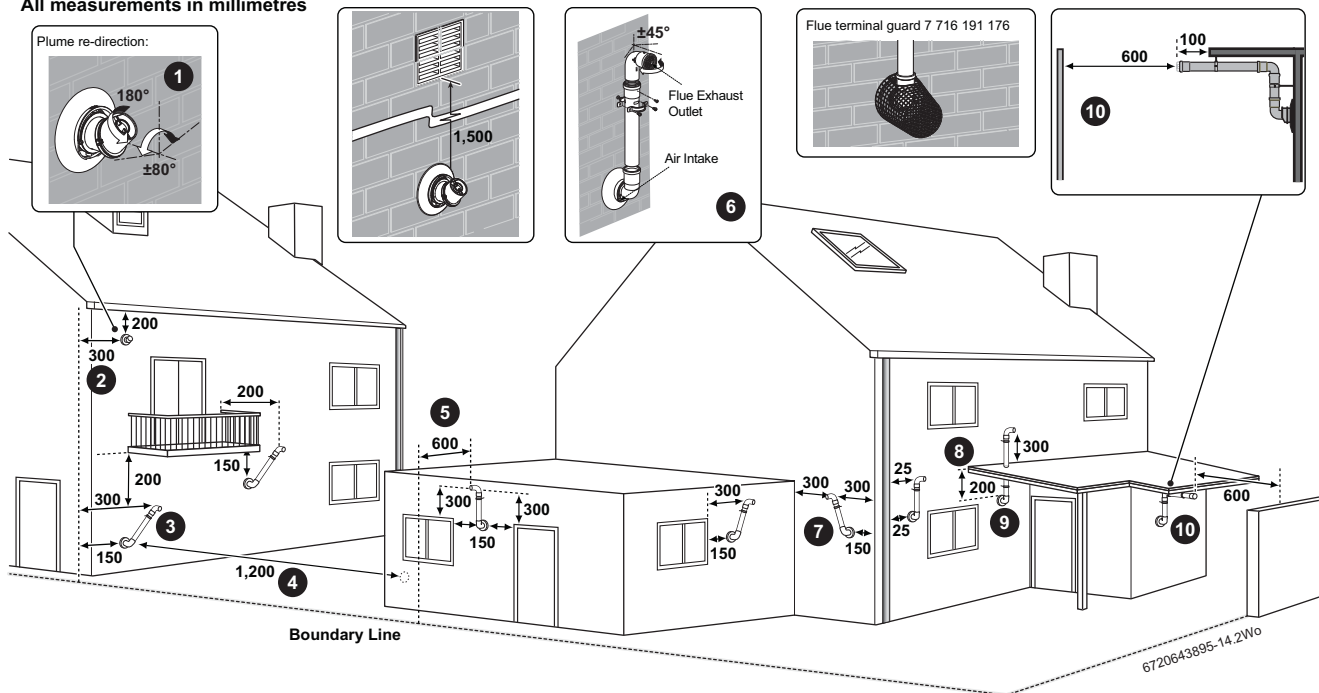


Fig. 18 Plume terminal positions

NOTICE:

- ▶ All measurements are the minimum clearances required.
- ▶ The minimum length plume management length is 500mm to a maximum of 4,500mm, this includes two 90° bends. Maximum flue length is reduced from 6,000mm to 5,000mm when plume management of 500mm is used. Maximum flue length of 2,200mm with maximum plume management of 4,500mm
- ▶ For each metre (1000mm) of plume management length the internal flue length is reduced by 700mm.
- ▶ Subsequent 45° bends = 750mm and 90° = 1500mm.
- ▶ Refer to previous page for all concentric flue terminal positions unless the flue position is specified on the figure above "Plume terminal positions".
- ▶ Terminals must be positioned so to avoid combustion products entering the building.
- ▶ Support the flue at approximately one metre intervals and at a change of direction, use suitable brackets and fittings.

Key to illustration

1. This feature allows some basic plume re-direction options on a standard telescopic horizontal flue terminal.
300mm minimum clearances to a opening e.g. window.
However the minimum clearances to an opening in direction that the plume management is facing, must be increased to 1,500mm. Where the flue is less than 150mm to a drainpipe and plume re-direction is used the deflector should not be directed towards the drainpipe.
2. 300mm adjacent to a boundary line.
3. Plume Management Kit air intake can be reduced to 150mm providing the flue exhaust outlet is no less than 300mm adjacent to a boundary line.
4. 1,200mm between terminals facing each other.
5. 600mm distance to a boundary line, unless it will cause a nuisance. BS 5440:Part 1 recommends that care is taken when siting terminal in relation to boundary lines.
6. Using a Plume Management Kit the air intake measurement can be reduced to 150mm providing the flue exhaust outlet has a 300mm clearance.
Plume kits running horizontally must have a 10° fall back to the boiler for proper disposal of condensate.
For details on specific lengths see relevant boiler Technical & Specification information.
7. Internal/external corners. The air intake clearance can be reduced to 150mm providing the flue exhaust outlet has a 300mm clearance.

8. Clearances no less than 200mm from the lowest point of the balcony or overhang.
9. 1,200mm from an opening in a car port on the same wall e.g. door or window leading into the dwelling.
10. 600mm distance to a surface facing a terminal, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting terminals in relation to surfaces facing a terminal.



Note:

- ▶ Installations in car ports are not recommended.
- ▶ The flue cannot be lower than 1,000mm from the top of a light well due to the build up of combustion products.
- ▶ Dimensions from a flue terminal to a fanned air inlet to be determined by the ventilation equipment manufacturer.

3.10.1 DETERMINE THE PLUME MANAGEMENT SYSTEM LENGTH

| Effective straight flue length for telescopic flue with plume management | |
|--|-------------------------------------|
| Minimum plume length 500mm (M) | Maximum plume length 5,000mm (M) |
| Maximum flue length 5,000mm (L) | Maximum flue length 2,200mm (L) |

Table 9



Note:

- ▶ Measurement M must be a minimum of 500mm and must not exceed 4,500mm for a 60mm plume management system used with the horizontal Ø 60/100mm flue.

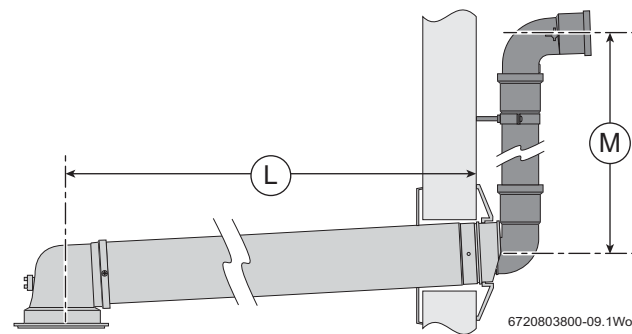


Fig. 19 Effective lengths L and M

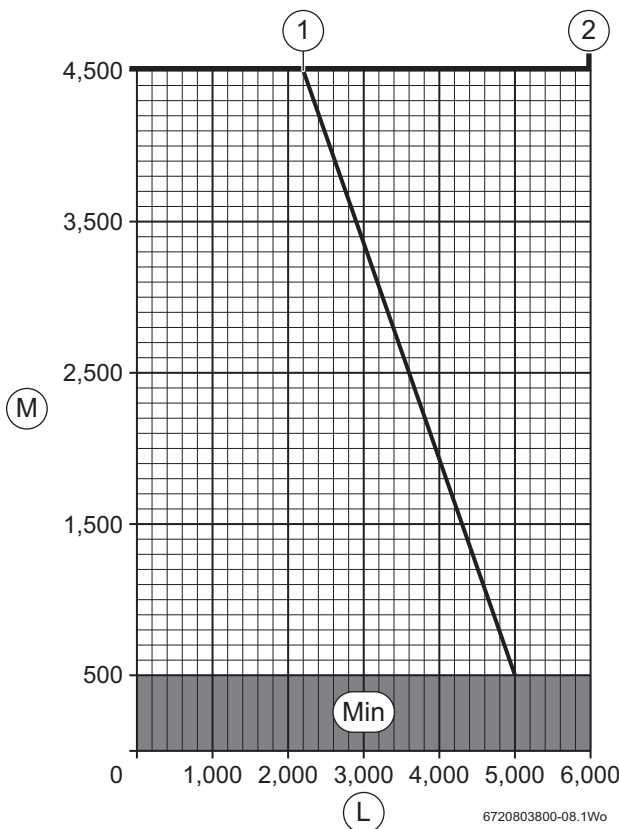


Fig. 20 Effective flue lengths versus plume management lengths

- [Min] Minimum plume kit length 500mm
- [M] Plume management length allowed (mm)
- [L] Effective flue length (mm)
- [1] 28, 32 & 36CDi Compact data line
- [2] Maximum plume length for all boilers

Refer to figure 20 to determine the appropriate plume length (M) versus the flue length (L).

The lengths for both plume and flue are the effective lengths, which includes the effective length of any bends plus the straight lengths.

The graph can be used to calculate:

- **Effective flue length** if a specific effective plume length is required.
- **Effective plume length** if a specific effective flue length is required.

4 INSTALLATION



WARNING: All the previous “Pre-Installation” sections must be read and the requirements met before starting boiler or flue installation.

4.1 UNPACKING WALL FRAME & ANCILLARY ITEMS



CAUTION: LIFTING AND CARRYING

- ▶ Only lift a manageable weight, or ask for help.
- ▶ Bend your knees and keep your back straight with feet apart, when lifting or putting down heavy objects.
- ▶ DO NOT lift and twist at the same time.
- ▶ Lift and carry object close to the body.

- ▶ Remove the retaining straps from the carton.
- ▶ Open the four carton flaps and unpack as follows:

1. Remove items 1 to 6 from the cardboard tray.
2. Remove the wall mounting frame and cardboard tray together.

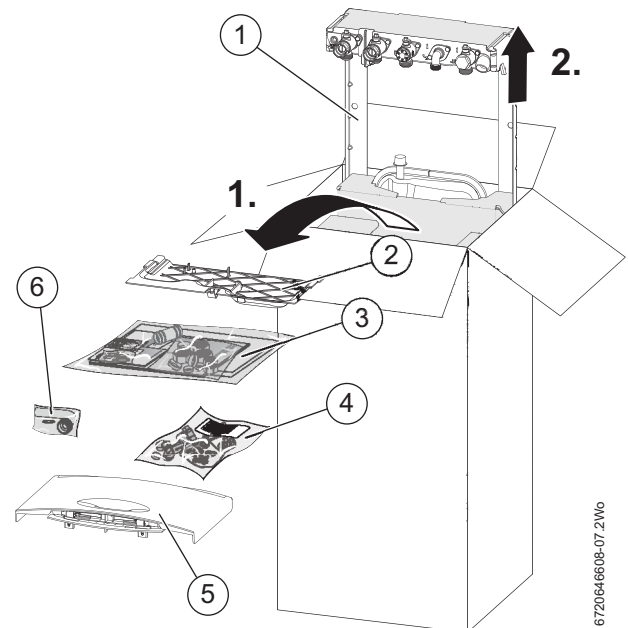


Fig. 21 Unpacking

- [1] Wall mounting frame
- [2] Bottom panel
- [3] Literature pack with wall mounting template
- [4] Integral Filling Loop kit
- [5] Front fascia panel
- [6] PRV installer connection elbow

IMPORTANT HANDLING INSTRUCTIONS:

- It is advised that two people are used to carry the carton from the van to the point of delivery.
- Once the carton has been delivered, the outer carton is removed first. Care should be taken when releasing the straps. If a sharp implement

is used make sure the outer carton is not pierced and that the implement is used in such a way so that it may not cause personal injury.

- All sharp objects must be covered or the blade retracted after use and put away in a safe place.
Care should be taken when lifting the boiler from the base and the proper technique for safe lifting of any heavy object should be strictly observed.

Additional requirements for roof space installation:

- The boiler should be first unpacked before ascending ladder to a loft space.
- Two sets of steps should be used.
- Two people should share the lifting of the boiler up to the loft hatch, where the boiler is entered into the loft space tilted and slid on its back into the loft.
- Once the appliance is removed from its packaging check the contents against the packing list.

NOTICE:
▶ Before installing the appliance, ensure that the system has been cleaned as explained on page 9.

4.2 WALL MOUNTING TEMPLATE & FLUE OPENING

WARNING: BEFORE DRILLING ENSURE THAT THERE ARE NO PIPES, ELECTRICAL CABLES, DAMP PROOF COURSES OR OTHER HAZARDS.

SAFETY:

All relevant safety precautions must be undertaken. Protective clothing, footwear, gloves and safety goggles must be worn as appropriate.

FIXING THE WALL MOUNTING FRAME:

- ▶ The boiler wall mounting template shows the relative positions of the flue and the top and bottom fixing points of the wall mounting frame.
1. Fix the wall mounting template to the wall in the desired position.
 2. Drill 4 holes for the wall mounting frame through the template, additional mounting holes can be utilised if required.

i The wall mounting template has been sized to allow for minimum clearances of 5mm sides, 200mm base and 170mm above boiler case (which is 30mm above a 100mm diameter flue elbow).

REAR FLUE OUTLET

- ▶ The drawing opposite shows the boiler wall mounting template with the flue centre lines of both the 100mm and 125mm flue systems.
3. Mark the centre line of the flue to be used (3); the external diameter of the hole can also be marked if required.
- ▶ If a 100mm diameter flue is to be used, a 125mm diameter hole is required. However, if using the weather sealing collar by pushing it through from inside the property, then a 150mm diameter hole is required to accommodate this.
 - ▶ The flue turret of the 100mm flue has an in-built 3° angle.
 - ▶ If extensions are to be added then the complete flue must rise at an angle of 3°.
 - ▶ Drill the hole, preferably using a core drill.

SIDE OUTLET:

4. Mark from the centre line of the wall mounting template to the wall that the flue will pass through (4).
- ▶ Allow for a rise of 52mm per metre length of flue, to give a 3° angle.

- ▶ Clear any debris from the site.

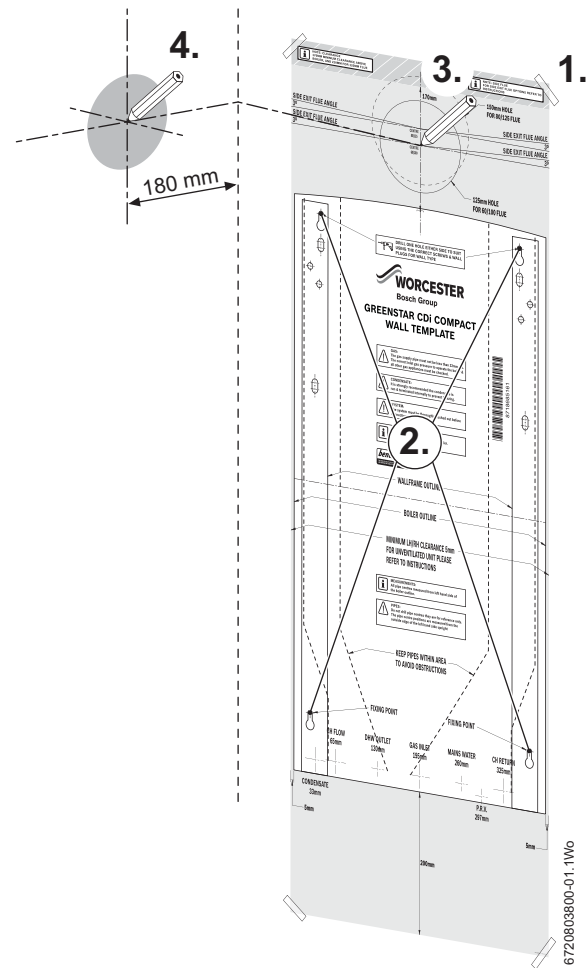


Fig. 22 Marking the flue position

- ▶ Remove wall mounting template.
- ▶ Secure the wall mounting frame to the wall with the appropriate fittings for the boiler weight and wall type.
- ▶ Remove and discard the red plastic dust cap from the expansion vessel pipe before hanging the boiler.

4.3 UNPACKING THE APPLIANCE

1. Remove outer carton (1) and place safely away from the working area.
2. Remove the inner sleeve (3) leaving all other cardboard inserts and base (4) in place.
3. Remove the protective wrapping (5) from the boiler.

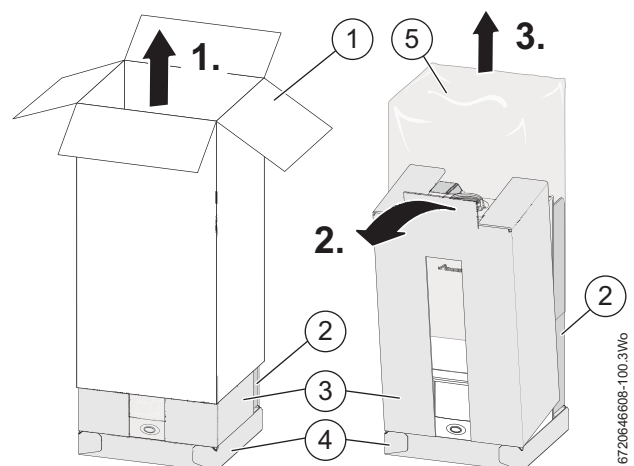


Fig. 23 Remove the carton

4. Remove the protective cardboard (5) from over the isolating valves.
5. Remove the protective cardboard (6) from around the expansion vessel.
6. Remove the inner packing (2) from the back of the boiler.
7. Lie the boiler on the floor ensuring that the V shaped cardboard insert (8) is in place.

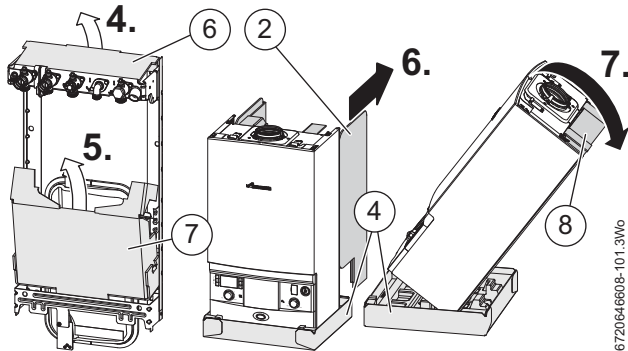


Fig. 24 Finish unpacking

REMOVING THE OUTER CASE

- ▶ Before the case can be removed the control panel must be moved into the service position, i.e. hinged open.
1. Remove the two screws underneath the fascia securing the control panel.
 2. Pull the catches forward to release.
 3. Pull the bottom of the fascia forward and out to release the top of the control panel.
 4. Hinge open the control panel into the service position
 5. Refer to figure 25 and release the two screws securing the lower part of the case.
 6. Release the spring clips at the top of the boiler.
 7. Slide the case off the frame and store safely out of the way.

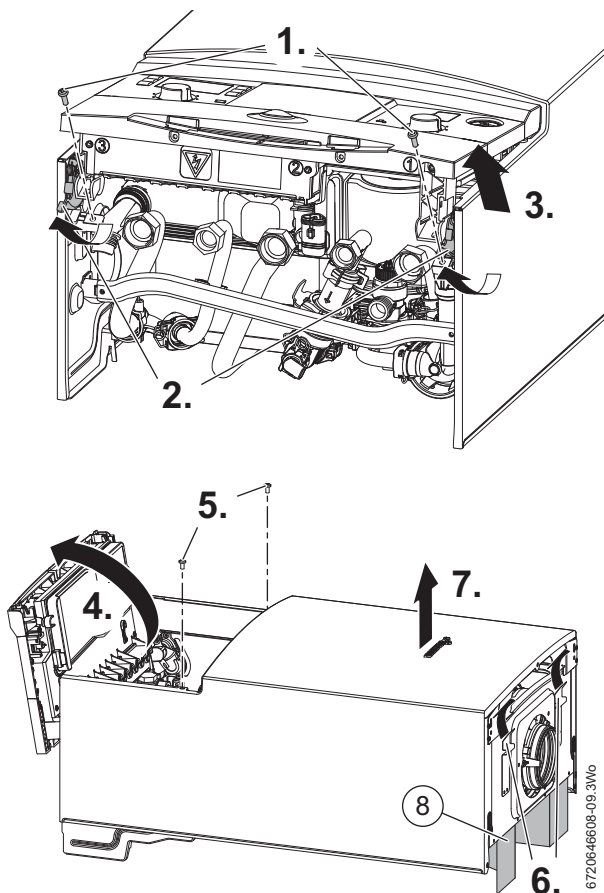


Fig. 25 Releasing the control panel



Refer to Figure 26. The connector (1) in the wiring harness is provided for the installation of the Domestic Hot Water Pre-Heat accessory - 7 716 192 735

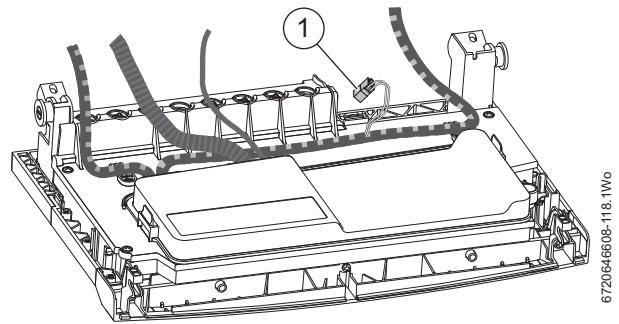


Fig. 26 Unused connector

- ▶ Remove any packaging within the boiler and the packaging base (3).
- ▶ Leave the V shaped support (5) in place until the boiler is ready to be hung on the wall frame, then remove.

4.4 PRE-PLUMBING BOILER CONNECTIONS



CAUTION:

- ▶ Isolate the mains gas supply before starting any work and observe all relevant safety precautions.
- ▶ Be aware of plastic components when using a naked flame on pipe work.

PLUMBING THE CONDENSATE DRAIN PIPE

- ▶ Fit the condensate discharge pipe as close to the wall as possible to ensure easy fitting of the boiler bottom panel.
- ▶ Route the condensate pipe to an appropriate discharge point, refer to section 3.4.
- ▶ Plumb up to the wall frame with 22mm pipe.
- ▶ Ensure that there is enough pipe to insert 25mm into the rubber hose connector.
- ▶ Attach the connector to the condensate drain pipe.

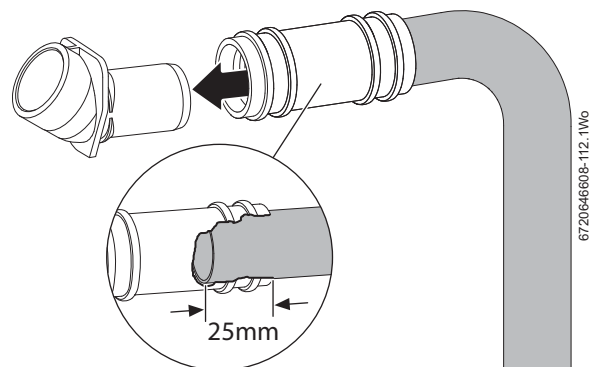


Fig. 27 Condensate connection

PRV PRE-PLUMBING CONNECTION

1. Fit the PRV pre-plumbing connector to the PRV locator bracket as shown in the figure below.
- The elbow is supplied in the Hardware/Literature pack.

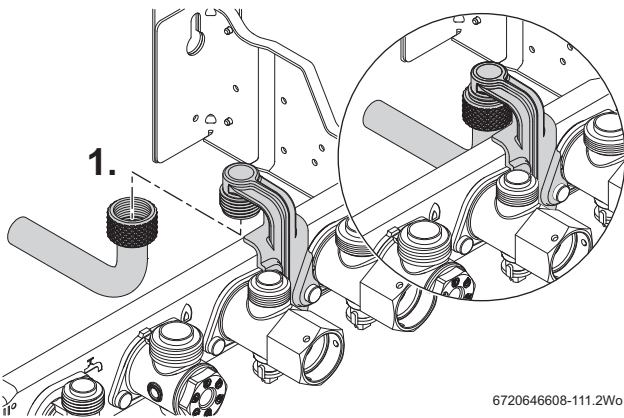


Fig. 28 PRV pipe connection

Once the wall frame has been mounted the PRV discharge pipe can be fitted.

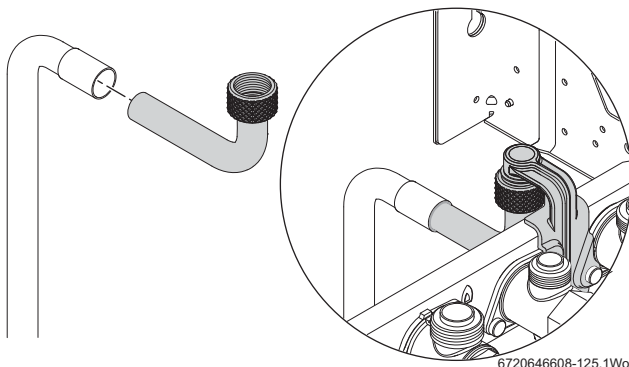


Fig. 29 PRV elbow fitting

- ▶ Connect the PRV discharge pipe to the pre-plumbing connector.
- ▶ The discharge pipe can be routed as required.
- ▶ The pre-plumbing connector must be removed before the boiler is hung on the wall frame.

INTEGRAL FILLING LINK



Fit the Integral Filling Link, supplied with the boiler, before hanging the boiler on the frame.

Fitting the Filling Link assembly at this stage will be easier than when the boiler is hung on the wall frame.

- ▶ Close the isolating valves on the DHW inlet and CH return connections.



There may be mains and system water pressure behind the blanking plugs.

- ▶ Unscrew the blanking plugs from the DHW inlet and CH return connections.
- ▶ Place the filter inside the inlet of the Filling link, ensuring that the mesh is inside the Filling link assembly.
- ▶ Fit the Filling link assembly onto the DHW inlet and CH return connections, refer to figure 30

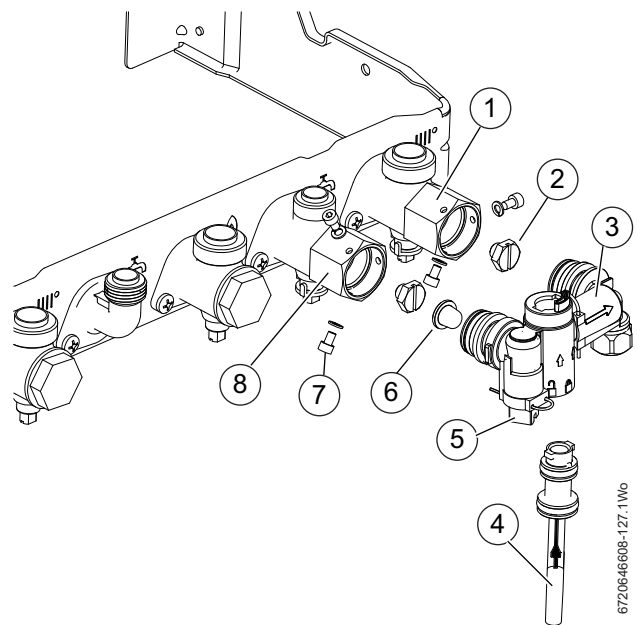


Fig. 30 Fitting the Filling link

- [1] CH return connection
- [2] Blanking plugs x 2
- [3] Filling link assembly
- [4] Filling key
- [5] White control screw
- [6] Filter
- [7] M4 screws and washers x 4
- [8] DHW inlet connection

- ▶ Ensure that the Filling link is pushed in fully to the locating tabs on both sides of the assembly.
- ▶ Fit an M4 screw and washer in at least two places on each connections.
- ▶ Ensure that the white plastic Control Screw [5] is turned clockwise into the fully closed position.



Do not insert Filling key [4] at this stage.

- ▶ Open the isolating valves on the DHW inlet and CH return connections.

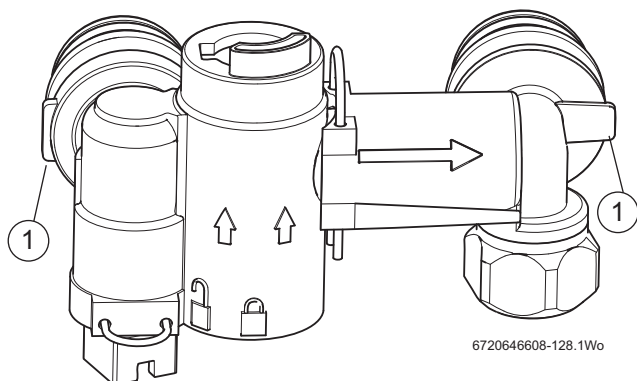


Fig. 31 Location tabs

- [1] Locating tabs

GAS AND WATER CONNECTIONS



WARNING: Bonded washer for gas (3)

- ▶ The bonded washer must be used on the gas pipe isolating valve connection.

► Connect the system pipes using the compression nuts and olives supplied in the Literature/Hardware pack.

1. CH flow (22mm),
2. DHW outlet (15mm),
3. Gas inlet (22mm bonded washer),
4. Domestic Cold Water inlet (15mm),
5. CH return (22mm),

► Fit sealing washers to service valves before hanging boiler.

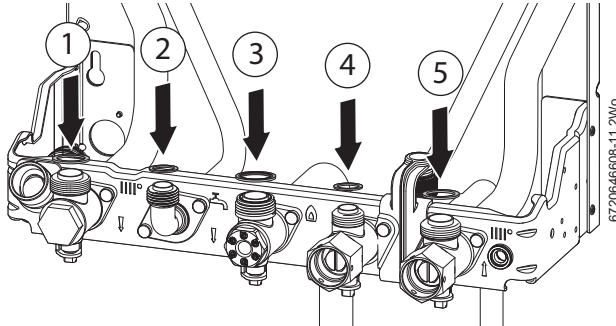


Fig. 32 Sealing washers

4.5 HANGING THE BOILER



CAUTION: Lifting the boiler

- Do not lift the boiler using the control panel as a hand hold.
- There are two handling holes incorporated into the inner casing left and right in the lower section of the appliance.



NOTICE: Before hanging the boiler remove:

- the plastic strip fitted to pipes.
 - the red cap from the expansion vessel.
 - the red plug in the expansion vessel connection in the hydraulic manifold.
- Protect the floor from residual water.



The expansion vessel is secured to a bracket on the wall frame in a "Pre-Installation" position.



Ensure that the control panel is in the closed position before hanging the boiler.
There is no requirement to re-fit the bottom screws at this time.

- Stand the boiler upright to gain access to the rear of the hydraulic manifold.
- Release the wire retaining clip securing the red plastic blanking plug.

1. Before hanging the boiler:

- Remove the blanking plug from the expansion vessel connection at the hydraulic manifold.
- Lubricate the expansion vessel "O" ring with silicone grease.
- Ensure that the wire retaining clip is still fully released so that the expansion vessel pipe connection can be made into the hydraulic manifold.

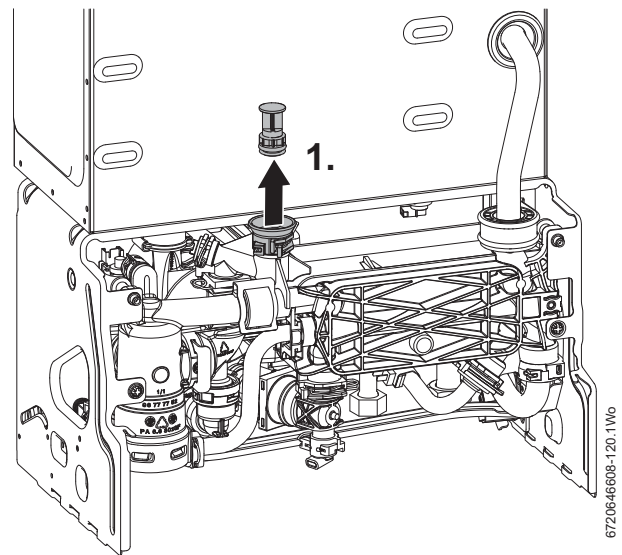


Fig. 33 Removing the blanking plug

Refer to figure 34

1. Ensure that the plastic protection cap is removed from the expansion vessel connection pipe.

2. Remove the pre-plumbing connector:

- Unscrew the PRV outlet pipe from the pre-plumbing connector.
- Remove the two screws (1) holding the pre-plumbing connector in place.
- Remove the temporary PRV pre-plumbing connector, and discard.
- Replace the two screws (1) removed earlier and tighten firmly.
- The boiler is mounted on the wall frame utilising the two mounting points, indicated on figure 34, left and right at the top of the wall frame.

