

Installation and Maintenance Instructions

## Gas fired condensing regular boiler

### **Greenstar 8000+**

GR8701iW 30 R | GR8701iW 35 R | GR8701iW 40 R | GR8701iW 45 R | GR8701iW 50 R



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# 1 Explanation of symbols and safety instructions

## 1.1 Explanation of symbols

### Warnings

In warnings, signal words at the beginning of a warning are used to indicate the type and seriousness of the ensuing risk if measures for minimising danger are not taken.

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

**DANGER**  
**DANGER** indicates that severe or life-threatening personal injury will occur.

**WARNING**  
**WARNING** indicates that severe to life-threatening personal injury may occur.

**CAUTION**  
**CAUTION** indicates that minor to medium personal injury may occur.

**NOTICE**  
**NOTICE** indicates that material damage may occur.

### Important information

**i**  
 The info symbol indicates important information where there is no risk to people or property.

### Additional symbols

Symbol	Meaning
▶	a step in an action sequence
→	a reference to a related part in the document
•	a list entry
–	a list entry (second level)

Table 1

## 1.2 General safety instructions

### ⚠ Notices for the target group

These installation instructions are intended for gas, plumbing, heating and electrical contractors. All instructions must be observed. Failure to comply with instructions may result in material damage and personal injury, including danger to life.

- ▶ Read the installation, service and commissioning instructions (heat source, heating controller, pumps, etc.) before installation.
- ▶ Observe the safety instructions and warnings.
- ▶ Follow national and regional regulations, technical regulations and guidelines.
- ▶ Record all work carried out.

### ⚠ 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 competent registered gas engineer, such as a **Gas Safe** registered engineer including a **British Gas** engineer. Failure to install correctly could lead to prosecution.
- If you are in any doubt, contact the Worcester, Bosch Group help line (0330 123 3366).
- Distance learning and training courses are available from Worcester.
- The BENCHMARK Commissioning Checklist can be found on page 84 of this Installation manual.

### ⚠ Intended use

The appliance may only be used for heating water or domestic hot water in domestic properties.

- ▶ Observe the details on the data plate and the specifications (installation manual) to ensure correct use of this appliance.
- ▶ Worcester, Bosch Group offer flue gas systems which are suitable for use with the appliance. It is the responsibility of the installer of the flue to ensure this flue gas system operates correctly and in a safe manner.

### ⚠ 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 or regulator.
- ▶ Open windows and doors.
- ▶ Warn your neighbours and leave the building.
- ▶ Prevent anyone from entering the building.
- ▶ Move well away from the building: call the National Gas Emergency Service on 0800 111 999.
- ▶ L.P.G. boilers: Call the supplier's number on the side of the gas tank.

### ⚠ Risk to life from carbon monoxide poisoning.

#### There is a risk to life from escaping flue gases

- ▶ Do not modify the flue gas system.
- ▶ Ensure that flue pipes and gaskets are undamaged.

#### If flue pipes are damaged or leaking:

- ▶ Turn off and isolate the appliance.
- ▶ Open windows and doors.
- ▶ If necessary, leave the building and warn your neighbours.
- ▶ Prevent anyone from entering the building.
- ▶ Rectify any damage to the flue system immediately.

### ⚠ Installation and maintenance

Installation and maintenance must only be carried out by a competent registered gas engineer, such as a Gas Safe registered engineer or British Gas engineer.

- ▶ Carry out a gas tightness test after completing work on gas-carrying components.
- ▶ Only use original spares.

### ⚠ Electrical work

Electrical work must only be carried out by a qualified electrician:

- ▶ Before starting electrical work;
  - Ensure that the electricity supply is safely Isolated and secured to prevent inadvertent re-connection. Information on safe isolation can be found in the Health and Safety Executive guidance HSG85.
  - Using test equipment approved to GS38 to confirm that the electricity supply is disconnected.
  - Before touching live parts: Wait at least five minutes to discharge the capacitors.

- ▶ Refer to the manufacturer's information when installing non Worcester components and systems to the Worcester appliance.

#### ⚠ Handover to the user

When handing over, instruct the user how to operate the heating system and inform the user about its operating conditions.

- ▶ Explain how to operate the heating system and draw the user's attention to any safety relevant action.
- ▶ In particular:
  - Advise that alterations, servicing and repairs must only be carried out by a competent, registered gas engineer, such as a Gas Safe registered engineer or British Gas engineer.
  - Advise the user to have the appliance and system serviced annually to help ensure economy, safety and reliability.
  - The heat generator may only be operated with the casing fitted and closed.
- ▶ Point out the possible consequences (including personal injury, danger to life and material damage) of improper or inadequate inspection, cleaning and maintenance.
- ▶ Point out the dangers of carbon monoxide (CO) and recommend the use of CO detectors.
- ▶ Leave the installation instructions with the completed Benchmark Checklist (or a certificate confirming compliance with IS 813, Eire only) and the operating instructions with the user or at the gas meter.

#### ⚠ Servicing

Advise the user to have the appliance and heating system thoroughly serviced annually by a competent, registered gas engineer, such as a Gas Safe registered engineer or British Gas engineer.

In the Republic of Ireland servicing work must be carried out by a Registered Gas Installer (RGII).

Approved spares must be used to help maintain the efficiency, safety and reliability of the appliance.

#### ⚠ Benchmark Service Record

The service engineer must complete the Benchmark Service Record at the back of this manual after each service.



Benchmark places responsibilities on both manufacturers and installers.

The purpose is to ensure that customers are provided with the

correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons and that it meets the requirements of the appropriate Building Regulations. The Benchmark Checklist can be used to demonstrate compliance with Building Regulations and should be provided to the customer for future reference.

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

Visit [hhic.org.uk](http://hhic.org.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 warranty.

#### ⚠ Fitting and modification

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 warranty. The manufacturer accepts no liability arising from any such actions, excluding statutory rights.

#### ⚠ General manual handling guidelines

- ▶ Only remove packaging at the time of the final installation.
- ▶ Always use Health and Safety guidance for manual handling of an appliance.
  - Never lift or carry more than the safe guidance limit on your own.
  - Always use appropriate methods and equipment when lifting/carrying an appliance.
- ▶ Never lift or carry packages by the shipping straps.
- ▶ During handling and unpacking, wear safety gloves.
- ▶ Dispose of packing materials appropriately.

#### ⚠ Important handling instructions

Care should be taken when transporting, lifting and carrying the appliance.

- ▶ Use a means of transport suitable for handling appliances (e.g. sack truck with strap, stair climbing or step trolley).
- ▶ When handling appliances, secure them against a fall.
- ▶ Let only trained personnel undertake the handling.
- ▶ The correct method for handling heavy objects should be strictly observed, at all times.

## 2 Regulations

### Installation regulations

Current Gas Safety (Installation and Use) Regulations:

All gas appliances must be installed by a competent, registered gas engineer, such as a Gas Safe registered engineer or British Gas engineer in accordance with the current 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
- ▶ IET Regulations
- ▶ Building Regulations (England)
- ▶ Building Regulations (Wales)
- ▶ Building Standards (Scotland) (Consolidation)
- ▶ S.I. No. 183 and 292 - Energy Performance of Buildings Regulations (Ireland; current version)
- ▶ Health and Safety Document 635 (The Electricity at Work Regulations 1989) and any other local requirements
- ▶ EU Regulations No. 2017/1369 - Energy Labelling (as retained in UK law and amended)
- ▶ EU Regulations No. 811/2013 - Energy Labelling (as retained in UK law and amended)

### Building Regulations Part L1A (Current version) - new dwellings

If the installation is in a new build property or it is a first time installation in an existing property, the heating systems must conform to current building regulations Part L1A.

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

An alternative would be individual electronically controlled TRVs.

For dwellings with a floor area over 150m<sup>2</sup>, separate time and temperature control for each zone is required. It is best practice to fit Thermostatic Radiator Valves (TRV's) to all radiators except the area where the room thermostat is sited.

#### **Building Regulations Part L1B (Current version) - existing dwellings**

For appliance 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, it is best practice to fit Thermostatic Radiator Valves (TRV's) to all radiators except the area where the room thermostat is sited.

#### **British Standards**

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

- BS7074:1
  - Code of practice for domestic and hot water supply
- BS6891
  - Installation of low pressure gas pipework up to 28mm (R1)
- BS5546
  - Installation of gas hot water supplies for domestic purposes
- EN12828
  - Central heating for domestic premises
- BS5440:1
  - Flues and ventilation for gas appliances of rated heating not exceeding 70kW (net): Flues
- BS5440:2
  - Flues and ventilation for gas appliances of rated heating not exceeding 70kW (net): Air Supply
- BS7593
  - Treatment of water in domestic hot water central heating systems
- BS6798
  - Installation of gas fired boilers of rated input up to 70kW (net)
- BS7671
  - IET Wiring Regulations

#### **LPG Installations**

An appliance using LPG 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 buildings**

Where the appliance 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.

#### **Water supply:**

All seals joints and compounds (including flux and solder) and components used as part of the secondary domestic water system must meet the requirements of the WRC and hold approval by a notified body, e.g. WRAS. The installation must also comply with the requirements of Part G of the Building Regulations.

#### **CH Water**

Salt based artificially softened water must not be used to fill the central heating system.

## **3 Product Information**

### **3.1 About the appliance**

The boiler has the following features:

- Pre-wired
- Galvanised steel inner frame
- Digital control system
- Automatic ignition
- Direct burner ignition electrodes
- Built-in frost protection
- Built-in fault finding diagnostics
- Adjustable gas valve
- Modulating combustion air fan with speed regulator
- CH temperature sensor & control
- Pump anti-seizure protection
- Flue gas temperature sensor
- High-volume condensate siphon
- Plate type DHW heat exchanger
- Low Energy Modulating pump
- Range-rateable (the ability to change the maximum power output to suit the heat demand of the building)

#### **⚠ Misuse**

Appliance must be used as per the intended use statement. Operation outside the parameters of the intended use is considered misuse and could cause harm to people and damage to property.

Accessories should be as per accessories list. Minimum operational parameters are included in this document.

Using the appliance outside of its intended use may also invalidate the manufacturer's guarantee.

### 3.2 Scope of delivery

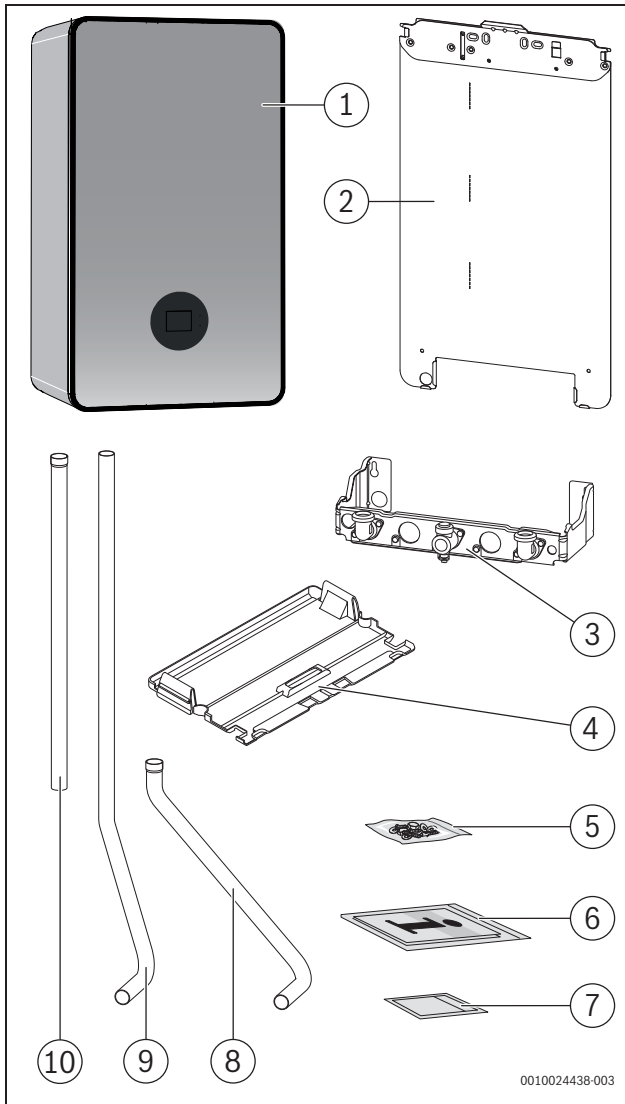


Fig. 1 Scope of delivery

- [1] Wall mounted gas condensing boiler
- [2] Mounting bracket
- [3] Mounting plate
- [4] Bottom cover
- [5] Fixing pack (screws with accessories)
- [6] Product documentation
- [7] Guarantee card
- [8] Return Pipe 1
- [9] Flow Pipe
- [10] Return Pipe 2

### 3.3 Declaration of Conformity

The design and operating characteristics of this product comply with the British, European and supplementary national requirements.



The UKCA and CE markings declare that the product complies with all the applicable British and European legislation, which is stipulated by attaching these markings.

You can request the complete text of the Declaration of Conformity from the UK address indicated in this document.

### 3.4 Simplified UK/EU Declaration of conformity regarding radio equipment

Bosch Thermotechnik GmbH hereby declares, that the product Greenstar 8000+ described in these instructions complies with the Directive UK S.I. 2017/1206 (UK) 2014/53/EU.

You can request the complete text of the UK/EU Declaration of Conformity from the UK address indicated in this document.

### 3.5 Appliance type overview

This appliance are for use with:

- Natural Gas or LPG (Cat.II 2H3P type C13, C33 & C53)

This document refers to the following appliance types:

Appliance type	Part number	Gas Council number
GR8701iW 30 R NG	7 736 702 592	41-800-29
GR8701iW 35 R NG	7 736 702 593	41-800-30
GR8701iW 40 R NG	7 736 702 594	41-800-31
GR8701iW 45 R NG	7 736 702 595	41-800-32
GR8701iW 50 R NG	7 736 702 596	41-800-33
GR8701iW 30 R LPG	7 736 702 599	41-800-36
GR8701iW 35 R LPG	7 736 702 600	41-800-37
GR8701iW 40 R LPG	7 736 702 601	41-800-38
GR8701iW 45 R LPG	7 736 702 602	41-800-39
GR8701iW 50 R LPG	7 736 702 603	41-800-40

Table 2 Type overview

The name of the appliance consists of the following parts:

- GR8301iW: Type name
- 30, 35, 40, 45 or 50: Heat output in kW
- R: Regular appliance
- NG: Gas type (Natural Gas)
- LPG: Gas type (Liquid Petroleum Gas)

### 3.6 Product identification

#### Data plate

The data plate contains performance data, approval data and the serial number of the product.

The position of the data plate can be found in the product overview in this chapter.

#### Additional type plate

The additional type plate contains information on the product name and the most important product data.

It is located in an easily accessible place on the outside of the product.

### 3.7 Pipework positions and flue outlet

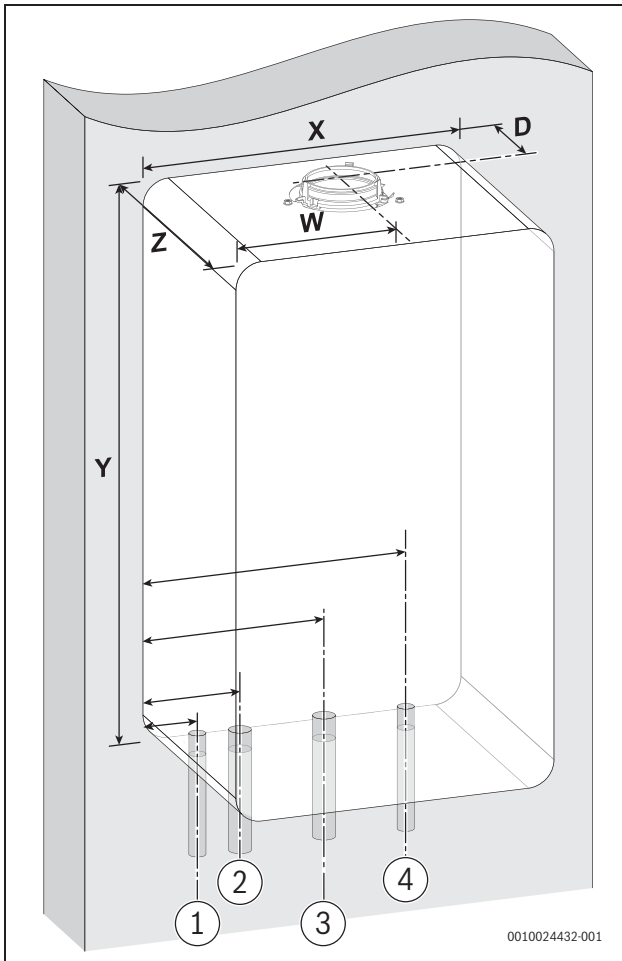


Fig. 2 Pipe and flue outlet dimensions

	Description	Dimensions (mm)
X	Appliance width	440
Y	Appliance height	780
Z	Appliance depth	365
W	Flue centre from appliance left side	220
D	Flue centre from rear of appliance	87

Table 3 Appliance and flue outlet dimensions

#	Function	From left case edge	Diameter of pipe
1	Condensate outlet	58mm	22mm • Rubber push fit connection
2	CH flow	90mm	22mm • Compression fitting
3	Gas inlet	220mm	22mm • Compression fitting
4	CH return	350mm	22mm • Compression fitting