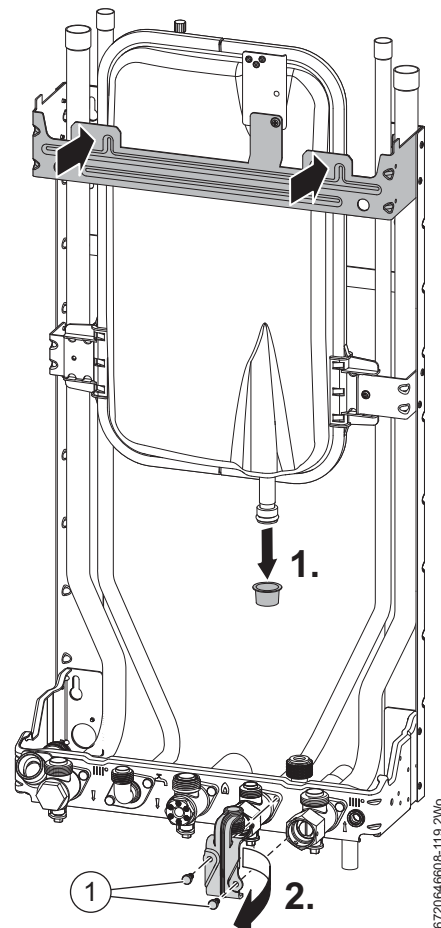


Fig. 34 Mounting points

- ▶ Hang the boiler on to the wall mounting frame utilising the two mounting points positioned left and right at the top rear of the appliance.
The expansion vessel is shown removed for clarity.

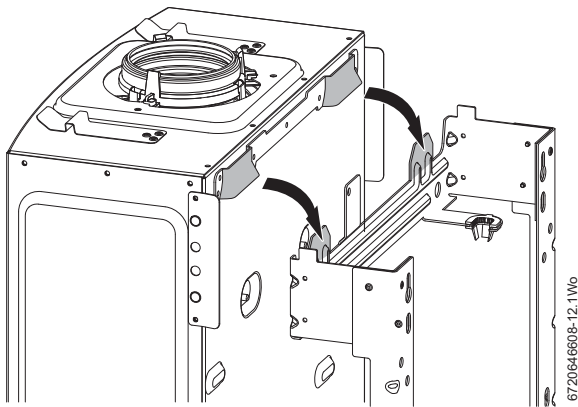


Fig. 35 Hanging the boiler

WARNING: Bonded washer (gas)

- ▶ The bonded washer must be used on the gas pipe isolating valve connection.

- ▶ Connect the PRV discharge pipe on the hydraulic unit onto the PRV outlet pipe work, and tighten firmly.
- ▶ Ensure that the gas and water connections to the isolating valves are made using the fibre washers supplied in the Literature/Hardware pack. Tighten the gas and water connections firmly.

CONNECTING THE EXPANSION VESSEL

To connect the expansion vessel to the hydraulic pump manifold situated to the left of the pump:

1. Release the expansion tank from the retaining bracket, see fig 36.
2. Ensure that the wire retaining clip on the pump manifold is fully withdrawn, but not removed, before inserting the expansion vessel pipe into pump manifold, see fig. 36.
3. Secure in place with the wire retaining clip.

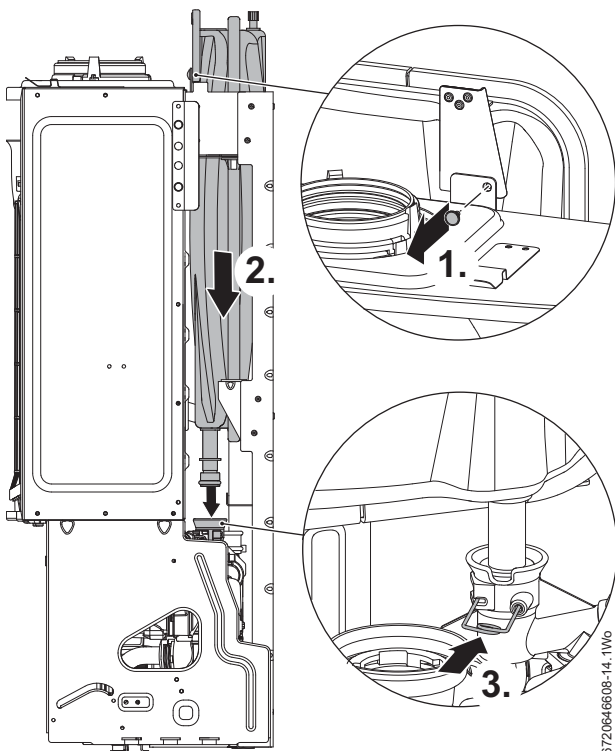


Fig. 36 Expansion vessel connection

CONNECTING THE SIPHON OUTLET

1. Push the black rubber siphon discharge hose, onto the wall frame connector, until fully engaged.

FILLING THE SIPHON

2. Pour 200 to 250 millilitres of clean water through the inner flue opening to fill the siphon before running the boiler.

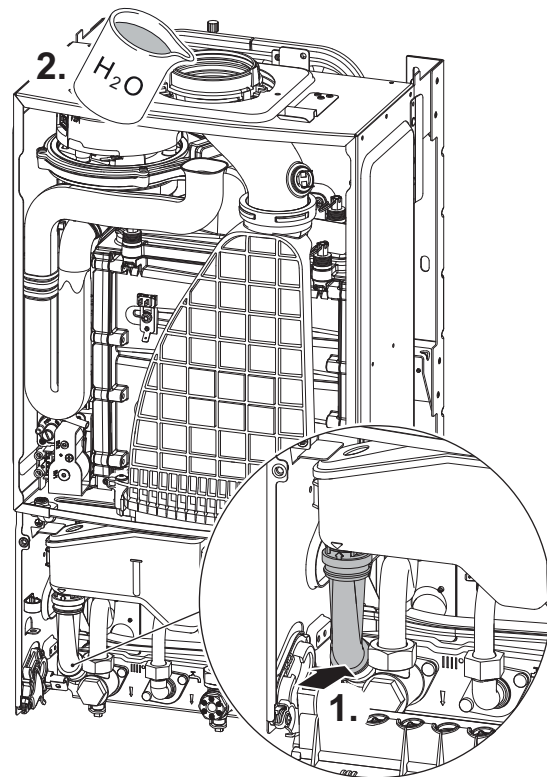


Fig. 37 Siphon fill

4.6 FLUE INSTALLATION

HORIZONTAL FLUE (60/100mm diameter)

For vertical flues and 80/125mm horizontal flues, please refer to separate instructions supplied with the flue kit.



To ease assembly of flue components, apply silicone lubricant to sealing surfaces.

Basic instructions for the 60/100mm diameter flue are shown below.

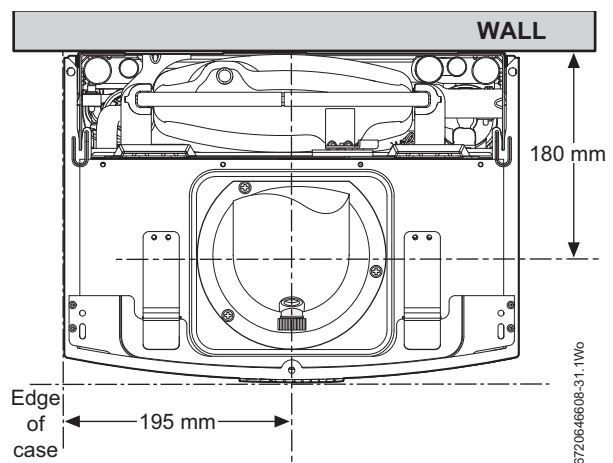


Fig. 38 Flue turret centre

4.6.1 MEASURING THE FLUE (STANDARD FLUE):

- ▶ Measure from the outside of the wall to the centre line of the flue turret to determine length L.
- ▶ Subtract 50mm from the length L to give the correct dimension to the flue elbow connection.
- ▶ If the length L falls within the telescopic range of 350 to 570mm or 570 to 790mm using the longer telescopic flue, then no cutting will be required.
- ▶ If the required length is less than 350mm the standard telescopic flue can be modified, refer to fig. 40.
- ▶ If the required length is greater than 570mm, then the longer telescopic flue, giving a range of 570 - 790mm, can be used
- ▶ If the required length is greater than 790mm, then flue extensions will have to be used. Refer to the 60/100 Horizontal Flue Instruction manual provided in the telescopic flue kit.
- ▶ Refer to section 3.8 for flue options.

Adjusting the telescopic flue length:

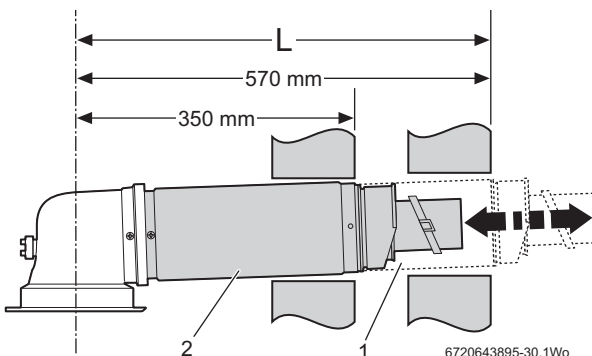


Fig. 39 Standard telescopic flue

Extend tube (1) by withdrawing from tube (2) to achieve the flue length required, between 350 - 570mm or 570 to 790mm if using the longer telescopic flue.

Secure with screw provided and seal joint with the aluminium tape supplied.

4.6.2 REDUCING THE TELESCOPIC FLUE LENGTH



Ensure that the "TOP" label is facing up before securing the flue section to the turret.

The flue terminal MUST be fitted with the 'TOP' label uppermost to allow the correct fit and use of the plume management system.

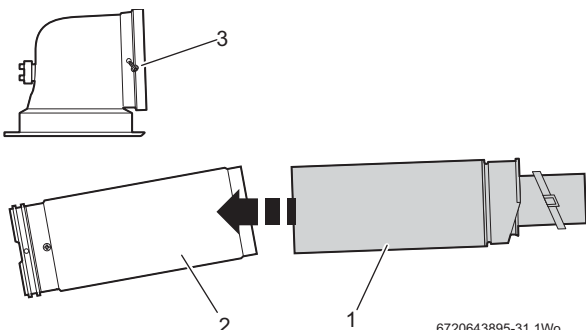


Fig. 40 Reducing the standard terminal

- ▶ Remove securing screws (3) to detach the terminal assembly from the turret.
- ▶ Slide terminal section (2) from the terminal assembly and discard.
- ▶ To use terminal (1) without cutting remove the location lug (4) on the inner flue tube (5) and remove any burrs.
- ▶ Push the terminal fully home into the turret and secure the terminal end with the screws (3).

To reduce the flue length further:

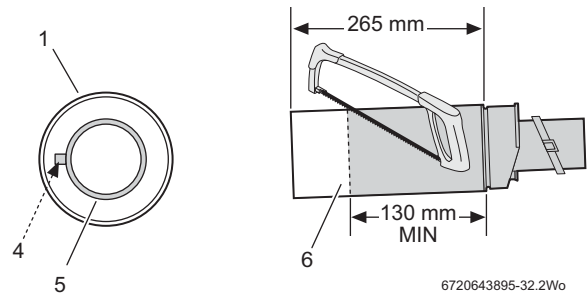


Fig. 41 Further reduction

- ▶ Mark the length required for the terminal as shown (min. 130mm) and cut square, taking care not to damage the tubes.
- ▶ Remove any burrs and chamfer the edges of the tubes to assist ease of connection and prevent seal damage.
- ▶ Push the terminal fully home into the turret and secure the terminal end with the screws (3), ensure that the "TOP" label is facing up.



The aluminium tape is not required when reducing the terminal.

4.6.3 INSTALLING THE TELESCOPIC FLUE:

Refer to figure 42.

1. Set the flue length to the distance required, secure with screws provided.
2. Seal the joint with the aluminium tape provided.
3. Slide the inner wall seal onto the terminal.
4. If fitting from inside the building; slide the outer wall seal onto the terminal.

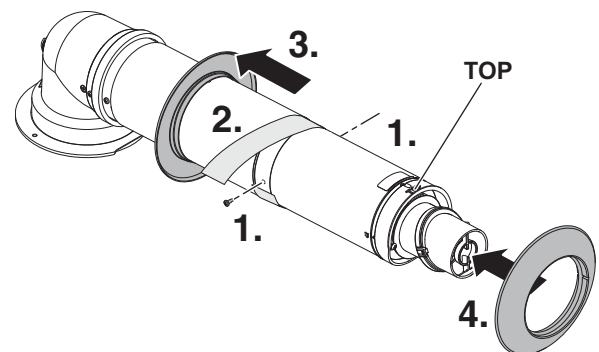


Fig. 42 Telescopic flue



The turret securing screws are from the boiler and are not in flue kit.

Refer to figures 43 & 44.

1. Remove the three inner flue tube retaining screws (2). The inner tube will be held in place in the appliance.
2. Check the boiler flue seal is correctly seated and apply silicone grease.
3. Position terminal through the flue opening in the wall to the outside of the building by the distance shown.
- or -
If the outer seal is already fitted, push the terminal through the hole until the outer seal is outside and then pull the terminal back to the wall to seal.
4. Align the flue turret to the boiler flue outlet with flat facing (1) to the rear of the boiler.
The flue turret should be pushed straight down, on to the boiler.

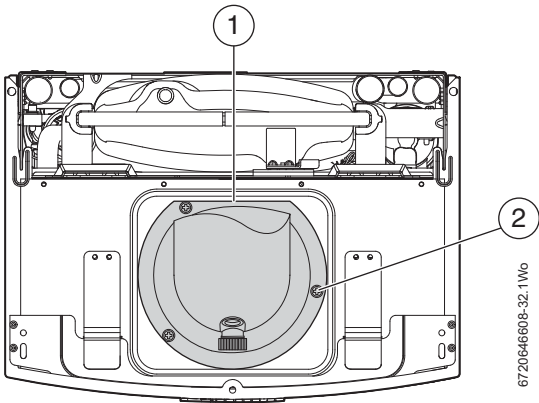


Fig. 43 Aligning the turret

- ▶ Fit the screws removed in step 1 to secure flue turret.
- ▶ If fitting the outer seal from outside the building, slide the outer wall seal onto the terminal as shown.
- ▶ "Make good" the gap between the flue and inner wall and if possible on the outer wall.

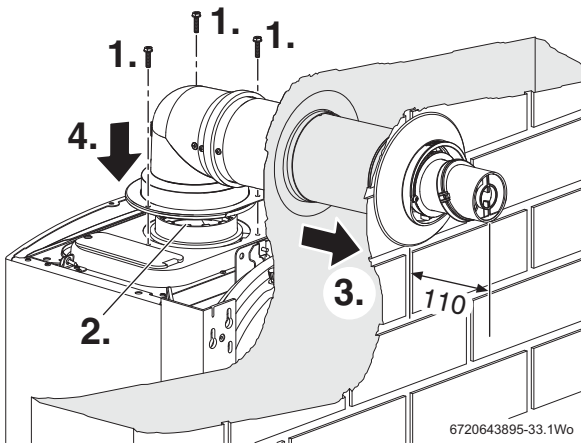


Fig. 44 Telescopic flue installation



For more information refer to the 60/100 Horizontal Flue kit Instruction Manual

ADDITIONAL NOTES AND REMINDERS:

- Ensure that all cut lengths are square and free from burrs.
- The flue is sealed when assembled correctly and the components are pushed fully home and secured by the screws provided.
- The flue is set at an angle of 3° or 52mm per metre length.

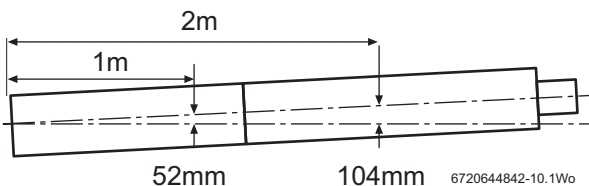


Fig. 45 Slope for condensate disposal

4.6.4 FLUE TERMINAL PLUME RE-DIRECTION:

The flue discharge can be re-directed allowing some plume redirection control, alternatively, a complete plume management system can be fitted to the flue terminal.

RE-DIRECTING THE FLUE DISCHARGE

1. Unclip (1 & 2) the terminal end and rotate through 180°.

NOTICE: DO NOT rotate the complete terminal assembly.

2. Refit to the terminal, ensuring that the clips (1 & 2) are engaged and secure.
3. Loosen screws (3) and rotate the entire outlet assembly to redirect the plume. Tighten screws (3) to secure in the required position.



The flue terminal outlet has built-in stops to limit rotation for horizontal flues to allow condensate to run back into the boiler for safe disposal. Do not attempt to force beyond the limit stops.

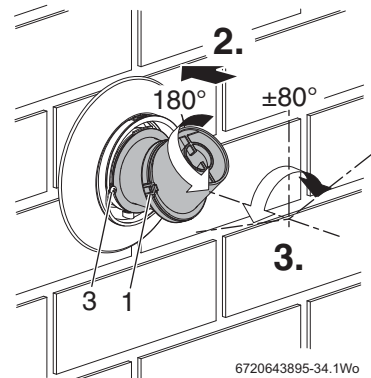
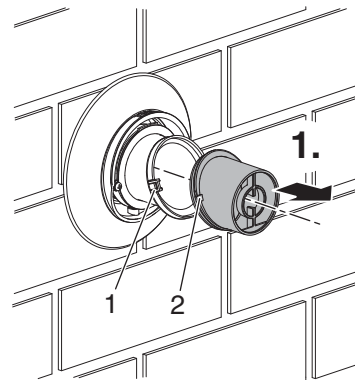


Fig. 46 Plume redirection

NOTICE: Outlet position

- ▶ The flue terminal outlet position must follow those stated in the relevant appliance instruction manual. When redirecting the flue discharge the outlet terminal must be at least 1500mm from any opening in the direction of the discharge to prevent combustion products from entering the building.

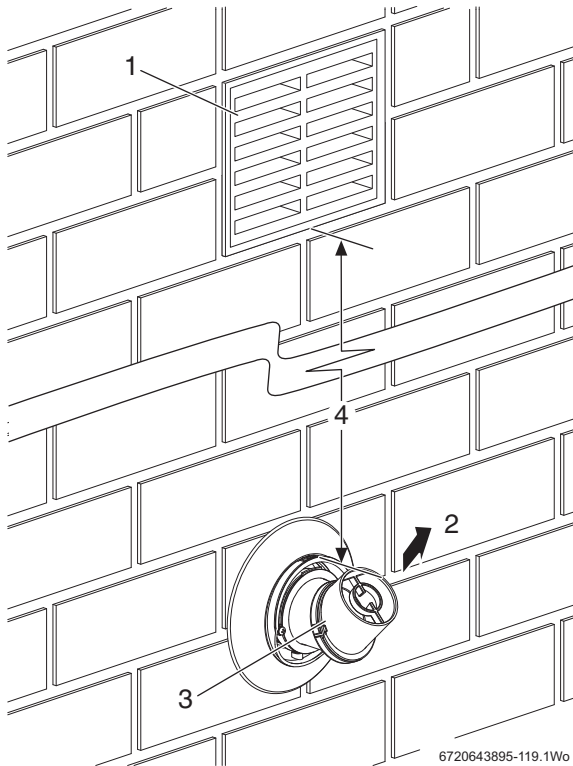


Fig. 47 Plume distance to opening

| | |
|---|--|
| 1 | Opening in building |
| 2 | Flue discharge |
| 3 | Plume deflector |
| 4 | Minimum 1500mm from an opening in the building |

Table 10 Key to figure 47

4.7 ELECTRICAL

CAUTION: Isolate the mains electrical supply before starting any work and observe all relevant safety precautions.

The boiler is pre-fitted with a mains supply cable. Route the cable through the right hand side of the wall mounting frame.

- The mains electrical supply to the boiler must be through either a fused double pole isolator or a fused three pin plug and unswitched socket situated, where practicable, adjacent to the boiler.
- The isolator must have a contact separation of 3mm minimum in both poles.
- Any additional equipment connected to the boiler must not have a separate electrical supply.
- External fuse rating 3A.

ACCESS TO ELECTRICAL CONNECTIONS:

► Access to all wiring connections are via the Installer access cover at the bottom front of the control panel. No access is required to other parts of the control board.

1. Refer to figure 48 and release the three captive screws securing the Installer access cover.
2. Remove the Installer access cover.

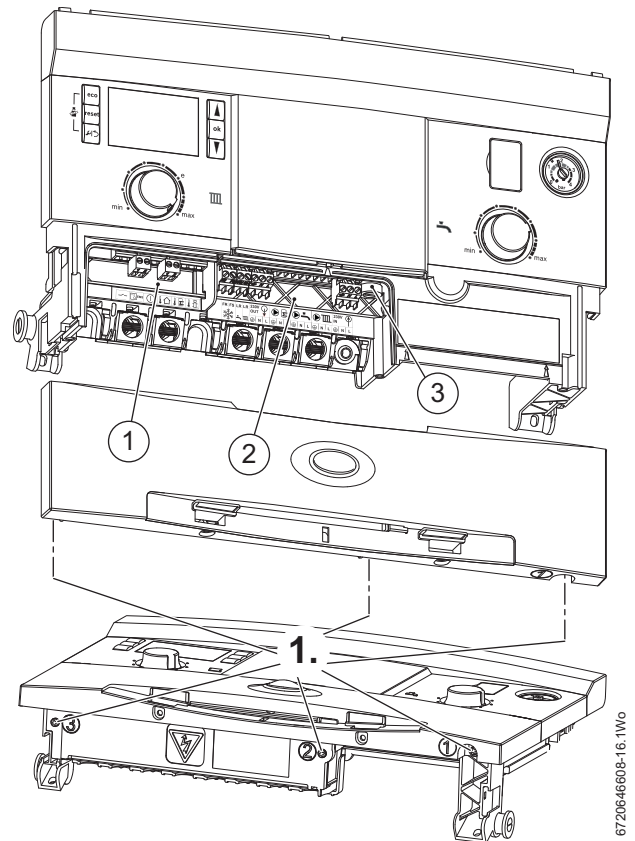


Fig. 48 Removing the installer access cover

| | |
|---|---------------------------|
| 1 | Low voltage connections |
| 2 | Mains voltage connections |
| 3 | Fuse carrier - 5A |

Low voltage connections

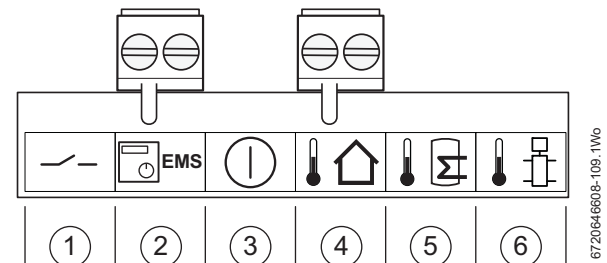


Fig. 49 Low voltage connectors

| Low voltage terminal strip | |
|----------------------------|--|
| 1 | Low voltage room thermostat input (NOT USED) |
| 2 | EMS bus connections |
| 3 | External cut off switch (NOT USED) |
| 4 | Outdoor compensation sensor |
| 5 | Cylinder sensor (NOT USED on Combi) |
| 6 | Low Loss Header sensor (NOT USED) |

Table 11 Key to figure 49

Mains voltage connections

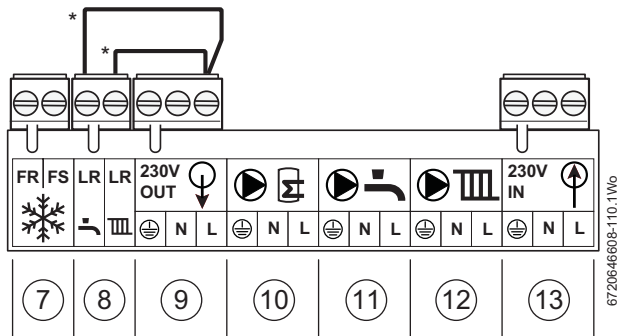


Fig. 50 Mains voltage connectors

| Mains voltage terminal strip | |
|------------------------------|--|
| 7 | External frost thermostat |
| 8 | 230 V A.C. switched live inputs |
| 9 | 230 V A.C. mains output to wiring centre |
| 10 | DHW charge pump (NOT USED on Combi) |
| 11 | DHW circulation pump (NOT USED on Combi) |
| 12 | CH circulation pump (NOT USED on Combi) |
| 13 | Boiler 230 V A.C. mains supply |
| * | Pre-wired links |

Table 12 Key to figure 50

NOTICE: DHW LR switched live

- ▶ This input provides connection for a proprietary twin channel control to time the preheat function on the DHW. All Worcester twin channel digital controls provide this functionality.

4.7.1 MOUNTING OPTIONAL PLUG-IN CONTROLS

CAUTION: Isolate the mains electrical supply before starting any work and observe all relevant safety precautions.

Refer to the Programmer/Timer manual for set up and operation of the unit.

REMOVING THE BLANKING PLATE

The control panel must be released and swung forward slightly to gain access to the top cover panel, refer to section 6.3 for access to the control panel.

1. Release the captive screws securing the top cover panel.
2. Remove the cover panel to enable the blanking plate to be removed.
3. Release the three captive screws enough to allow the Installer access cover to be lowered by 10mm.
4. Lower the Installer access cover to allow the blanking panel to be removed.
5. Use the tab (1) to lift and also press up on the bottom edge of the blanking plate to release the clips from the slots in the control panel.
6. Pull the blanking plate forward to remove.

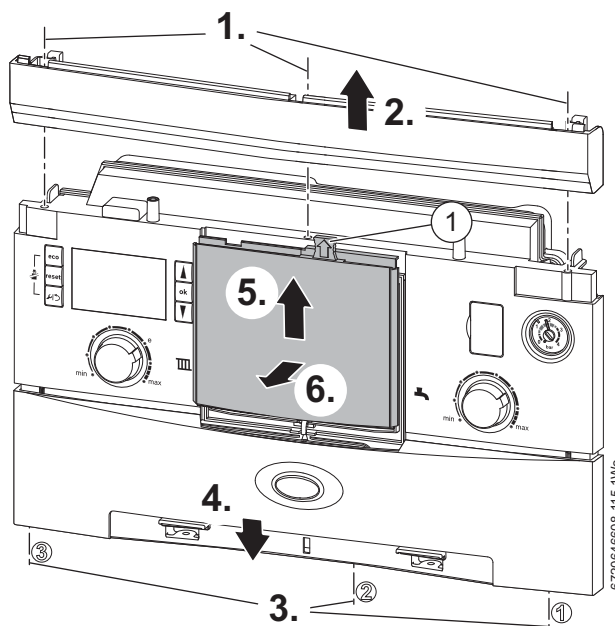


Fig. 51 Removing the blanking plate

FITTING THE PROGRAMMER/TIMER

i When fitting EMS intelligent programmers, step 1 can be ignored.

1. Connect the ribbon cable to the socket (2) in the control panel, ensuring that the cable will fit into the recess (3) in the control panel.
2. Align the clips on the back of the Programmer/Timer with the slots in the control panel.

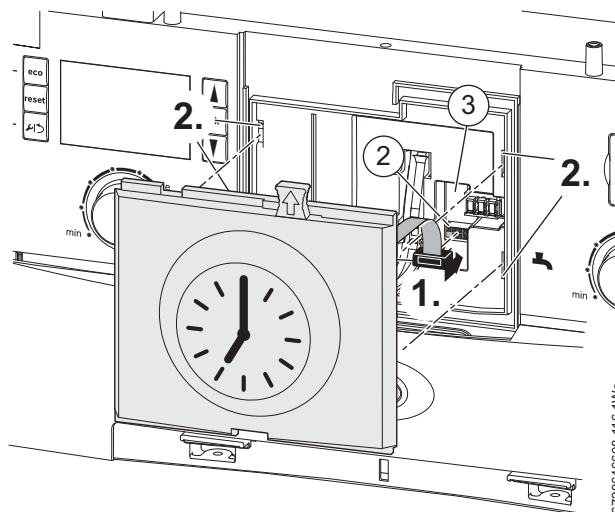


Fig. 52 Connecting the Programmer/Timer

3. Push the Programmer/Timer in to engage with the slots in the control panel.
 4. Pull the Programmer/Timer down to secure with the clips.
 5. Slide the Installer access cover up into position.
 6. Secure with the three captive screws.
 7. Replace the top cover panel.
 8. Secure in position with the captive screws.
- ▶ Re-secure the control panel.

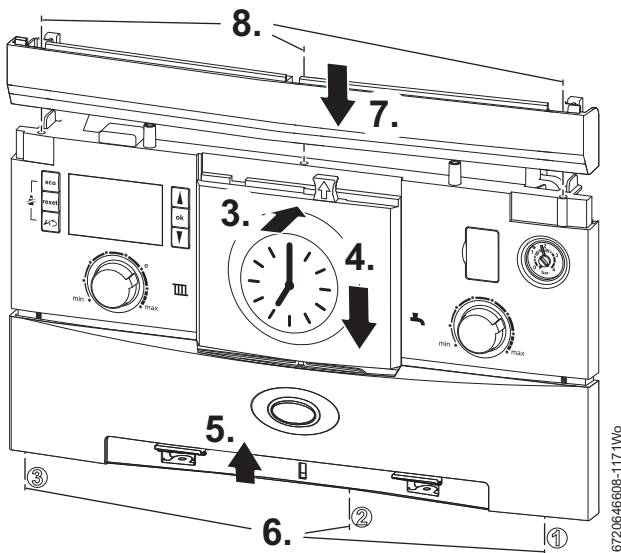


Fig. 53 Fitting the Programmer/Timer

| Part number | Description |
|---------------|---|
| 7 716 192 036 | MT10 mechanical timer |
| 7 716 192 037 | MT10RF mechanical thermostat |
| 7 716 192 038 | DT20 twin channel digital timer |
| 7 716 192 054 | DT20RF digital RF thermostat with twin channel programmer |
| 7 716 192 052 | DT10RF digistat |
| 7 716 192 053 | DT10RF optimiser |
| 7 716 192 065 | FR10 intelligent room thermostat |
| 7 716 192 066 | FR10 programmable room thermostat |
| 7 716 192 067 | FW100 weather compensation controller |

Table 13 Controls accessories

4.7.2 NEW COMPLETE SYSTEM INSTALLATIONS

If a new complete heating system installation is in a new build property or is a first time installation in an existing property, heating systems must conform to current building regulations Part L1a.

All new heating systems in dwellings must have at least two heating zones. Each of these zones will be controlled by a thermostat and zone valve.

An alternative would be individual electronically controlled TRVs. Hot water supplied from a storage system would require separate time and temperature control.

If the dwelling is over 150m², then a separate time and temperature control for each zone is required.

All radiators must have TRVs fitted in all rooms except bathrooms and rooms with room thermostats.

The exception to this are single storey, open plan dwellings where the living area is more than 70% of the total useable floor area. Then this type of dwelling can be controlled as one zone.

Figures 54 and 55 give some suggestions regarding zoning the system for a small dwelling, less than 150m², using either a third party programmer or a Worcester programmer.

THIRD PARTY EXTERNAL TIMER AND TWO ZONES

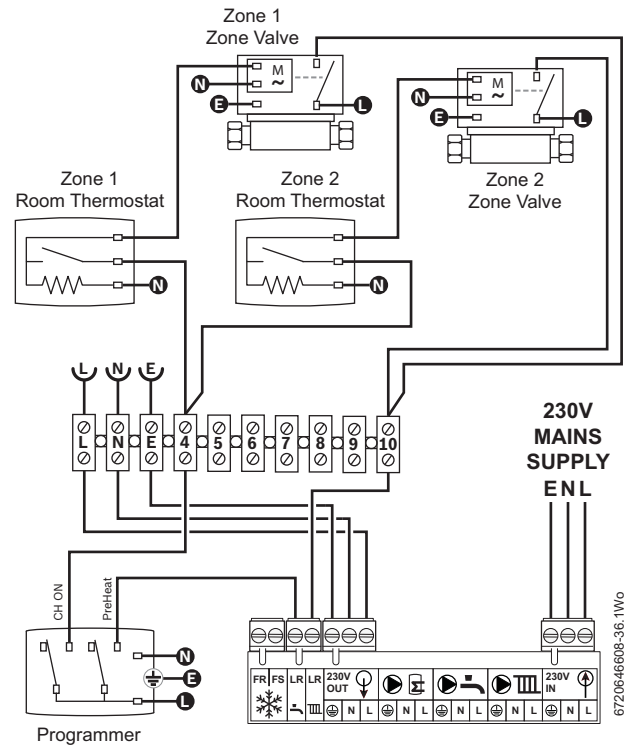


Fig. 54 Two room thermostats, one external timer

INTEGRATED TIMER AND TWO ZONES

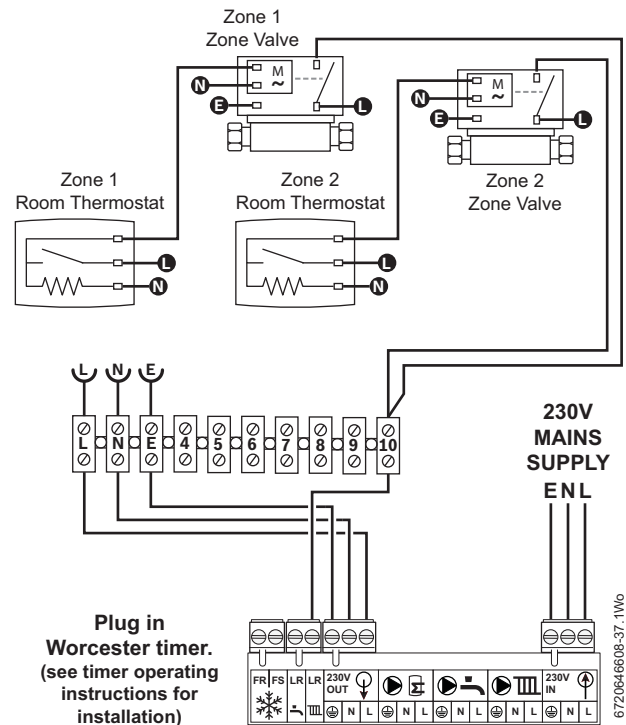


Fig. 55 Two room thermostats, one integrated timer

4.7.3 EXISTING INSTALLATIONS

For boiler replacements on an existing system, it is not necessary to zone the upstairs and downstairs separately, compliance with the zone requirements can be achieved by a single room thermostat or programmable room thermostat.

While the system is drained down, TRVs must be fitted to all rooms except the bathrooms and the room with the room thermostat.

The following figures show the options of room thermostat with programmer, room thermostat only or programmable room thermostat.



The programmable room thermostat may be a hard wired or RF type.
This diagram is applicable for a hard wired unit or the receiver section of the RF pack.

EXTERNAL 230V PROGRAMMER AND ROOM THERMOSTAT

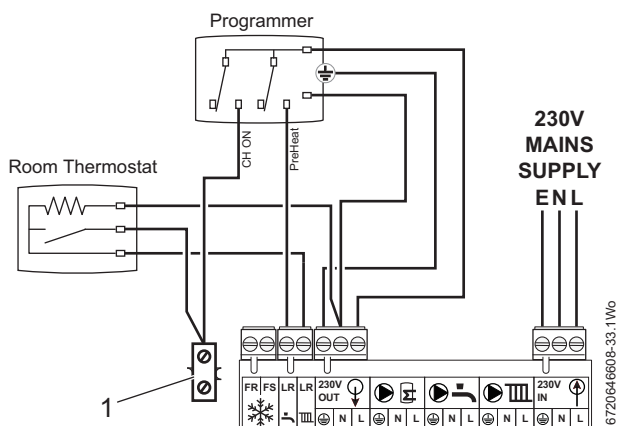


Fig. 56 Room thermostat with programmer

1 Series connector, not supplied. Connector to be made safe.

ROOM THERMOSTAT ONLY

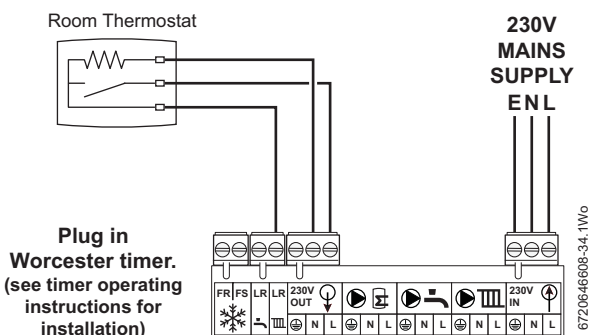


Fig. 57 Room thermostat with plug in timer

PROGRAMMABLE THERMOSTAT

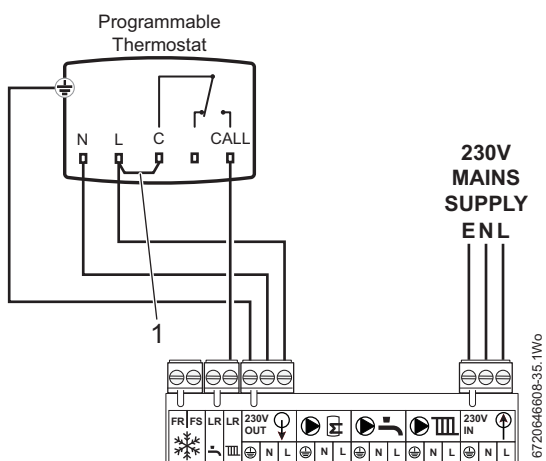


Fig. 58 Programmable thermostat

1 The link between the Live (L) and Common (C) may already be fitted as part of the Programmable thermostat, if not then a link must be wired in.

- ▶ Remove the link between L_R (CH) and L at the 230V OUT terminal block connection.
- ▶ Connect external controls LIVE supply to terminal L at the 230V OUT terminal block connection.
- ▶ Connect external controls LIVE return to terminal L_R (CH)



Live Return (L_R) is sometimes referred to as 'Call for Heat' or 'Switched Live'.

- ▶ Connect external controls NEUTRAL to terminal N at the 230V OUT terminal block connection.



Some devices do not require connection of a neutral i.e. battery powered devices.

OPTIONAL EXTERNAL FROST STAT CONNECTION FOR PROTECTION OF SYSTEM PIPEWORK IN UNHEATED AIR SPACE

- ▶ Connect frost thermostat cables to terminals F_S & F_R.
- ▶ These connections are not polarity sensitive.
- ▶ The external frost thermostat only operates the pump.

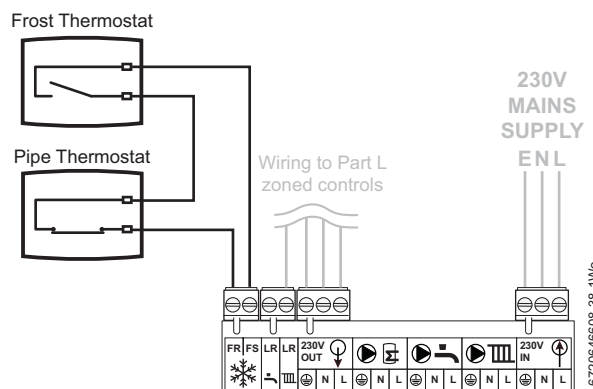


Fig. 59 Frost Thermostat

5 COMMISSIONING

5.1 PRE-COMMISSIONING CHECKS




CAUTION: ISOLATE THE MAINS ELECTRICITY SUPPLY BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

Check that the service and water pipes are connected to the correct positions on the manifold.

Ensure that the washers have been fitted to the water connections and the bonded washer to the gas connection on the manifold, refer to Fig. 32.

1. - CH Flow (22mm)
2. - DHW (15mm)
3. - Gas inlet - bonded washer (22mm)
4. - Domestic cold mains water in (15mm)
5. - CH Return (22mm)


- ▶ Check the gas type specified on the data label, on the right hand side of the combustion chamber, matches that of the gas supply.
- ▶ Turn on the main gas supply, carry out a tightness test on the gas pipe work with the boiler gas pipe isolating valve open, and connections. Rectify any leaks.
- ▶ Check that the condensate pipe has been connected and correctly fitted to the siphon.
- ▶ Check pressure relief drain pipe is correctly fitted and securely tightened.

 **NOTICE:** If the boiler is not to be commissioned immediately then, after successfully completing all of the checks and any rectification work:


- ▶ Close the gas valve
- ▶ Close the water shut off valve
- ▶ Isolate the gas supply
- ▶ Isolate the electricity supply
- ▶ Label appropriately

5.2 FILLING THE SYSTEM

1. Turn on the water main and open the system valves.
2. Open all radiator valves.
3. Fill the system via a WRAS approved filling loop or the optional Worcester Integral Filling Link accessory to 1 bar then close the filling loop valve(s).
4. The Automatic Air Vent will release any air trapped in the boiler.
5. Manually vent all radiators, tighten when completed and check the system and correct any leaks.
 - ▶ The boiler integral expansion vessel is pre-charged to 0.75 bar (equal to a static head of 7.5m (24.6ft)). A Schraeder type valve is fitted to the expansion vessel to allow for pressure adjustment if required.
 - ▶ If an extra expansion vessel is fitted to the central heating return, adjust this to the same pressure as the appliance internal expansion vessel, refer to separate instructions with the extra expansion vessel.
6. If required increase system pressure back to 1 bar.
7. Isolate and remove filling loop connection to system or if using the optional integral filling connection (not supplied with the boiler) remove the key and place in its storage position on the bottom cover of the boiler.

 If the Worcester “Keyless” filling link is fitted, the link does not have to be removed.

5.3 WATER TREATMENT

 **NOTICE:**


- ▶ Artificially softened water must not be used to fill the central heating system.

ENSURE THAT THE SYSTEM HAS BEEN CLEANED. REFER TO SECTION 3.1 OF THESE INSTRUCTIONS.

FLUSHING (Central Heating):

- ▶ Ensure the boiler is switched off.

5.4 STARTING THE APPLIANCE


 **CAUTION: RUNNING THE APPLIANCE**

- ▶ Never run the appliance when the appliance/system is empty or partially filled.


- ▶ Open all drain cocks and drain the system while the boiler is hot.
- ▶ Close drain cocks and add a suitable flushing agent at the correct strength for the system condition in accordance with the manufacturer’s instructions.
- ▶ Run the boiler/system at normal operating temperature for the time stated by the manufacturer of the flushing agent.
- ▶ Drain and thoroughly flush the system to remove the flushing agent and debris.

INHIBITOR (Central Heating):

- ▶ Check drain cocks are closed and all radiator valves are open before adding a suitable inhibitor compatible with aluminium (or combined inhibitor/anti-freeze if the system is exposed to freezing conditions) to the heating system water in accordance with the manufacturers instructions.

 The pH value of the system water must be less than 8 or the appliance guarantee will be invalidated.

- ▶ Fill system via a WRAS approved filling loop to between 1 and 1.5 bar.
- ▶ Vent all radiators; tighten vents when complete.
- ▶ Re-pressurise if necessary to 1bar.
- ▶ Set all controls to maximum.
- ▶ Record the date when the inhibitor was added to the system on the guarantee card and Benchmark checklist.

 **NOTICE:**

- ▶ The concentration of inhibitor in the system should be checked every 12 months or sooner if system content is lost.
- ▶ The addition of sealing agents to the system water is not recommended as this can cause problems with deposits left in the heat exchanger.
- ▶ In cases where all attempts to find a micro leak have failed, Worcester, Bosch Group supports the use of Fernox F4 leak sealer.

WATER TREATMENT

Suitable water treatment products can be obtained from the following manufacturers:

| | |
|----------|---|
| FERNOX | 01799 550811 or www.fernox.com |
| SENTINEL | 0800 389 4670 or www.sentinel-solutions.net |

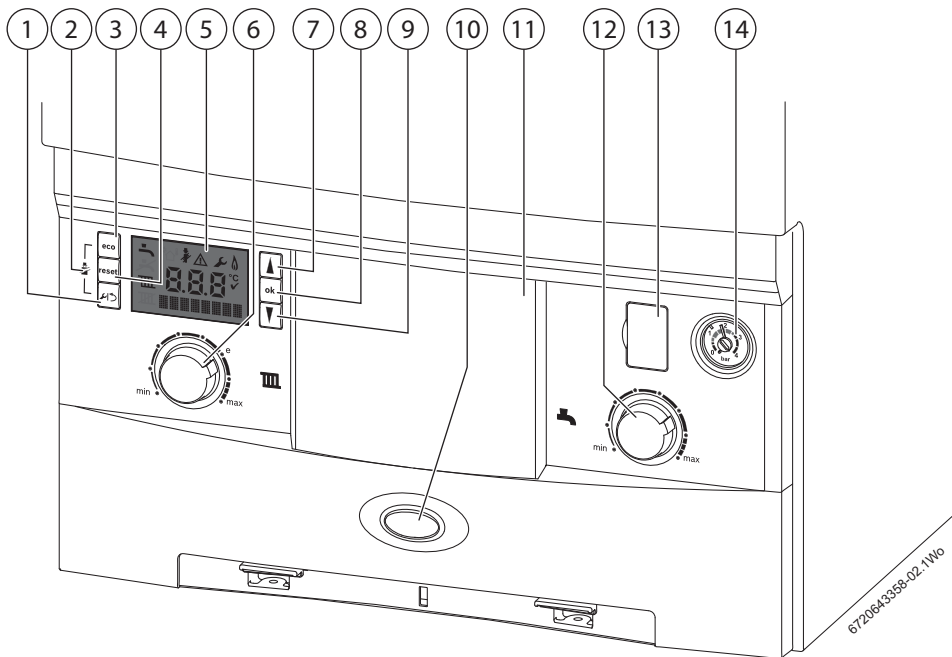


Fig. 60 Control panel

| Key to figure 60 | |
|------------------|--------------------------------------|
| 1 | Spanner/return button |
| 2 | Service engineer symbol |
| 3 | Eco button |
| 4 | Reset button |
| 5 | Boiler display |
| 6 | Central heating temperature control |
| 7 | Scroll up button |
| 8 | OK - Select/confirmation button |
| 9 | Scroll down button |
| 10 | Operation and fault indicator (blue) |
| 11 | Position for optional programmer |
| 12 | Hot water temperature control |
| 13 | Diagnostic port |
| 14 | System pressure gauge |

Switching the appliance on/off:

- ▶ Turn on the mains power supply, initially the “Boiler start up screens” will be displayed (refer to figure 61).
- ▶ Turn on any external controls
- ▶ Set the thermostatic radiator controls to maximum temperature
- ▶ Set the clock/programmer to continuously ON and the room thermostat to maximum temperature

The blue Operation and fault indicator light will be illuminated when there is a demand for heat or hot water.

Turn the boiler CH temperature control (6) to maximum.

The “burner on” flame symbol will be shown on the boiler display after a successful ignition sequence.

If the boiler fails to light, a flashing fault code will be displayed.

NOTICE: RESET

▶ Do not press the blue operation/fault diagnostic indicator (10) to reset the boiler.

To reset the boiler, press the reset button (4), the tick symbol will be displayed briefly for a successful reset.

5.4.1 BOILER START UP SCREENS

On initial start up, the following screens are displayed:

1. All the symbols are displayed for approximately two seconds.
2. The control will run an internal test for approximately 30 seconds.
3. When the internal test has been successfully performed, this screen is displayed:
 - The boiler is in stand-by.
 - The flow temperature sensor indicates the primary temperature from the heat exchanger (not the target set point).

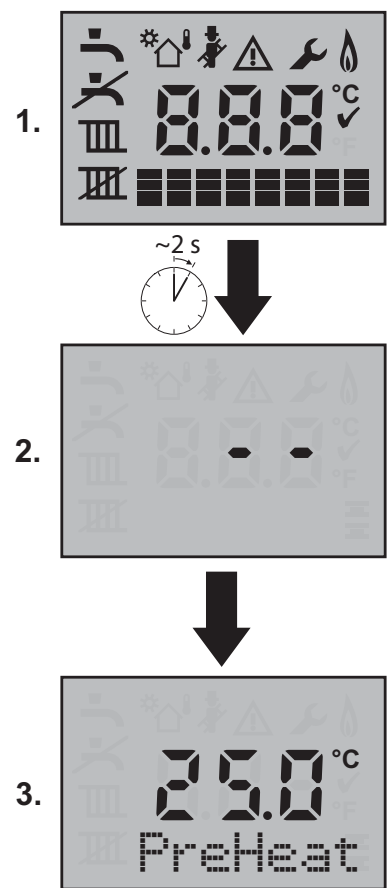


Fig. 61 Boiler start up screen

- ▶ If no adjustments are made for 30 seconds the back light is turned off.

- ▶ As soon as an adjustment is made, the screen will light up and the relevant information will be displayed.

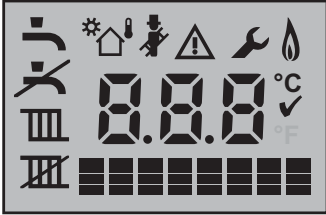











| SCREEN DISPLAY | DESCRIPTION |
|--|--|
| All possible screen symbols  | This screen is displayed briefly during boiler start up and shows all the symbols that could be displayed. |
| Alpha/Numerical display  | Displays a temperature or boiler status code. |
| Text display  | Displays PreHeat or Eco, or diagnostic code |
| Hot water  | Displays this symbol during a DHW demand. |
| Central Heating  | Displays this symbol during a CH demand. |
| Chimney sweep mode  | Displays during service when the boiler is set to maximum or minimum output. |
| Alert  | Displays with the boiler status code and diagnostic code during a fault condition. |
| Service mode  | Displays when a qualified service engineer is in the service menus. |
| Burner on  | The boiler is in operation and the flame is alight. |
| Centigrade  | Displays next to the temperature reading. |
| Confirmation  | This symbol confirms a manual change. |

Table 14 Symbol description

STATUS CODES


Refer to section 7.5 for Status codes and Service menus.


These are not faults, but provide information concerning the current status of the boiler.

During normal boiler operation various Status codes can be displayed by pressing the  button.

The first screen of the Information menu displays the current Status code, this will change as the boiler runs through the various modes and sequences.

5.5 COMMISSIONING

 **NOTICE:** The combustion settings on this gas-fired boiler have been checked, adjusted and preset at the factory for operation on the gas type defined on the data plate. No measurement of the combustion values is necessary provided there is a meter installed allowing the gas rate to be checked. **DO NOT ADJUST THE AIR/GAS RATIO VALVE.**

 When running in the service mode, the boiler will operate both the central heating and the domestic hot water circuits. This is to allow sufficient time for this part of the commissioning procedure. It will be necessary to run water through the domestic hot water circuit to ensure that the boiler will not cycle on low heating demands.

Having checked:

- ▶ That the boiler has been installed in accordance with the installation instructions.
- ▶ The integrity of the flue system and flue seals.

5.5.1 CHECKING THE GAS INLET PRESSURE

The inlet pressure to the appliance must be checked using the following procedure:

MEASURING THE INLET PRESSURE

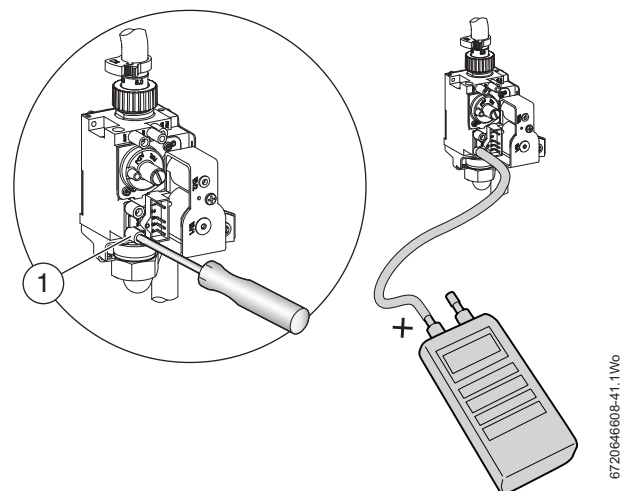




Fig. 62 Inlet pressure test point

- ▶ Close gas isolation valve.
- ▶ At the inlet test point (1), slacken the screw for a maximum of half a turn and connect a manometer. It is important to use a screwdriver of the correct size, too small a blade will damage the screw.
- ▶ Open the gas isolation valve.
- ▶ Measure the pressure with the boiler running at maximum.
 - Press the  and  button for at least five seconds and the boiler will ramp up to maximum output in approximately 30 to 35 seconds.
 - The display will show the chimney sweep symbol and the word MAX will flash.

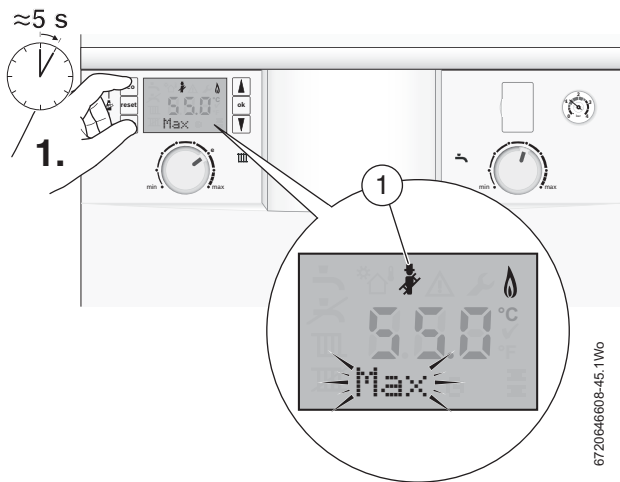


Fig. 63 Setting boiler to maximum

- ▶ Check the gas supply working pressure at the gas valve conforms to values shown in Fig. 64 or Fig. 65 .
- ▶ Press the **ok** button to return to normal operation.
- ▶ The boiler will run for 15 minutes in service mode and return to normal if no other inputs are made.



Ensure that the inlet pressure is satisfactory with all other gas appliances working.

After the tests are completed:

- ▶ Disconnect the manometer.
- ▶ Retighten, but do not overtighten the inlet pressure test point screw.

GAS PRESSURE WITHIN THE SYSTEM

Refer to the figures below for natural gas or L.P.G gas pressures.

The working pressure at the boiler must not be less than the working pressure read at the meter minus 1mbar for natural gas or minus 2.5mbar for L.P.G.

The pressure drop from the meter to the gas valve must not be more than 2.5mbar for natural gas or 4mbar for L.P.G.

If the pressure drop is greater than shown below, then this would indicate a problem with the supply pipe work which must be rectified.

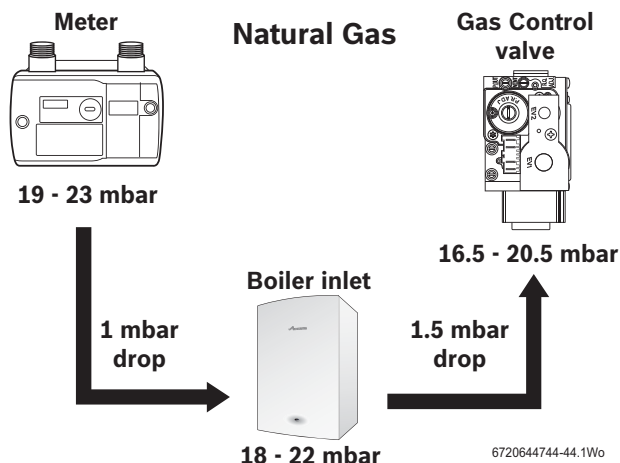


Fig. 64 Natural gas pressures

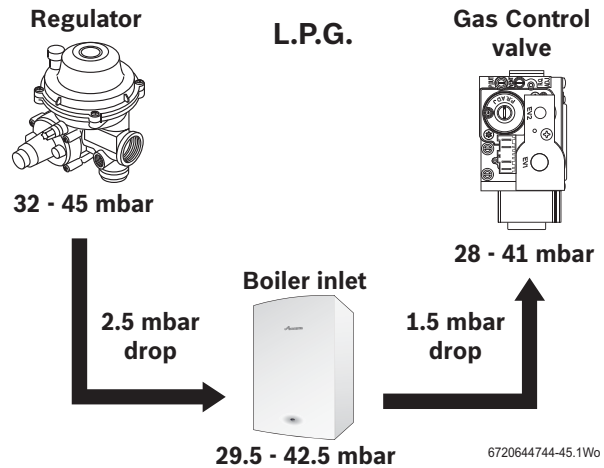


Fig. 65 L.P.G. pressures

NOTICE:
Do not continue commissioning until the correct gas pressure is achieved.

5.5.2 CHECKING THE GAS RATE

- ▶ The gas rate should be measured at the gas meter after the boiler has been operating for a minimum of 10 minutes at maximum output.
- ▶ See Technical data section on page 8 of this manual for gas rates and CO/CO₂ ratios.
- ▶ Where a gas meter is not available (e.g. L.P.G.) the CO/CO₂ must be checked.

5.5.3 GAS RATING TEST

- ▶ Ensure all other gas appliances are isolated.

1. Set the boiler to maximum output by pressing **eco** and the **set** button together for at least 5 seconds.

The chimney sweep symbol (1) will be displayed at the top of the screen and the word "Max" will flash at the bottom of the screen. The boiler will ramp up to maximum output in 30 to 35 seconds.

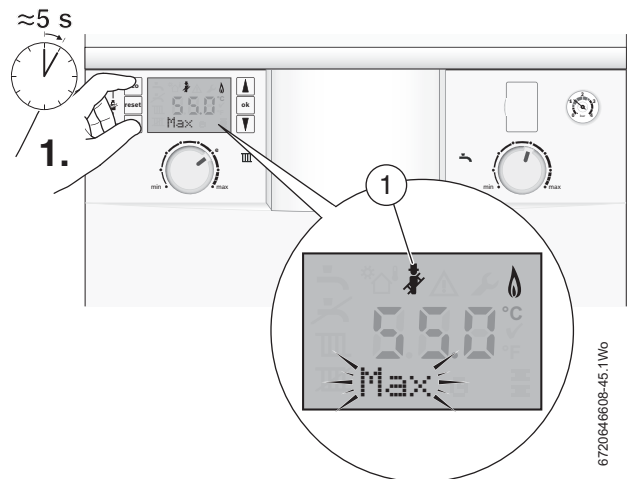


Fig. 66 Setting boiler to maximum

- ▶ Ensure that the boiler has stabilised at maximum output.
- ▶ Carry out Gas rating procedures as described in "Essential Gas Safety" third edition.
- ▶ If pressure and gas rate are satisfactory press the **ok** button and the boiler will return to normal operation.
 - If left in the service mode the control will return to normal operation after 15 minutes.

5.5.4 CHECKING FOR LEAKS DURING OPERATION

- ▶ Use an approved leak detector to check all connections for possible leaks. The product must be certified as a gas leak testing agent.

- ▶ Do not allow the product to come into contact with the electrical wiring.

5.6 DOMESTIC HOT WATER

Controlling the hot water temperature:

The hot water temperature can be set to between approximately 40°C and 60°C using the DHW temperature control.

DOMESTIC HOT WATER PRE-HEAT:

Pre-heat reduces the time taken to produce hot water at the tap and is controlled by the ECO button.

- ▶ Press the ECO button to select either state:
 - When Pre-Heat is displayed, the boiler will be in pre-heat mode (which will reduce the time taken to produce hot water at the tap).
 - When ECO is displayed the boiler will be in Economy mode and Pre-Heat will be off.

5.7 FINISHING COMMISSIONING

5.7.1 REPLACING THE BOILER CASE:

1. Replace the boiler case.
2. Make sure that the securing points on top of the case are properly located.
3. Tighten the bottom two screws (2).

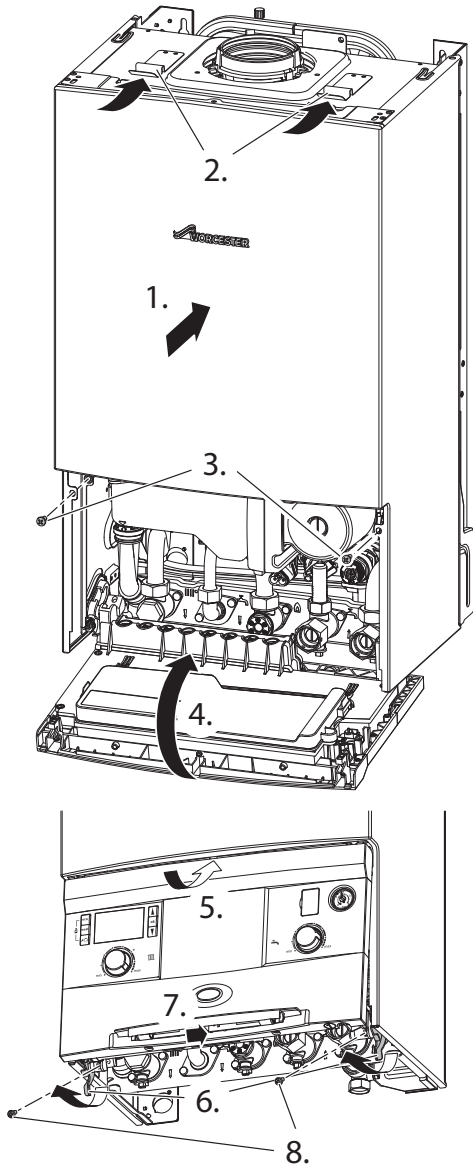


Fig. 67 Fitting case

5.7.2 SECURING THE CONTROL PANEL

4. Raise the control panel.
5. Push the control panel up to engage the top edge under the case.
6. Lift the catches with your fingers.
7. Press the bottom of the control panel back to engage with the catches.
8. Secure the catch retaining screws underneath the boiler.

5.7.3 FITTING THE FASCIA FLAP

1. Rotate the hinge to be in-line with the flap and present the flap assembly up to the fascia.
2. Push the pegs on the hinge into the three slots in the front of the fascia and close the flap.
3. Secure the flap to the fascia with the two screws provided.

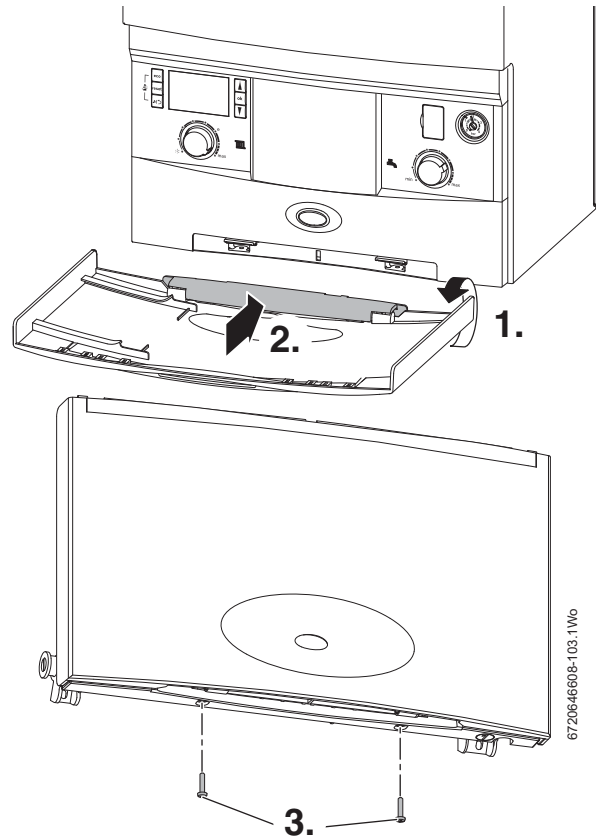


Fig. 68 Installing the fascia flap

5.7.4 INSTALLING BOTTOM PANEL

1. The bottom panel slides onto two ledges either side of the boiler frame.
2. Hold the panel up against the underside of the boiler. Please note the second plastic tab should be offered up to the boiler guides and not the rear tabs. Slide towards the rear, until there is no more movement.
3. Slide the panel forward until it is fully engaged.