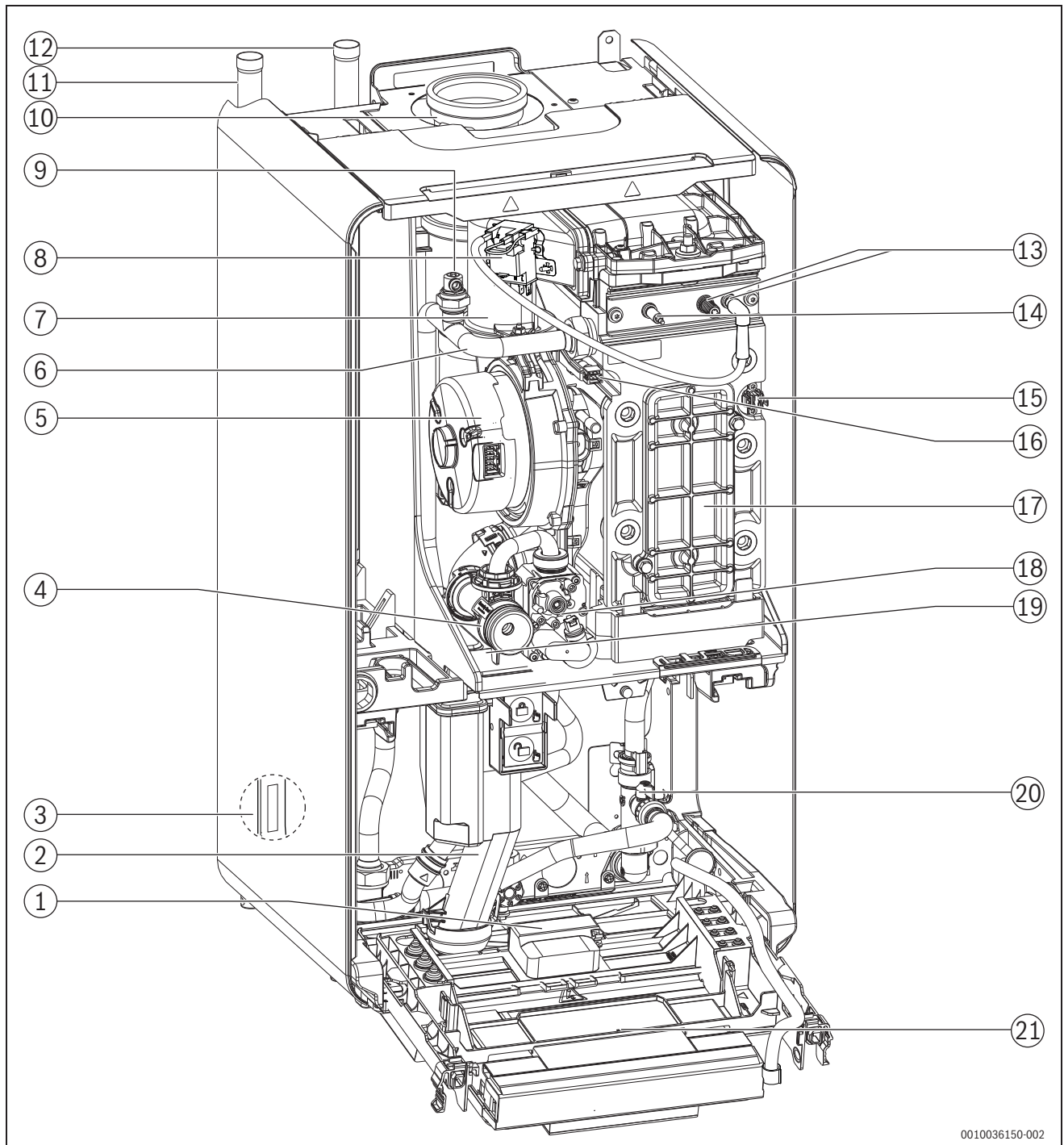
Table 4 Pipe dimensions



For servicing purposes, keep condensate discharge pipe away from other hydraulic components.



**3.8 Product overview**



0010036150-002

Fig. 3 Product overview Regular boilers, combustion cover removed

- [1] Key accessory housing slot (wireless Gateway)
- [2] Condensate trap
- [3] Data plate 1
- [4] Venturi (sealed)
- [5] Fan
- [6] Heating flow
- [7] Air-gas manifold with non-return valve
- [8] Ignition transformer
- [9] Air vent
- [10] Flue
- [11] Flow pipe
- [12] Return pipe
- [13] Ignition electrodes
- [14] Flame sensing electrode

- [15] Heating block temperature limiter
- [16] Flow temperature sensor at heating block
- [17] Inspection cover
- [18] Condensate sump
- [19] Gas valve
- [20] Drain point
- [21] Control unit

**3.9 Product data for energy consumption**

The product data on energy consumption can be found in the operating instructions for the user.

## 4 Pre-Installation

### NOTICE

#### Risk of damage to system or appliance!

Before installation

- ▶ All the following Pre-Installation sections must be read and requirements met before starting appliance or flue installations.

### 4.1 System preparation

#### 4.1.1 Artificially softened water

The heating system must not be filled with water which has been treated using an ion exchange (salt based) water softener. Where these water softeners are installed, a permanent untreated water supply should be provided to maintain pressure in the heating system.

A bypass must be provided at the water softener to comply with BS:14743. Where a permanent untreated supply cannot be provided, the system must be initially filled using the bypass provided at the water softener. Occasional topping up of the system with artificially softened water is acceptable. Inhibitor must be added to the system. The pH levels must be between 6.5 and 8.0 at the time of commissioning. When a permanent untreated supply is not provided to the heating system filling point, the pH levels must be checked annually and recorded in the service record.

### NOTICE

#### Risk of damage to appliance!

- ▶ The heating system must not be filled with water which has been treated using an ion exchange water softener.
- ▶ If the system is partially drained for maintenance or repair work, the system must be refilled by utilising the bypass valve at the water softener. The pH and inhibitor levels should be checked.

#### 4.1.2 Water systems and pipework

##### Primary system plastic pipework:

- Any plastic pipework must have a polymeric barrier, complying with BS 7921 and installed to BS 5955 with 600mm (minimum) length of copper connected to the appliance.
- Plastic pipework used for under-floor heating must be correctly controlled with a thermostatic blending valve limiting the temperature of the circuits to approximately 50°C with 1000mm (minimum) length of copper or steel pipe connected to the appliance.

##### Primary system/connections/valves:

- Do not use galvanised pipes or radiators.
- All system connections, taps and mixing valves must be capable of sustaining a pressure of 3 bar.
- Radiator valves should conform to BS 2767:10.
- All other valves should conform to BS 1010.
- It is best practice to fit Thermostatic Radiator Valves (TRV's) to all radiators, except the area where the room thermostat is sited which must be fitted with lockshield valves that are left open.
- If the circulating pump speed is fixed, and system circulation can be significantly adjusted by TRV's or zone valves, an auto bypass should be installed and adjusted to provide constant pump head pressure to the heating circuits. If flow to the heating circuits can be stopped completely by zone valves, an auto bypass must be installed and adjusted to open during pump over-run and should provide a minimum 3 metre circuit when activated. If a constant pressure pump setting is selected, and circulation cannot be completely stopped by zone valves, an auto bypass will not be required.

- Drain cocks are required at all the lowest points on the system.
- Air vents are required at all high points on the system.

#### Primary system considerations - Regular appliances

##### Open vent

- Close Coupled feed and expansion arrangement:
  - The open vent pipe and feed and expansion pipe must rise continuously from the appliance and be a maximum of 150mm apart.
  - The feed and expansion cistern must be positioned to provide a minimum static head of 250mm above the highest point in the heating system to the water level in the feed and expansion cistern.
  - Ensure adequate space is left in the expansion cistern for expansion of the system water.
- No valve shall be fitted in the open vent pipe or the feed and expansion pipe.
- The open vent pipe must be at least 22mmØ.
- The feed and expansion pipe must be at least 15mmØ.

##### Sealed system (appliance converted to operate on a sealed system)

- The CH sealed system must be filled using a WRAS approved filling loop or comply with examples in 4.1.4 "Appliances converted to sealed primary system" section.
- An expansion vessel, of a size suitable for the system, must be fitted as close as possible to the appliance in the central heating return.
- Also fit a pressure gauge, a 3 bar pressure relief valve and stop cock (fixed cylinder type or sealed system approved connection).
- No valve shall be fitted that can isolate the appliance from the expansion vessel or pressure relief valve.
- An automatic air vent must be fitted.

#### 4.1.3 System layouts examples

##### Open vent primary system - Cylinder and central heating zone:

Typical S-Plan example

- The cylinder return must be the last connection on the common return pipe to prevent reverse circulation.

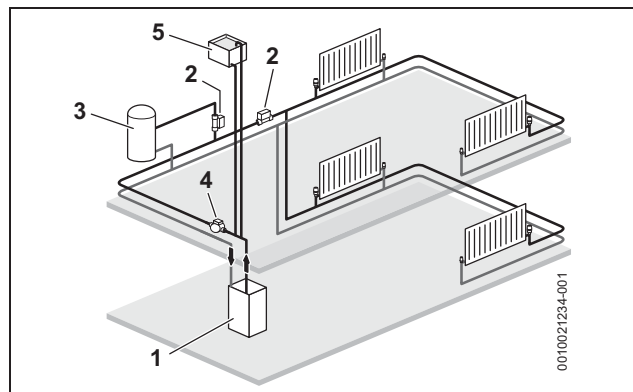


Fig. 4 Cylinder and heating zone

- [1] Appliance
- [2] Zone valves
- [3] Domestic hot water cylinder
- [4] Circulation pump
- [5] Feed and expansion tank

##### Open vent primary system - Cylinder and 2 x central heating zones:

Typical S-Plan Plus example

- The cylinder return must be the last connection on the common return pipe to prevent reverse circulation.

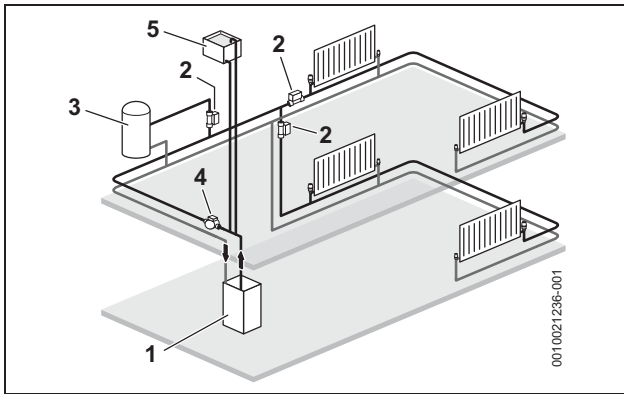


Fig. 5 Cylinder and 2 x heating zones

- [1] Appliance
- [2] Zone valves
- [3] Domestic hot water cylinder
- [4] Circulation pump
- [5] Feed and expansion tank

**Open vent primary system - 3-way valve, cylinder and central heating zone:**

Typical Y-Plan example

- The cylinder return must be the last connection on the common return pipe to prevent reverse circulation.

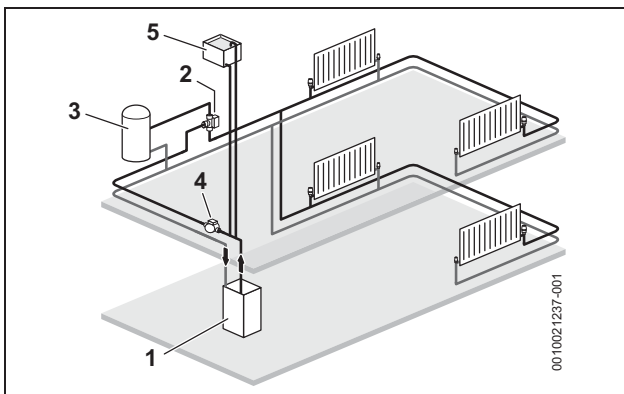


Fig. 6 3-Way valve, cylinder and heating zone

- [1] Appliance
- [2] 3-Way zone valve
- [3] Domestic hot water cylinder
- [4] Circulation pump
- [5] Feed and expansion tank

**Converted to sealed primary system - Cylinder and central heating zone:**

Typical S-Plan example

- The cylinder return must be the last connection on the common return pipe to prevent reverse circulation.

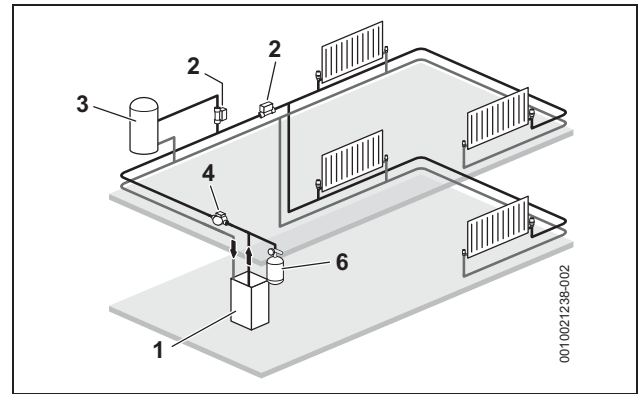


Fig. 7 Cylinder and heating zone

- [1] Appliance
- [2] Zone valves
- [3] Domestic hot water cylinder
- [4] Circulation pump
- [6] Sealed system kit
  - Expansion vessel
  - Pressure gauge
  - 3 bar pressure relief valve

**Converted to sealed primary system - Cylinder and 2 x central heating zones:**

Typical S-Plan Plus example

- The cylinder return must be the last connection on the common return pipe to prevent reverse circulation.

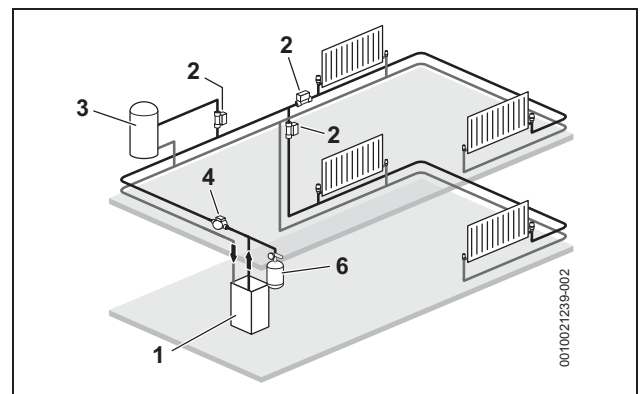


Fig. 8 Cylinder and 2 x heating zones

- [1] Appliance
- [2] Zone valves
- [3] Domestic hot water cylinder
- [4] Circulation pump
- [6] Sealed system kit
  - Expansion vessel
  - Pressure gauge
  - 3 bar pressure relief valve

**Converted to sealed primary system - 3-way valve, cylinder and central heating zone:**

Typical Y-Plan example

- The cylinder return must be the last connection on the common return pipe to prevent reverse circulation.

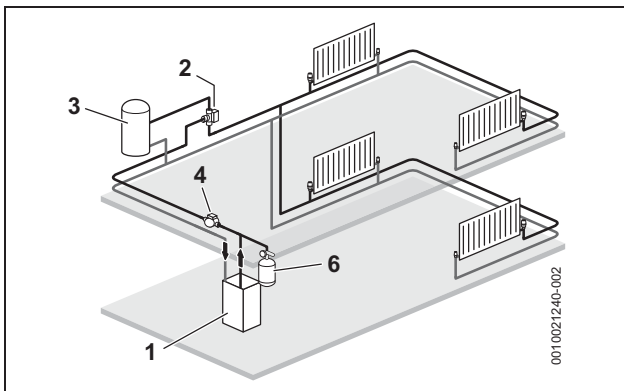


Fig. 9 3-Way valve, cylinder and heating zone

- [1] Appliance
- [2] Zone valves
- [3] Domestic hot water cylinder
- [4] Circulation pump
- [6] Sealed system kit
  - Expansion vessel
  - Pressure gauge
  - 3 bar pressure relief valve

**4.1.4 Appliances converted to sealed primary system**

**Filling primary sealed systems**

**NOTICE**

**Filling the primary sealed system**

The system must not be filled with salt based softened water.

- Ensure the primary water filling point uses an untreated cold water connection from the mains supply, before a water softener.

- Filling the system must comply with one of the following methods shown.
- The filling point must be at low level and must never be a permanent connection to the mains water supply.
- Filling loops must be WRAS approved.
- If the external filling link is sited away from the appliance, then a pressure gauge should be installed at the filling point.



The pressure shown on the gauge may differ from that shown on the digital display. Final system pressure adjustments must be made whilst referencing the digital display.

**External filling loop**

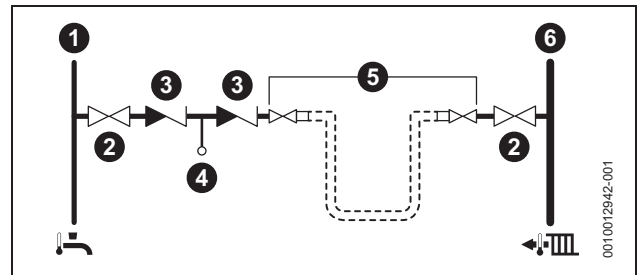


Fig. 10 External filling loop system fill example

- [1] Cold mains inlet pipe
- [2] Stop valve
- [3] Check valve
- [4] Test point
- [5] Hose union
- [6] Central heating flow pipe

**Semi-sealed system fill - Top-up tank**

In situations where the cold mains pressure is not sufficient to pressurise the system to between 0.6 and 1.7 bar an alternative can be to use a top-up tank.

This will allow the appliance to operate on a semi-sealed system configuration.

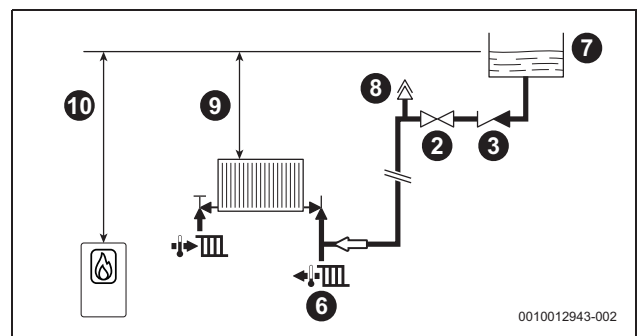


Fig. 11 Semi-sealed system top-up tank fill example

- [2] Stop valve
- [3] Check valve
- [6] Central heating flow pipe
- [7] Top-up tank
- [8] Automatic air vent
- [9] Minimum height above the highest point of the system - 1000mm (39 in)
- [10] Minimum static head above top surface of the appliance to the water level in feed and expansion tank - 2000mm (79 in).

## 4.2 Mains supply

### 4.2.1 Electrical supply

- Supply: Single phase, 230V AC - 50 Hz
- The power supply and wiring for the appliance must comply with the current applicable national and regional regulations as well as all technical rules and guidelines for electrical installations.
- The wiring between the appliance and the electrical supply must comply with the current applicable national and regional regulations as well as all technical rules and guidelines for electrical installations.
- External isolator fuse size for the appliance: 3 Amps.
- The appliance must be earthed.
- Cable: Flexible PVC insulated cable, 0.75mm<sup>2</sup> temperature rated to 90 °C, in accordance with regulations as well as all technical rules and guidelines for appliance power supply installations.
- Any additional components that are connected to the appliance must be connected through the same isolator as the appliance.
- Additional equipment wired to the appliance must comply with the current applicable national and regional regulations as well as all technical rules and guidelines.
- Appliance IP rating - IPX4D

### 4.2.2 Gas supply

- Appliances using Natural Gas (NG) must be connected to a governed meter.
- Appliances using Liquid Petroleum Gas (LPG) must be connected to a regulator.
- Installation and connection of the gas supply to the appliance must be in accordance with the latest version of BS6891.
- Gas pipe sizing should be calculated to ensure no more than the permitted mbar drop between the meter/governor to the appliance inlet (→ chapter 13.7).
- The meter or regulator and its pipework 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.

#### Pipe sizing (NG & LPG)



Gas pipework:

- ▶ Gas installation pipework must be designed to ensure the pressure loss between the meter outlet (NG) or storage and regulator (LPG) and the inlet to each appliance does not exceed 1mbar (NG) 2.5mbar (LPG) (→ table 16 "Allowed mbar pressure drop").

#### Basic pipe sizing calculation



Basic pipe sizing calculation.

- ▶ **This method is only an estimate - for more complex design please refer to latest version of BS6891 and training given in ACS.**

#### Natural Gas (NG):

Discharge rates for copper tube with 1mbar differential pressure between the ends for Natural Gas.

Discharge rates for Natural Gas (m <sup>3</sup> /hr) with straight horizontal copper tube					
Pipe length (m)	Discharge m <sup>3</sup> /hr	Pipe size (mm)			
		15	22	28	35
3		2.9	8.7	18	32
6		1.9	5.8	12	22
9		1.5	4.6	9.4	17
12		1.3	3.9	8	15
15		1.1	3.4	7	13
20		0.95	2.9	5.9	11
25		0.92	2.5	5.2	9.5
30		0.88	2.3	4.7	8.5

Table 5 Natural Gas (NG)



Natural Gas:

- ▶ When using this table to estimate the gas flow rate in pipework of a known length, the effective length will be increased by 0.5m for each 90° elbow and tee fitted and by 0.3m for each 45° bend.

#### Liquid Petroleum Gas (LPG):

Discharge rates for copper tube with 2.5mbar differential pressure between the ends for LPG.

Discharge rates for LPG (m <sup>3</sup> /hr & kW) with straight horizontal copper tube						
Tubing length (m)	Outside diameter					
	15mm		22mm		28mm	
	kW	m <sup>3</sup> /hr	kW	m <sup>3</sup> /hr	kW	m <sup>3</sup> /hr
3	38.4	1.49	207	8.01	412	15.92
6	26.1	1.01	135	5.21	230	8.86
9	20.5	0.79	108	4.19	215	8.33
12	17.9	0.70	94	3.62	187	7.25
15	15.5	0.60	82	3.20	168	6.51
18	13.5	0.53	74	2.86	145	5.61
21	12.9	0.50	67	2.58	135	5.24
24	12.0	0.47	61	2.58	126	4.87

Table 6 Liquid Petroleum Gas (LPG)



Liquid Petroleum Gas (LPG):

- ▶ When using this table to estimate the Gas flow rate in pipework of a known length, the effective length will be increased by 0.6m for each 90° elbow or tee and by 0.3m for each 45° bend or straight coupler.

## 4.3 Appliance location and clearances

### 4.3.1 Appliance location

- Follow local regulations for the location within the property that the appliance is to be installed.
- This appliance is only suitable for installing internally within a property at a suitable location onto a flat, fixed rigid surface capable of supporting the appliance weight.
- The appliance is not suitable for external installation.
- Protect installation area against dust and moisture.



No surface protection is required against heat transfer from the appliance.



#### DANGER

##### Danger from explosive and flammable materials:

Storage of explosive and flammable materials.

- ▶ Do not store flammable materials (paper, curtains, clothing, primer, paint, ...) in proximity to the appliance.



#### DANGER

##### Danger to life from explosion!

An increased and permanent ammonia concentration may lead to stress corrosion cracking on brass (e.g. gas valves, union nuts). As a result, there is a risk of explosion from gas escaping.

- ▶ Do not use wall mounted gas boilers in rooms where there is an increased or permanent ammoniac concentration (e.g. livestock stables or storage room for fertilisers).
- ▶ If contact with ammonia is unavoidable, make sure that there are no brass parts installed in the system.



#### WARNING

##### Risk of injury due to damage to the appliance

- ▶ The appliance must not be sited in such a position that some or all of the underside of the appliance is above a permanently fixed hob.
- ▶ Reasonable care should be taken to ensure the appliance is not installed directly above where other heat-producing kitchen appliances such as portable hot plates, toasters and kettles are likely to be sited.

##### Surface temperature

The maximum surface temperature of the appliance is below 85 °C. Therefore no special safety measures are required to protect flammable materials and fitted furniture. Country-specific regulations must be observed.

##### Wall structure

The wall used for installation of the appliance must be load-bearing and the appliance must be able to rest on it over the entire surface.

#### NOTICE

##### Damage to appliance:

Contaminated combustion air.

- ▶ Do not use any cleaners containing chlorine or hydrogen halide (i.e. spray cans, primers, cleaners, paint and glue).
- ▶ Do not store or use these substances in the appliance or room.
- ▶ Avoid the build-up of dust.

#### NOTICE

##### Damage to appliance:

Extreme temperatures may cause damage to the heating system.

- ▶ Ensure the appliance location's ambient temperature is above 0 °C and below 50 °C.

#### NOTICE

##### Damage to system:

The heating system pipework can be damaged by frost if installed in an internal unheated area, such as a loft, basement or garage. The appliance internal frost protection only monitors the system water temperature within the appliance to provide protection for the appliance.

- ▶ Install a frost thermostat and pipe thermostat connected in series, to protect the system pipework. We recommend that the frost thermostat is sited in the coldest unheated area in which pipework is located and that it is set to call for heat at 5 °C. The Pipe stat should be located on whichever pipe is furthest from the heated area where warmer water will be drawn from considering the direction of flow, and set to end the demand at 15 °C.
- ▶ The system pipework in the internal unheated area should be insulated.
- ▶ If the appliance is to be shut down for an extended period, drain the central heating system.



The appliance must be installed where:

- ▶ The area is well lit, allowing users to clearly see the appliance to carry out any work or checks.
- ▶ An engineer can gain clear and safe standing space access in front of the appliance to work on the product or component, including making adequate provision for visual inspection of flues in voids.
- ▶ The homeowner can gain clear and safe standing space access in front of the appliance to gain access to the controls or to check, top up or reset the appliance.
- ▶ Roof space installations must fully conform to BS 6798: roof space installations.
- ▶ Products in roof spaces must have permanent fixed lighting, a permanent fixed retractable ladder and a fixed floor area sufficient to allow access for normal use and servicing around the product and between the product and the access hatch. For sealed system we would also recommend that a remote pressure gauge and filling loop are sited where the customer can gain easy access to assist with checking and topping up.

### 4.3.2 Locations containing a bath or shower



#### CAUTION

##### Risk of electric shock

- ▶ Any switch or appliance control using mains electricity must not be within reach of a person using the bath or shower.
- Installations in locations containing a bath or shower should only be considered if there is no other option.
  - Observe all the current applicable national and regional regulations as well as all technical rules and guidelines.
  - These may contain additional or deviating requirements for installations in wet rooms.
- Circuit breaking devices should be used in accordance with the regulations as well as all technical rules and guidelines.

- Check the IP rating of any control units to be used on this appliance.
- Figures 12 and 13 are for guidance only.

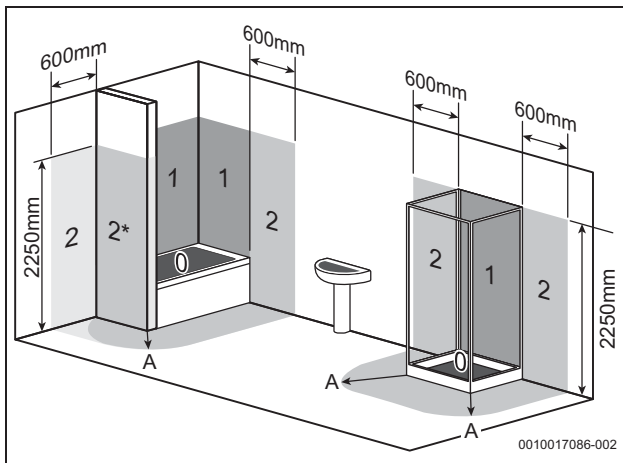


Fig. 12 Bathroom installations

- [0] Zone 0
- [1] Zone 1
- [2] Zone 2
- [2\*] Without the end wall, zone 2 must extend 600mm from the bath.
- [A] 600mm radius from the bath or shower.

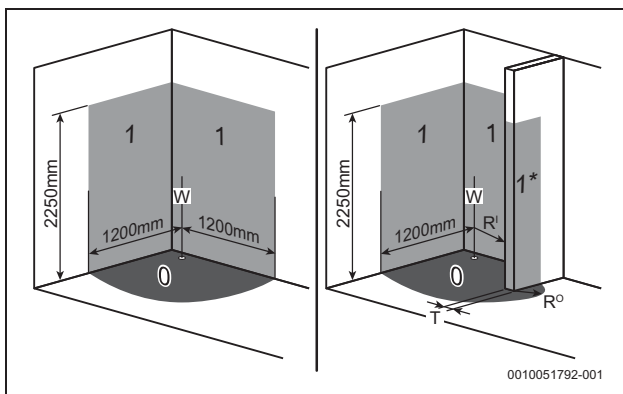


Fig. 13 Wet room installations

- [0] Zone 0:  
The floor area where you will stand in water which would replace what is usually the bath or shower tray. This is measured from the centre of the fixed water outlet (waste).
- [1] Zone 1:  
The same floor area as zone 0 but extending 2.25m above zone 0.
- [1\*] With permanent fixed partitions, zone 0 must extend around the partition to maintain the 1200mm clearance from the fixed water outlet (waste) ( $R^1 + T + R^0 = 1200\text{mm}$ ).
- [W] Fixed water outlet (waste).
- [R<sup>1</sup>] Radial distance from the fixed water outlet (waste) to the inner corner of the partition.
- [T] Thickness of the partition.
- [R<sup>0</sup>] Radial measurement from the outer corner of the partition.

**i**

Example calculation for how far zone 0 extends around the partition.

- ▶  $R^0 = 1200 - (R^1 + T)$
- ▶ If  $R^1$  is 750mm and  $T$  is 120mm
  - $R^0 = 1200 - (750 + 120)$ , then  $R^0 = 330\text{mm}$

- Appliance protection rating - IPX4D
  - An appliance fitted with a control unit rated to IPX4D can be installed in zone 2.
  - An appliance fitted with a control unit rated below IPX4D must be installed outside zone 2.

### 4.3.3 Plumbing manifold

#### Connections

Heating System: 22mm compression fittings

Gas: 22mm compression fittings

Use the fittings supplied in the Hardware pack.

1. CH Flow 22mm
2. Mains Gas Supply 22mm
3. CH Return 22mm

#### Pre-plumbing

With the plumbing manifold installed, pipe work can be installed to the valves on the manifold.

The pipes can be run below the boiler or alternatively up behind the boiler.

#### Running pipes behind the boiler

If the boiler pipes are to be run behind the appliance ensure that the pipes pass close to the wall as shown in the diagram opposite, and within the pipe guide.

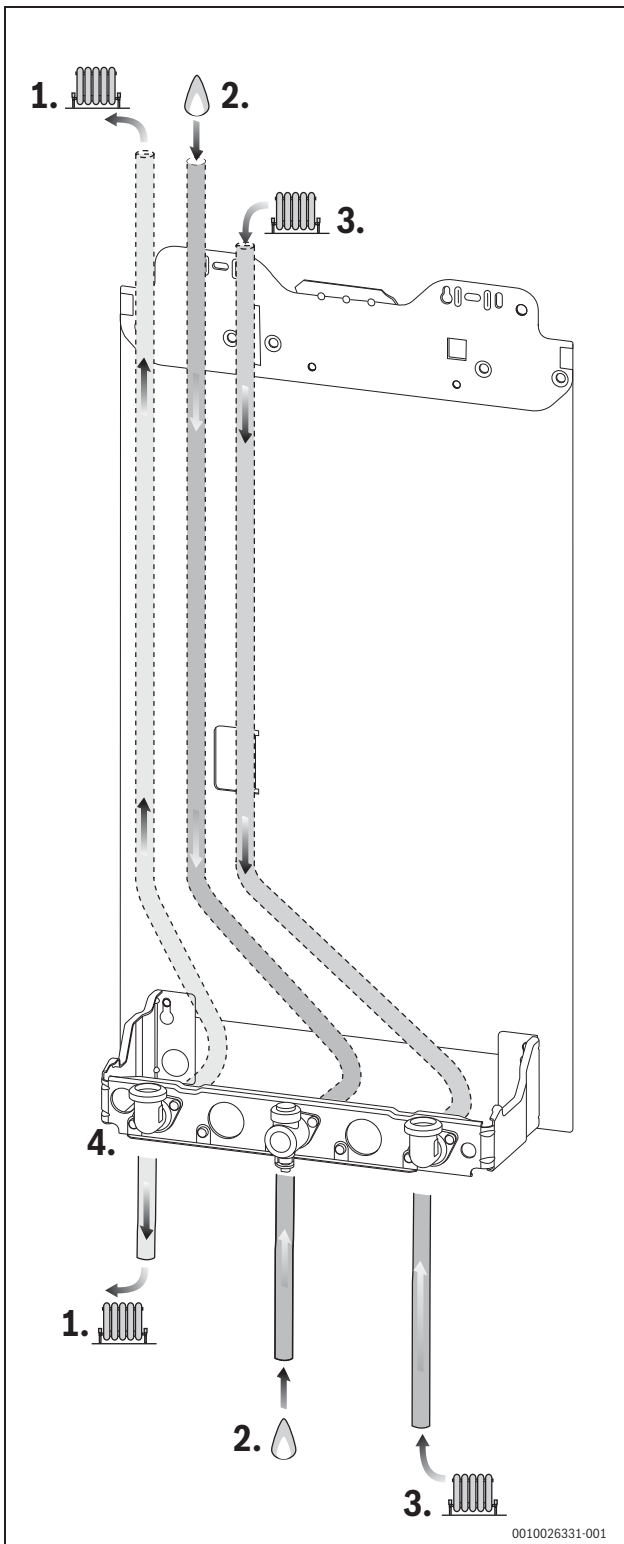


Fig. 14 Plumbing manifold

- [1] CH flow
- [2] Gas
- [3] CH return
- [4] Condensate

#### 4.3.4 Appliance clearances

- The following details cover the installation, service and maintenance clearances for the appliance.

#### CAUTION

##### Risk of damage to appliance or property

The appliance will overheat if the clearance space around the appliance is restricted by objects.

- ▶ Do not restrict this space with the addition of cupboards, shelves etc. next to or around the appliance.
- ▶ Do not store any combustible materials on or next to the appliance, such as clothes, towels, paper or plastic bags.

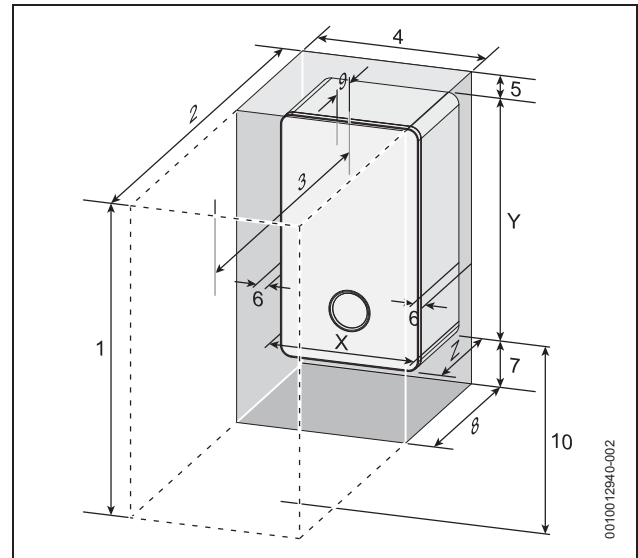


Fig. 15 Appliance minimum clearances

Minimum clearances		
	Description	Dimensions [mm]
X	Appliance width	440
Y	Appliance height	780
Z	Appliance depth	365
Installation/Maintenance		
1	Overall clearance height	1,150/1,190*
2	Overall clearance depth	965
3	In front of appliance	450
4	Overall clearance width	450
5	Above the appliance	170/210*
6	Either side of appliance	5
7	Below the appliance	200
8	Compartment depth	385
9	Appliance to removable door	20
10	Min clearance to the floor	400

Table 7

[\*] Height for either 60/100 flue or 80/125 flue



**Reduced front maintenance minimum clearances**

The front servicing clearance for this appliance can be reduced to 450mm.

For installations with a front servicing clearance less than 600mm (minimum of 450mm), the following additional criteria must be achieved.

- The bottom of the appliance case must be between 1000mm and 1500mm from the floor.
- There must be at least 450mm clearance in front of the appliance to floor level. Anything sited below the appliance must not protrude into this clear space.
- There must be at least 200mm clearance to any structure which is sited below the appliance.
- There must be at least 300mm clear space to either the left hand or right hand side of the appliance. This clear space must be from the required clear height above the appliance to floor level.
  - This clearance will not apply if the appliance is sited within 300mm of a door way and the door frame is the only obstruction.