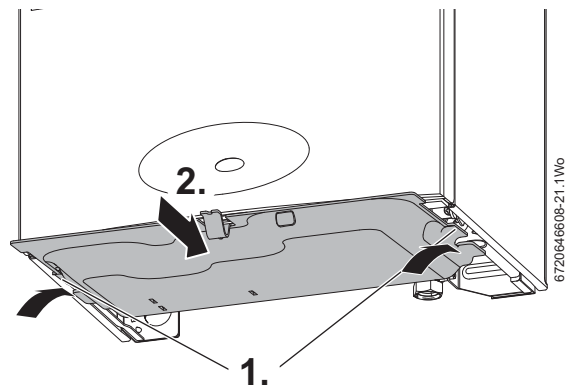


Fig. 69 Bottom panel installation

5.7.5 HAND OVER

- ▶ Complete the Benchmark Gas Boiler Commissioning Checklist at the back of this manual.
- ▶ Open the fascia flap by hinging the flap downwards using the curved hand hold in the centre of the flap.
- ▶ Set up the controls and show the customer how to operate all the controls shown in the User Guide plus any external controls.
- ▶ Instruct the customer on:
 - the need to repressurise the boiler occasionally and the pressure expected at the pressure gauge.
 - where to find and store the filling loop key.
 - location of the filling loop and system pressure gauge.
 - the use of the filling loop and how to repressurise the system.
 - how to use the TRVs.
 - how to reset the boiler.
- ▶ Show the customer the fault finding information in the User guide.
- ▶ Show the customer where the serial number/boiler information is when they call in with a problem (Benchmark checklist at the rear of the manual).
- ▶ Have you given the customer details of how to contact the installer/gas emergency numbers.
- ▶ Have you shown the customer how to safely isolate the boiler
- ▶ Have you advised the customer where they can find information on the Worcester, Bosch Group website, www.worcester-bosch.co.uk.
- ▶ Advise the customer that the varying external temperatures will affect the output of the boiler, especially the DHW.
- ▶ Ensure that the User Guide and Installation, Commissioning and Service manual, with the Benchmark checklist and service record, is left with the boiler or homeowner.
- ▶ If the appliance is unused and exposed to freezing conditions, shut off all the mains supplies and drain the system and boiler, label accordingly.

5.7.6 BOILER GUARANTEE

This boiler has a guarantee against faulty materials or workmanship for a period of two years from the date of installation subject to the following terms and conditions:

- During the period of this guarantee any components of the boiler which are proven to be faulty or defective in manufacture will be exchanged or repaired free of charge by Bosch Thermotechnology Ltd.
- The householder may be asked to prove the date of installation, that the boiler was correctly commissioned and, where appropriate, the first year's service has been carried out to the satisfaction of Bosch Thermotechnology Ltd., when requested. These should be documented as a part of the Benchmark Checklist.
- The boiler has been used only for the normal domestic purposes for which it was designed.

This guarantee does not affect your statutory rights.

GUARANTEE REGISTRATION

Your Greenstar boiler carries a two year guarantee against faulty material or manufacture subject to Terms and Conditions.

To read the full Terms & Conditions please visit us on-line at www.worcester-bosch.co.uk/guarantee.

The Guarantee Registration form is available on this same page and can be completed and submitted electronically.

Alternatively, please telephone one of our Guarantee Registration advisors on 0844 892 2552.

Your statutory rights are not affected by the manufacturers guarantee.

6 SERVICE AND SPARES



CAUTION: Mains supplies:

- ▶ Turn off the gas supply and isolate the electrical mains supply before starting any work on the appliance and observe all relevant safety precautions.



CAUTION: Component replacement:

- ▶ After replacement of a gas related component, where a gasket or seal has been disturbed or replaced, check for gas tightness using a gas sniffer/analyser.
- ▶ Also after re-assembly, carry out the following checks:
 - Fan pressure in section 6.5,
 - Flue gas analysis in section 6.6.



NOTICE: Service work

- ▶ Service work must be carried out by a competent engineer, such as British Gas or Gas Safe registered personnel!



NOTICE: CO/CO₂ ANALYSER

- ▶ Service work must not be attempted if a calibrated CO/CO₂ analyser and manometer is not available.

- To ensure continued efficient operation the appliance must be checked at regular interval.
- The frequency of servicing will depend upon the particular installation conditions and usage, however, normally an annual service is recommended.
- The extent of the service work required by the appliance is determined by the operating condition of the appliance when tested by qualified engineers.
- After each service, the service interval record sheet at the rear of this manual, must be completed.

6.1 INSPECTION AND SERVICE

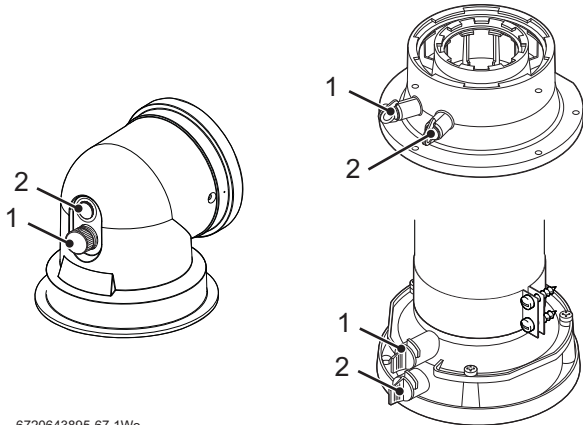
1. Check that the terminal and terminal guard, if fitted, are unobstructed and undamaged.
2. If the appliance is in a compartment or cupboard, check that the specified service space around the appliance is clear.
3. Check all joints and connections in the system and remake any that show signs of leakage.
Refill and re-pressurise if applicable as described in the commissioning section.
4. Operate the appliance and take note of any irregularities.
Refer to the fault finding pages for rectification procedure.

6.2 CHECKING FLUE INTEGRITY

The integrity of the flue system and performance of the boiler can be checked via the flue turret sample points.

| | |
|------------------------|---|
| Flue gas sample point | 1 |
| Air inlet sample point | 2 |

Table 15 Key to figure 70



6720643895-67.1Wo

Fig. 70 Flue turret test points

With the boiler case on and the boiler running at maximum output (refer to section 6.5.1 "Setting the boiler maximum").

- ▶ Insert the analyser probe into the air intake sample point.
- ▶ Ensure that the probe reaches the centre of the air intake, adjust the cone on the probe so that it seals the sample point and correctly positions the end of the probe.
- ▶ Allow the readings to stabilise and check that:
 - O₂ is equal to, or greater than 20.6%.
 - CO₂ is less than 0.2%
- ▶ If the readings are outside these limits then this indicates that there is a problem with the flue system or combustion circuit, e.g. missing or dislodged seals.

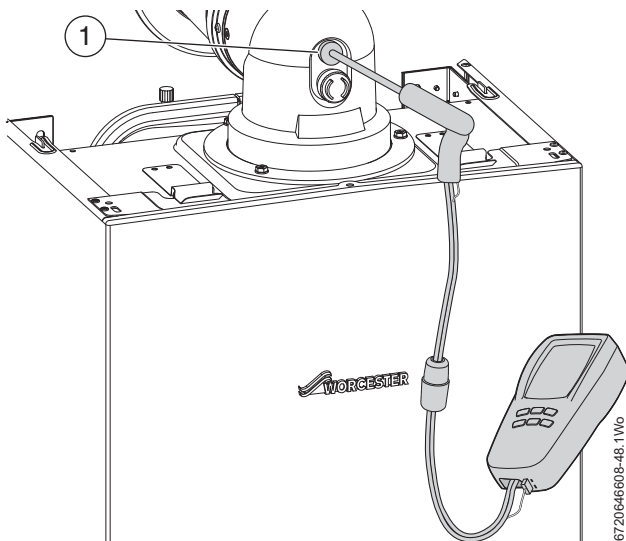


Fig. 71 Flue integrity test

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6.3 COMPONENT ACCESS

To gain access to the components, remove the outer case:

1. Remove the two screws securing the control panel.
2. Release the two catches.
3. Pull the bottom of the control panel forward and down.
4. Lower the control panel into the service position.
5. Undo and remove the two bottom retaining screws.
6. Lift the spring clips on top of the case.
7. Pull the case towards you to remove.

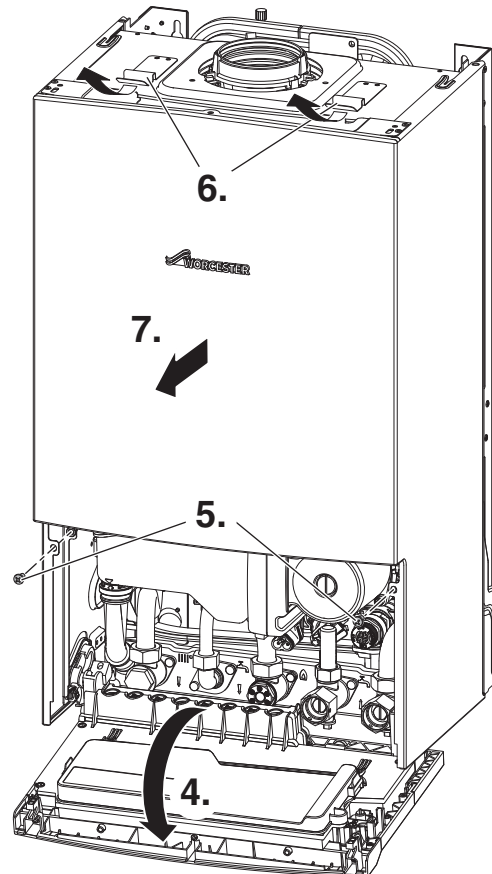
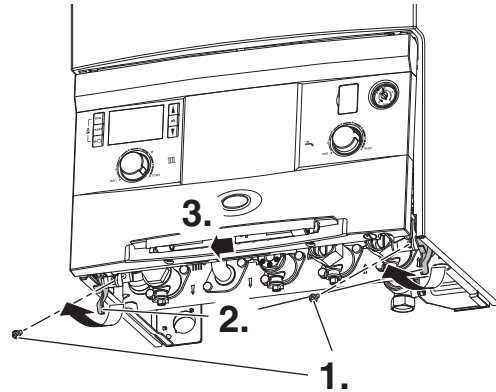


Fig. 72 Component access

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6.4 CHECKING THE GAS INLET PRESSURE



NOTICE: Gas inlet pressure

- ▶ Ensure that the gas pressure is satisfactory with all other gas appliances working.
- ▶ Do not continue with the other checks if the correct gas pressure can not be achieved.

- ▶ Refer to section 5.5.1 and check that the gas working pressures in the system conform to the figures shown below:

| Allowed mbar pressure drop | | | | |
|----------------------------|--------------------|--------------|------------------|----------------------|
| meter/ regulator | across pipework | boiler inlet | across boiler | gas control valve |
| Natural gas | | | | |
| 19 - 23 | 1 | 18 - 22 | 1.5 | 16.5 - 20.5 |
| L.P.G. | | | | |
| 32 - 45 | 2.5 | 29.5 - 42.5 | 1.5 | 28 - 41 |
| mbar range | | | | |

6.5 FAN PRESSURE TEST



This test is to determine if the heat cell requires cleaning or attention.

Before setting the boiler to maximum output for the fan pressure test, refer to figure 74:

- ▶ Switch the boiler off.
- ▶ Remove the combustion air intake pipe (1).
- ▶ Remove the fan pressure test point cover (2).
- ▶ Connect the digital manometer pipe (3) to the fan pressure test point (4).
- ▶ Replace the combustion air intake pipe.
- ▶ Switch the boiler on.
- ▶ Set the boiler to maximum output.

6.5.1 SETTING THE BOILER TO MAXIMUM

To set the boiler to maximum output, refer to figure 73:

1. With the control panel in the operating position, press and hold the and buttons together for at least five seconds.
 - The chimney sweep symbol (1) will be displayed at the top of the screen.
 - The word Max will flash at the bottom of the screen.
 - The boiler will take approximately 30 to 35 seconds to ramp up to maximum output.
 - Allow the boiler to stabilise at maximum output.
- ▶ Ensure that the fan/gas valve do not modulate.

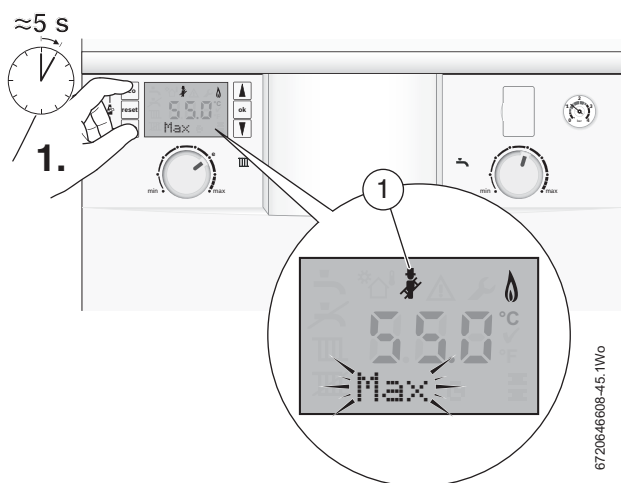


Fig. 73 Set boiler to maximum



When running at maximum output, and the water temperature is 65°C or less, the boiler will operate both the central heating and DHW circuits with the diverter valve in the mid position. It will be necessary to run sufficient water through the DHW circuit to ensure that the boiler will not cycle on low heating demands. This is to allow sufficient time for the setting procedure. When the water temperature reaches 75°C the diverter valve will switch to CH only.

6.5.2 FAN PRESSURE

- ▶ Remove the combustion air intake pipe [1]
- ▶ Remove the cover [2] from the fan pressure test point [4]
- ▶ Connect the pipe [3] from the digital manometer to the fan pressure test point [4]
- ▶ Refit the combustion air intake pipe

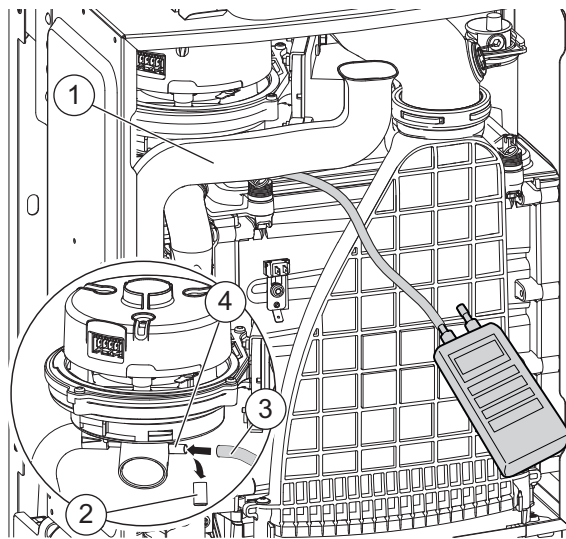


Fig. 74 Fan pressure test point

NOTICE: Fan pressure test

- ▶ The boiler must be run at maximum output for the fan pressure test and flue gas analysis.

With the combustion air intake pipe fitted and the boiler running at maximum output, measure the fan pressure:

- ▶ The pressure will read negative, refer to the chart in figure 75 below.

FAN PRESSURE TEST

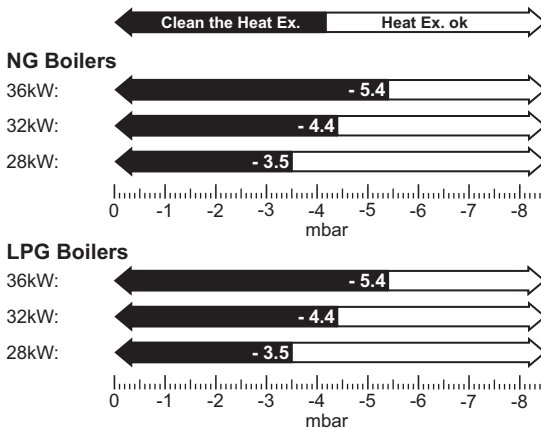


Fig. 75 Fan pressure readings

- ▶ If the manometer reading is in the white area of the chart the heat exchanger/exhaust path/siphon does not require attention.
- ▶ If the manometer reading is in the black area of the chart then carry out the following checks:
 - Check that the siphon is not blocked.
 - Check the exhaust paths for restrictions.
 - Clean the heat exchanger with a suitable cleaning tool, refer to section 6.7 - Cleaning the heat exchanger.
- ▶ Re-check the fan pressure readings.

If the boiler, after completing the above checks, fails the fan pressure test then contact Worcester, Bosch Group for advice.

- ▶ After the measurements are taken switch the boiler off.
- ▶ Remove the combustion air intake pipe.
- ▶ Disconnect the manometer and replace the test point cover.
- ▶ Replace the combustion air intake pipe.

6.6 FLUE GAS ANALYSIS



NOTICE: Combustion testing

- ▶ Combustion testing must be carried out by a competent person. Testing must not be attempted unless the person carrying out the combustion check is equipped with a calibrated Combustion Analyser conforming to BS 7927 and is competent in its use.





Ensure that the gas inlet pressure has been checked and is satisfactory, refer to section 5.5.1

COMBUSTION TEST



When running in maximum output, and the water temperature is 65°C or less, the boiler will operate both the central heating and DHW circuits with the diverter valve in the mid position. It will be necessary to run sufficient water through the DHW circuit to ensure that the boiler will not cycle on low heating demands. This is to allow sufficient time for the setting procedure. When the water temperature reaches 75°C the diverter valve will switch to CH only.

- ▶ Connect the flue gas analyser to the flue gas sampling point (1) as shown in the figure below.
- ▶ Ensure that the probe reaches the centre of the flue gas exhaust, adjust the cone on the probe so that it seals the sample point and correctly positions the end of the probe.
- ▶ Press the  and  buttons together
 - The chimney sweep symbol will be displayed at the top of the screen.
 - “Max” will flash at the bottom of the screen.
 - The boiler will ramp up to maximum output in approximately 30 to 35 seconds.
- ▶ Run the boiler at maximum output for at least 10 minutes.
- ▶ Check the CO/CO₂ readings against the information in table 16.

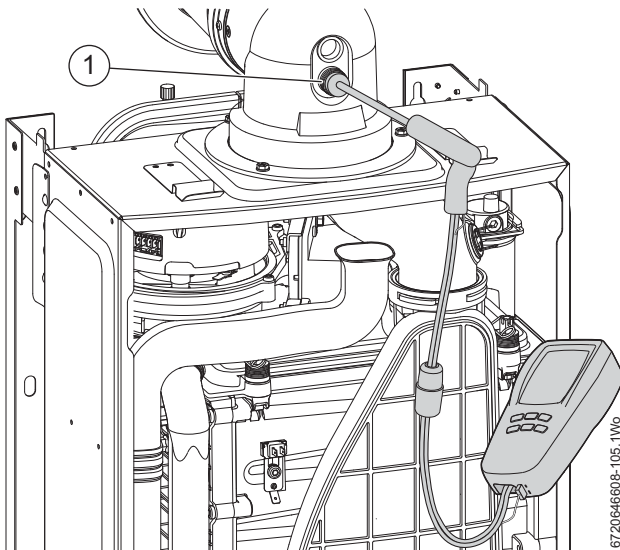



Fig. 76 Combustion test

- ▶ Check CO is less than 200ppm.
- ▶ Set the boiler to minimum power by pressing the down arrow button.
 - “Min” will flash at the bottom left of the screen.
 - The boiler will take 30 to 35 seconds to ramp down to minimum output.
 - Allow the boiler to stabilise at minimum output.
- ▶ Check that the CO is less than 200ppm.

- ▶ Return the boiler to maximum, by pressing the UP arrow button, and re-check the CO/CO₂.
 - “Max” will flash at the bottom left of the screen.
 - The boiler will take approximately 30 to 35 seconds to ramp up to maximum output.
 - Allow the boiler to stabilise at maximum output.
- ▶ If correct, press the  button and the boiler will return to normal operation.
- ▶ Re-assemble and refit boiler case.



Note: Natural Gas and L.P.G. minimum CO₂ has a tolerance of plus 0.5% to minus 1.0%

| CO/CO ₂ settings for Greenstar CDi Compact | | |
|---|----------------------|----------------------|
| CO/CO ₂ must be measured after 10 minutes. | | |
| Gas type | CO ₂ max. | CO ₂ min. |
| Natural gas | 9.1% ± 0.5 | 8.5% +0.5 – 1.0 |
| L.P.G. | 10.6% ± 0.5 | 9.6% +0.5 – 1.0 |

CO - less than 200 ppm (0.002 ratio)

Table 16 CO/CO₂ settings

If the CO₂ is out of tolerance then please check:

- ▶ the gas inlet pressure,
- ▶ the gas rate,
- ▶ the fan test pressure,
- ▶ the condition of burner,
- ▶ the flue and air intake, plus any possible blockages in the condensate disposal.
- ▶ for leaks or obstructions in the gas way,
- ▶ that the injector is clean.

After all checks have been and the CO₂ is still out of tolerance then the gas valve must be replaced.

6.7 CLEANING THE HEAT EXCHANGER



NOTICE: Gaskets

- ▶ Replace the burner and electrode assembly gaskets after cleaning the heat exchanger.



There is an optional tool available to assist in cleaning the heat exchanger, part number 7 746 901 479

The following items will have to be removed to gain access to the heat exchanger for cleaning:

- ▶ Lower the control panel into the service position.
- ▶ Remove the case.
- ▶ Disconnect electrical wires to the fan, ignition transformer, spark electrodes, flue overheat thermostat, main heat exchanger temperature sensor and flow pipe temperature sensor.
- ▶ Flueway
- ▶ Fan assembly
- ▶ Ignition transformer
- ▶ Spark electrode assembly
- ▶ Burner housing, burner and gasket

Refer to sections 6.8.9 to 6.8.13 for instructions on how to remove the items to gain access to the heat exchanger channels so that the heat exchanger can be cleaned

6.7.1 CLEANING THE SIPHON

1. Protect the controller from water ingress and disconnect the black discharge hose from the wall frame connector.
 2. Rotate the siphon body clockwise to release the bayonet connection.
 3. Pull the siphon body down and away from the boiler.
- ▶ Empty the water and debris into a suitable container.
 - ▶ Visually inspect the siphon to ensure that it is clean and free from debris.

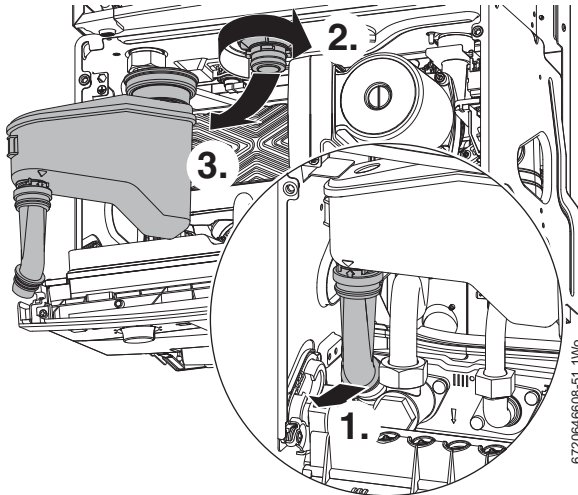


Fig. 77 Cleaning the siphon

REFITTING THE SIPHON

- ▶ Fill siphon with 200 to 250 millilitres of water.
1. Push the siphon up onto the sump assembly until it fully engages with the sump connection.
- NOTICE:** Do not use solvents, adhesive or lubricant when pushing the pipe onto the rubber connector.
2. Twist the siphon to the left to secure the bayonet connection.
 3. Push the black discharge hose, onto the wall frame connector, until fully engaged.

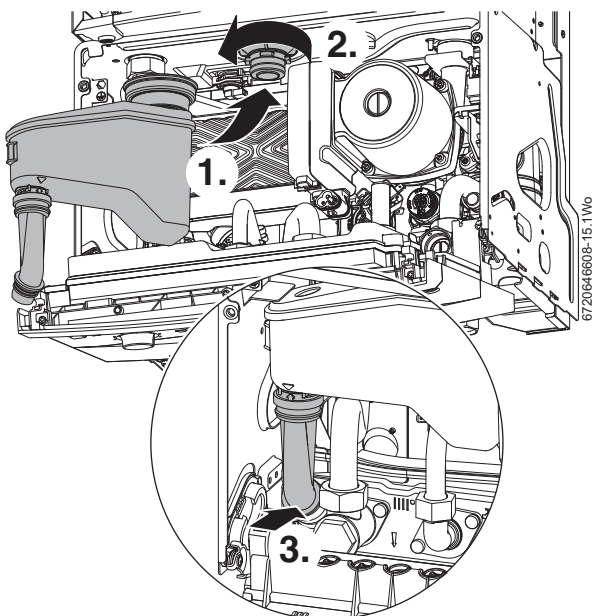
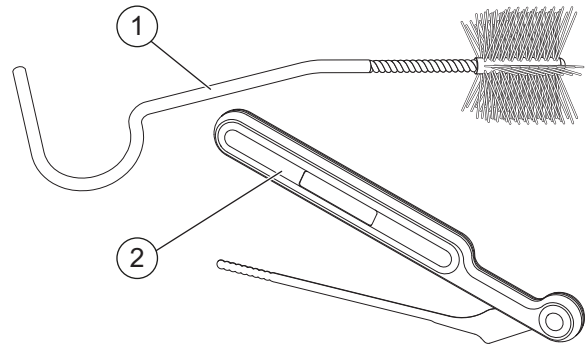


Fig. 78 Fitting siphon

6.7.2 CLEANING THE PRIMARY HEAT EXCHANGER

SINGLE BLADED TOOL AND BRUSH

Use a suitable blade to clean the heat exchanger channels. There is an optional tool available to clean the heat exchanger, part number 7 746 901 479.



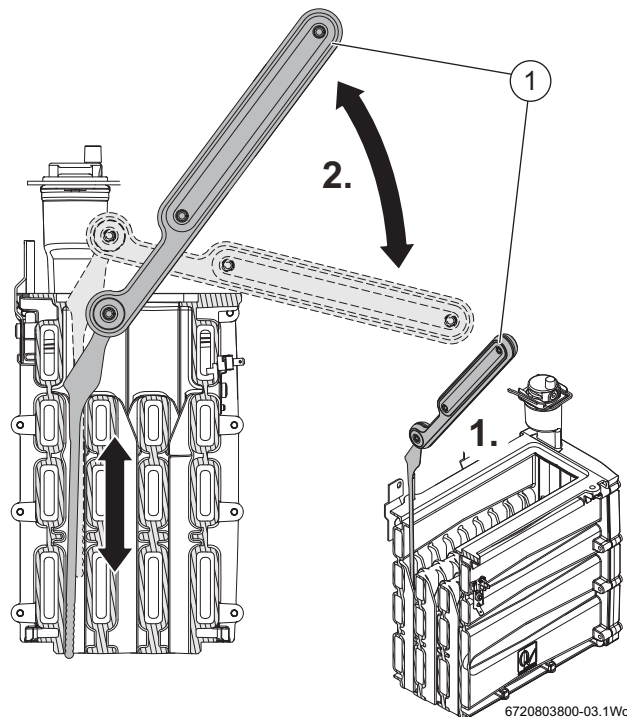
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Fig. 79 Single-bladed cleaning tool and brush

- ▶ Visually inspect the inside of the heat exchanger by shining a torch from the top down into the sump area.
- ▶ When there is little or no light visible this would suggest that those channel(s) are restricted.
- ▶ It is recommended that all channels are cleaned.
- ▶ Remove the siphon and place a suitable container under the outlet to catch the water and debris.
- ▶ Protect the controller from water ingress.

To clean the rear and middle channel of the heat exchanger

1. Orient the cleaning tool (2) as shown in figure 80 and insert the tool into the rear or middle channels for cleaning.
2. Move the cleaning tool handle up and down motion, using the front edge of the heat exchanger as a pivot, to clean the channel.



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Fig. 80 Heat exchanger cleaning tool

To clean the front channel of the heat exchanger

3. Orient the cleaning tool (2) as shown in figure 81 and insert the tool into the front channel for cleaning.
4. Move the cleaning tool handle up and down motion, using the front edge of the heat exchanger as a pivot, to clean the channel.

- ▶ Use the brush to dislodge the debris and pour water down the channels to flush out the debris.

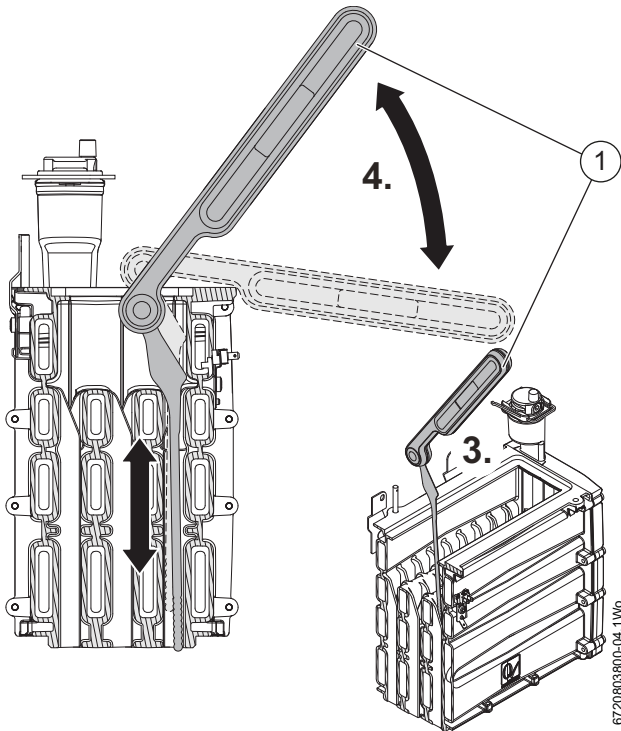


Fig. 81 Cleaning the front channels



On completion of the heat exchanger cleaning and re-assembly, perform the fan pressure test as described in section 6.5.2

6.8 REPLACEMENT OF PARTS



CAUTION: Mains supplies:

- ▶ Turn off the gas supply and isolate the mains supplies before starting any work on the boiler and observe all relevant safety precautions.



CAUTION: Component replacement:

- ▶ After replacement of a gas related component, where a gasket or seal has been disturbed or replaced, check for gas tightness using a gas sniffer/analyser.
- ▶ On re-assembly check all affected seals for cracks, hardness and deterioration. If damaged or in any doubt the seal must be replaced.
- ▶ Also after re-assembly, carry out the following checks:
Fan pressure in section 6.5,
Flue gas analysis in section 6.6.

6.8.1 REMOVING THE OUTER CASE

Removing the bottom panel:

1. Pull the catch down.
2. Slide the panel forward and down to remove

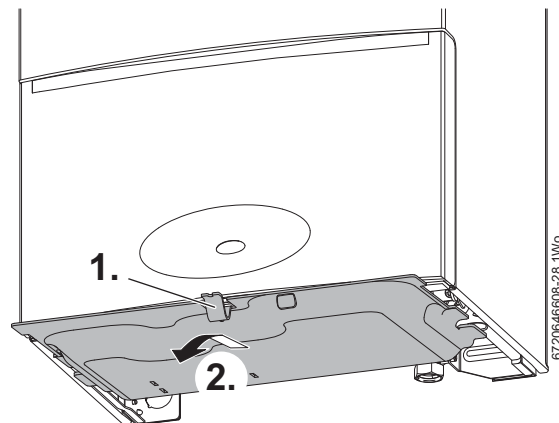


Fig. 82 Bottom panel

Removing the outer case:

1. Locate and remove the two screws under the front of the boiler.
2. Pull the two catches, located under the front of the boiler, down to release the control panel
3. Pull the bottom of the control panel forward slightly and down.
4. Allow the control panel to rotate down on the hinges.
5. Remove the two screws securing the bottom of the case.
6. Release the two catches on top of the boiler.
7. Pull the case towards you and remove.