**i** Minimum clearances must be observed to any obstruction/ surface, (dark shaded areas, figures 16 and 17).

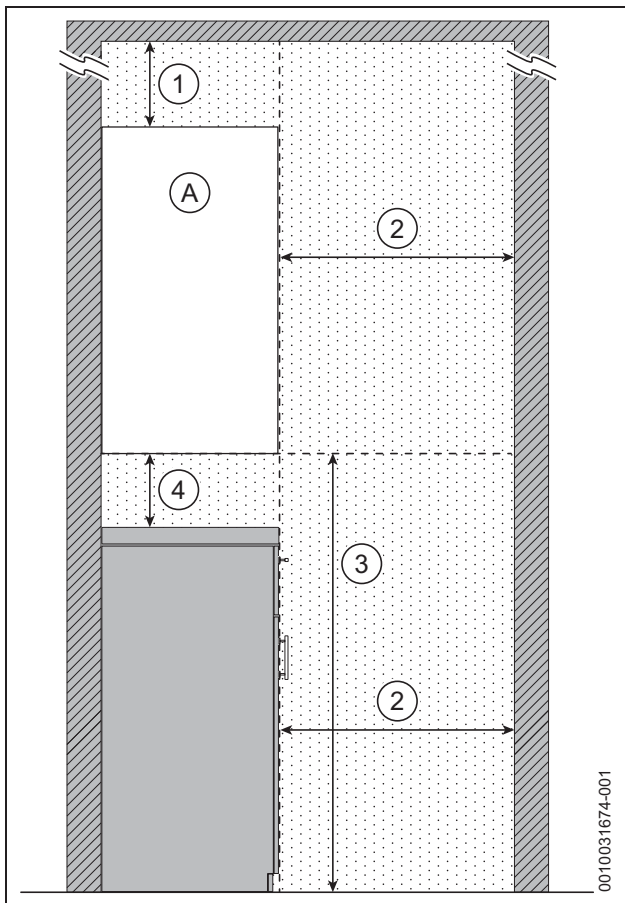


Fig. 16 Reduced front maintenance clearances - Side view

- [A] Appliance.
- [1] Above appliance - Same clearance required as for standard clearances of 60/100 flue or 80/125mm flue.
- [2] In front of appliance - Minimum 450mm.
- [3] Bottom of appliance to the floor - 1,000 - 1,500mm.
- [4] Below appliance - 200mm.

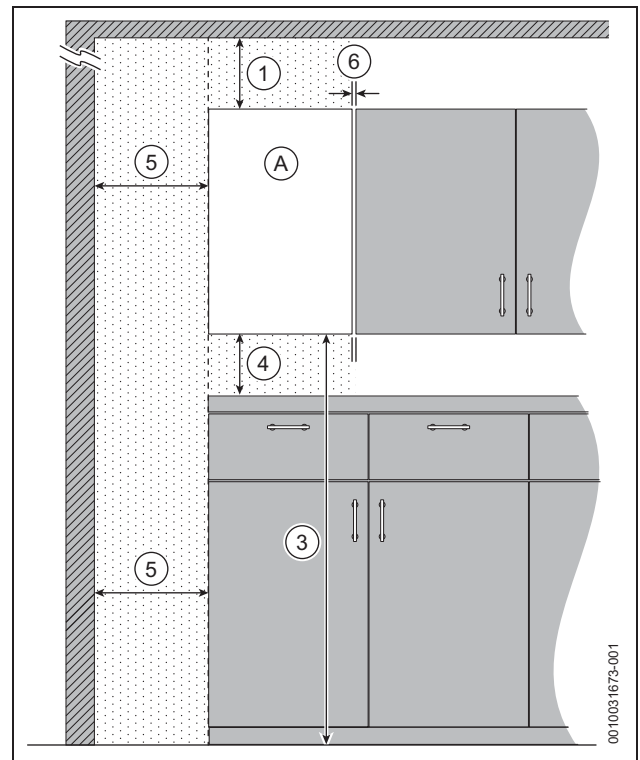


Fig. 17 Reduced front maintenance clearances - Front view

- [A] Appliance.
- [1] Above appliance - Same clearance required as for standard clearances of 60/100 flue or 80/125mm flue.
- [3] Bottom of appliance to the floor - 1,000 - 1,500mm.
- [4] Below appliance - 200mm.
- [5] One side of appliance - Minimum 300mm.
- [6] One side of appliance - Minimum 5mm.

**Roof space installation clearances**

**i** Important!  
 ▶ In order to ensure personal safety when products are installed in roof spaces, the following criteria should be achieved. Failure to make proper provision for safe access to and maintenance of the product may affect the warranty.

**Access:**

- A permanently fixed, retractable loft ladder is required for safe access into the roof space.
  - The ladder must be installed to comply with the manufacturers instructions and the fixings used must be capable of safely supporting the full maximum load capacity of the ladder.
  - Step ladders, unsecured or temporarily secured ladders are not considered to provide safe access.
- Fixed lighting must be provided to ensure safe access to and at the working area.

### Working area:

- The access route and working area must not be used as a storage space and must be kept completely clear.
  - It is not acceptable for anything that could result in an engineer slipping or tripping or that will obstruct his access to be stored in the access or working area.
  - If the working area does not extend to the loft hatch, any boards which are provided for access must be securely fixed to the ceiling joists. The access boarding must be at least 600mm wide. Joints must be properly supported and must not be overlapped.
- There must be provision for means of preventing accidentally stepping into the loft hatch.
  - Safety guard, handrail or safety chain to prevent accidentally stepping into the loft hatch.



The same work area and access requirements would be required for any floor standing equipment such as a cylinder.



Product clearances:

- ▶ Minimum clearances must be maintained around the product.

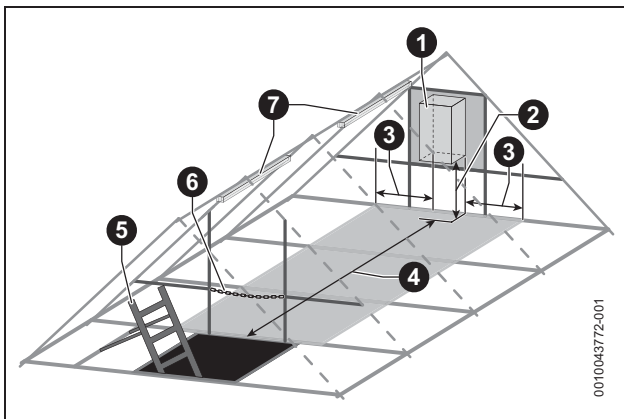


Fig. 18 Roof space installation clearances

- [1] Product
- [2] Clearance below
- [3] Side clearance
- [4] Front clearance
- [5] Permanently fixed, retractable loft ladder
- [6] Safety guard, handrail or safety chain
- [7] Fixed lighting

Minimum clearances		
	Description	Dimensions (mm)
2	Below the product to the loft floor boarding	200
3	Either side of product to the edge of the loft floor boarding	600
4	In front of product to the edge of the work area or to the loft hatch <sup>1)</sup>	1,200

- 1) The shortest distance must be applied. If the work area does not extend to the loft hatch, then there must be a safe walkway of at least 600mm wide to the boarded work area.

Table 8 Minimum clearances

### Appliances in compartments

Follow the latest requirements of BS6798 and BS5440 and note:

- Minimum clearances must be maintained.

- An access door is required to install, service and maintain the appliance and any ancillary equipment.
- If the appliance is installed in an unventilated airing/storage cupboard, there is no requirement to make a partition between the appliance and the storage space as long as the minimum clearances around the appliance are maintained.

## 4.4 Flue systems considerations



### WARNING

#### Flue systems

Possible flue gas escape

- ▶ Use Worcester, Bosch Group approved Condensfit II flue systems only, no other manufacturer's flue have been tested or approved for use with Worcester, Bosch Group appliances.



### CAUTION

#### Concealed flue systems:

- ▶ Where a flue system is going to be concealed, 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.



Refer to the manual supplied with the Worcester, Bosch Group flue kit for complete installation instructions.

#### Flue kit part numbers

Part number	Flue Ø	Description
7 738 112 869	60/100	Telescopic horizontal flue kit (silver)
7 716 191 082	60/100	Telescopic horizontal flue kit
7 716 191 171	60/100	Extended telescopic horizontal flue kit
7 733 600 048	60/100	Horizontal high level telescopic flue kit
7 719 003 702	80/125	Telescopic horizontal flue kit
7 719 002 430	60/100	Vertical balanced flue kit
7 719 002 431	80/125	Vertical balanced flue kit

Table 9 Flue kit assembly part numbers

#### 4.4.1 Flue length

The maximum flue length will depend on the following factors:

- 60/100mm flue system
  - Vertical/horizontal flue type
  - Appliance output
  - Plume management length
- 80/125mm flue system
  - Vertical/horizontal flue type
  - Appliance output

**Horizontal maximum flue lengths**

Output	Flue length [L] 60/100			Flue length [L] 80/125 No plume management available
	No plume management	+ 500mm of plume management	+ 4500mm of plume management	
50 kW	9,000mm	9,000mm	6,200mm	40,000mm
45 kW	8,000mm	8,000mm	5,200mm	35,000mm
40 kW	11,000mm	11,000mm	8,200mm	35,000mm
35 kW	10,000mm	10,000mm	7,200mm	29,000mm
30 kW	17,000mm	17,000mm	14,200mm	25,000mm

Table 10 Maximum flue lengths - Horizontal flues

**Vertical maximum flue lengths**

Output	Flue length [L] 60/100	Flue length [L] 80/125
50 kW	12,000mm	40,000mm
45 kW	12,000mm	35,000mm
40 kW	15,000mm	35,000mm
35 kW	14,000mm	29,000mm
30 kW	21,000mm	25,000mm

Table 11 Maximum flue lengths - Vertical flues

**Flue system bends**

**NOTICE**

**Effective flue lengths of bends:**

Each bend used has an equivalent straight flue length.

► Refer to table 12.

Bend	Effective flue length	
	60/100	80/125
45°	0.5m	0.5m
90°	1.5m	1.5m

Table 12 Effective length of bends

**4.4.2 Flue options**

The systems have different maximum flue lengths, refer to the following example flue options for those maximum flue lengths.

**Horizontal high level flue assembly**

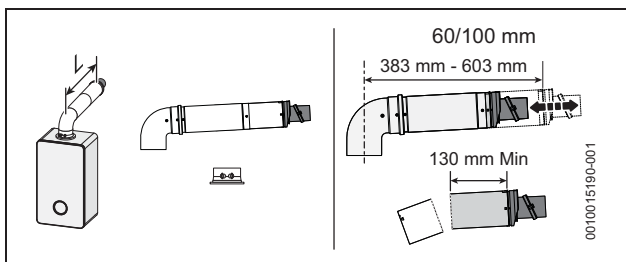


Fig. 19 Horizontal flue option

- Flue length [L] (initial bend included in length calculation)
  - 60/100 = 202 - 603mm
  - 80/125 = N/A

**Telescopic horizontal flue assembly**

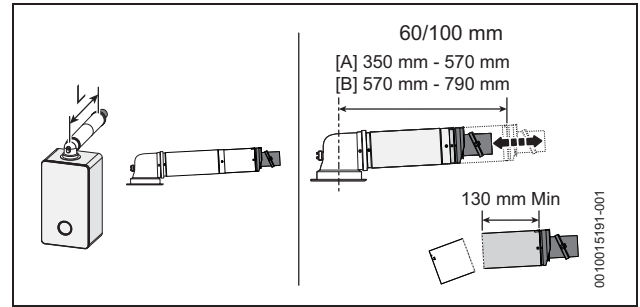


Fig. 20 Horizontal flue option

**Telescopic horizontal flue assembly [A]**

- Flue length [L] (adaptor bend included in length calculation)
  - 60/100 = 180 - 570mm
  - 80/125 = 405 - 600mm

**Extended telescopic horizontal flue assembly [B]**

- Flue length [L] (adaptor bend included in length calculation)
  - 60/100 = 570 - 790mm
  - 80/125 = N/A

**Horizontal fixed length flue assembly**

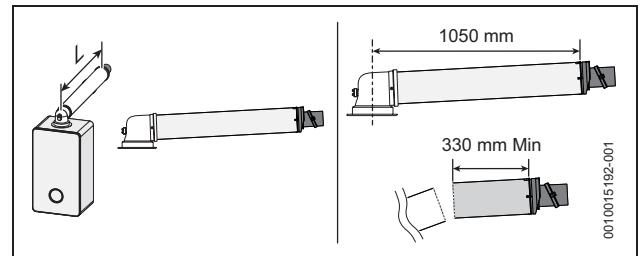


Fig. 21 Horizontal flue option

- Flue length [L] (adaptor bend included in length calculation)
  - 60/100 = 330 - 1,050mm
  - 80/125 = N/A

**Extended horizontal flue**

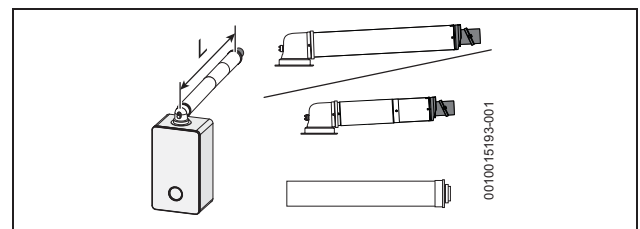


Fig. 22 Horizontal flue option

- Flue length [L] (adaptor bend included in length calculation)
  - Maximum flue length as stated in Table 10 "Maximum flue lengths - Horizontal flues".

**Horizontal flue with additional 90° elbow**

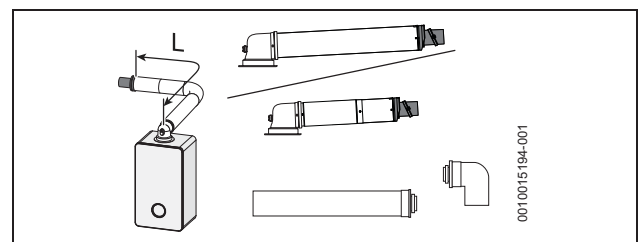


Fig. 23 Horizontal flue option

- Flue length [L] (adaptor bend included in length calculation)
  - Maximum flue length as stated in Table 10 "Maximum flue lengths - Horizontal flues" minus the 90° bend equivalent straight flue length as stated in Table 12 "Effective length of bends".

**Horizontal flue with additional 90° elbows**

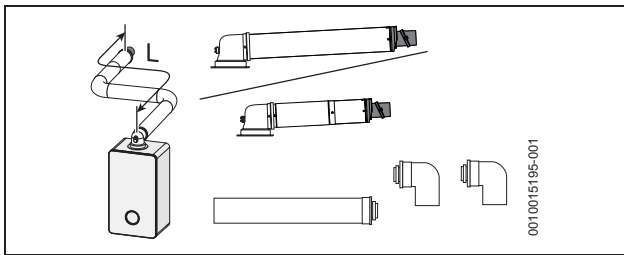


Fig. 24 Horizontal flue option

- Flue length [L] (adaptor bend included in length calculation)
  - Maximum flue length as stated in Table 10 "Maximum flue lengths - Horizontal flues" minus 2 x 90° bends equivalent straight flue length as stated in Table 12 "Effective length of bends".

**High level horizontal flue**

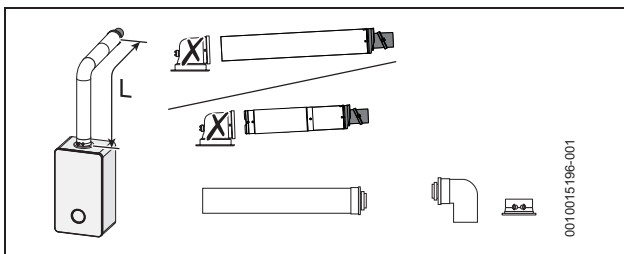


Fig. 25 Horizontal flue option

- Flue length [L] (initial bend included in length calculation)
  - Maximum flue length as stated in Table 10 "Maximum flue lengths - Horizontal flues".

**High level horizontal flue with additional 90° elbow**

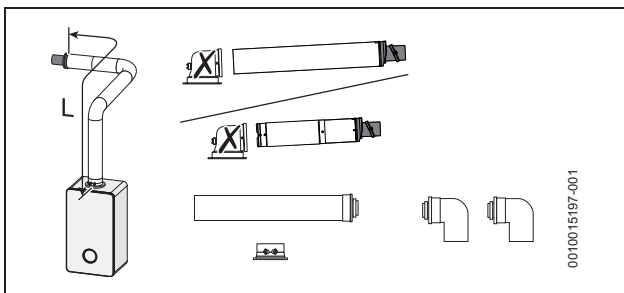


Fig. 26 Horizontal flue option

- Flue length [L] (initial bend included in length calculation)
  - Maximum flue length as stated in Table 10 "Maximum flue lengths - Horizontal flues" minus the 90° bend equivalent straight flue length as stated in Table 12 "Effective length of bends".

**High level horizontal flue with additional 90° elbows**

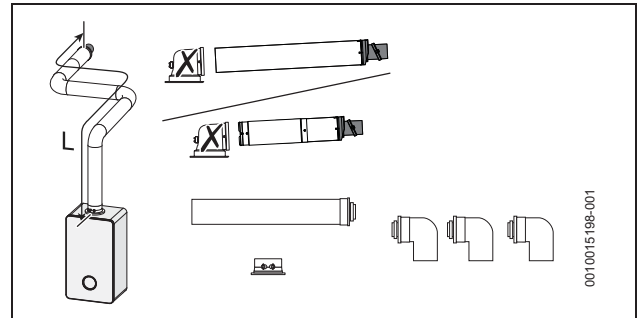


Fig. 27 Horizontal flue option

- Flue length [L] (initial bend included in length calculation)
  - Maximum flue length as stated in Table 10 "Maximum flue lengths - Horizontal flues" minus 2 x 90° bends equivalent straight flue length as stated in Table 12 "Effective length of bends".

**Vertical balanced flue assembly**

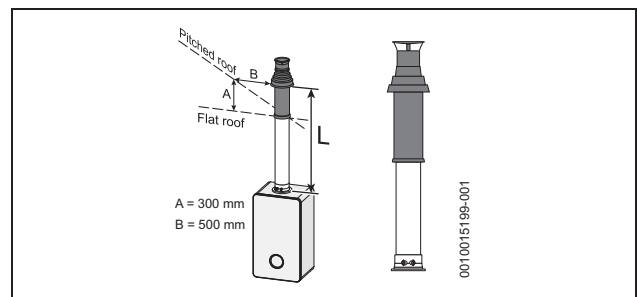


Fig. 28 Vertical flue option

- Flue length [L]
  - Maximum flue length as stated in Table 11 "Maximum flue lengths - Vertical flues".