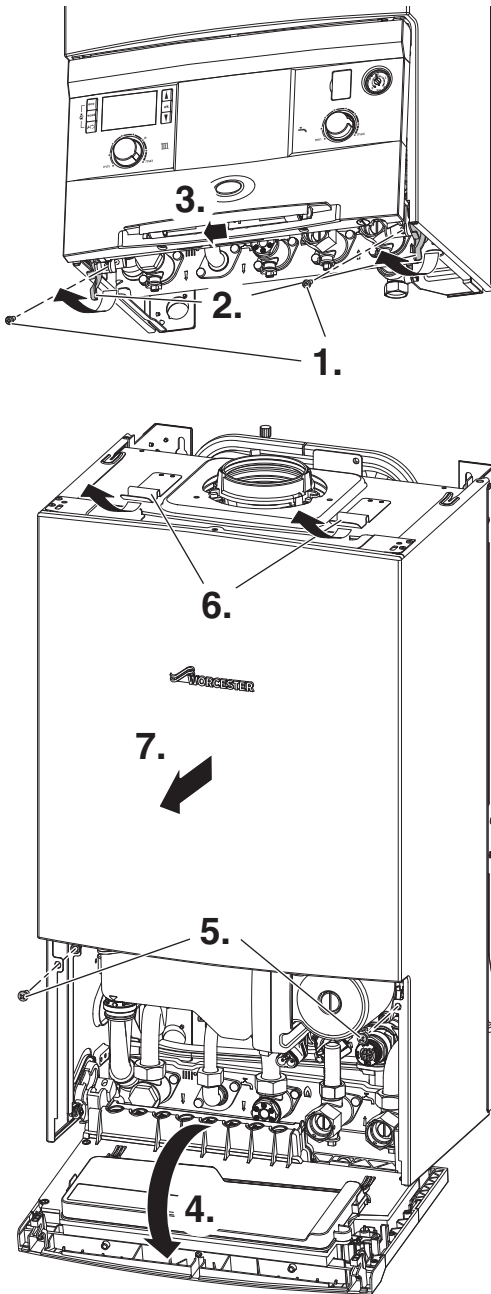


Fig. 83 Removing outer case

6.8.2 DRAINING THE BOILER

Many of the tasks in this section require that the boiler be isolated and drained.

1. Connect a suitable hose firmly to the drain point and run the hose outside to a suitable point or container.
2. Turn the drain valve a ¼ turn anticlockwise to open the drain. Turn the valve firmly clockwise to close.

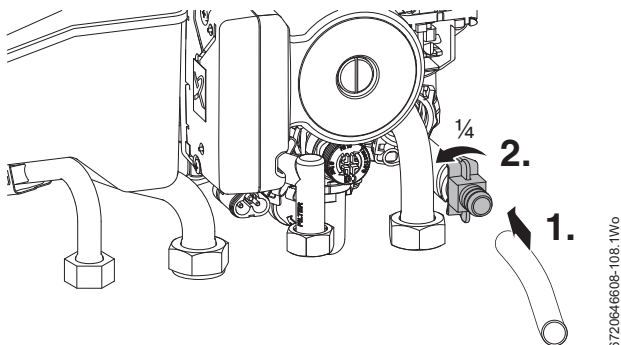


Fig. 84 Draining the boiler

6.8.3 SYPHON REMOVAL

1. Disconnect the discharge hose from the wall frame connector.
2. Rotate the siphon body clockwise to release the bayonet connection.
3. Pull the siphon body down and away from the boiler.

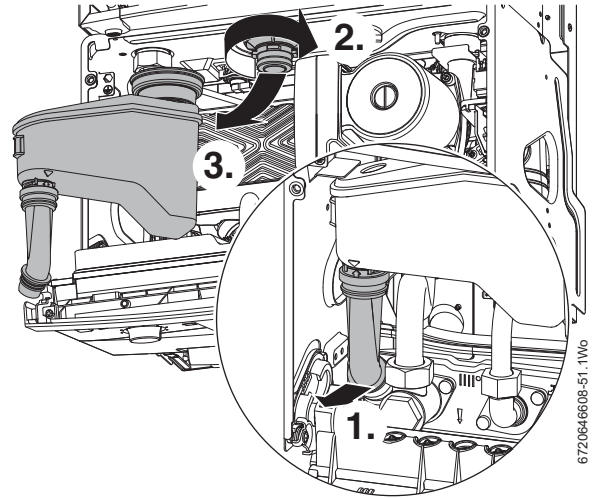


Fig. 85 Syphon removal

6.8.4 PRIMARY SENSOR (CH NTC)

- ▶ Remove the combustion air inlet pipe from the pre-mix unit, rotate anticlockwise and pull away from the fan assembly.
- ▶ Ease the gas pipe to the left.
- ▶ Disconnect the lead to the sensor.
- ▶ Remove the sensor by pulling forward.
- ▶ Replace the sensor onto the flow pipe.
- ▶ Connect the lead to the sensor.
- ▶ Re-fit the combustion air inlet pipe to the pre-mix unit.

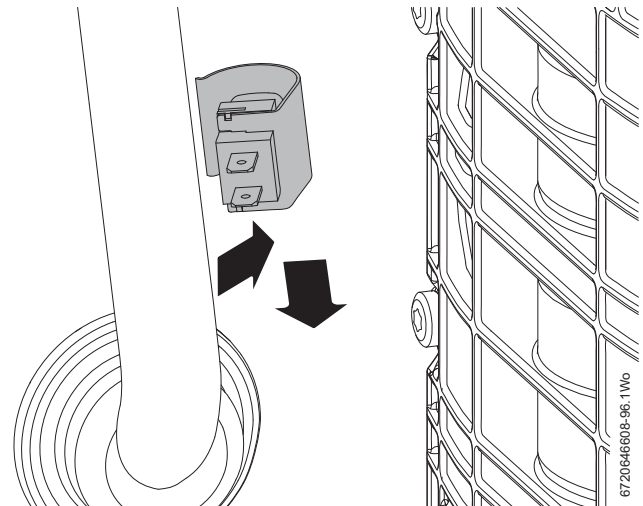


Fig. 86 Primary sensor

6.8.5 MAXIMUM SAFETY SENSOR (NTC)

- ▶ Disconnect the lead to the Maximum safety sensor.
- 1. Remove the screw securing the sensor.
- 2. Remove the sensor from the heat exchanger.
- ▶ When replacing the sensor, ensure that the assembly is properly located on the orientation pin.

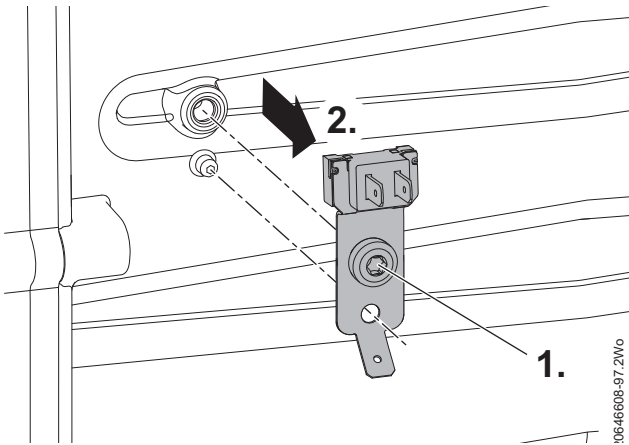


Fig. 87 Max safety sensor

6.8.6 FLUE OVERHEAT THERMOSTAT

- ▶ Disconnect the lead to the flue overheat thermostat.



Take care not to damage the housing when removing the thermostat.

- ▶ Using a small screwdriver, gently prise the thermostat from the housing taking care not to damage the housing or grommet.

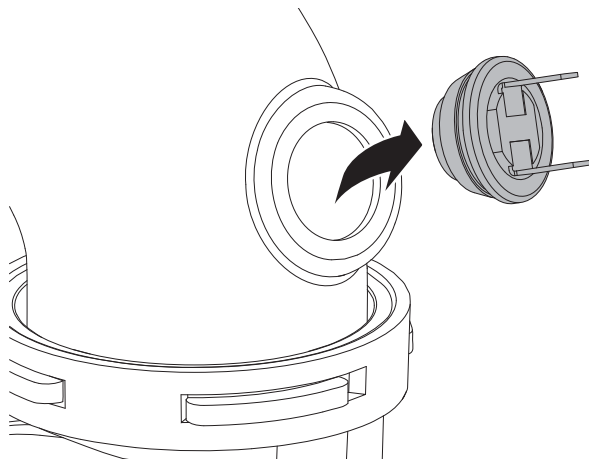


Fig. 88 Flue overheat thermostat

- ▶ To replace, push the thermostat and new grommet gently back into the opening until contact with the locating ridge is felt.
- ▶ The Flueway will have to be removed if the thermostat falls into the housing, refer to section 6.8.9.

6.8.7 AUTO AIR VENT

Ensure that the boiler has been fully drained.

- 1. Remove the spring clip completely.
- 2. Lift the air vent out of the housing and remove.

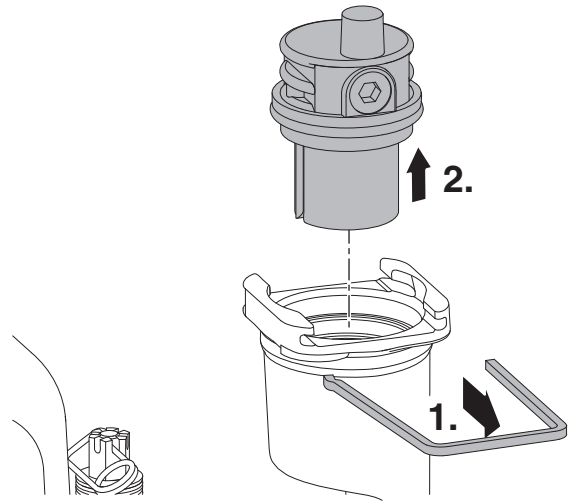


Fig. 89 Auto air vent

When re-assembling ensure that the "O" ring is fitted to the Auto air vent and NOT the heat exchanger, otherwise the Air vent will be difficult to fit. Apply silicone grease to the "O" ring to ease assembly.

6.8.8 GAS VALVE

- ▶ Isolate the mains electrical supply and the gas supply at the boiler gas cock.
- ▶ Remove the combustion air inlet pipe.
- ▶ Disconnect the electrical connector from the valve
- 1. Remove the gas pipe from the top of the valve.
- 2. Undo the bottom gas pipe connection.
- 3. Remove the screw securing the gas valve.
- 4. Lift the gas valve to clear the bottom gas connection.
- 5. Pull the gas valve forward out of the boiler.

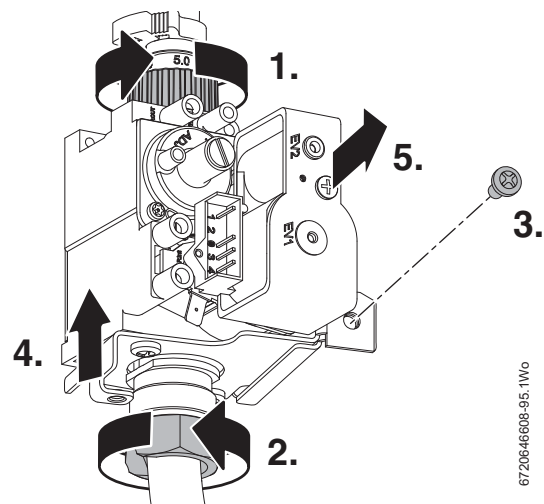


Fig. 90 Gas valve

- ▶ When fitting the new valve, start with the bottom gas connection and tighten by hand before making any other connections to the valve.
- ▶ Secure the valve with the screw.
- ▶ Tighten the bottom connection firmly with a suitable spanner.
- ▶ Connect the top gas pipe.
- ▶ Reconnect the electrical connector.
- ▶ Open the boiler gas isolator.
- ▶ Check all the gas connections for gas tightness.

6.8.9 FAN ASSEMBLY

CAUTION: Component replacement:

- ▶ After replacement of a gas related component, where a gasket or seal has been disturbed or replaced, check for gas tightness using a gas sniffer/analyser.
- ▶ On re-assembly check all affected seals for cracks, hardness and deterioration. If damaged or in any doubt the seal must be replaced.
- ▶ Also after re-assembly, carry out the following checks:
Fan pressure in section 6.5,
Flue gas analysis in section 6.6.

To remove the fan, disconnect the electrical mains and gas supplies, and remove the following components:

- Flueway
- Combustion air inlet pipe and gas pipe

FLUEWAY REMOVAL

1. Release the two screws securing the Flueway to the sump.
2. Using a screwdriver under the tabs (1) next to the screws, lever the Flueway up to clear the seal and pull the Flueway forward.
3. Rotate the exhaust pipe to the left and pull the Flueway down to separate from the exhaust pipe.

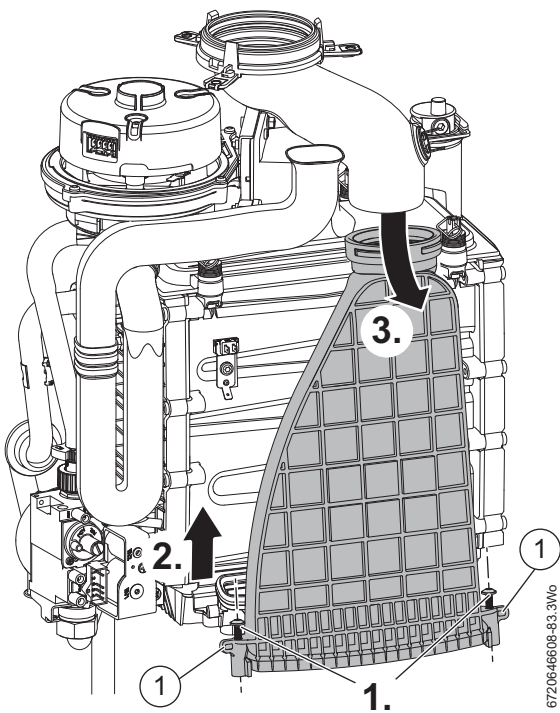


Fig. 91 Flueway removal

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SUMP SEAL

1. Place seal on sump interface.
 2. Be sure the ear lugs of the seal are mounted on the lugs of the sump.
- Before placing the flue pipe.
- ▶ Be sure the seal is clean and free of debris.

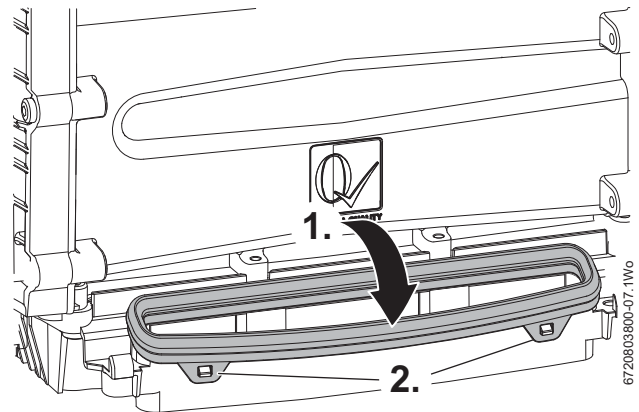


Fig. 92 Sump seal



Never place the seal in the flueway before assembly of the flueway.
Place seal always on sump interface.

COMBUSTION AIR INLET AND GAS PIPE DISCONNECTION

1. Rotate the combustion air inlet pipe anticlockwise to release from the fan assembly and pull away from the fan.
2. Undo the top gas pipe connector at the gas valve.

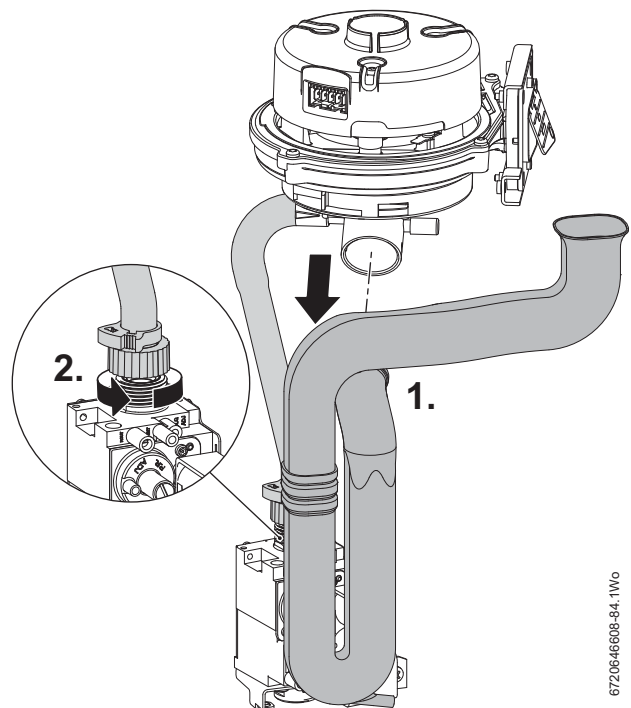


Fig. 93 Combustion air inlet pipe removal

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FAN REMOVAL



The boiler case is shown removed to aid clarity.

3. Rotate the exhaust pipe anticlockwise to gain access to the fan assembly securing screws.
4. Support the weight of the fan and remove the two screws securing the fan.

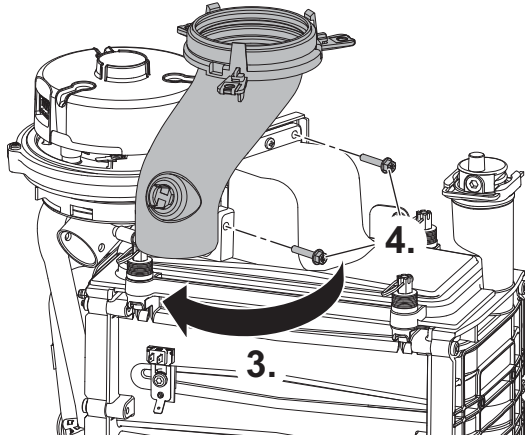


Fig. 94 Fan removal 1

5. Rotate the exhaust pipe clockwise.
6. Pull the fan assembly away from the mount, lift and rotate the fan towards you. Ensure that the front of the fan clears the left hand front castellated nut securing the burner housing.
7. Pull the gas pipe off the fan body connection, the pipe is secured by the interference fit between the pipe and connector.



When refitting the rubber gas pipe, ensure that the pipe is correctly oriented by aligning the notch in the pipe with the lug on the fan connector. Do not kink the pipe. There is a raised arrow on the pipe indicating the location of the notch.

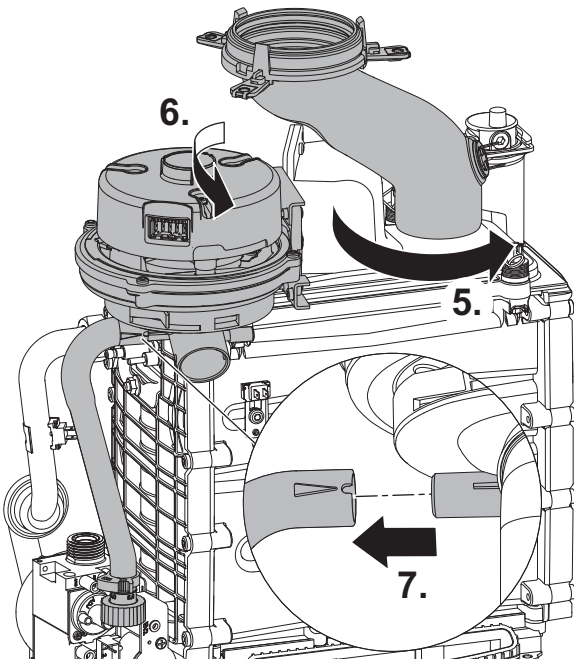


Fig. 95 Fan removal 2

6.8.10 AIR/GAS FLAP VALVE ASSEMBLY

1. Remove the single screw securing the air/gas flap valve assembly.
2. Pull the flap assembly away from the housing.

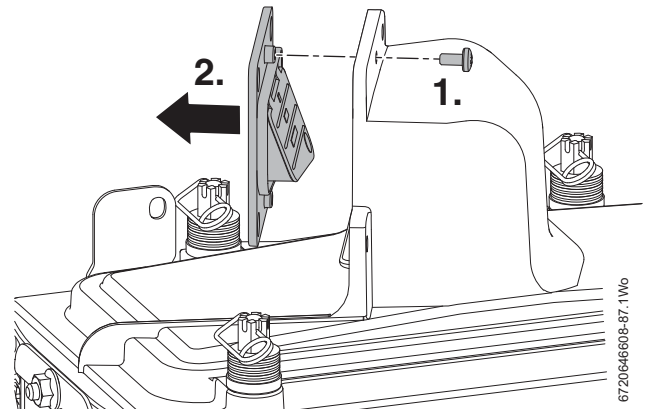


Fig. 96 Air/gas flap valve

6.8.11 IGNITION TRANSFORMER

To remove the ignition transformer

- ▶ Isolate the boiler electrically.
- ▶ Remove the combustion air inlet pipe.
- ▶ Ensure that the harness wires are disconnected from the transformer.
- ▶ Remove the electrode cables.
- ▶ Lift the transformer from the retaining clip.

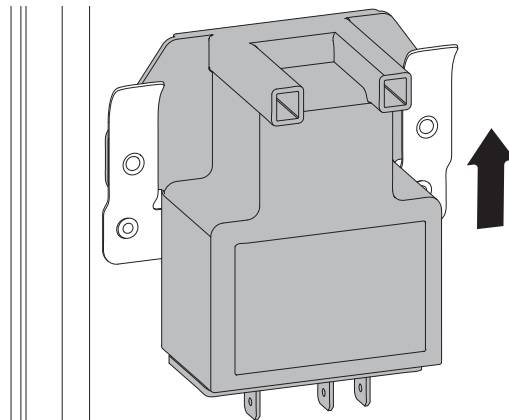


Fig. 97 Ignition transformer

6.8.12 ELECTRODE ASSEMBLY



CAUTION: Component replacement:

- ▶ After replacement of a gas related component, where a gasket or seal has been disturbed or replaced, check for gas tightness using a gas sniffer/analyser.
- ▶ Also after re-assembly, carry out the following checks:
Fan pressure in section 6.5,
Flue gas analysis in section 6.6.

To remove the spark electrode assembly:

1. Undo and remove the two nuts securing the electrode assembly
 2. Rotate the electrode assembly down and forward to remove from the Heat exchanger.
- ▶ Inspect the spark electrodes (2), ionisation probe (3) and ceramics for signs of contamination or damage, replace as necessary.
 - ▶ If necessary, clean the spark electrodes and ionisation probe with a plastic scouring pad.
 - ▶ Re-assemble with a new electrode gasket (1),

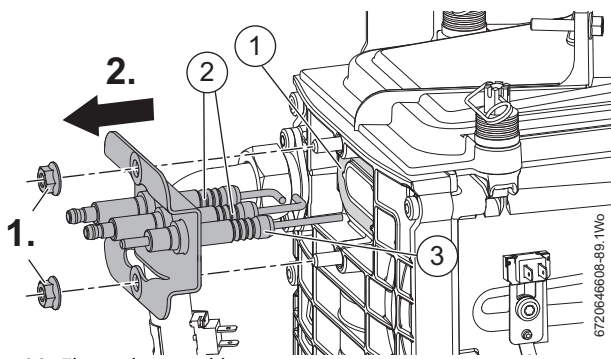


Fig. 98 Electrode assembly

6.8.13 BURNER HOUSING, BURNER/ GASKET



The front two bolts retaining the burner housing are NOT captive and will drop out when the nuts are removed.

To remove the burner housing.

1. Release and remove the four spring pins from the castellated nuts.
2. Undo the front two castellated nuts/springs and remove and retain along with the front two bolts (1).
Slacken the two rear castellated nuts/springs, but do not remove.

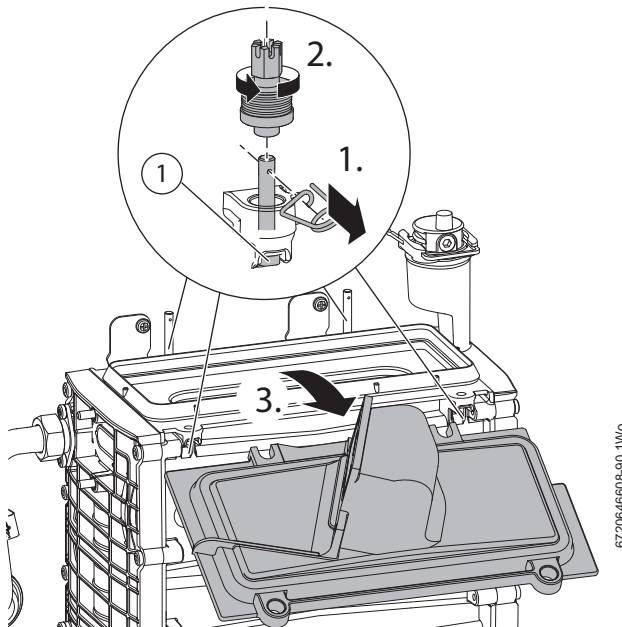


Fig. 99 Burner housing

3. Pull the burner housing up and forward to remove.

To remove the burner and gasket.

1. Lift the gasket (1) and burner mesh (2) from the heat exchanger body.
- ▶ When fitting the burner, ensure that the convex side of the burner faces down into the heat exchanger.
 - ▶ Always fit a new gasket (1) when re-assembling the heat exchanger.

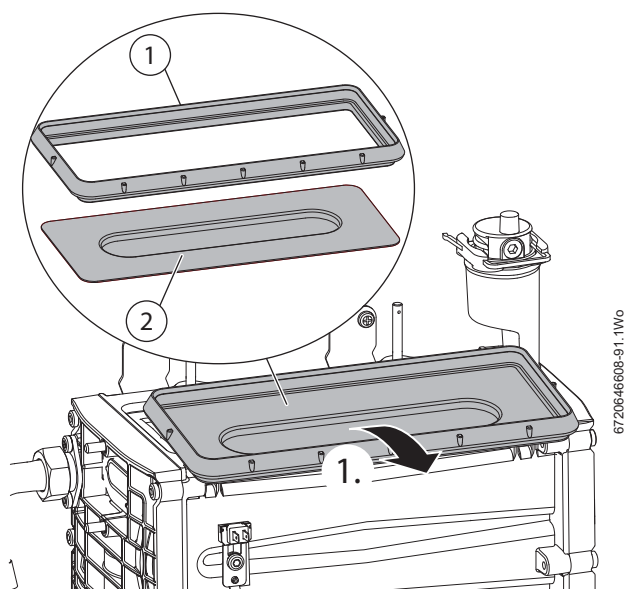


Fig. 100 Burner and gasket

6.8.14 HEAT EXCHANGER



Before removal:

- ▶ Isolate the electrical power to the boiler.
- ▶ Drain the boiler.

HEAT EXCHANGER DISCONNECTION

1. Undo the flow and return connections.
 2. Pull both the flow and return pipes away from the heat exchanger.
- ▶ Replace the fibre washers (1) when replacing the heat exchanger.

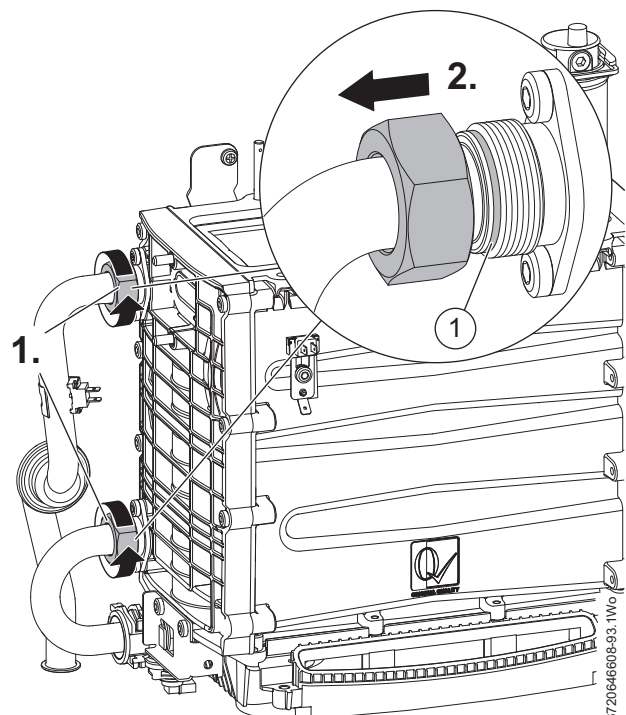


Fig. 101 Heat exchanger disconnection

HEAT EXCHANGER REMOVAL

- ▶ Ensure any electrical wires or connectors are removed.
 - ▶ Remove the Auto air vent (refer to section 6.8.7) to ease removal of the heat exchanger
1. Unscrew the heat exchanger retaining nut.
 2. Remove the heat exchanger retaining nut.
 3. Remove the two screws securing the heat exchanger to the air box.

4. Lift the heat exchanger until the lower connection clears the hole in the air box.
5. Pull the heat exchanger towards you to remove.

CAUTION: Component replacement:

- ▶ After replacement of a gas related component, where a gasket or seal has been disturbed or replaced, check for gas tightness using a gas sniffer/analyser.
- ▶ Also after re-assembly, carry out the following checks:
Fan pressure in section 6.5,
Flue gas analysis in section 6.6.

▶ Re-assemble in the reverse order.

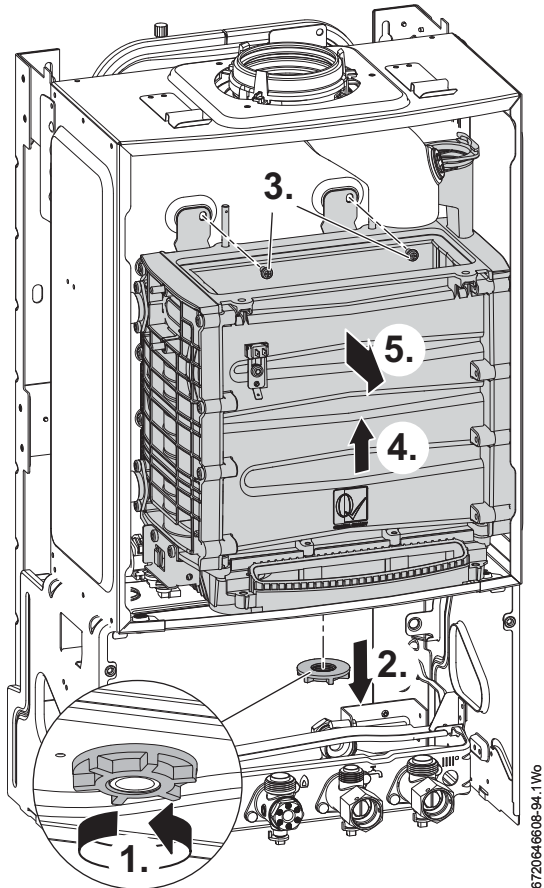


Fig. 102 Heat exchanger removal

6.8.15 DIVERTER VALVE MOTOR AND DIVERTER VALVE REMOVAL

- ▶ Disconnect the lead from the diverter valve motor.

 1. Pull the diverter valve motor from the housing.
 2. Undo and remove the two screws from the diverter valve motor housing.
 3. Pull the diverter valve motor housing from the diverter valve assembly.

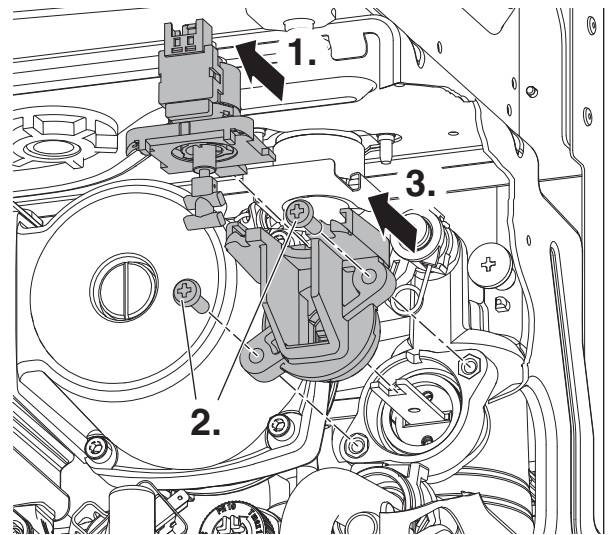


Fig. 103 Diverter valve

6.8.16 DHW TEMPERATURE SENSOR (NTC)

- ▶ Disconnect the electrical connector from the sensor.
- ▶ Unclip the sensor from the pipe.

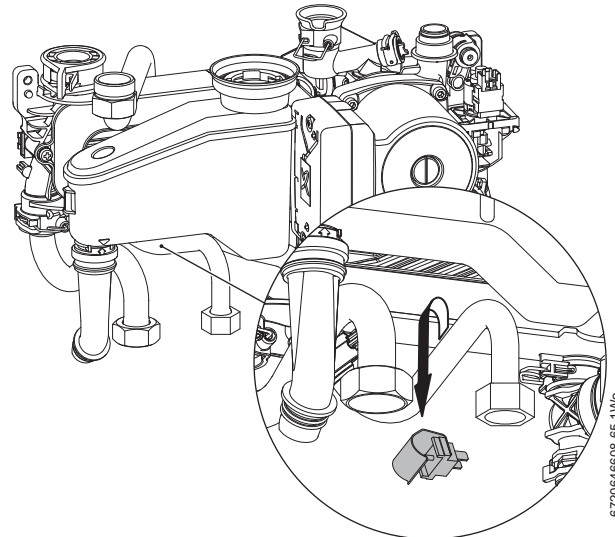


Fig. 104 DHW temperature sensor

6.8.17 PUMP HEAD



- Before removal:
- ▶ Isolate the electrical power to the boiler.
 - ▶ Drain the boiler.
 - ▶ There may be water inside the pump.
Protect any electrical items from water ingress.

1. Disconnect the main electrical connector from the bottom of the pump.
 2. Remove the four screws securing the pump head.
 3. Pull the pump free from the housing.
- ▶ Use a screwdriver to gently disconnect the three wire connector from the bottom of the pump.

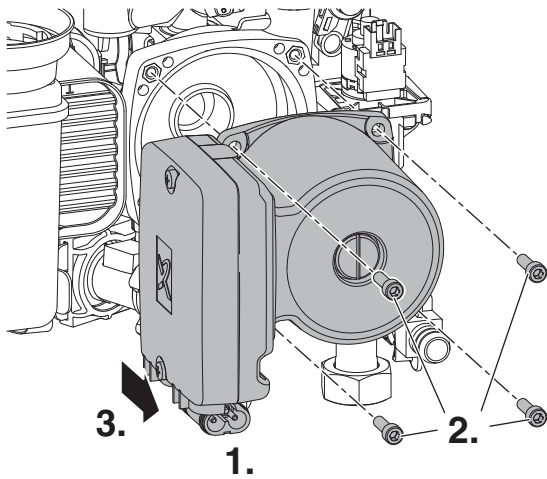


Fig. 105 Pump head removal

6720646608-66.1W0

6.8.18 FLOW SENSOR, FLOW RESTRICTOR AND FILTER REMOVAL

- ▶ Isolate the cold mains and ensure that the DHW circuit is fully drained.
- ▶ Disconnect the electrical connection to the turbine.
- ▶ Undo the nut connecting the flow sensor assembly elbow to the Cold Mains isolating valve.

1. Remove the clip from the housing.
2. Pull the flow sensor assembly out.
3. Remove the flow regulator (1) from the turbine assembly (2).
4. Remove the clip from the flow sensor assembly.
5. Separate the elbow (3) from the turbine assembly (2).
6. Remove the filter (4).

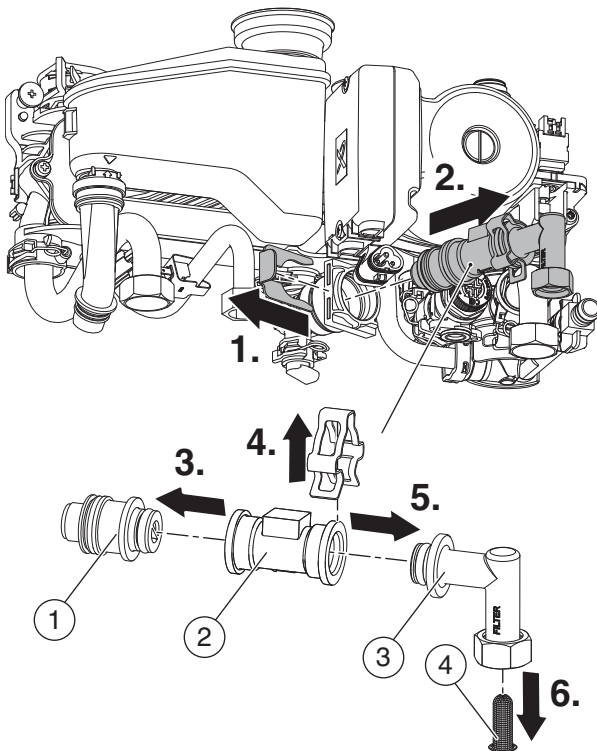


Fig. 106 Flow sensor assembly

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6.8.19 FLOW REGULATOR

The flow regulator can be further broken down into:

- 1 - Spacers
- 2 - Flow regulator
- 3 - Flow regulator housing

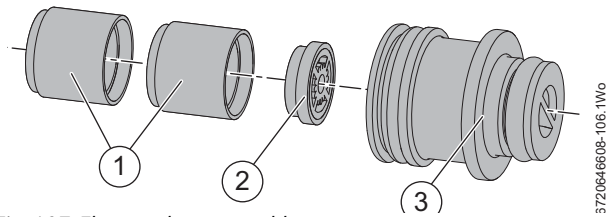


Fig. 107 Flow regulator assembly

3720646608-106.1W0

6.8.20 PRESSURE GAUGE

- ▶ Ensure that the boiler is fully drained.

1. Carefully prise the lugs apart.
2. Remove the pressure gauge.
3. Withdraw the spring clip from the pressure sensing head housing.
4. Remove the pressure sensing head and pressure gauge capillary from the housing.

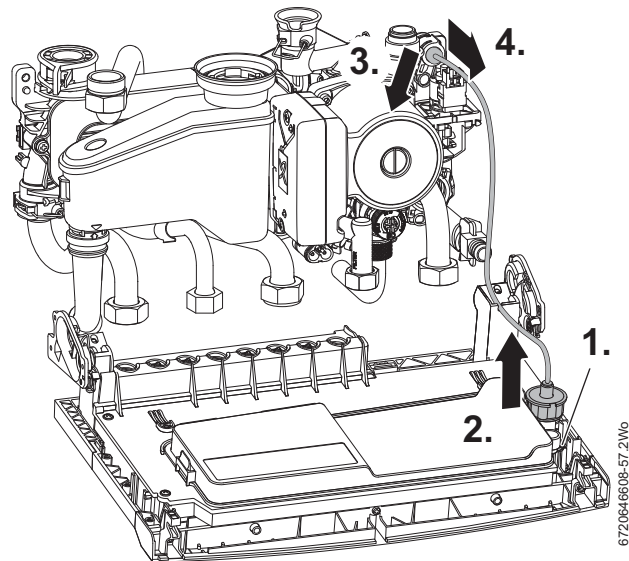


Fig. 108 Pressure gauge removal

6720646608-57.2W0

6.8.21 BOILER RETURN SENSOR (NTC)

- ▶ Isolate the boiler and ensure that the boiler is fully drained.

1. Withdraw the spring clip to release the sensor.
 2. Pull the sensor down to remove from the housing.
- ▶ To refit follow the above actions in reverse.

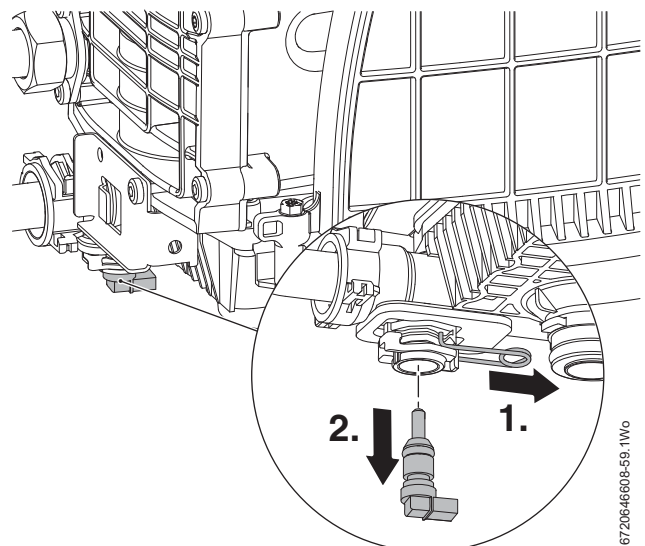


Fig. 109 Boiler return sensor

6720646608-59.1W0

6.8.22 DRAIN TAP

- ▶ Ensure that the boiler is full drained down.
 - ▶ The drain tap rotates anticlockwise for a ¼ turn to open.
1. Rotate the drain tap fully anticlockwise passed the ¼ turn stop point to release.
 2. Push in and withdraw from the housing.

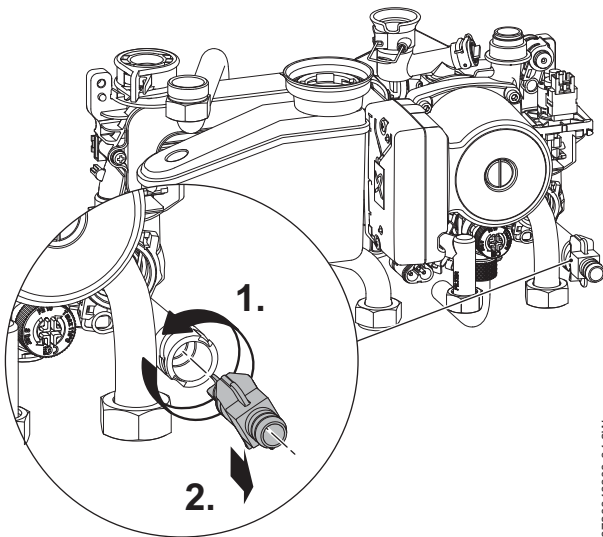


Fig. 110 Drain tap

6720646608-64.2WVo

6.8.23 CH PRESSURE RELIEF VALVE

- ▶ Isolate the boiler and ensure that the boiler is fully drained.
1. Release the knurled connector from the bottom of the PRV.
 2. Pull the captive clip to the left to release the PRV.
 3. Pull the Central Heating pressure relief valve out of the housing.
- ▶ Replace in reverse order, secure with the clip and mounting screws.

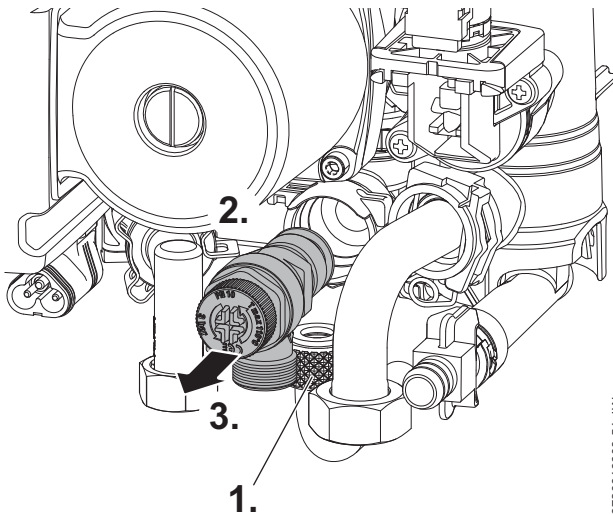


Fig. 111 PRV

6720646608-54.1WVo

6.8.24 DHW PRESSURE RELIEF VALVE



- Before removal:
- ▶ Isolate the electrical power to the boiler.
 - ▶ Drain the boiler.
 - ▶ Isolate the cold water mains.

1. Release the retaining clip
2. Pull the pressure relief valve (1) with the deflector (2) from the housing.

- ▶ When replacing the DHW pressure relief valve, re-use the deflector from the old PRV.

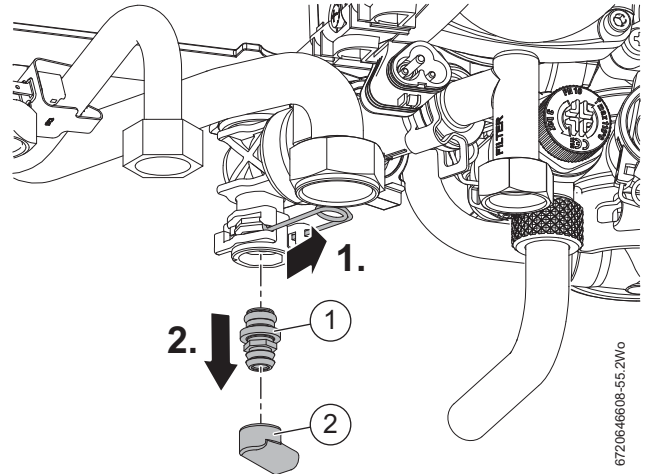


Fig. 112 DHW PRV

6720646608-55.2WVo

6.8.25 DHW PLATE HEAT EXCHANGER



- Before removal:
- ▶ Isolate the electrical power to the boiler.
 - ▶ Isolate the cold water mains and drain DHW circuit within the boiler.
 - ▶ Drain the boiler.

1. Undo and remove the retaining screw.
2. Rotate the left hand side of the heat exchanger towards you and slide out to the left.

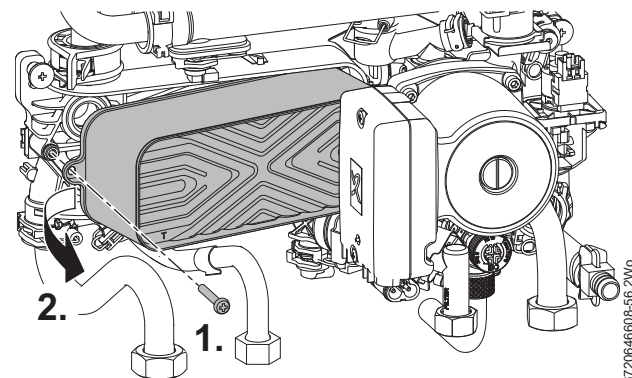


Fig. 113 Remove plate heat exchanger.

6720646608-56.2WVo

- ▶ When replacing the heat exchanger, ensure that any seals that have been disturbed are replaced.

6.8.26 HYDRAULIC BLOCK REMOVAL



- Do not remove the hydraulic block assembly unless absolutely necessary.
- Before removal:
- ▶ Isolate the electrical power to the boiler.
 - ▶ Drain the boiler.
 - ▶ Isolate the cold water mains and drain the DHW circuit within the boiler.

1. Squeeze the ratchet connector and rotate clockwise to release.
2. Release the pin on the expansion vessel connector at the pump assembly.
3. Pull the expansion vessel up and secure in raised position.
4. Remove the clip securing the pump return to the heat exchanger.

5. Remove the two screws securing the CH pressure relief valve mounting.
6. Remove the screws securing the hydraulic block assembly.

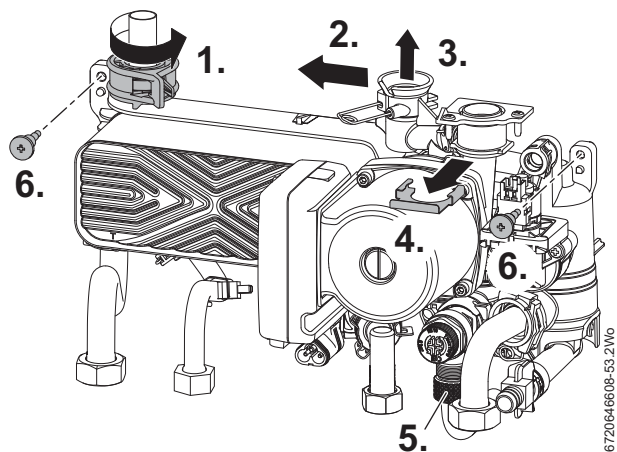


Fig. 114 Hydraulic block

6.8.27 BYPASS VALVE

Remove the hydraulic block from the boiler.

1. Remove the clip on the return connection.
2. Remove the clip on the pump connection.
3. Remove the spring clip retaining the by-pass pipe.
4. Separate the return unit from the flow manifold.
5. Using a pair of pliers remove the by-pass valve.

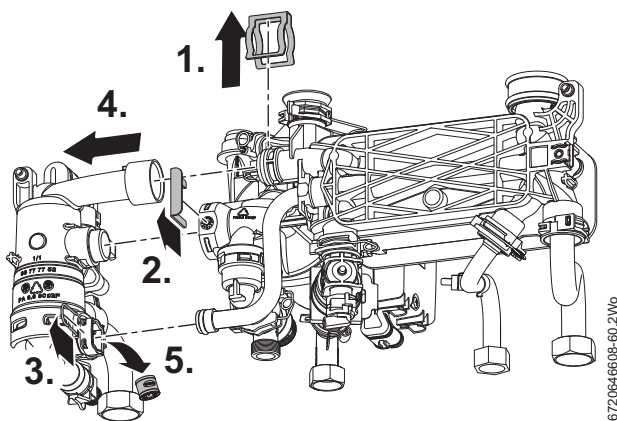


Fig. 115 Bypass valve

► When re-assembling, in reverse order, ensure that any seals that have been disturbed are replaced.

6.8.28 ACCESS TO BOILER CONTROL COMPONENTS

1. Release the three captive screws retaining the installer access cover.
2. The access cover can now be removed with the flap.

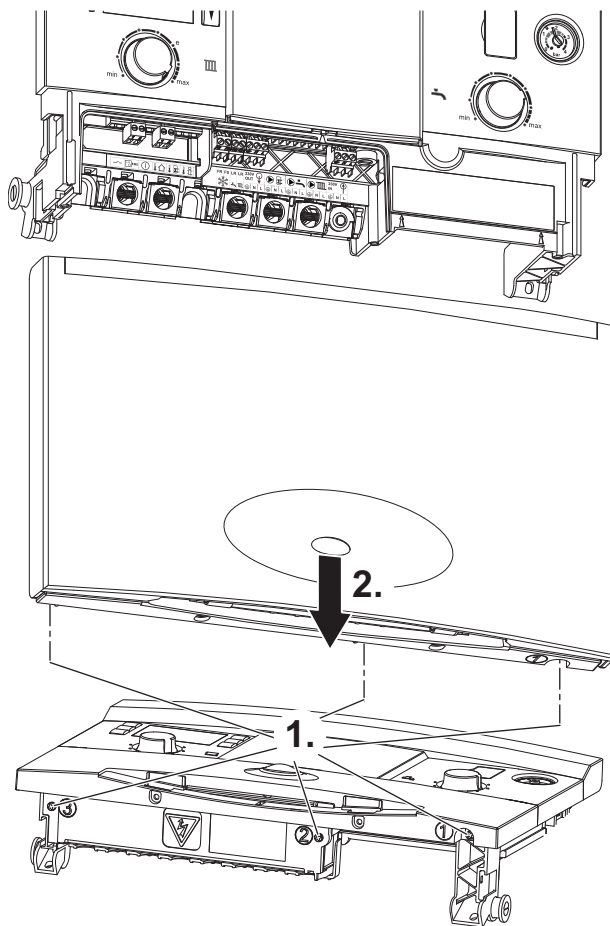


Fig. 116 Installer access cover

PCB FUSE

The fuse is located next to the high voltage connectors and the spare fuse (1) is located on the back of the access cover.

To remove the fuse:

1. Push the top of the fuse holder up.
2. Rotate the top of the fuse holder anti-clockwise and remove.

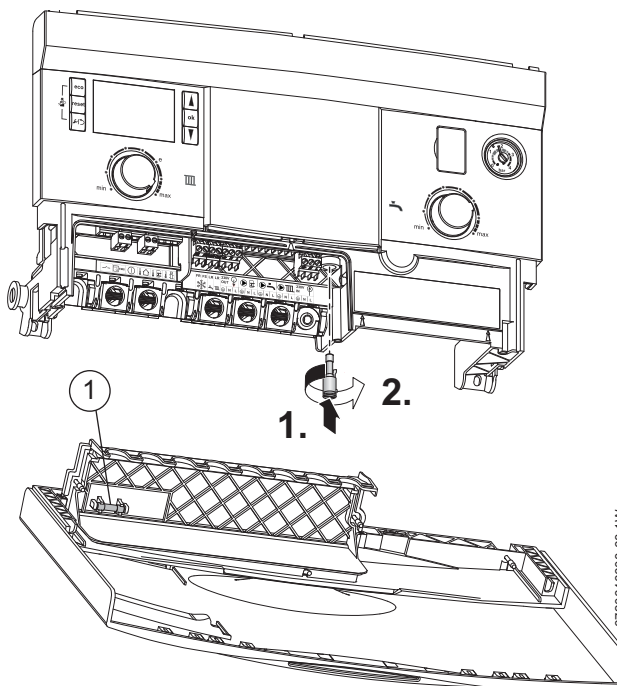


Fig. 117 Fuse holder

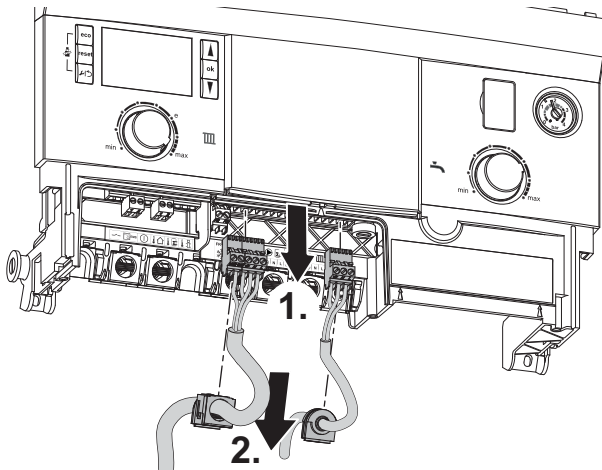
6.8.29 REPLACING THE CONTROL UNIT



The control unit is supplied in a plastic housing. The complete unit must be replaced. The HCM must be exchanged from the old to the new control unit.

With the installer access cover removed:

1. Remove all the connectors
2. Slide out all the cable strain relief clamps

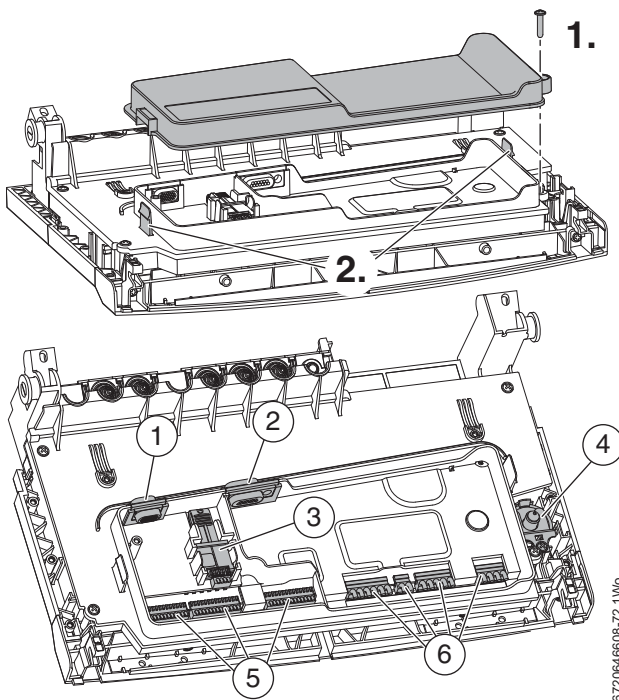


6720646608-73.1W0

Fig. 118 Disconnect external connections

With the control unit in the service position:

1. Remove the single cover retaining screw.
 2. Release the catches and remove the access cover.
- ▶ Lift the HCM (3) from the retainer and disconnect the cable, keep the HCM to fit into the new control unit.
 - ▶ Disconnect and remove all cables and connectors from the control unit.
 - ▶ Remove the pressure gauge, refer to section 6.8.20.



6720646608-72.1W0

Fig. 119 Access to the cables

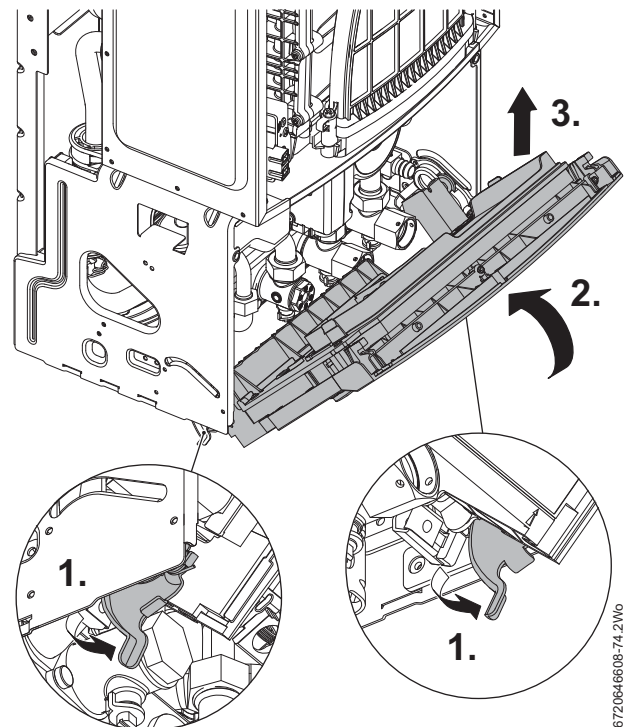
- [1] Low voltage cable inlet
- [2] Mains voltage cable inlet
- [3] HCM - Heating Control Module
- [4] Pressure gauge
- [5] Low voltage connectors
- [6] Mains voltage and earth connectors

REMOVING THE CONTROL UNIT

- ▶ Support the control unit and detach the control unit support strap.
1. Release the two catches underneath the panel.
 2. Hinge the control unit up to approximately a 45° angle.
 3. Push inwards and upwards to disengage the control unit from the hinge supports.
- ▶ Remove the support strap from the control unit.
 - ▶ Fit the new control unit in the reverse order.
 - ▶ Attach support strap to the new control unit.
 - ▶ Fit the HCM, removed from the old control unit, into the retainer and reconnect the cable.
 - ▶ Reconnect all the cables previously disconnected under the access cover.

CAUTION: Earth cables must be reconnected.

- ▶ Replace the access cover and secure with the screw.
- ▶ Reconnect the cables previously disconnected under the installer access cover.
- ▶ Replace the installer access cover and secure with the three screws removed earlier.



6720646608-74.2W0

Fig. 120 Removing the controller

6.8.30 EXPANSION VESSEL

The expansion vessel can be replaced with the boiler in place if there is a side exit flue fitted and a minimum clearance of 450mm above the boiler casing. If a vertical flue is fitted then a similar clearance to one side of the flue is required.

If the clearance is not available, then the boiler will need to be removed from the mounting frame to gain access to the expansion vessel.

Alternatively, a second vessel of at least the capacity of seven litres can be fitted to the return pipe from the heating system as close as possible to the boiler.

EXPANSION VESSEL REPLACEMENT (BOILER FITTED)

- ▶ Isolate the power from the boiler.
- ▶ Lower the control panel into the service position.
- ▶ Isolate the boiler from the heating system using the service valves.
- ▶ Drain the boiler.
- ▶ At the pump manifold, release the clip and disconnect the expansion vessel.
- ▶ Pull the vessel up and out over the flue system or to one side if a vertical flue is fitted.
- ▶ Fit a new "O" ring to the replacement vessel and smear with silicone grease.
- ▶ Reassemble the expansion vessel into the wall frame and slide down the runners until the end pipe is reconnected into the pump manifold.
- ▶ Secure the pipe with spring clip

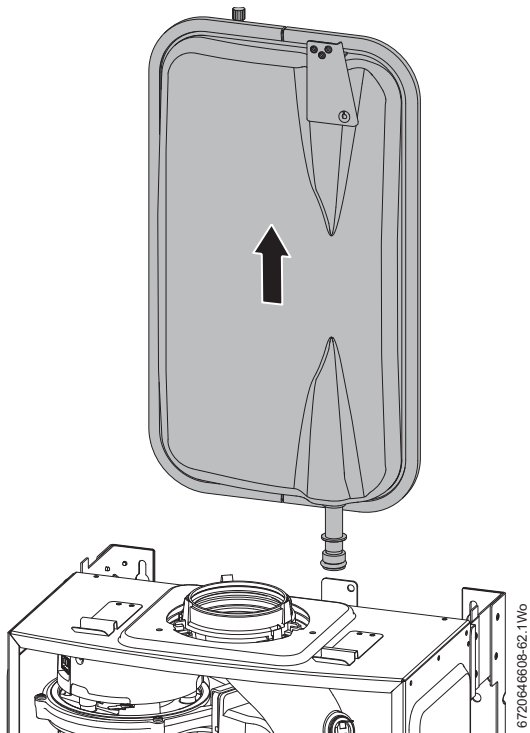


Fig. 121

EXPANSION VESSEL REPLACEMENT (BOILER REMOVED)

- ▶ Isolate the power from the boiler.
- ▶ Isolate the heating systems and gas connection using the service valves.
- ▶ Drain the boiler.
- ▶ Disconnect the electrical supply and any external controls.
- ▶ Disconnect the flue from the boiler.
- ▶ Undo the connections to the boiler at the service valves.
- ▶ Lower the control panel into the service position.
- ▶ At the pump manifold, release the clip and disconnect the expansion vessel.
- ▶ Lift the expansion vessel up to clear the pump manifold connection.
- ▶ Secure the expansion vessel to the wall frame by the bracket at the top.
- ▶ Undo the two screws at the bottom of the case.
- ▶ Release the clips at the top of the case and slide the case towards you to remove.
- ▶ Disconnect the pipes and siphon discharge hose from the plumbing manifold.
- ▶ Disconnect the PRV.
- ▶ Lift the boiler off the wall frame.

1. Remove the screw retaining the expansion vessel to the wall frame and lift the expansion vessel to clear the cross beam.