**Vertical balanced flue with 90° elbow offset**

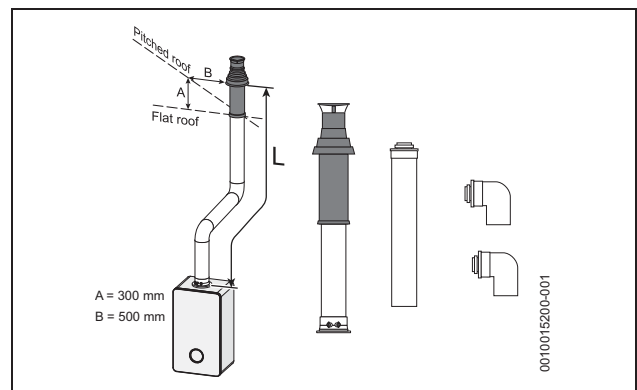


Fig. 29 Vertical flue option

- Flue length [L]
  - Maximum flue length as stated in Table 11 "Maximum flue lengths - Vertical flues" minus 2 x 90° bends equivalent straight flue length as stated in Table 12 "Effective length of bends".

**Vertical balanced flue with 45° elbow offset**

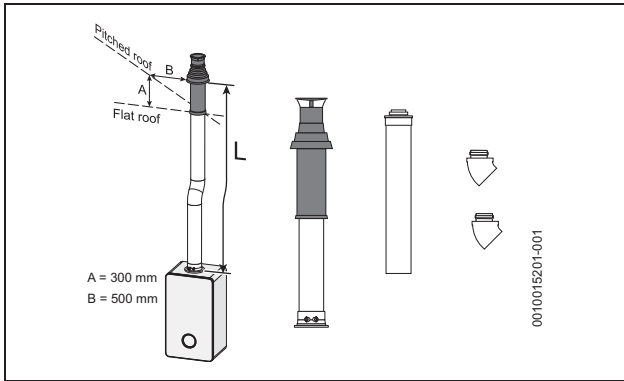


Fig. 30 Vertical flue option

- Flue length [L]
  - Maximum flue length as stated in Table 11 "Maximum flue lengths - Vertical flues" minus 2 x 45° bends equivalent straight flue length as stated in Table 12 "Effective length of bends".

**4.4.3 Plume management system**

For every extra 1,000mm of plume management after the first 500mm, the internal 60/100 flue length must be reduced by 700mm, up to a maximum of 4,500mm of plume management.

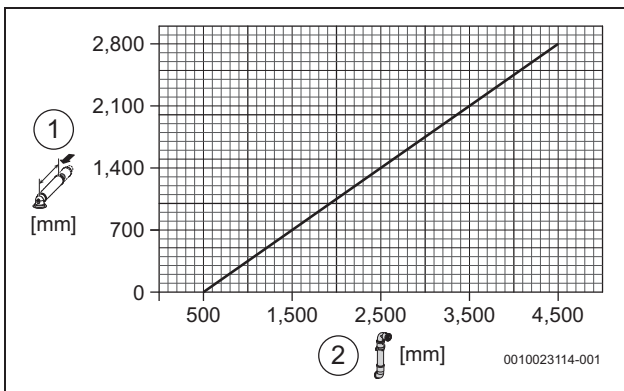


Fig. 31 Reduction to flue length as plume length increases graph

- [1] Reduction to flue length [mm] (maximum reduction 2,800mm)
- [2] Plume length [mm] (maximum plume length 4,500mm)

**NOTICE**

**Plume management length:**

- ▶ The plume management length must be a minimum of 500mm and must not exceed the maximum straight length for a horizontal Ø 60/100mm flue with a 60mm plume management system as stated previously.



Horizontal plume management runs

- ▶ The initial horizontal run from the terminal elbow must have a minimum 10° fall back, (stop tabs in the elbow prevent less than 10°) to the appliance for proper disposal of condensate.
- ▶ Any further horizontal runs after an elbow can be 3°.



**WARNING**

**Minimum plume management length:**

The minimum distance of 500mm must be maintained between air inlet and exhaust.

- ▶ Do not terminate the plume management inside the terminal exclusion zone (shaded area) shown in figure 32.

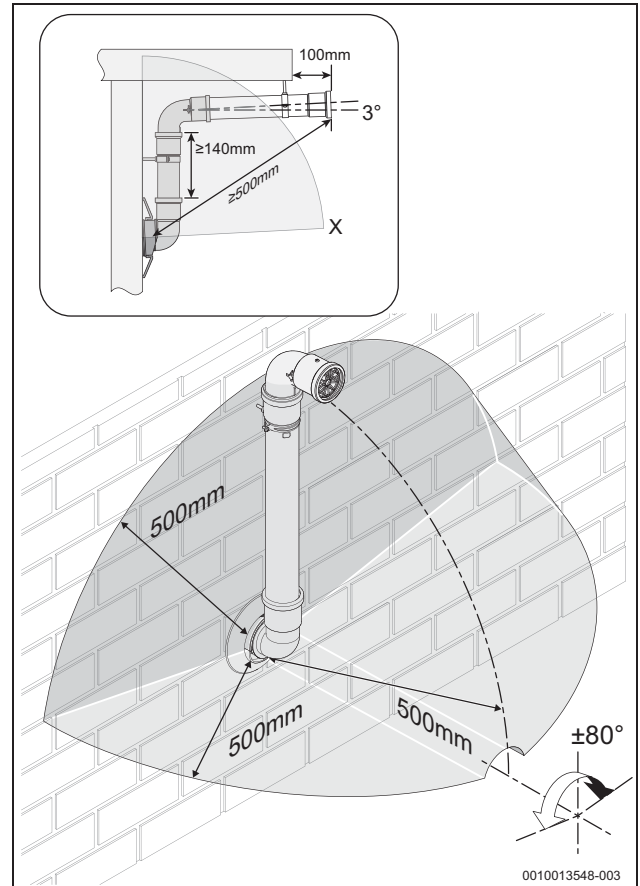


Fig. 32 Terminal exclusion zone

**NOTICE**

**Cutting the 500mm pipe**

- ▶ The Plume management extension kit contains the components required for such a configuration.

**4.4.4 Flue terminal positions**



**CAUTION**

**Flue terminal positions**

- ▶ All measurements are the minimum clearances required.
- ▶ Terminals must be positioned so to avoid combustion products entering the building.

## Vertical flue terminal positions

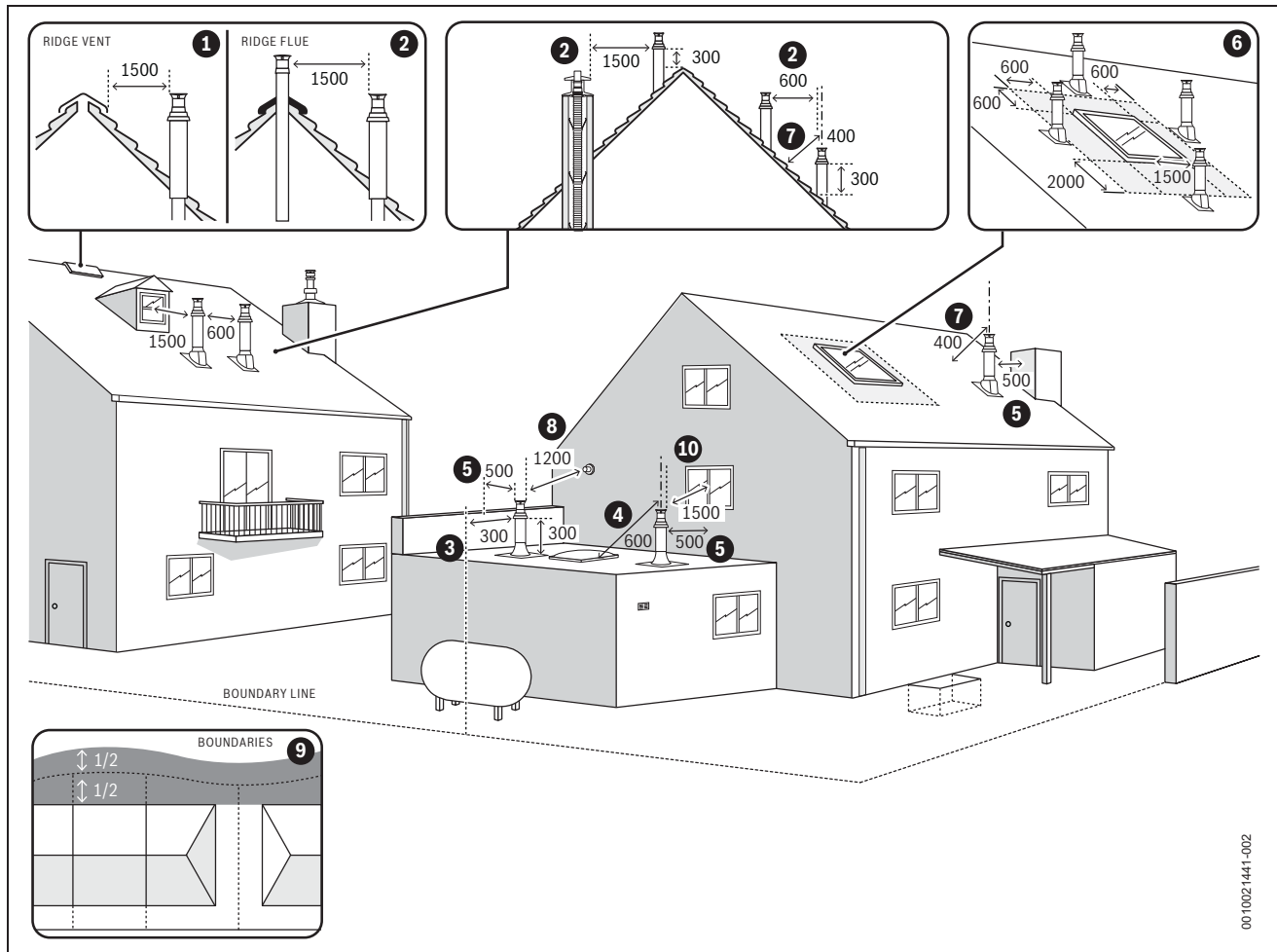


Fig. 33 Vertical flue terminal positions

### Key to figure 33:

- [1] 1,500mm measured between a vertical flue terminal and an opening or vented window. 500mm measured horizontally between a vertical flue terminal and an opening or vented window providing the flue terminal is at least 300mm above the opening.
- [2] Minimum clearance to an additional flue, 600mm to a room sealed flue or 1,500mm to an open flue.
- [3] 300mm clearance from a vertical flue terminal adjacent to a boundary line, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting a terminal in relation to boundary lines.
- [4] 600mm minimum clearance measured from an opening or vented skylight to a vertical flue terminal. If the terminal is within 1,500mm of the opening or vented skylight then it must be at least 300mm above the opening.
- [5] 500mm clearance measured horizontally from a vertical flue to a vertical structure.  
Not required if the terminal is 300mm above the structure.
- [6] The flue must not penetrate the roof in the shaded area. The terminal must be at least 1,500mm from the opening or vent when sited below the window or 600mm when sited to either side or above.
- [7] 400mm measured diagonally from a pitched roof or 500mm in regions with heavy snow fall. 300mm measured vertically from the air intake to the closest intersection with the roof.
- [8] 1,200mm separation measured between a vertical flue and a horizontal flue terminal.
- [9] For the purpose of determining suitable flue terminal positions for gas appliances, the boundary can be considered to extend to the

- centre line of any adjacent routes or waterways e.g. paths, streets, rights of way, canals, rivers or railways.
- [10] 1,500mm measured between a vertical flue terminal and an opening or vented window. 500mm measured horizontally between a vertical flue terminal and an opening or vented window providing the flue terminal is at least 300mm above the opening.



### Note:

- ▶ Where a vertical flue terminates in an area that is enclosed on 3 sides, the flue must be no more than 1,000mm below the lowest roof line. You must ensure that all clearances are maintained and that products of combustion disperse safely from the area.

**Horizontal flue terminal positions**

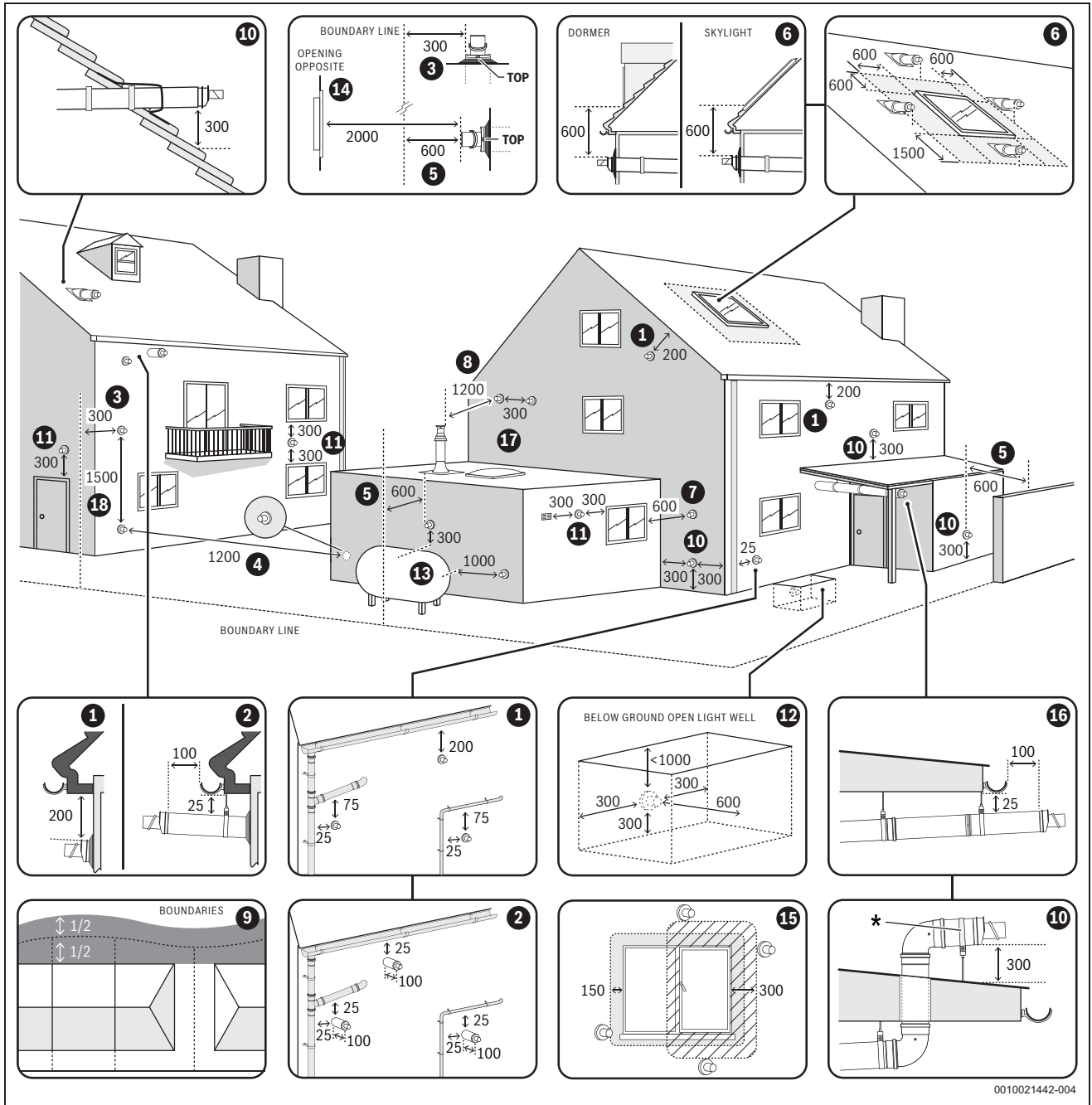


Fig. 34 Horizontal flue terminal positions

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**Key to figure 34:**

- [1] 200mm below eaves and 75mm below gutters, pipe and drains.
- [2] The dimension below eaves, gutters, pipes and drains can be reduced to 25mm, as long as the flue terminal is extended by 100mm past any overhang. The telescopic flue joint must be sealed with suitable silicone sealant if it is external to the building.
- [3] 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 surfaces or boundary lines.
- [4] 1,200mm separation measured between terminals facing each other.
- [5] 600mm distance to a surface or boundary line facing a terminal, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting terminal in relation to surfaces or boundary lines.
- [6] The terminal must be at least 1,500mm from the opening or vent when sited below the window or 600mm when sited to either side or above.
- [7] 600mm diagonally to an opening door, air vent or opening window.  
If the flue terminal is at least 300mm above the adjacent opening door, air vent or opening window, then the diagonal measurement does not apply.
- [8] 1,200mm separation measured between a vertical flue and a horizontal flue terminal.
- [9] For the purpose of determining suitable flue terminal positions for gas appliances, the boundary can be considered to extend to the centre line of any adjacent routes or waterways e.g. paths, streets, rights of way, canals, rivers or railways.
- [10] 300mm to an internal or external corner. 300mm above a surface, such as the ground/ floor level or roof surface.  
\* If the terminal section is less than 150mm and has two screws

- securing it to the elbow, the terminal section will not require a supporting bracket.
- [11] 300mm above, below and either side of an opening door, air vent or opening window.
- [12] Below ground level in an open lightwell. The flue must be at least 600mm from the opposing surface and have at least 300mm clearance either side and below. The flue terminal must be no more than 1,000mm from the top of the lightwell.
- [13] Flues should clear any LPG storage by 1,000mm horizontally and 300mm above.
- [14] Proximity of flue duct outlet to boundaries, 2,000mm distance to an opening in adjacent building facing a terminal. BS 5440: Part 1 recommends that care is taken when siting terminal in relation to boundary lines.
- [15] 300mm from an opening or vented window, 150mm to a fixed unvented window.
- [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. The telescopic flue joint of the terminal must be sealed with suitable silicon sealant if it is external to the building.
- [17] 300mm Horizontally from a terminal on the same wall.
- [18] 1500mm Vertically from a terminal on the same wall.

**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.
- ▶ A flue terminal guard shall be fitted whenever a terminal or air inlet is fitted less than 2,000mm above ground, above a balcony or above a flat roof to which people have access.

**4.4.5 Plume re-direct and plume management terminal positions**

Maximum and minimum plume management lengths:

- ▶ A minimum distance of 500mm must be maintained between the plume management outlet and the flue air intake.
- ▶ The maximum plume management length is 4.5 metres for the appliances detailed on the front of this manual.
- ▶ The 45° bend is equivalent to 0.75 metres of straight plume management and the 90° bend is equivalent to 1.5 metres.