2. Pull the expansion vessel towards you and down to remove.

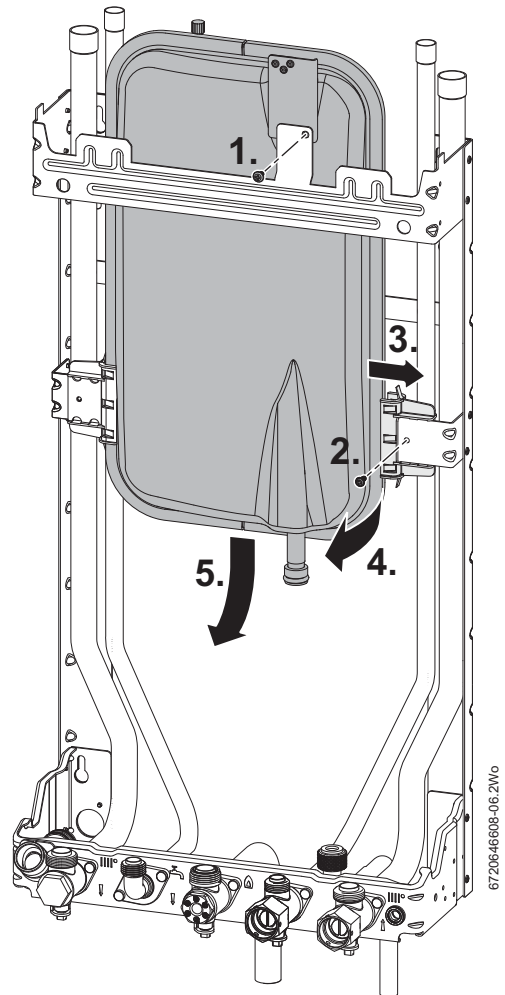
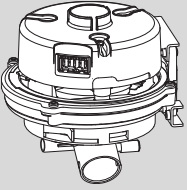
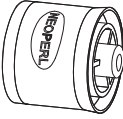
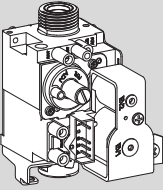
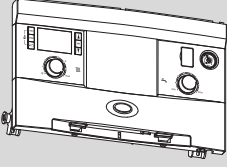
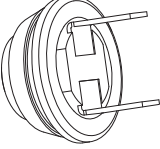
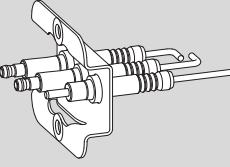
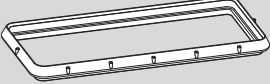
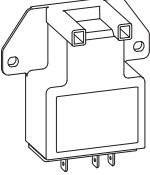
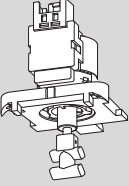
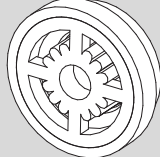
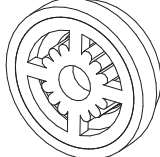
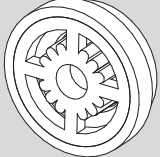
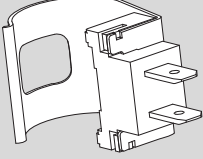
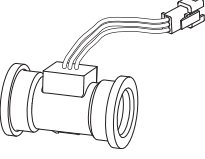
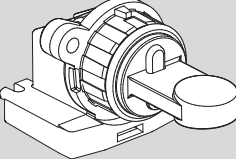
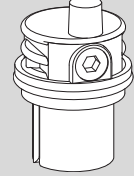

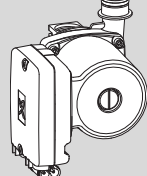
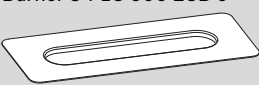
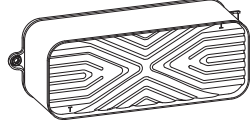
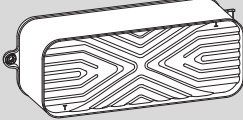
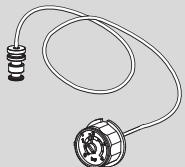

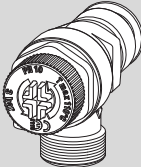
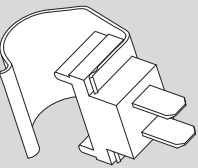
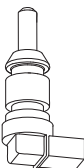
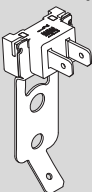


Fig. 122 Removing the expansion vessel

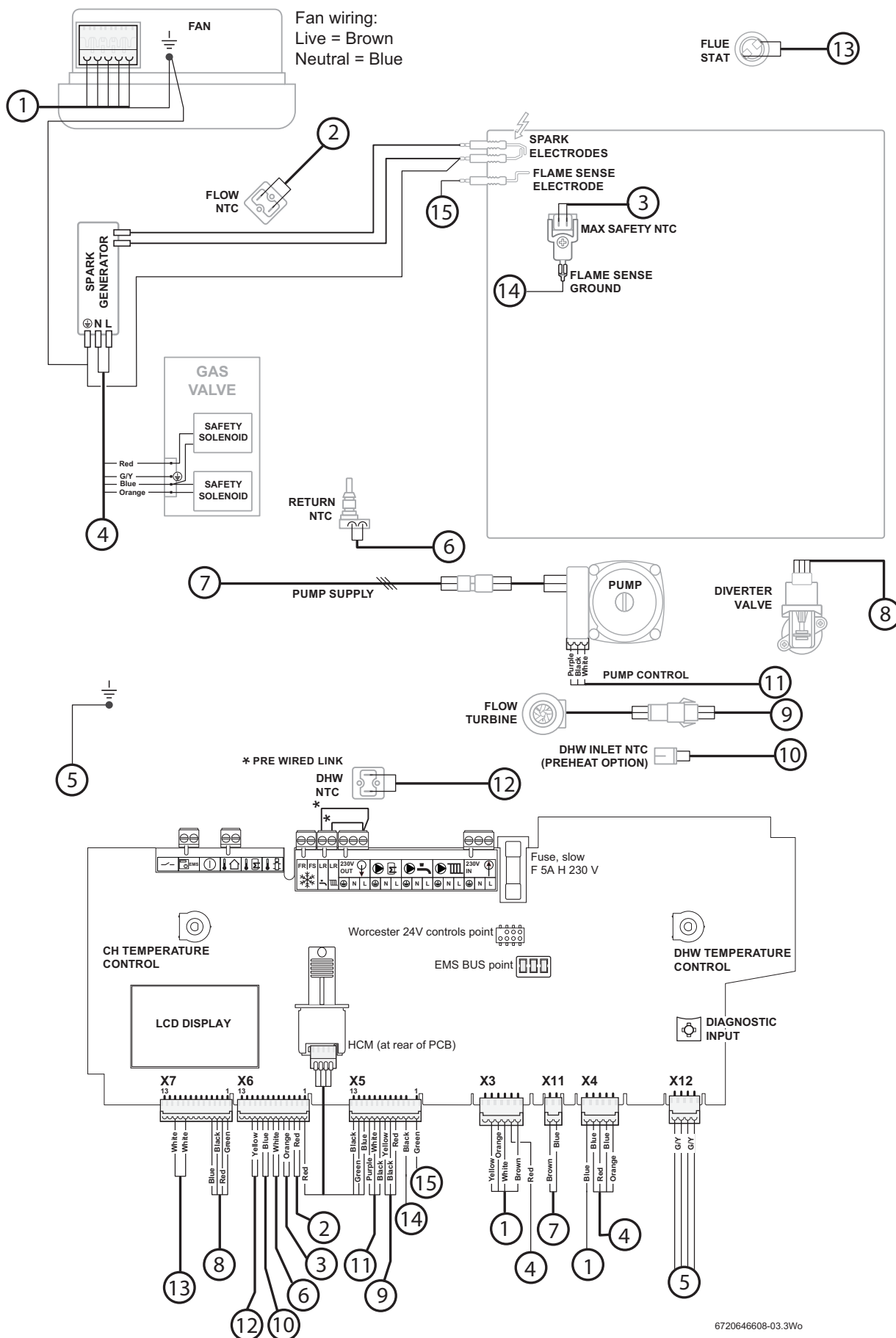
- ▶ Replace the expansion vessel in the reverse order.
- ▶ Follow the procedures in this manual for commissioning this product.

6.9 SHORT PARTS LIST

| | | |
|---|--|--|
| <p>Fan 8 718 603 05A</p>  | <p>By pass valve 8 716 106 434 0</p>  | <p>Gas Valve 8 718 600 04A 0</p>  |
| <p>Control panel 8 718 686 274 0</p>  | <p>Flue overheat thermostat 8 717 206 213 0</p>  | <p>Electrodes (including gasket) 8 718 600 28A 0</p>  |
| <p>Burner seal 8 718 600 24A 0</p>  | <p>Spark generator 8 718 688 015 0</p>  | <p>Diverter valve motor 8 718 682 839 0</p>  |
| <p>Flow regulator 10 litre E-W-LP Light blue 8 718 684 212 0 Used on 28CDi Compact</p>  | <p>Flow regulator 11 litre E-W-LP Brown 8 718 684 213 0 Used on 32CDi Compact</p>  | <p>Flow regulator 13 litre E-W-LP Olive green 8 718 688 409 0 Used on 36CDi Compact</p>  |
| <p>Flow NTC 8 718 688 801 0</p>  | <p>Flow turbine 8 717 002 132 0</p>  | <p>Diverter valve assembly 8 716 106 845 0</p>  |
| <p>Auto Air Vent T 005 000 87A 0</p>  | <p>Pressure relief valve DHW 8 717 401 029 0</p>  | <p>Pump assembly 8 718 685 798 0</p>  |
| <p>Burner 8 718 600 23B 0</p>  | <p>Heat exchanger 18 plate 8 718 642 948 0 Used on 28CDi compact</p>  | <p>Heat exchanger 22 plate 8 718 641 238 0 Used on 32 & 36CDi Compact</p>  |
| <p>Pressure gauge 8 718 686 513 0</p>  | <p>Expansion vessel 8 718 684 945 0</p>  | <p>Pressure relief valve 3 bar 8 718 681 163 0</p>  |
| <p>DHW NTC 8 716 010 809 0</p>  | <p>Return temp. sensor (NTC) 8 718 684 323 0</p>  | <p>Max safety sensor NTC 8 718 685 483 0</p>  |

7 FAULT FINDING AND DIAGNOSIS

7.1 INTERNAL WIRING DIAGRAM



6720646608-03.3Wo

7.2 CENTRAL HEATING FUNCTION

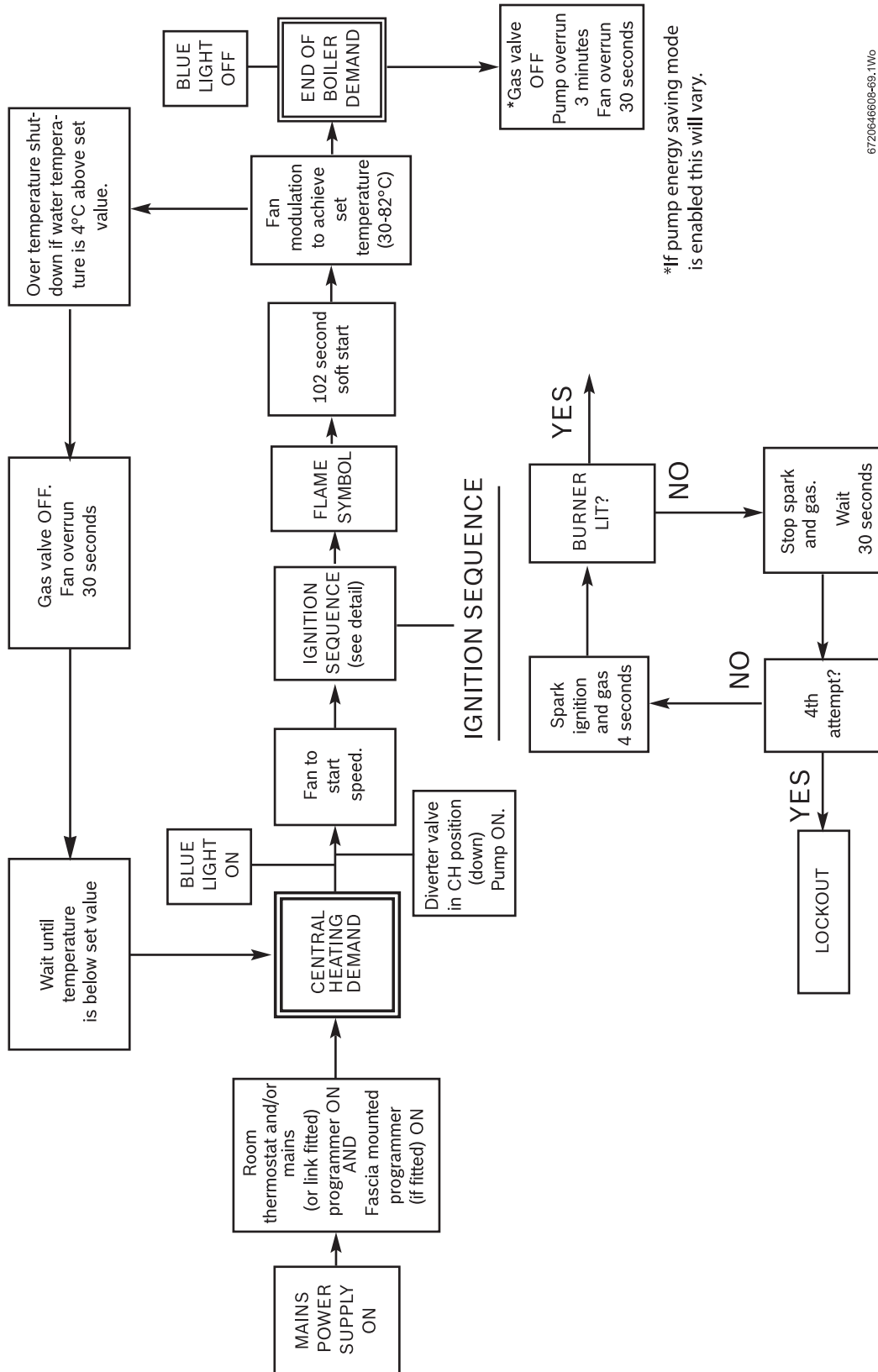
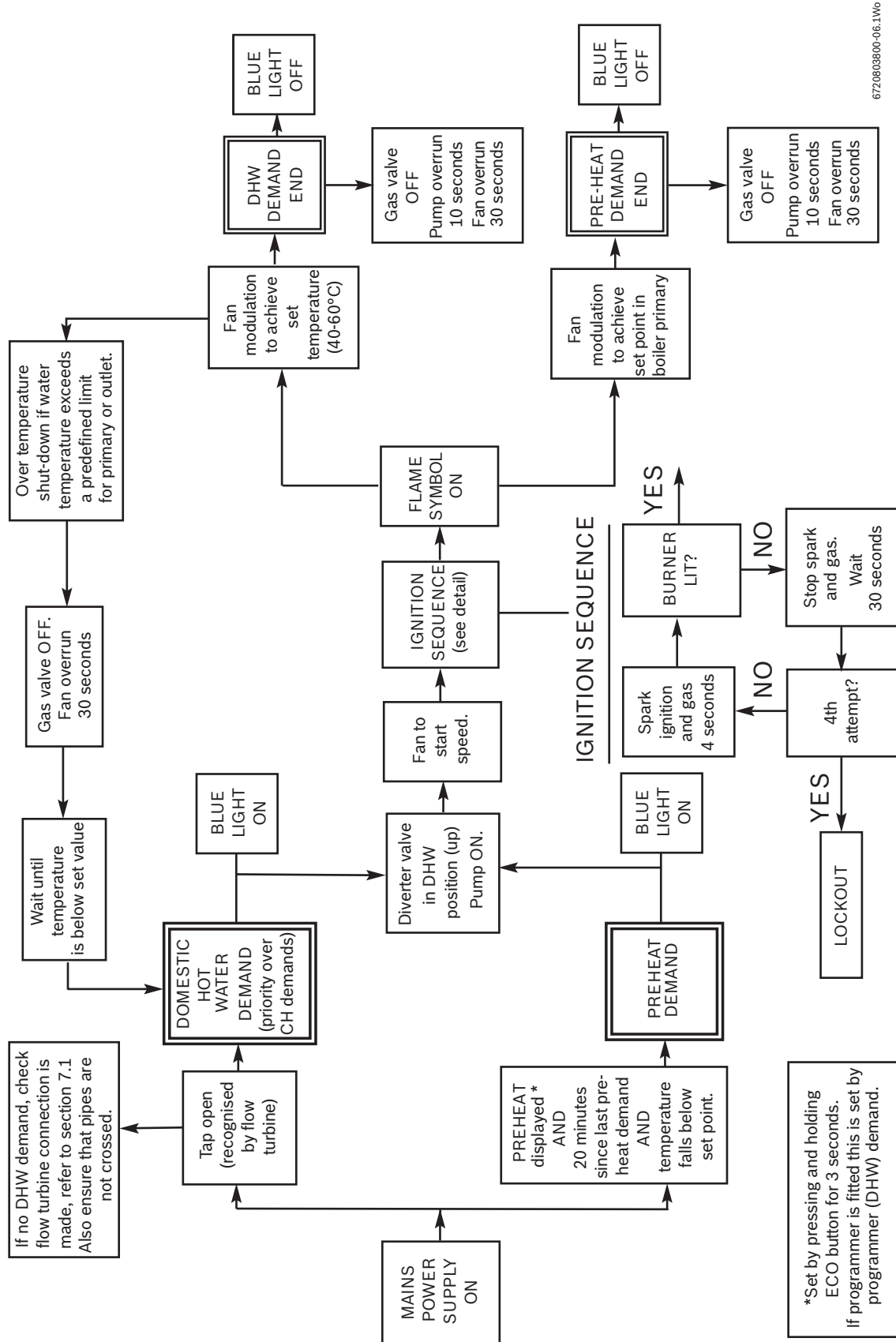


Fig. 123 Central Heating function

7.3 PREHEAT AND DHW FUNCTION

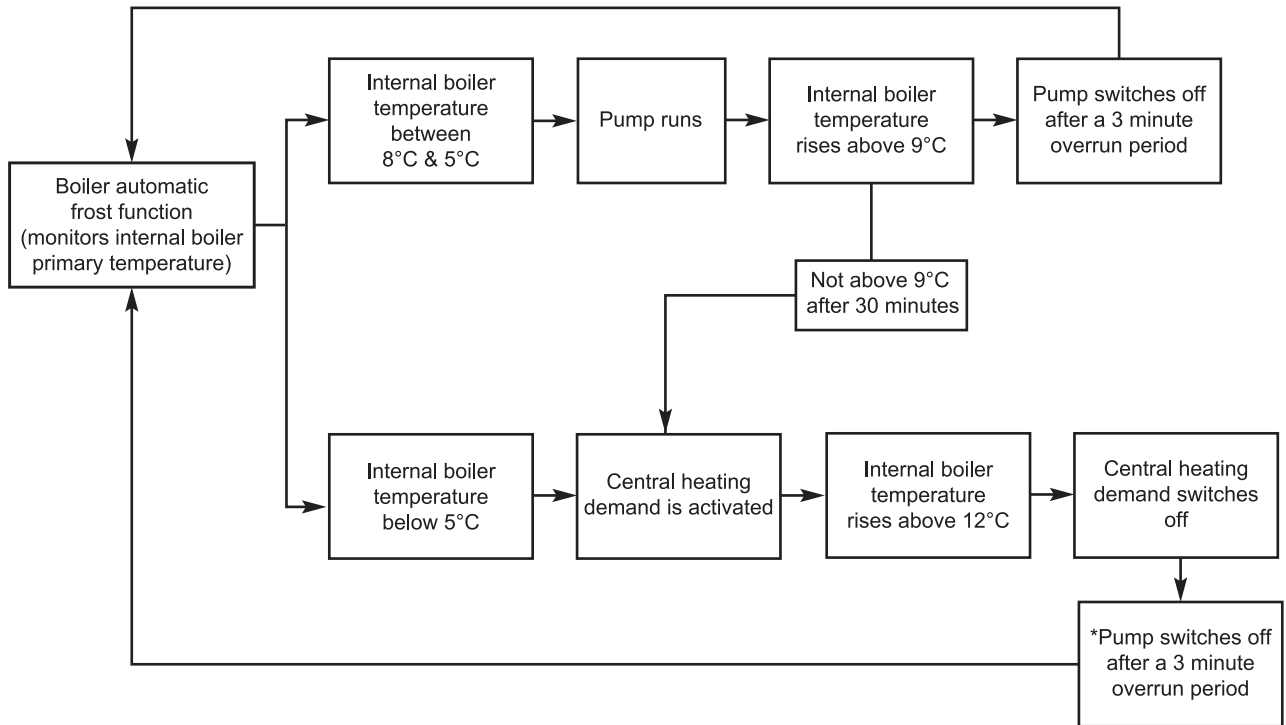


6720803800-06.1V6

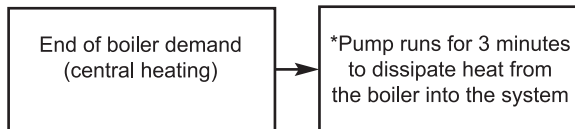
Fig. 124 PreHeat and DHW function

7.4 PROTECTION FUNCTION

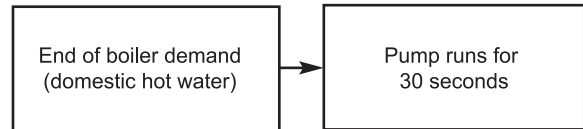
AUTOMATIC INTERNAL FROST FUNCTION



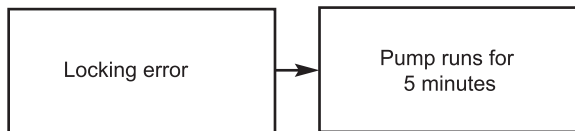
PUMP OVERRUN FUNCTION CH



PUMP OVERRUN FUNCTION DHW

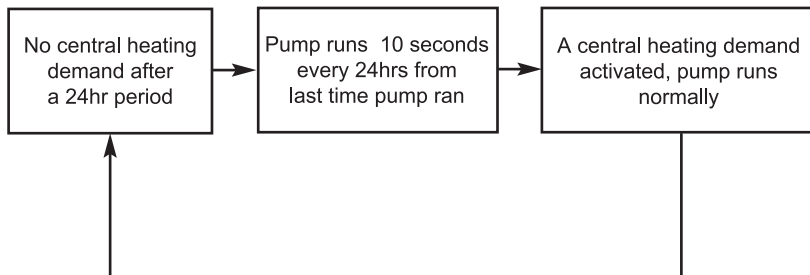


PUMP OVERRUN LOCKING ERROR



* This may vary if the Pump Energy Saving mode is enabled

PUMP ANTISEIZE FUNCTION



6720646608-71.1W6

Fig. 125 Protection function

7.5 INFORMATION AND SERVICE MENUS

STATUS CODES

During normal boiler operation various Status codes can be displayed by pressing the  button.

The first screen of the Information menu displays the current Status code, this will change as the boiler runs through the various modes and sequences. These are not always faults, but just provide information concerning the current status of the boiler.

| Status codes | Fault codes | |
|--------------|-------------|---|
| 200 | | CH System is being heated |
| 201 | | DHW system is being heated |
| 202 | | Anti rapid cycle mode |
| 203 | | System stand by |
| 204 | | System waiting, primary flow temperature above setpoint |
| 205 | | Waiting for airflow |
| 207 | CE | System pressure too low |
| 208 | | Test mode active due chimney switch |
| 210 | E9 | Flue-gas thermostat activated |
| 211 | | TTB opened (thermal kickback device) |
| 212 | | Safety or flow temperature rises too fast |
| 213 | D4 | Temperature difference between supply and return exceeding limit |
| 214 | C7 | Fan not running |
| 215 | C6 | Fan running too fast |
| 216 | C6 | Fan running too slow |
| 217 | C7 | No airflow after defined period of time |
| 218 | E5 | Flow temperature too high |
| 219 | E9 | Safety sensor temperature too high |
| 220 | E9 | Safety sensor shorted |
| 221 | E9 | Safety sensor disconnected |
| 222 | E2 | Flow sensor shorted |
| 223 | E2 | Flow sensor disconnected |
| 224 | E9 | MAX thermostat activated |
| 225 | | Difference between flow and safety exceeding limit (bi-sensor only) |
| 227 | EA | No ionisation detected after ignition |
| 228 | F7 | Ionisation current detected before burner-start |
| 229 | EA | Loss of ionisation signal during operation |
| 230 | EA | Ionisation signal out of bounds |
| 231 | FD | Mains power error - electrical power interruption |
| 232 | D3 | external cut-off switch activated |
| 233 | 9U | HCM problem |
| 234 | EA | Gas valve coil disconnected |
| 237 | C4 | Airflow present during last 24 hours - fan running continuously |
| 238 | F0 | Gas valve error |
| 239 | F0 | Watchdog relay error |
| 240 | D1 | Return sensor shorted |
| 241 | D1 | Return sensor disconnected |
| 242 to 256 | F0 | Internal error call Bosch helpline 0844 892 3366 |
| 257 | b7 | Internal error - replace control board |
| 258 & 259 | F0 | Internal error call Bosch helpline 0844 892 3366 |
| 260 | | No temperature rise after burner start |
| 261 | EA | First Safety timing error |
| 262 & 263 | F0 | Internal error call Bosch helpline 0844 892 3366 |
| 264 | C1 | Airflow stopped during operation |
| 265 | | Stand-by mode forced due to energy transfer limit |
| 266 | CE | No pressure variation detected after switching pump |
| 267 | F0 | Watchdog timeout error |
| 268 | | Component test mode |
| 269 | EA | Ignition device activated too long |

| Status codes | Fault codes | |
|--------------|-------------|--|
| 270 | | Power up mode |
| 271 | D4 | Temperature difference between flow and safety sensor exceeding limit |
| 272 | F0 | Internal error |
| 273 | C4 | Airflow present during last 24 hours |
| 274 | | Ionisation signal present during last 24 hours |
| 276 | E9 | Flow temperature exceeded 95° |
| 277 | E9 | Safety sensor temperature exceeded 95° |
| 278 | F0 | Sensor test failed |
| 279 | F0 | AD converter error, unstable measurement |
| 280 | F0 | Recycle timing error |
| 281 | A1 | Pump stuck or running in air |
| 282 | H5 | No feedback from pump |
| 283 | | Burner starting |
| 284 | | Gas valve(s) opened, first safety time started |
| 285 | E9 | Return temperature exceeded 95°C |
| 286 | D1 | Return temperature too high |
| 287 | F0 | Ionisation sensor shorted |
| 288 | CF | Water pressure sensor not connected or short-circuit to supply |
| 289 | CF | Water pressure sensor not connected or short-circuit to ground |
| 290 | F0 | AD converter reference error |
| 305 | | Anti fast cycle mode |
| 306 | FA | Ionisation detected after burner stop |
| 307 | | Pump stuck |
| 308 | | Pump running in air |
| 309 | | CH & DHW system are being heated |
| 310 | | CUS communication error |
| 311 | | CUS locked |
| 312 | | CUS blocked |
| 313 | | CUS reported error condition |
| 314 | | Mains disconnected during super lockout |
| 315 | | Several times lack of water flow |
| 316 | E9 | Flue gas sensor temperature too high |
| 317 | A3 | Flue gas sensor shorted |
| 318 | E9 | Flue gas sensor disconnected |
| 321 | | Self-test of flue gas supervision |
| 322 | | Code error |
| 323 | A8 | EMS communication error |
| 324 | | DHW-NTC defect |
| 325 | | DHW-NTC not correctly installed |
| 326 | | Storage-NTC defect |
| 327 | | Reset-key stuck or short-circuit |
| 328 | | Internal error |
| 329 | CE | No pressure variation detected after switching pump |
| 332 | E5 | Supply sensor exceeded 110°C |
| 333 | | Start temporarily not allowed due to flow error on CH |
| 338 | F0 | Too many short burner starts without confirmation of water flow |
| 341 | D4 | CH: supply and/or return temperatures rising too fast |
| 342 | D4 | HW: supply temperature rising too fast |
| 343 | ED | CH: flue gas temperature rising but supply temperature not |
| 344 | ED | HW: flue gas temperature rising but supply temperature not |
| 345 | EF | Supply and/or return temperatures do not change after burner start |
| 346 | EC | Flue gas temperature rising too fast |
| 347 | E3 | Return temperature higher than supply temperature (some time after burner start) |
| 348 | EE | HW: supply temperature too hot |

| Status codes | Fault codes | |
|--------------|-------------|--|
| 349 | EF | CH: Boil Detect, large delta T despite minimum burner load |
| 350 | E2 | Flow sensor shorted 351 'E2' Flow sensor disconnected |
| 353 | -- | Burn temporarily blocked due to no 20 minute continuous OFF time in last 24 hours. |
| 354 | | Overpressure setting erased |
| 357 | | Primary Heat Exchanger air venting program active - approx. 100 seconds |
| 358 | | Three way valve kick |
| 359 | | DHW outlet temperature too hot |
| 364 | FA | Gas valve EV2 leak test failed |
| 365 | Fb | Gas valve EV1 leak test failed |
| 372 | | Temporarily ignoring CH requests to limit temperatures of the appliance components |
| 373 | 8C | SuperLock caused by too frequent thermostat overheat detections during burning |
| 374 | 8C | SuperLock caused by too frequent ionisation loss during burning |
| 375 | E4 | Preheat sensor on DHW inlet Short Circuit |
| 376 | E4 | Preheat sensor on DHW Inlet Open Circuit |
| 380 | | Inlet temperature greater than DHW Outlet Set point |
| 800 | CC | Outdoor sensor defect |
| 808 | A7 | Domestic hot water sensor defect |
| 810 | | Domestic hot water remains cold |
| 828 | | Water pressure sensor defect |





7.5.1 SELECTING THE INFORMATION MENU

The Information Menu is a "read only" menu. Information about the boiler is displayed here, some of the values are updated in real time to give the current status of the boiler.

All menus time-out after two minutes and the display returns to the normal operation display, the display backlight turns off after another 30 seconds.

Double up or down arrows indicate that the menu can only be scrolled up or down, an up and down arrow combination indicates position in the menu where options can be scrolled either up or down.

To enter Information menu:

1. Press the  button to enter the information menu.
 - ▶ A three figure boiler status code will be displayed along side the information menu number. Refer to status code table on page 58 for a description of the boiler status codes.
2. Use the  and  arrow buttons to scroll through the menu items.
 - ▶ Press the  button again to exit the Information menu.

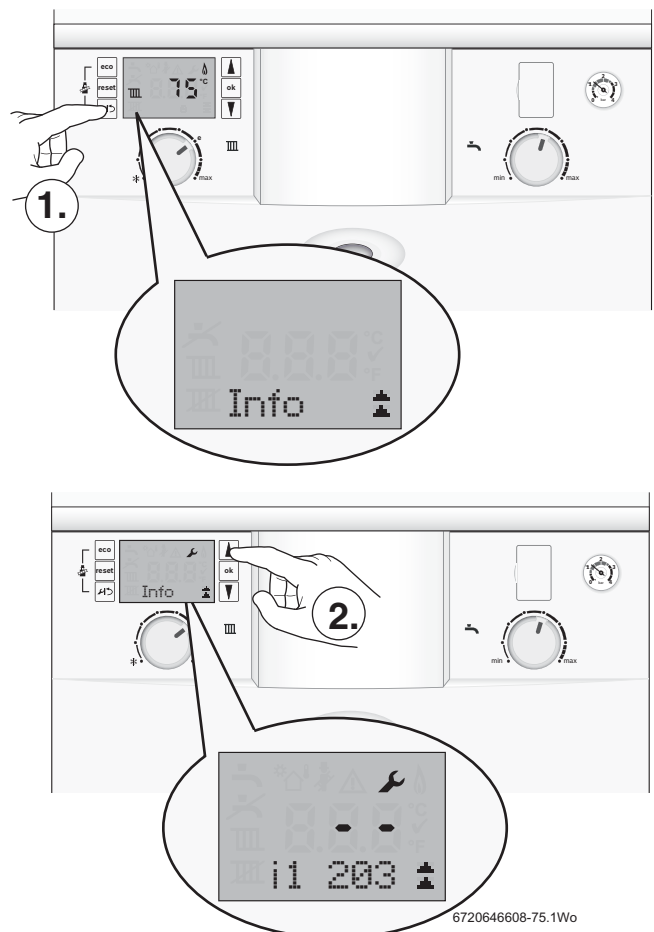


Fig. 126 Accessing the Information menu

6720646608-75.1Wo

| | | |
|-----|--|---|
| i1 | Current status | Every operation and mode of the boiler has a related boiler status code. The boiler status code is displayed on the screen as a three figure number. Refer to table on page 58 or error table for information on the boiler status codes. |
| i2 | Last error | This can be viewed during normal operation. Displays the last diagnostic code with boiler status code. |
| i3 | Maximum heating output | The maximum possible heat output is displayed in kW. The boiler may have the maximum output reduced via Menu 3.1A |
| i6 | DHW flow rate at 40 °C temp. rise ± 15%. | The screen displays the current DHW flow rate in litres per minute to one decimal place. |
| i7 | Supply temperature setpoint | This is the temperature set point for the primary flow from the main heat exchanger. (This will be zero during HW demand.) |
| i8 | Ionization current | The ionization current should be equal to or greater than 35 µA (micro Amps). |
| i9 | Flow temperature | This is the actual temperature from the main heat exchanger displayed in real time. |
| i10 | Maximum temperature | This is the current temperature from the "Maximum safety sensor". This sensor is mounted on the front of the heat exchanger. |
| i11 | DHW flow temperature | The current DHW flow temperature. |
| i12 | DHW temperature setpoint | This is the temperature selected via the Hot Water control knob on the fascia. |
| i14 | Return temperature | The current temperature returned to the main heat exchanger. |
| i15 | Outdoor temperature | |
| i16 | Pump modulation | The current pump modulation is displayed as a percentage. |
| i17 | Burner modulation | The current burner modulation is displayed as a percentage. |
| i18 | Fan speed | The current fan speed is displayed in Hertz. The value is up-dated in real time. |
| i19 | Time inputs | This indicates the status of the optional fascia mounted controls: 0 = CH off, DHW off 1 = CH off, DHW on 2 = CH on, DHW off 3 = CH on, DHW on |
| i20 | Software version | Firmware version of the main control board. |
| i21 | Software version | Firmware version of the fascia control display board |

Table 17 Information menu listing

| | | |
|-----|---|---|
| i22 | Heat Control Module (HCM) number. | The last three digits of the HCM are displayed: 332 = 28kW Combi N.G. 333 = 28kW Combi L.P.G. 334 = 32kW Combi N.G. 335 = 32kW Combi L.P.G. 372 = 36kW Combi N.G. 373 = 36kW Combi L.P.G. |
| i23 | Heat Control Module (HCM) version number. | For example "4" |

Table 17 Information menu listing

7.5.2 SELECTING SERVICE MENUS

1. Press and hold and together for one second, the display will show Menu 1.

Double up or down arrows indicate that the menu can only be scrolled up or down, an up and down arrow combination indicates position in the menu where options can be scrolled either up or down.