**NOTICE**

- ▶ All measurements are the minimum clearances required.
- ▶ Refer to “Horizontal flue terminal positions” for all concentric flue terminal positions unless the flue position is specified in figure 35 “Plume re-direct and plume management 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.



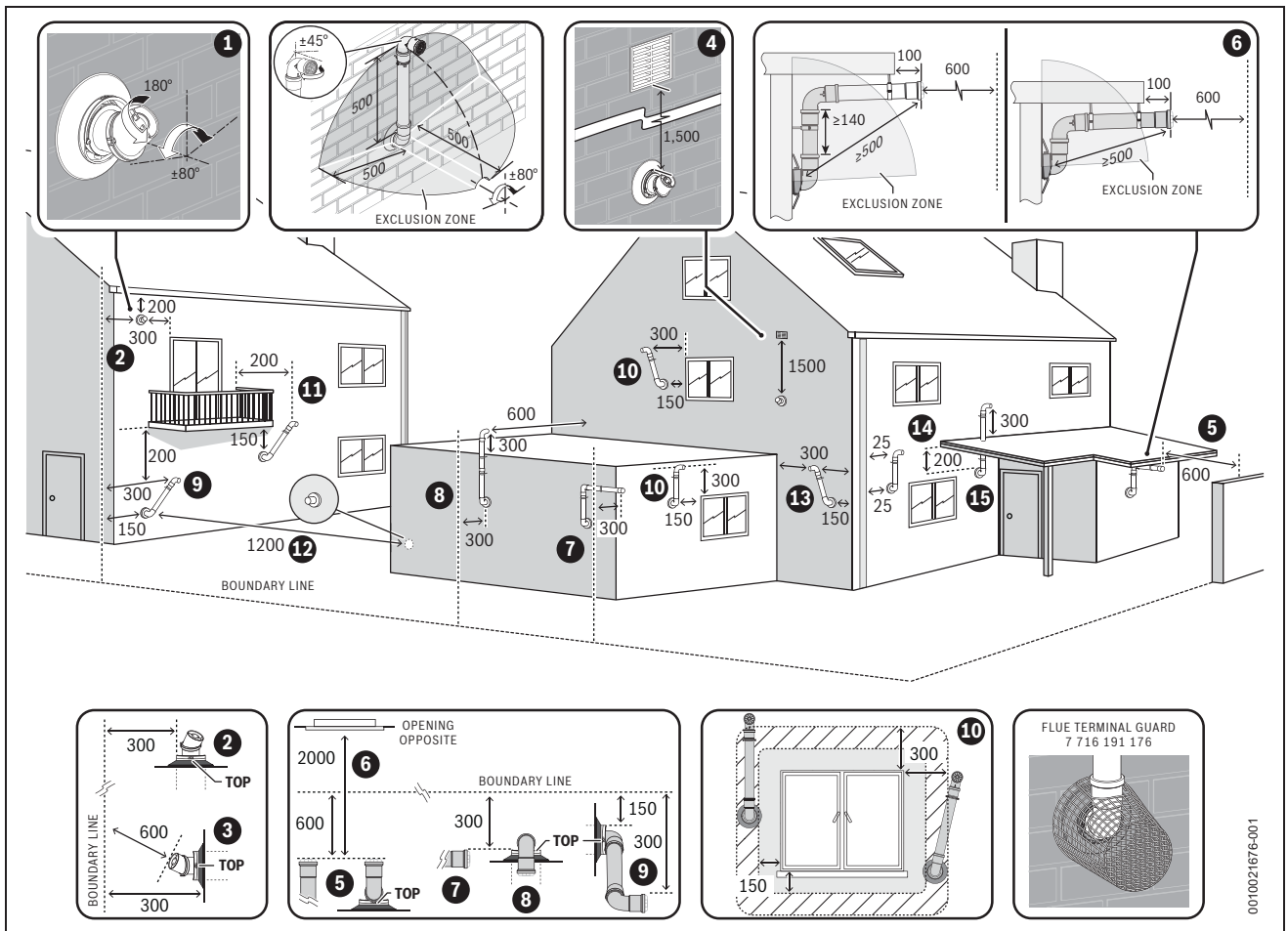


Fig. 35 Plume re-direct and plume management terminal positions

### Key to figure 35

#### - Plume re-direct terminal positions:

- [1] This feature allows some basic plume re-direction options on a standard telescopic horizontal flue terminal.  
300mm minimum clearances to an opening e.g. window.  
However the minimum clearances to an opening in the 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 redirection is used the deflector should not be directed towards the drainpipe.
- [2] 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 surfaces or boundary lines.
- [3] Where the flow of products of combustion is not at right angles to the boundary, the 600mm dimension may be measured in the direction of flow as long as the terminal is not less than 300mm from the boundary.
- [4] When redirecting the flue discharge the terminal end must be at least 1,500mm from any opening in the direction of the discharge to prevent combustion products from entering the building.

### Key to figure 35

#### - Plume management terminal positions:

- [5] 600mm distance facing a surface or a boundary line, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting a terminal in relation to surfaces or boundary lines.
- [6] Proximity of flue duct outlet to boundaries, 2000mm distance to an opening in adjacent building facing a terminal. BS 5440: Part 1 recommends that care is taken when siting terminal in relation to boundary lines.
- [7] 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 surfaces or boundary lines.
- [8] 300mm distance from a boundary line to the air intake as long as the exhaust terminal faces away from the boundary line. The exhaust terminal must have a minimum 300mm clearance to a surface below and there must be at least 600mm clearance when measured horizontally in a straight line from the exhaust terminal to any other surface.
- [9] 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.
- [10] Above, below and either side of an opening door, air vent or opening window.  
Using a Plume Management kit the air intake measurement can be reduced to 150mm providing the flue exhaust outlet has a 300mm clearance.
- [11] Below balcony or overhang. The air intake clearance can be reduced to 150mm providing the flue exhaust outlet has a 200mm clearance.
- [12] 1,200mm between terminals facing each other<sup>1)</sup>.
- [13] Internal/external corners. The air intake clearance can be reduced to 150mm providing the flue exhaust outlet has a 300mm clearance.
- [14] Clearances no less than 200mm from the lowest point of the balcony or overhang.
- [15] If a plume management kit is installed within the confines of a carport or other covered, partially enclosed extension, then the exhaust terminal must be positioned at least 1200mm away from any opening into the building which is sited within the footprint of

1) 600mm in case two plume management kits are used on opposing terminals. Each terminal should use a minimum length of 500mm plume management.

the carport.

If the exhaust terminal is extended at least 300mm beyond the footprint of the carport then the distance from the terminal to an opening within the carport can be reduced to 600mm.

The exhaust terminal can also be routed through the roof of the carport providing 25mm clearance is provided around the flue pipe to any flammable material and that it extends at least 300mm above the roof.

The air intake must have a minimum 150mm clearance to any opening in the building in order to ensure the integrity of the structure is maintained. If the exhaust terminates within the footprint of the carport then the carport must have at least 2 sides completely open. If the exhaust terminates at least 300mm beyond the footprint of the carport then the carport must have at least one completely open side. The exhaust terminal must be positioned to ensure that plume will not cause nuisance or damage to vehicles and that minimum clear distances in front of the terminal will not be impeded by vehicles.



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.
- ▶ Plume kits running horizontally must have at least a 3° fall back to the appliance for proper disposal of condensate, except or the initial horizontal run from the terminal.  
The initial plume kit horizontal run will have at least a 10° fall back to the appliance, due to the terminal elbow design, for proper disposal of the condensate.

## 4.5 Condensate discharge



Full details on condensate discharge.

- ▶ Follow the latest version of **BS6798** and HHIC guidance.

For correct installation and trouble free operation of the appliance the following advice should be followed:

1. **To minimise the risk of freezing, wherever possible: the condensate drain should be installed internally.**
2. All condensate pipework must 'fall' from the appliance by a minimum of 3° (52mm per metre) to ensure adequate condensate flow.
3. The pipework route must allow air to be supplied back to the appliance for correct operation.
4. Connection to a rainwater down pipe must include an air break.

Also:

- Assessment of the risk of the condensate pipe freezing must be carried out and appropriate precautions taken where necessary. This must take into account the specific site conditions.
- The condensate pipework connected to the condensate drain outlet on the appliance should have a minimum internal diameter (ID) of 19mm.
- Keep external pipework as short as possible.  
Further precautions against freezing must be taken if external pipe runs exceed 3m.
- External pipework should have a minimum internal diameter (ID) of 30mm.
- Minimise the number of bends and connectors.
- Remove burrs and debris after cutting the pipe.
- Remove surplus solvent from the interior of the pipe.

- The condensate pipework shall be run in standard drainpipe material, e.g. polyvinyl chloride (PVC), unplasticised poly vinyl chloride (PVC-U), acrylonitrilebutadiene.styrene (ABS), polypropylene (PP) or chlorinated poly vinyl chloride (PVC.C).

**4.5.1 Condensate pipework**

**NOTICE**

**General consideration**

- ▶ Where a new or replacement appliance is being installed, access to an internal “gravity discharge” point should be one of the factors considered in determining appliance location.
- ▶ Condensate pipe connection at the appliance:  
The condensate pipe must have a nominally outside diameter of 22mm plastic pipe.
- ▶ Ensure there are no blockages in the pipe run.
- ▶ Ensure that the discharge method for the installation can effectively handle the condensate waste from the appliance.

**Condensate pipework - Unheated internal areas**

**NOTICE**

**Unheated internal areas.**

Although the large volume siphon will reduce the risk of freezing, condensate discharge may freeze in exposed areas during prolonged cold temperatures.

- ▶ Internal pipe runs in unheated areas such as lofts, basements and garages should be treated as external runs.  
For additional information refer to “External Connections” section 4.5.4.

**4.5.2 Appliance siphonic condensate trap**

The appliance has a large capacity condensate trap reducing the risk of condensate discharge pipework freezing up in prolonged cold temperatures.

The expanded siphonic operation discharges every 10 to 15 minutes. Resulting in:

- Increased velocity and flow rate.
- With less frequent siphonic actions per hour, the condensate pipework is empty for longer.
- Significantly reducing freezing potential for a 48 hour period at -15 °C, provided the installation parameters listed below are followed.

**4.5.3 Internal connections**



**Good Practice**

- ▶ The following guidance indicates the good practices that must be maintained for the Installation and Maintenance of a product.

**Soil stack connection**

→ Figure 36

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

Wherever possible, the condensate drainage pipe should be routed and terminated so that the condensate drains away from the appliance 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.

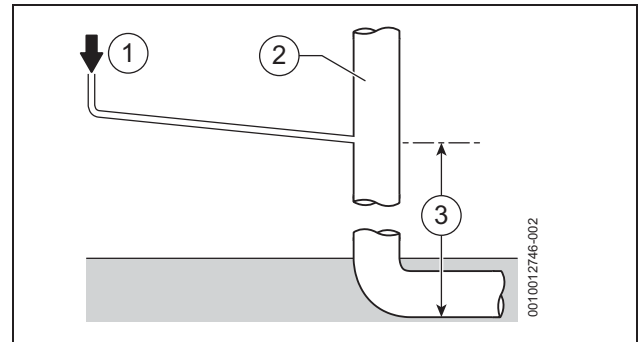


Fig. 36 Disposal to soil vent stack

- [1] Condensate discharge from appliance
- [2] Soil and vent stack
- [3] Minimum 450mm and up to 3 storeys

**Waste pipe connection**

→ Figure 37

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

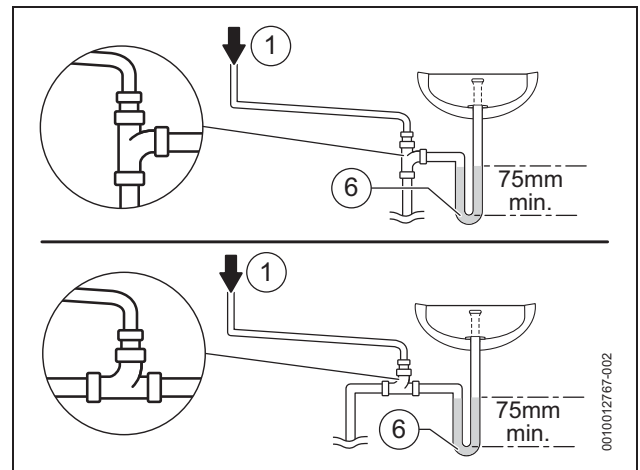


Fig. 37 Waste pipe disposal

- [1] Condensate discharge from appliance
- [6] 75mm sink waste trap

**Condensate pump**

→ Figure 38

Where direct connection to “gravity discharge” pipework 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 condensate pump manufacturer.

- The pump outlet should discharge to a suitable “gravity discharge” outlet.
  - The condensate then flows, by gravity, through the 22mm plastic pipe to the condensate discharge point.

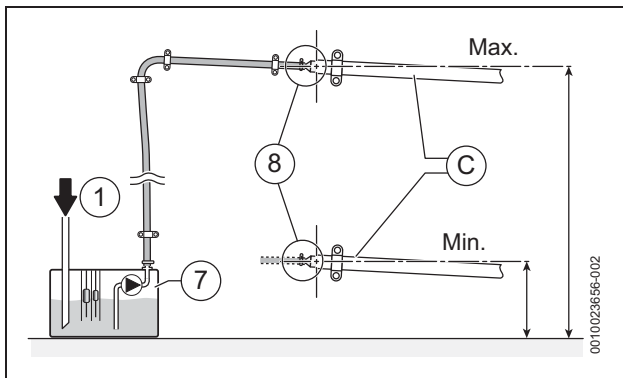


Fig. 38 Condensate pump example

- [1] Condensate discharge from appliance
- [7] Condensate pump
- [8] Pipework transition
- [C] Gravity discharge pipework



Proprietary condensate pump

- ▶ Ensure minimum and maximum pump lifting heights are followed as per condensate pump manufacturers instructions.

#### 4.5.4 External connections

##### NOTICE

#### Septic tanks

Untreated condensate must not be allowed into septic tanks.

- ▶ Connection to systems which drain into a septic tank should be avoided due to the risk of affecting anaerobic bacteria.

##### NOTICE

#### Rainwater down pipe or external drain disposal

Untreated condensate must not be allowed to flow into streams or rivers.

- ▶ A rainwater down pipe or an external drain shall only be used for condensate disposal if the down pipe or external drain is connected to a combined foul and rainwater drainage system.
- ▶ Refer to BS 6798 for more information on condensate disposal.

##### NOTICE

#### Grey water recovery system

Contamination of recovered water

- ▶ Condensate disposal shall not be allowed into a grey water recovery system that is intended for re-use.

#### External disposal considerations

##### NOTICE

#### Freezing conditions

Frozen condensate will block the condensate drain pipe and stop the appliance from running.

- ▶ Pipe lengths should be kept to a minimum and routed as vertically as possible.

##### NOTICE

#### Condensate waste disposal

- ▶ Care should be taken when siting a soak-away to avoid causing damage to existing services and building footings.

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:

- ▶ The external run be kept as short as possible and ideally should not exceed three metres.  
Additional precaution against freezing must be taken if the external pipe run does exceed three metres.
- ▶ The pipe should be run internally as far as possible before going externally and the pipe diameter should be increased to a minimum internal diameter (ID) of 30mm before it passes through the wall to the exterior.
- ▶ The hole through the wall for the condensate pipe should be sleeved and be sealed to the building fabric on the internal and external face using a suitable building material.
- ▶ 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 appliance, 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 pipework should be removed so that the internal pipe section is as smooth as possible.
- ▶ All external pipe drainage will be improved if the end is cut at 45° as opposed to a straight cut.
- ▶ In situations where there are likely to be extremes of temperature or exposure, the use of a proprietary trace-heating system for external pipework, incorporating an external frost thermostat, should be considered. All other guidance above and the instructions for the trace heating system, should be closely followed.
- ▶ As well as trace heating, other methods for protecting pipework that are run externally should be considered to prevent freezing during prolonged cold periods.
  - Insulation materials can be used, these should be of class "O" grade with an outer coating that is weather proof and have a UV resistant finish. A minimum of 19mm thick insulation is recommended for 32mm external pipes.
  - The use of a drain cover (such as those to prevent leaf blockage) may offer further protection from wind chill.

#### Additional protection for transition through a wall.

The external pipework can be insulated to help prevent freezing during prolonged cold periods.

- Where insulation is required, the entire run of external pipework [5] should be insulated with a recess in the external face allowing better insulation protection coverage [4] as it transitions to the outside of the building.
- The hole through the wall must be sealed to the building fabric on the internal [1] and external [3] face using a suitable building material, (use a 40mm sleeve [2] to pass the condensate pipework through and then seal the internal and external faces).

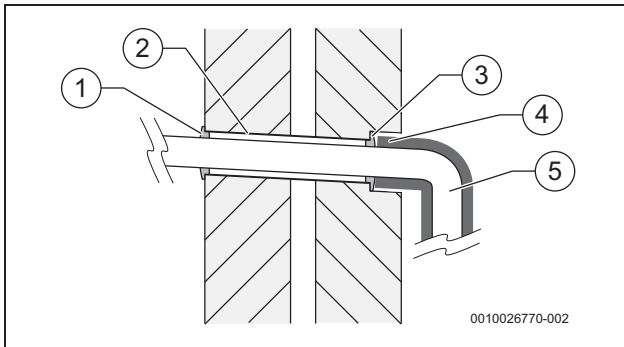


Fig. 39 Additional protection for transition through a wall

- [1] Internal face sealed (32mm pipe sealed to sleeve)
- [2] 40mm sleeve
- [3] External face sealed (32mm pipe sealed to sleeve)
- [4] Insulation recessed into the wall
- [5] Condensate discharge pipe



**Good Practice**

- The following guidance indicates the good practices that must be maintained for the Installation and Maintenance of a product.

**Rain water down pipe with external air break**

→ Figure 40

- Refer to following example to dispose of condensate to a rain water down pipe.
- An air break or rain water hopper must be utilised, between the appliance condensate outlet and the drainpipe, outside the property, to avoid flooding of the appliance should the downpipe become obstructed.

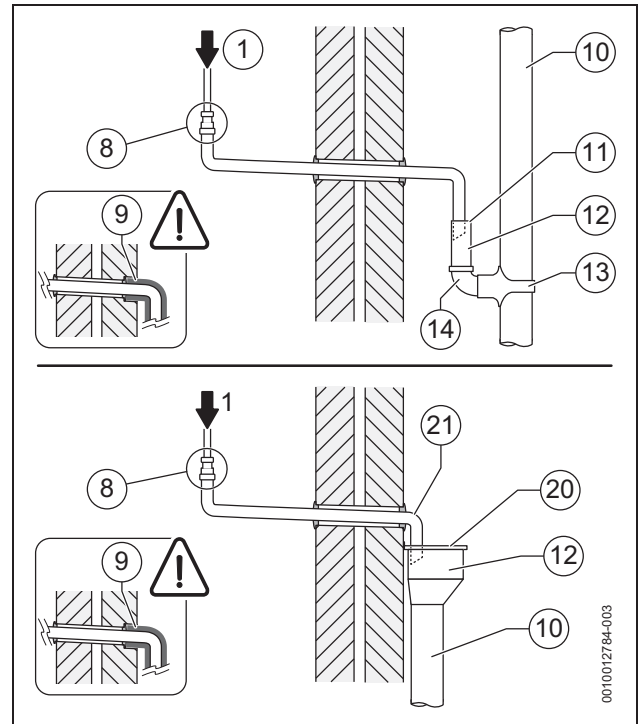


Fig. 40 Disposal into rain water down pipe

- [1] Condensate discharge from appliance
- [8] Pipework transition
- [9] Additional protection for transition through a wall. (→ page 28)
- [10] External rain water pipe to foul water
- [11] External air break
- [12] Air gap
- [13] Strap-on fitting
- [14] 43mm 90° male/female bend
- [20] Rain water hopper
- [21] Increase pipe size

**Open drain or gully with external air break**

→ Figure 41

Where the pipe terminates over an open drain or gully and there is a risk of ground flooding, then the additional requirement below is recommended:

- An air break should be installed in the external pipework as shown to avoid an airlock during ground flooding/adverse weather conditions which could prevent the condensate from discharging.

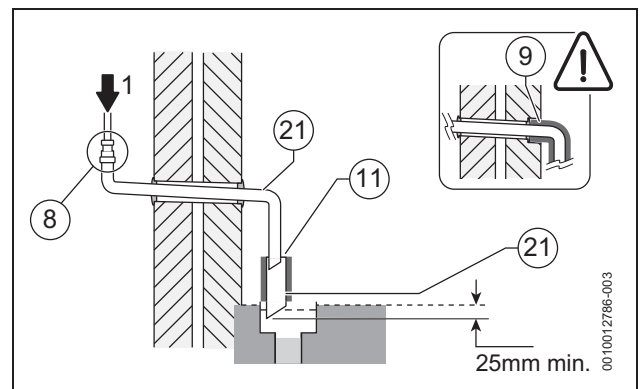


Fig. 41 Disposal to open drain or gully with air break

- [1] Condensate discharge from appliance
- [8] Pipework transition
- [9] Additional protection for transition through a wall. (→ page 28)
- [11] External air break
- [21] Increase pipe size

### Condensate soak away considerations

Before deciding to use a purpose-made soak away the history of the locality and the ability of the surrounding area to disperse the condensate should be taken into account, e.g. areas prone to flooding and ground with a high clay content can result in poor drainage with an increased risk of water logging or freezing causing the condensate pipe to become obstructed by water or ice and the boiler to shut down,

Although it is possible to increase the size of the soak away and the area with limestone chippings in clay soil areas, if the clay content is high and prevents effective dispersal of the condensate then a soak away may not be a suitable means of condensate disposal and an alternative method should be used.

### Condensate soak away with external air break

→ Figure 42

- Refer to following example to dispose of condensate to a soak away.
- The condensate soak away must be sited at least 500mm away from building footings.
- The condensate drainage pipe may be run above or below the ground to the soak away. The following example shows drainage pipe run above ground.
- The soak away must use a minimum of 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.
- An air break must be installed in the external pipework as shown to avoid an airlock during ground flooding/adverse weather conditions which could prevent the condensate from discharging.



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

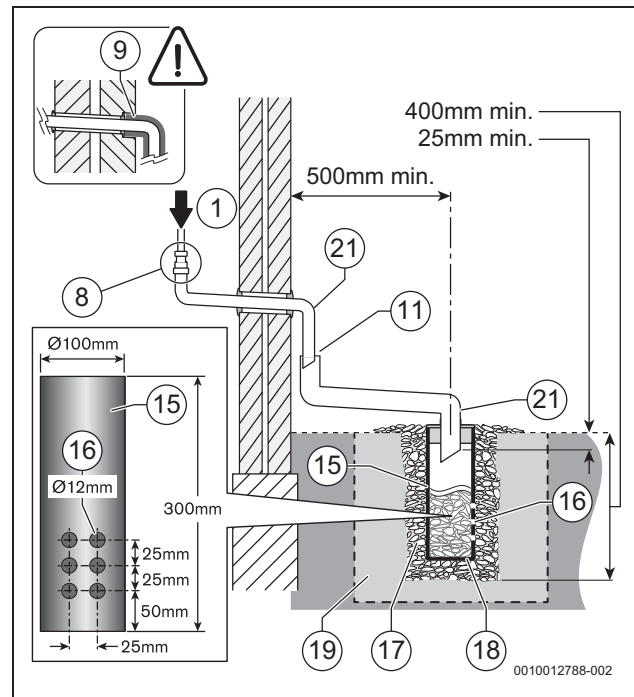


Fig. 42 Disposal to soak-away

- [1] Condensate discharge from appliance
- [8] Pipework transition
- [9] Additional protection for transition through a wall. (→ page 28)
- [11] External air break
- [15] 100mm minimum Ø plastic pipe
- [16] Drainage holes
- [17] Limestone chippings
- [18] Bottom of sealed tube
- [19] Increase size of soak away size and the area with limestone chippings if in clay soil area.  
Not recommended for high clay soil areas.
- [21] Increase pipe size



### Minimum Standard

- The following guidance indicates the minimum standards that must be maintained for the Installation and Maintenance of a product.

### Appliances with large capacity condensate trap or CondenseSure accessory or have trace heating fitted.

The need to insulate the pipework through the wall is not normally required for appliances with a large capacity condensate trap or CondenseSure/trace heating fitted for external runs under three metres. These pipes should be sleeved though the wall and the insulation recessed when used.

### Cavity wall considerations:

- Whilst insulating the pipe through a typical external wall is unlikely to be required for added protection against freezing in most circumstances, it might be a consideration where the property is located in particularly cold, exposed areas, has an uninsulated cavity or perhaps an unusual construction where there is a larger than normal cavity between the inner and outer wall.

### Trace heating fitted:

- Check with trace heating manufactures instructions for additional requirements.

**Large capacity condensate trap or CondenseSure fitted to the appliance:**

- External pipework exceeding three metres in length or an installation with increased risk of freezing due to environmental factors:
  - Additional protection of insulating the entire run of the condensate pipework [2] should be carried out. The pipe should be insulated externally using suitable waterproof and weather resistant insulation.
  - The hole through the wall must be sealed to the building fabric on the internal [1] and external [3] face using a suitable building material.

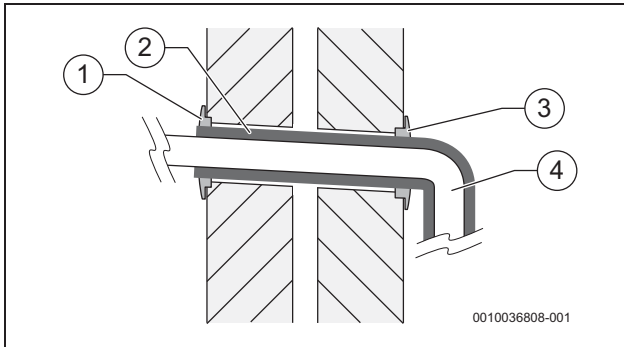


Fig. 43 Through the wall lagging example

- [1] Internal face sealed
- [2] Insulation
- [3] External face sealed
- [4] Condensate discharge pipe

**4.6 Appliances converted to sealed primary system**

**4.6.1 Pressure relief pipework**

**CAUTION**

**Scalding risk from hot water or steam!**

- ▶ The pressure relief valve (PRV) is an appliance safety device and may discharge hot water or steam when activated.
- ▶ The outlet pipe should be sited in such a way that it does not cause a hazard or an obstruction when discharging, for example above a window, entrance door or other public access way.
- ▶ The point of termination should provide a visual indicator in case the PRV discharges.

- The pressure relief discharge pipe [1 or 3] should be run in pipe which has a diameter of at least 15mm, that is made of copper or a material that will withstand PRV discharge temperatures and pressures, and which complies with BS 5254 or BS EN 1451.
- Plastic pipework must be properly supported with a maximum of 300mm between supports to prevent sagging.
- The PRV discharge pipe must run continuously downwards away from the appliance to a safe point of discharge.
- The pressure relief should discharge away from any electrical or other hazard, preferably to an external drain or soak-away.
- The pipe [1 or 3] should be finished with a partial bend, to face the external wall (as shown) to ensure safe discharge of hot water.
- In all normal circumstances a PRV discharge pipe installation as described above sufficiently meets all but the most exceptional circumstances.
  - Where the PRV discharge pipe could be susceptible to damage, vandalism, freezing etc that could cause either a blockage or restriction in the ability to discharge safely then a tundish should be considered. The tundish should be sited in a position where damage to the property or injury to occupants cannot occur from any spillage or discharge.

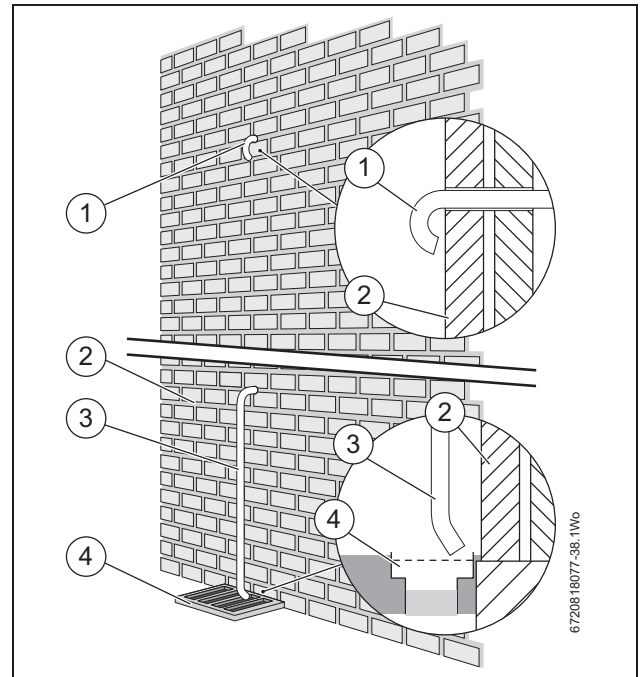


Fig. 44 Pressure relief pipework

- [1] Discharge pipe (turned back onto external wall example)
- [2] Outside wall
- [3] Discharge pipe (into drain or gully example)
- [4] External drain

**4.6.2 Alternative PRV connections - Combined PRV/condensate**

The PRV or a combined PRV/condensate discharge can be connected into a suitable internal waste system, the installer must ensure that all the pipework, including the waste pipe, is capable of withstanding PRV temperatures and pressures.

Connection to a waste water pipe is possible by using either:

- A shielded tundish with non-return valve used to discharge upstream of a trap (there must not be a trap directly in the PRV discharge pipe without a tundish).
- A PRV can discharge directly into a suitable waste pipe downstream of a trap. Connections must be on top of the pipe to ensure they do not block. A Hotun (or similar) can be fitted for visual indication if desired but is not necessary.

The guidance of BS 6798 sections 6.3.5 and 6.4.3.2a must be followed.

**i**

For installations where it is not possible to run the PRV discharge pipe continuously downwards away from the appliance, the remote PRV kit can be used to remove the PRV from the appliance and relocate it to a higher position.

**4.7 Cleaning primary systems**

**NOTICE**

**Risk of damage to system or appliance!**

Debris from the system can damage the appliance 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 a requirement of the Building Services Compliance Guide which is a second tier document to the Building Regulations to flush and inhibit the primary water system in accordance with BS 7593.
- ▶ The Building Services Compliance Guide recommends that a primary water cleanser is fitted to the system.
- ▶ Worcester Bosch recommend fitting a filter that will help remove both magnetite and non-magnetic debris. Worcester offers various filters that helps remove both magnetite and non-magnetic debris; see accessories list for available options.

#### NOTICE

#### Risk of damage to system or appliance!

- ▶ Salt based, artificially softened water MUST NOT be used to fill the system.

#### NOTICE

#### 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.

- ▶ Heating systems may lose small amounts of water over time. In cases where all attempts to find a system micro leak have failed, Worcester, Bosch Group supports the use of Fernox F4 leak sealer.

#### Before cleaning the system:

- ▶ Ensure that the system and pipe work is in good working order.
- ▶ **Where possible keep the existing appliance/circulating pump in place when flushing the system before installing the new appliance. Alternatively use an after market power flushing system or similar to remove magnetite and other debris from the central heating system.**
  - Even new central heating systems contain contaminants that need to be removed before treating the system with inhibitor/anti-freeze.
  - When an appliance is installed onto a new system then it is possible to use the appliance whilst cleaning the system. A system filter must be fitted to the return to reduce the risk of contaminants entering the appliance.
- ▶ **Follow the guidance of BS7593.**

#### 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.

Products approved to the BuildCert standard are deemed as compatible with the components and equipment within the appliance and system.



The inhibitor or combined inhibitor/anti-freeze must not cause damage to the materials within the appliance (aluminium, mild steel, stainless steel, copper and brass) and any other materials/components within the system.

- ▶ The concentration level of inhibitor in the system should be checked every 12 months or sooner if system content is lost.

#### Water treatment products

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

ADEY	01242 546700 www.adey.com
FERNOX	0330 100 7750 www.fernox.com
SENTINEL	01928 704330 www.sentinelprotects.com/uk

Table 13

#### 4.7.1 Flushing the system

Flushing the system using existing appliance/circulating pump or new appliance.



New appliances

- ▶ A new appliance must only be used to assist the cleaning of a newly installed system.
  - ▶ Fill the system with cold water and check for leaks.
  - ▶ **Open vented systems only:**
    - Turn off the water to the system header tank.
  - ▶ 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.
  - ▶ Mark the position of the lockshield valves and open them fully.
  - ▶ Fully open all TRVs.
  - ▶ Circulate the flushing agent before the appliance is fired up.
  - ▶ Run the appliance/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.
    - **Appliances converted to sealed primary system only.**  
Do not drain the system through the PRV of new appliances.
  - ▶ It may be necessary to use a power flushing machine to aid the cleansing procedure in some circumstances.
  - ▶ Close the drain cocks and manual air vents.
  - ▶ **Existing appliance/circulating pump if continuing to use before new appliance is installed.**
    - Add a suitable inhibitor to the system in accordance with the manufacturers instructions.
    - **Open vented systems only:**  
Turn on the water to the system header tank and allow the system to fill.
    - **Appliances converted to sealed primary system only.**  
Fill the system to between 1 and 1.5 bar via a WRAS approved filling loop.
    - Vent any air from the appliance and system.
  - ▶ **New appliance.**
    - Once the new appliance has been installed follow the guidance in Filling the appliance and adding inhibitor section.

## 5 Installation

### 5.1 Safety instructions

#### ⚠ Risk of explosion from escaping gas!

Escaping gas can cause an explosion.

- ▶ Ensure the mains gas supply is isolated before starting any work and follow all relevant safety precautions.

#### ⚠ Risk of poisoning due to escaping flue gases!

Flue gases can escape from incorrectly assembled flue system.



- ▶ Ensure the flue system is correctly installed in accordance to the flue installation instructions.
- ▶ Ensure you carry out a flue integrity check when commissioning the appliance.

**NOTICE****Risk of damage to appliance or accessories.**

- ▶ All the previous pre-installation sections must be read and requirements met before starting the appliance or flue installations.

**CAUTION****Risk of injury through incorrect lifting and carrying!**

- ▶ Only lift a manageable weight, or ask for help.
- ▶ Bend the knees and keep the 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.

**Appliance on site**

- ▶ Check contents of delivery are undamaged.
- ▶ Remove the appliance from its packaging and check the contents against the scope of delivery.
- ▶ Once the appliance is unpacked the installation can commence.

**WARNING****Damage to property!**

Damage caused by drilling into pipes, electrical cables, damp proof course or other hazards.

- ▶ Before drilling ensure that there are no obstructions or other hazards.

**NOTICE****Damage to appliance!**

Residue, metal shavings, and contaminants in the system pipework can damage the appliance.

- ▶ Flush the system pipework thoroughly to remove all residue.
- ▶ Follow the instructions with respect to cleaning primary systems.

**Running pipes behind the appliance.**

- Do not cross pipes over one another.
- Consider the routing of the flue pipe prior to fixing the position of additional pipework.
- Only follow the routing defined on the wall mounting template.