2. Scroll up and down through the menus with the and buttons on the right hand side of display.

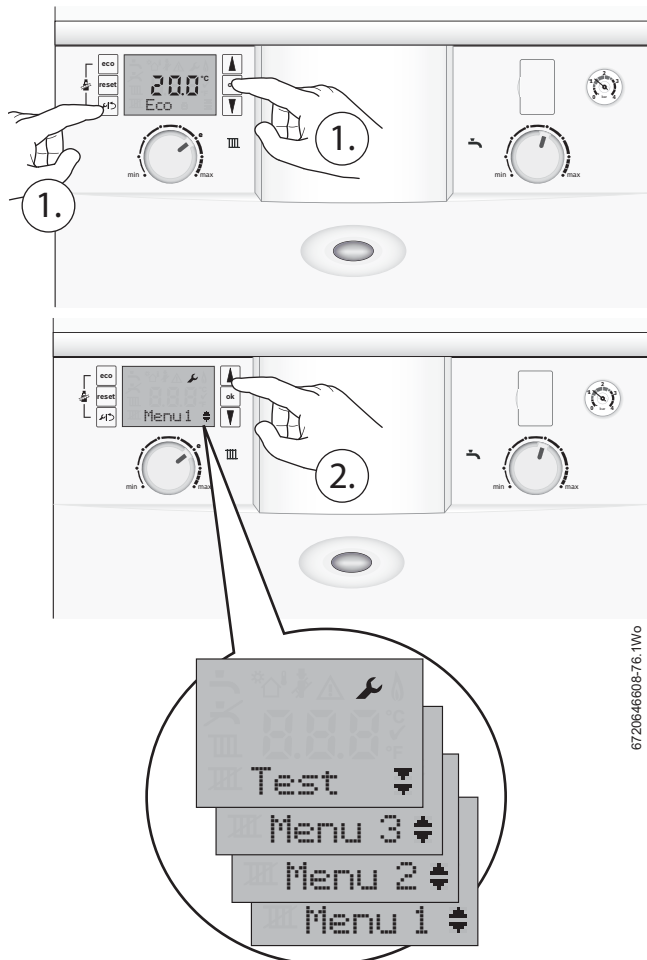


Fig. 127 Service menu selection

7.5.3 MENU 1 - SYSTEM PARAMETERS

Not applicable for Greenstar CDi Compact.

Initially Menu 1 will be displayed, but will contain no options.

7.5.4 MENU 2 - BOILER PARAMETERS

1. Select Menu 2 via the and scroll buttons.
2. Press and hold the button for one second to enter Menu 2.

This menu lists the boiler parameters, which can be adjusted in this menu.

To modify setting, select the desired menu option (refer to table 18) and press the button, the option will flash.

Adjust the parameter using the and arrow buttons and press the button to confirm.

A will display for three seconds to confirm the update of the new value.

If the setting is confirmed please record the saved value in the empty box next to the relevant setting in Table 18.

The same process is used for adjusting all Menus 1, 2, 3 and Test.

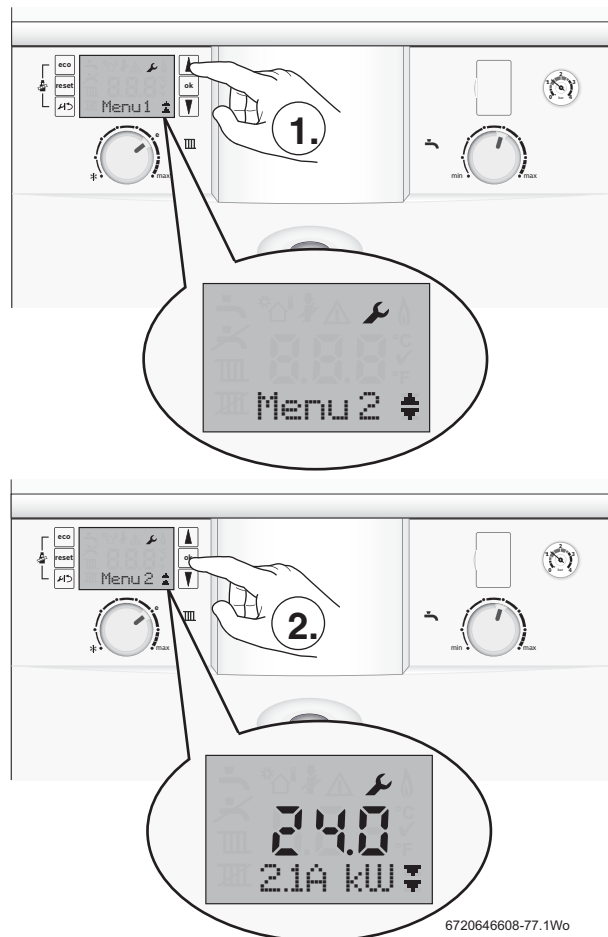


Fig. 128 Menu 2 selection

6720646608-77.1Wo

| Para No. | Parameter | Description | Updated valve |
|----------|---|---|---------------|
| 2.1A | Maximum power CH | Range rate the CH of the boiler. Adjustment in kW. The maximum is 24kW. | |
| 2.1C | Pump head selection | Select the right pump map (load and modulation percentage) to suit the property. 0 = Variable speed setting 1 to 4 option pump maps | |
| 2.1H | Minimum pump speed (pump speed at maximum CH burner load) | This parameter is only visible when 2.1C is set to 0 and 2.1D is set to 1. Then the minimum pump speed can be set. | |
| 2.1J | Maximum pump speed (pump speed at maximum burner load) | This parameter is only visible when 2.1C is set to 0 and 2.1D is set to 1. Then the maximum pump speed can be set. | |
| 2.1E | Pump energy saving mode | 4 = mode ON, 5 = mode OFF | |
| 2.2C | Air purge mode | This feature can be selected to purge the system and boiler of air. 0 = off, 1 = auto | |
| 2.3B | Anti fast cycle time for CH | This sets the amount of time between stop and starts of the main heat exchanger. The default is 10 minutes, the range is 0 to 60 minutes. | |


Table 18 Menu 2 parameters

| Para No. | Parameter | Description | Updated valve |
|----------|---|--|---------------|
| 2.3C | Anti fast cycle flow temperature hysteresis (negative tolerance only) | This sets the temperature drop before the burner re-starts, 6°K is the default. This is used in conjunction with the "Anti fast cycle time" The range is from 2 to 15°K in 1°K steps. | |
| 2.3F | CH delay after DHW demand | The default time is 2 minutes and can be adjusted to be between 0 and 30 minutes. This feature helps to keep the DHW heat exchanger hot if frequent demands are made. The boiler will not burn extra gas. CH will not be heated during this set time period. | |
| 2.5F | Service reminder time | Between 1 and 72 months can be set | |
| 2.7A | Operation/fault indicator (blue light) activation | 0 = The blue light will only operate as a flashing fault alert. 1 = The blue light will operate as a boiler operation and fault alert. This is set to 1 by default. | |
| 2.9E | Turbine signal delay | Delay time set to ignore a temporary DHW demand. Maximum delay is three seconds which can be set in ¼ second increments, e.g. 0.5 seconds is displayed as 2 or 1 second as 4. | |
| 2.9F | Pump post purge time for CH | The default pump overrun time is 3 minutes. This can set between 3 and 30 minutes. The actual time will be affected by the Pump Energy Saving mode. | |





Table 18 Menu 2 parameters

7.5.5 RESET TO FACTORY SETTINGS

To reset any or all changes made in menu 2 back to the factory defaults setting:



NOTICE: Menu 3
▶ Any changes made in Menu 3 are not reset via these actions.

- Press and hold the ,  and  arrow button for at least five seconds.
The screen will then display code 8E with the spanner symbol.
- Press the  button and "Reset" will be displayed with the tick symbol for three seconds.
After three seconds the screen will revert to the normal operation screen.

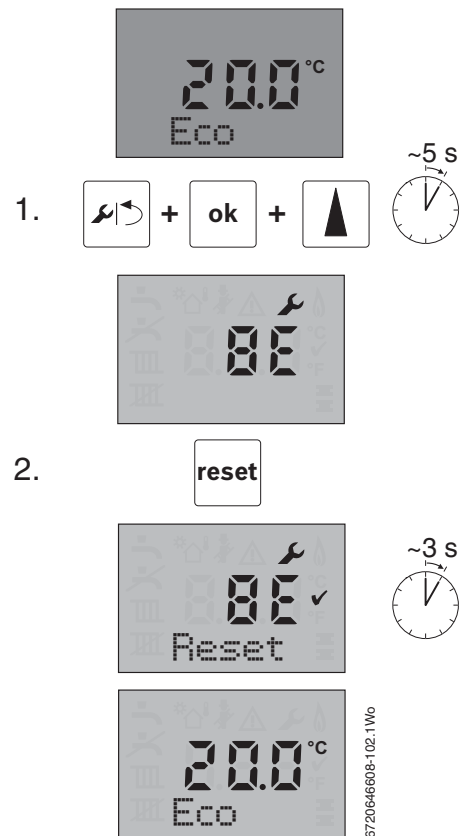


Fig. 129 Reset sequence



7.5.6 MENU 3 - BOILER MAXIMUM & MINIMUM LIMITS

The menu shows the boiler's minimum and maximum limits. Which can be adjusted in this menu.


The boiler will revert to adjusted settings in Menu 3 following a power interruption.

Menu 3 cannot be factory re-set.

- Select menu 3 via the  and  scroll buttons.
- Press and hold the  button for at least 5 seconds to enter Menu 3.

To modify setting, select desired menu option (refer to table 19) via the  and  arrow buttons and press the OK button, the option will flash.

Adjust the parameters using the  and  arrow buttons and press the OK button to confirm.

A  symbol will be displayed for three seconds to confirm the update of the new value.

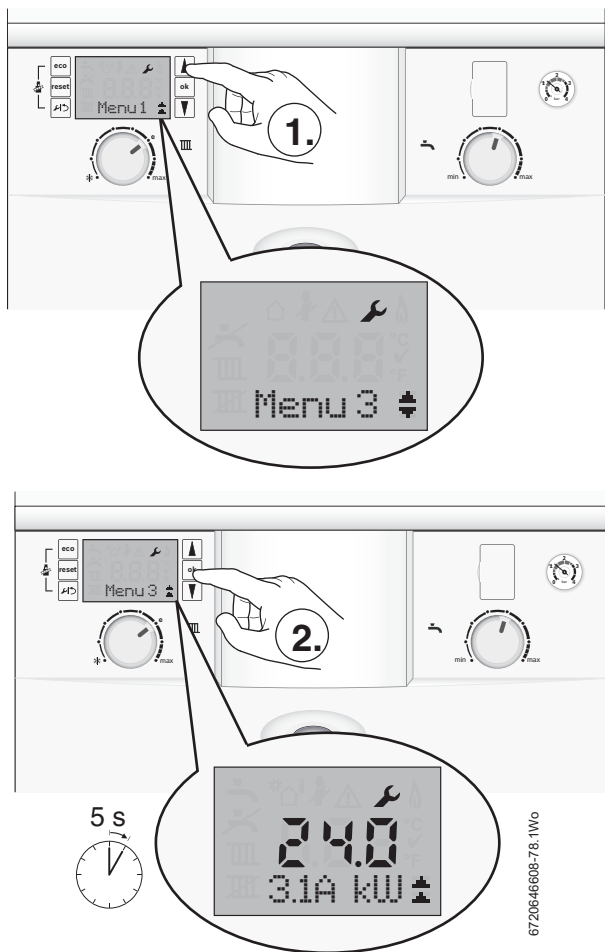


Fig. 130 Menu 3 selection

| | | |
|------|--|---|
| 3.1A | Maximum heating output | The maximum heating output in kW can be set here. The output can be down rated. Note: When maximum boiler output is required for CO/CO ₂ testing, this parameter is ignored and full power is delivered for the duration of the test. |
| 3.2B | Maximum flow temperature | This limits the upper flow temperature of the central heating knob. Which is 82°C as a maximum. This can be down rated. |
| 3.3D | Minimum boiler power for both heating and hot water. | This sets the minimum output, for example 3kW. |

Table 19 Menu 3 parameters

7.5.7 USING THE TEST MENU

This menu enables the testing of the functionality of components in an ON/OFF mode. The duration of each test is up to 60 seconds.

1. Select menu TEST via the ▲ and ▼ scroll buttons.
2. Press the ok button for one second to enter TEST.

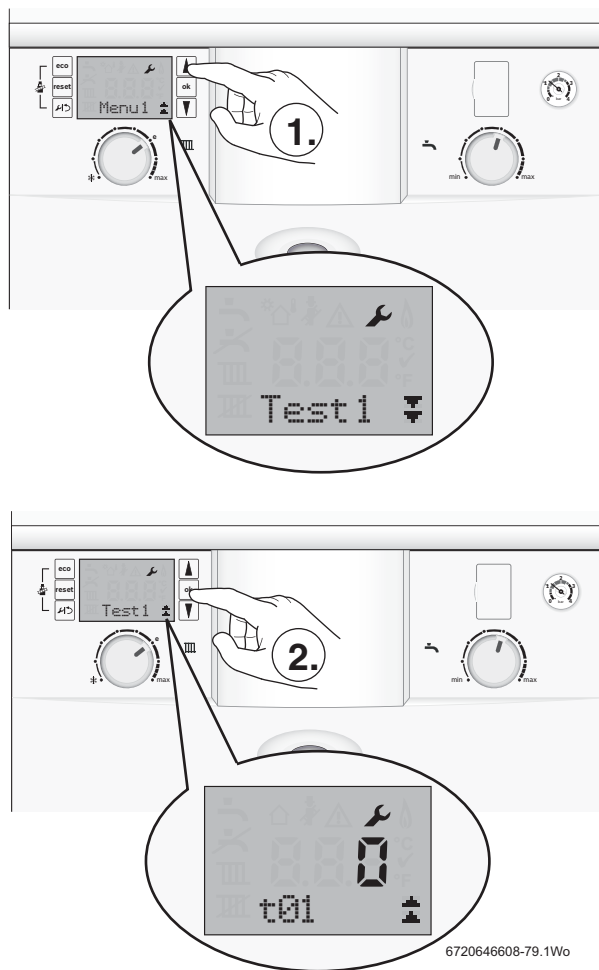


Fig. 131 Selecting test menu

SELECTING A TEST COMPONENT

Refer to table 20 and use the ▲ and ▼ arrow buttons to scroll through the various test options.

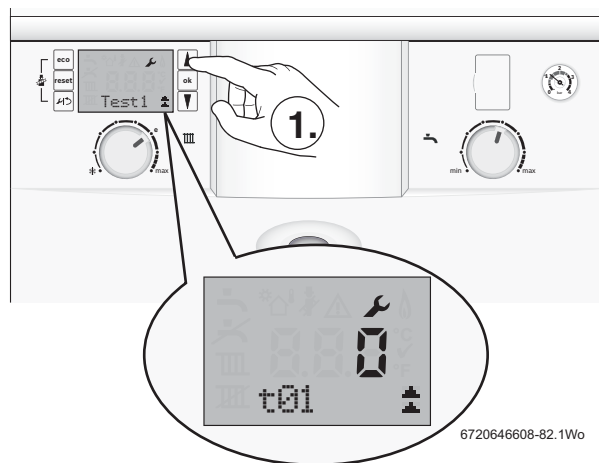


Fig. 132 Scroll through test options

TESTING THE COMPONENT

- ▶ Select a component to test.
- ▶ Press the **ok** button, the value 0 will flash.
- ▶ Use the **▲** arrow button to change the value to a flashing 1.
- ▶ Press **ok** to confirm the change, the value 1 will stop flashing and a **✓** will displayed for 3 seconds.

The test will run for 30 to 60 seconds unless the value is changed back to 0 before that time, the test may take 10 seconds to start.

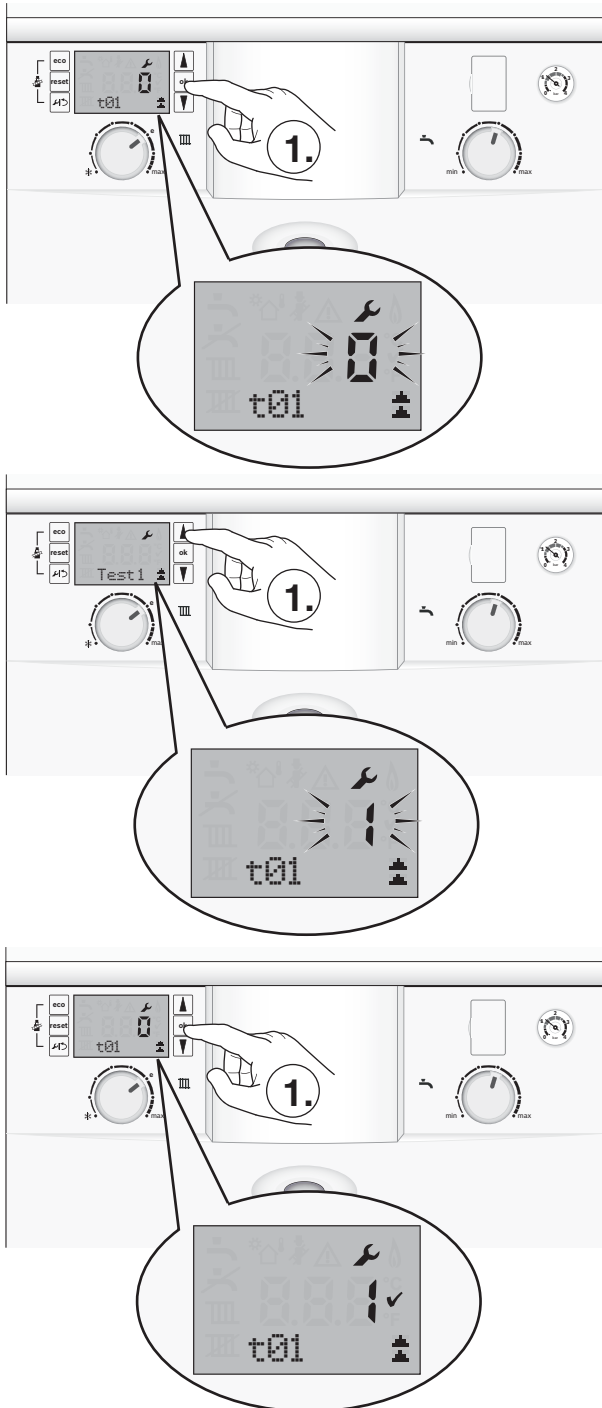


Fig. 133 Testing component

RESETTING THE TEST COMPONENT

After completing the test:

- ▶ Press the **ok** button, the value 1 will flash.
- ▶ Press the **▼** arrow button, the value will change to a flashing 0.
- ▶ Press **ok** to confirm the change, a **✓** will display for 3 seconds.

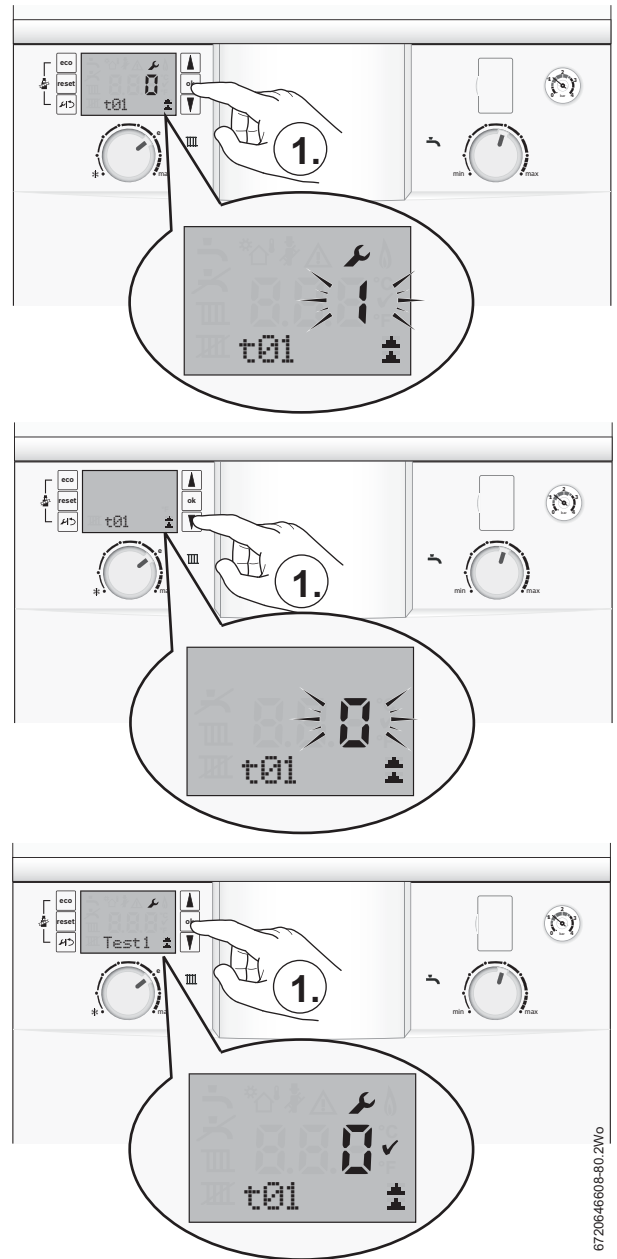


Fig. 134 Resetting test

| Note that it could be up to 10 seconds after the button is pressed before the selected component responds. | | |
|---|--|---|
| Test | | |
| t1 | Igniter test. Checking the igniter spark. | The igniter will spark for a maximum of 30 seconds. The spark will be audible if the igniter is OK. |
| t2 | Fan test. Checking the basic fan operation. | The fan will run for a maximum of 30 seconds. If the fan is OK then the fan will be heard running. |
| t3 | Pump test. Checking the basic pump operation. | The pump will run for a maximum of 45 seconds. If the pump is OK then the pump will be heard running. |
| t4 | Three way valve test. Test the operation of the diverter valve. | When 1 is selected via the test menu the diverter valve will move to the DHW position. When 0 is selected the valve will move to CH position. |
| t6 | Ionisation oscillator test. Tests the flame detection circuit. | Ionisation circuit is switched on. An A.C. voltage of approximately 150 Volts can be measured between the ionisation probe and earth. |

Table 20 Test menu

7.6 FAULT CODES

Should a fault develop with this boiler (or the system), the boiler will enter a locking or blocking condition, and fault code information will be generated as described in this section.

| | |
|----------------|--|
| Locking error | The boiler display will flash a warning triangle and fault code. At the same time a (static) cause code will also be displayed. Manual intervention is required following clearance of the fault: ▶ Press the reset button on the boiler fascia |
| Blocking error | The boiler will stop operating with no fault data displayed. The cause code, in the info menu, is accessed by pressing the spanner/return button. The condition will clear automatically when the associated fault clears e.g. waiting for an area to cool. In some cases a blocking error has a defined time duration prior to changing to a locking condition. |
| Fault code | Alpha numeric number indicating the fault group |
| Cause code | Three digit number. During a blocking error (or normal operating status) it is not displayed, but accessed in the info menu via the spanner/return button. During a locking error the cause code flashes on the display. |

LOCKING ERRORS

| Fault codes | Cause codes | Description | Reset type | Possible cause |
|-------------|-------------|---|--------------|--|
| 9U | 233 | HCM (Heat Control Module) | Reset button | Problem with the code plug |
| b7 | 257 | Internal error | | Replace control board. |
| C6 | 215 | Fan problem | Reset button | Fan running too fast |
| | 216 | Fan problem | Reset button | Fan running too slow |
| C7 | 214 | Fan problem | Reset button | Fan not running |
| | 217 | No airflow after a defined period of time | Reset button | Fan not running or airflow blocked |
| D1 | 240 | Return sensor error | Reset button | Sensor wet or damaged (the boiler will block for 300 secs before this condition). |
| | 241 | Return sensor error | Reset button | Sensor disconnected or damaged (the boiler will block for 300 secs before this condition). |
| | 286 | Return temperature too high | Reset button | Boiler overheat |
| E2 | 222 | Flow sensor short circuit | Reset button | Flow sensor shorted or damaged. |
| | 223 | Flow sensor open circuit | Reset button | Flow sensor disconnected or damaged. |
| E5 | 218 | Flow temperature too high | Reset button | Primary flow sensor overheated |
| | 332 | Primary flow sensor has exceeded 110°C | Reset button | Primary flow sensor overheated |
| E9 | 219 | Safety sensor temperature too high | Reset button | The main heat exchanger has overheated. Maximum temperature 105C° |
| | 220 | Safety sensor short circuit | Reset button | Maximum temperature sensor on the main heat exchanger has failed. |
| | 221 | Safety sensor open circuit | Reset button | Maximum temperature sensor on the main heat exchanger has not been recognised. |
| | 224 | Max temperature thermostat activated | Reset button | Flue gas thermostat overheat |
| EA | 227 | No flame detected after ignition | Reset button | Failure of four ignition attempts. The boiler waits 30 seconds before another attempt is made. |
| | 229 | Loss of flame signal during operation | Reset button | An established flame has been extinguished. This could be caused by: • moisture in the sump, due to a blocked sump/condensate trap. • a strong wind into the flue. |
| | 234 | Gas valve error | Reset button | Gas valve coil disconnected |
| | 261 | Ignition timing error | Reset button | Flame not established during the first 4 seconds ignition period. |

Table 21 Locking fault and cause code listing

| Fault codes | Cause codes | Description | Reset type | Possible cause |
|-------------|-------------|---|--------------|--|
| F0 | 237 | Internal error | | Call Worcester, Bosch Group Technical helpline 0844 892 3366 |
| | 238 | Gas valve error | Reset button | Leaking gas valve |
| | 239 | Internal error | | Call Worcester, Bosch Group Technical helpline 0844 892 3366 |
| | 242 - 256 | | | |
| | 258 | | | |
| | 259 | | | |
| | 262 | | | |
| | 263 | | | |
| | 267 | | | |
| | 272 | | | |
| | 279 | | | |
| 290 | | | | |
| | 278 | Sensor test failed | Reset button | On power up all safety sensors are checked. Check has failed. |
| | 280 | Recycle time error | Reset button | After the burner has stopped, the recycle mode purges gas from the heat exchanger before attempting to burn again. The software has 3.1 seconds to intervene before the boiler goes into this fault condition. |
| | 338 | Too many short burner starts without confirmation | Reset button | There is an error where the pump is not detecting water. |
| F7 | 228 | Flame error | Reset button | False flame. Flame detected before burner start. |
| | 328 | Internal error | | Replace control board |
| FA | 306 | False flame error | Reset button | Flame detected after burner stop |
| FD | 231 | Mains power error | Reset button | Electrical power interruption. |
| FA | 364 | Gas valve EV2 leak test failed | Reset button | Gas valve leak. |
| Fb | 365 | Gas valve EV1 leak test failed | Reset button | Gas valve leak. |

Table 21 Locking fault and cause code listing

BLOCKING ERRORS

| Fault code | Cause code | Description | Possible cause |
|------------|------------|--|---|
| A1 | 281 | Pump stuck or running in air | Little or no water in the system. |
| C1 | 264 | Airflow stopped during operation | Fan has stopped. |
| C4 | 273 | Airflow present during last 24 hours | Fan has been running continuously during the past 24 hours. |
| D1 | 240 | Return sensor short circuit | Wet sensor. Blocking for 300 secs before going to Locking error (→ table 21). |
| | 241 | Return sensor disconnected | Blocking for 300 secs before going to Locking error (→ table 21). |
| D4 | 271 | Temperature difference between flow and safety sensors exceeds limit | The temperature of the primary flow and the safety sensor on the WB7 should be within 15°C of each other. |

Table 22 Blocking codes

| Fault code | Cause code | Description | Possible cause |
|-------------------|-------------------|--|---|
| E9 | 224 | MAX thermostat activated | Flue gas thermostat overheat. |
| | 276 | Flow temperature exceeds 95°C | Primary overheat - boiler waits for temperature to reduce; if not it becomes a Locking error. |
| | 277 | Safety temperature exceeds 95°C | Main heat exchanger safety sensor overheat - boiler will wait for the temperature to reduce; if not it becomes a Locking error 219. |
| | 285 | Return temperature exceeds 95°C | The boiler will stop the burn and wait to see if it cools down. If after 2 seconds there is an increase in temperature the boiler will go to Locking error 286. |
| EA | 227 | No ionisation detected after ignition | No flame is detected. The boiler will block during 4 attempts before going to Locking fault. |
| EF | 349 | Central heating, boil detect. Large delta T despite minimum burner. | The boiler is operating at minimum burner load and there is a greater than 18°C Flow & Return temperature difference. |
| No code | 212 | Safety or flow temperature rises too fast | Air lock or reduced water content. |
| | 213 | Temperature difference between supply and return exceeding limit | Air lock or reduced water content. |
| | 260 | No temperature rise after burner starts | Sensor disconnected or no water content. |
| | 380 | Inlet DHW temperature higher than the DHW outlet temperature. | The output is blocked until the inlet temperature drops below the output temperature. |

Table 22 Blocking codes

Service Record

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

Service Provider

Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

Always use the manufacturer's specified spare part when replacing controls.

Service 1

Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 2

Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 3

Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 4

Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 5

Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 6

Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Operative ID No. _____

Comments: _____

Signature: _____

Service 7

Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 8

Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 9

Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Service 10

Date: _____

Engineer Name: _____

Company Name: _____

Telephone No. _____

Gas Safe Register No. _____

Comments: _____

Signature: _____

Worcester, Bosch Group
Cotswold Way, Warndon, Worcester WR4 9SW.
Tel. 0844 892 9900

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WORCESTER, BOSCH GROUP:

| | |
|--------------------|---------------|
| TECHNICAL SUPPORT: | 0844 892 3366 |
| APPOINTMENTS: | 0844 892 3000 |
| SPARES: | 01905 752571 |
| LITERATURE: | 0844 892 9800 |
| TRAINING: | 01905 752526 |
| SALES: | 01905 752640 |