## 5.2 Preparatory work

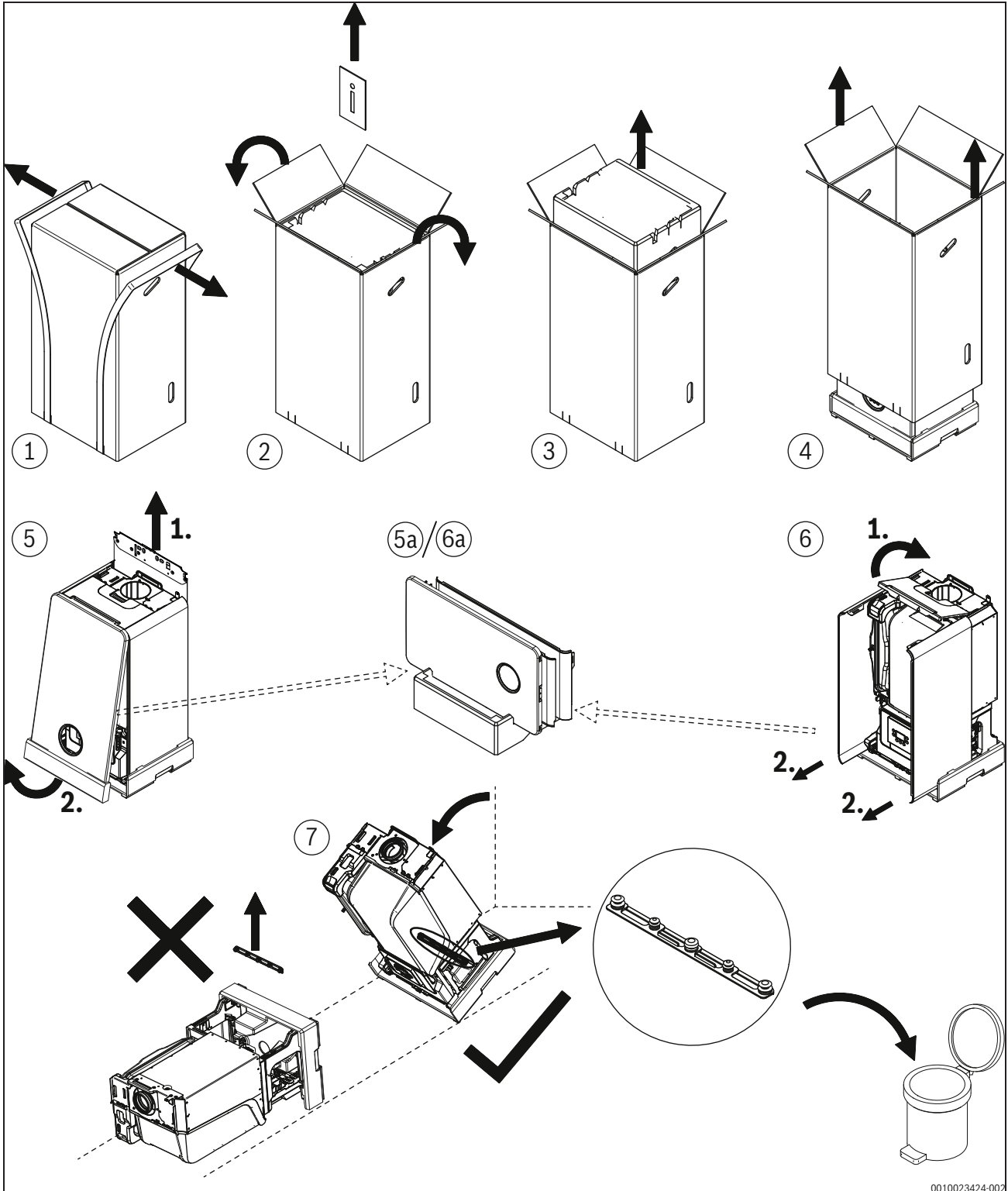
### Important handling instructions

- It is advised that two people are used to carry the carton from the vehicle to the point of delivery.
- Once the carton is in the property, 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 appliance from the base and the proper technique for safe lifting of any heavy object should be strictly observed.

### Unpacking



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Fig. 45 Unpacking

### Additional requirements for roof space installations

- The unpacked appliance can now be moved into the loft space
- Two sets of steps should be used.
- Two people should share the lifting of the appliance up to the loft hatch, tilt and slid on its back into the loft space.
- Ensure that the roof space has permanent fixed lighting, a permanent fixed retractable ladder and a fixed floor area, from the hatch to the appliance installation point. This will allow access for installation, normal use and servicing.



Before installing the appliance, ensure that the system has been cleaned.

### 5.3 Position the appliance

#### **⚠ Risk of explosion from escaping gas!**

Escaping gas can cause an explosion.

- ▶ Ensure the mains gas supply is isolated before starting any work and follow all relevant safety precautions.



Appliance positioning

- ▶ Ensure the appliance is mounted onto a flat, fixed rigid surface capable of supporting the appliance weight.
- ▶ Ensure all aspects of the installation are considered when positioning the appliance, flue run and discharge, condensate disposal etc.



#### **WARNING**

#### **Damage to property!**

Damage caused by drilling into pipes, electrical cables, damp proof course or other hazards.

- ▶ Before drilling ensure that there are no obstructions or other hazards.

#### **NOTICE**

#### **Damage to appliance!**

Residue, metal shavings, and contaminants in the system pipe work can damage the appliance.

- ▶ Flush the system pipe work thoroughly to remove all residue.
- ▶ Follow the instructions with respect to cleaning primary systems.

Running pipes behind the appliance.

- Do not cross a pipe over another.
- The area around a rear flue outlet must be avoided.
- Only follow the routing defined on the wall mounting template.

#### 5.3.1 Mounting frame fixing



 Existing wall fixings positions (CDi Classic)

- ▶ The existing wall fixings can be used only if they are still deemed by a competent person able to support the new appliance.



Wall mounting template

- ▶ The wall mounting template has been sized to allow for the minimum clearances around the appliance (→ chapter 4.3 "Appliance location and clearances").

→ Figure 46

The appliance wall mounting template shows the relative positions of the flue and the top and bottom fixings of the wall mounting frame.

- ▶ Fix the wall mounting template [3] to the wall in the desired position.
- ▶ Drill the holes [4] through the template for the primary fixing points as indicated on the template.
  - Additional fixing points for the appliance will be indicated on the wall mounting template.

#### **Flue outlet position.**

The appliance wall mounting template has the flue centre lines for the following flue systems:

- 60/100mm
- 80/125mm



Flue turret

- ▶ The flue turret has an in-built 3° angle giving the flue assembly the rise from the appliance to ensure the condensate flows back to the appliance.

#### **Rear flue outlet [2].**

- ▶ Mark centre line of flue to be used; the external diameter of the hole can also be marked if required.
- ▶ If extensions are to be added then the complete flue must rise at an angle of 3° from the appliance.

#### **Side flue outlet [1].**

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

#### **Example hole size.**

- If a 60/100mm diameter flue is to be used, a 125mm diameter hole is required.
- If using the weather sealing collar by pushing it through from inside the property, then a 150mm diameter hole is required to accommodate this.

#### **Flue outlet position marked and ready to drill hole.**

- ▶ Drill hole using a core drill or similar.
- ▶ Clear any debris from the site.

#### **Appliance fixings and flue outlet drilled and ready.**

- ▶ Remove the wall mounting template.

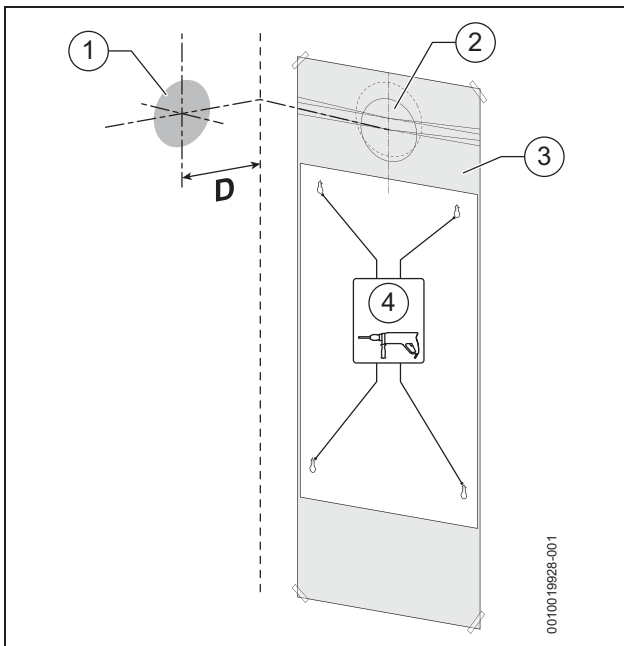


Fig. 46 Wall mounting template

- 1 Side exit flue example
- 2 Rear exit flue example
- 3 Wall mounting template
- 4 Primary fixing points
- D 87mm

**Carry handles**

For transportation of the appliance always use the carry handles [1] and [2] (with the control unit in the closed position).

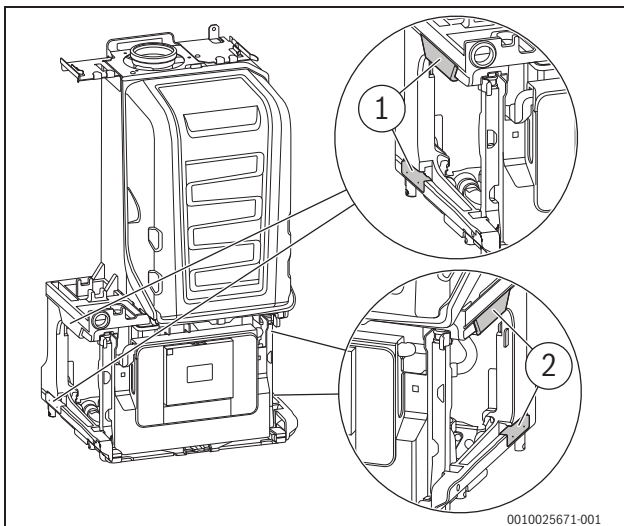


Fig. 47 Transport, lifting and handling

**Preparing the appliance installation**

**NOTICE**

**Incorrect mounting can cause material damage.**

If the appliance is mounted incorrectly, it may fall off the wall.

- ▶ Only install the appliance on a rigid, solid wall. This wall must be able to carry the weight of the appliance and must at least be as large as the bearing surface of the appliance.
- ▶ Only use screws and wall plugs that are suitable for the wall type and weight of the appliance.

- ▶ Remove the packaging, observing all notices in the packaging.

- ▶ Make sure that the gas type specified on the data plate is the same as the gas type supplied.
- ▶ Make sure that the installation location is in the country of destination specified on the data plate.
- ▶ Fasten the wall mounting plate to the wall using 4 screws and wall plugs.
- ▶ Attach the pre-plumbing manifold to the lower screws and tighten.

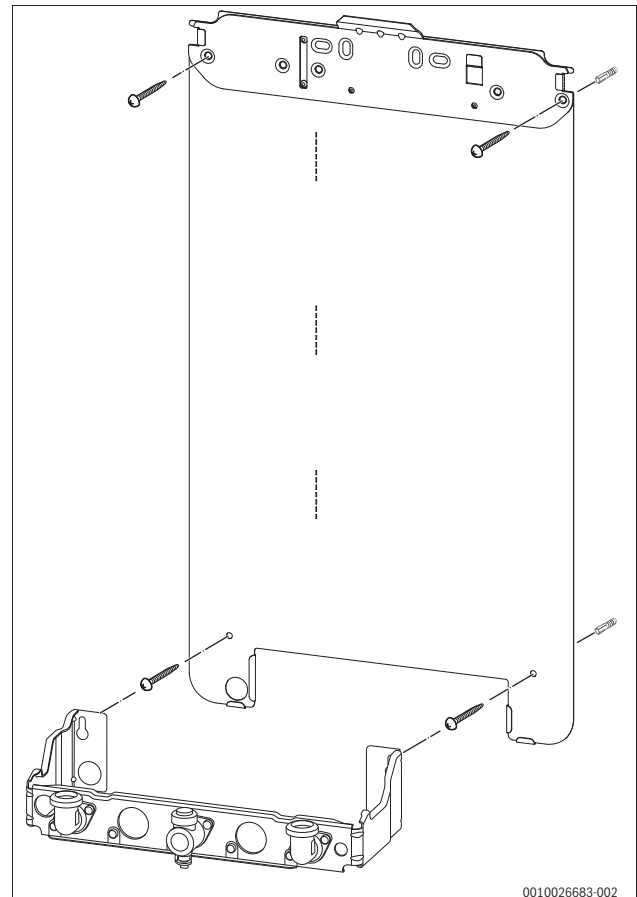


Fig. 48 Fitting the wall mounting plate and pre-plumbing manifold

**5.4 Appliance connections**

**WARNING**

**Appliance - gas connection**

- ▶ Ensure the mains gas supply is isolated before starting any work and follow all relevant safety precautions.

**NOTICE**

**Appliance - hydraulic connections**

- ▶ Ensure all water pipework, to be connected, are isolated/drained and follow all relevant safety precautions.
- ▶ Be careful of plastic components when using a naked flame on pipework.

**i**

Surplus water may be present inside the appliance due to factory testing.



External condensate pipework or internal pipe runs in unheated areas such as lofts, basements and garages exposed to prolonged cold temperatures should be protected (→ chapter 4.5).

**NOTICE**

**Commissioning without water damages the appliance!**

- ▶ Operate this appliance only when filled with water

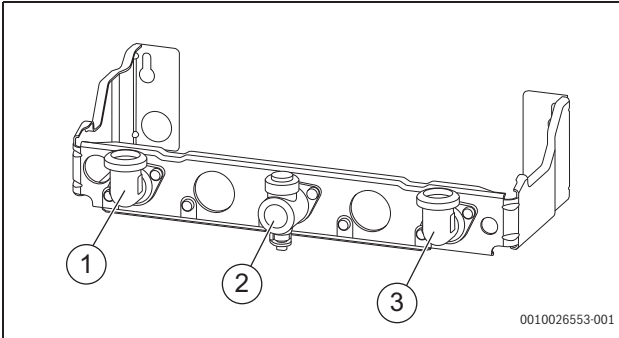


Fig. 49 Connections on the gas and the water side

- [1] Heating flow
- [2] Gas isolator
- [3] Heating return

**Preparing the pre-plumbing manifold**

- ▶ Fit sealing washers to service connectors before hanging appliance.

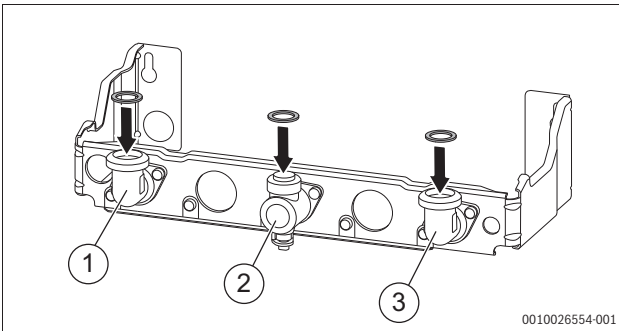


Fig. 50 Fitting the sealing washers

- [1] CH flow
- [2] Gas inlet
- [3] CH return

**Fitting the condensate pipework**

- ▶ Secure the pipe to the wall at the last joint.
- ▶ Ensure the pipe protrudes through the pre-plumbing manifold by 25mm.

- ▶ If exiting through the wall, to run externally, the pipe must have a 3° fall and be increased to a 32mm.

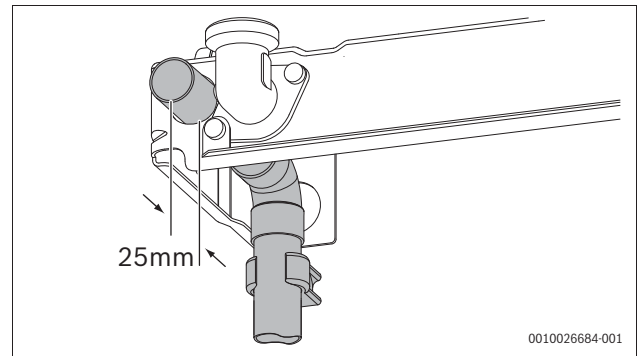


Fig. 51 Fitting the condensate pipes to the mounting plate

**5.5 Hanging the appliance**

**Before hanging the appliance**

1. Remove the orange plastic protective cover strip fitted to the appliance internal pipes by tilting the appliance forward, taking care to protect the floor from residual water. It is not necessary to lay the appliance on its back.
2. The appliance is a 2 person lift. Ensure that the control panel is in its closed position and the top and side panels are removed before lifting the appliance.

**Hanging the appliance**

- ▶ Ensure that top and side panels are removed.
- ▶ Fit the sealing washers to service connectors.
- ▶ Hang the appliance on to the wall mounting frame by the centre hook.
- ▶ Unlock the condensate trap and remove from appliance (→ Fig. 92).
- ▶ Check the positioning of the sealing washers on the pipe connections.
- ▶ Tighten the union nuts on the pipe connections starting with the CH return on the right.



It is recommended the lifting operation is carried out by 2 people, observing all precautions for safe lifting of heavy objects.

Do not lift by the top case panel. There are two handling holes incorporated into the inner casing left and right in the lower section of the appliance.

**CAUTION**

**Damage to boiler**

Boiler may fall and/or not work properly.

- ▶ Make sure the boiler fits tightly the designated grooves [1] in the manifold.

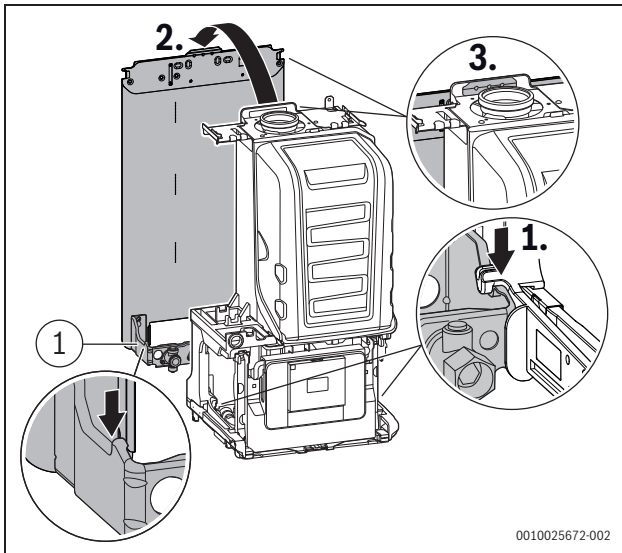


Fig. 52 Hanging the boiler

- ▶ Make connections between the boiler and the pre-plumbing manifold and the pre-plumbing manifold and the system pipes.
- ▶ Connect the CH flow pipes to the boiler's 22mm compression connections.
- ▶ Connect the CH return pipes to the boiler's 22mm compression connections.
- ▶ Connect the gas supply to the boiler gas cock 22mm compression.
- ▶ Connect the condensate discharge pipe work to the boiler's condensate outlet connections.

#### Condensate connection

**Never terminate or discharge into any open source, including; sink, bath, shower, bidet, toilet etc.**



Any external condensate pipe work of an excessive run should be protected with weather resistant insulation to help prevent freezing (→ chapter 12).

- ▶ Ensure that the condensate drain is 22mm diameter plastic pipe. It must fall at least 52mm per metre towards the outlet.

Refer to Fig. 53, condensate connection:

- ▶ Align the installation side plastic pipe work through the pre-plumbing manifold.
- ▶ Connect the installation side plastic pipe work to the end of the condensate hose.
- ▶ Push the plastic pipe work inside the condensate hose at least 25mm.

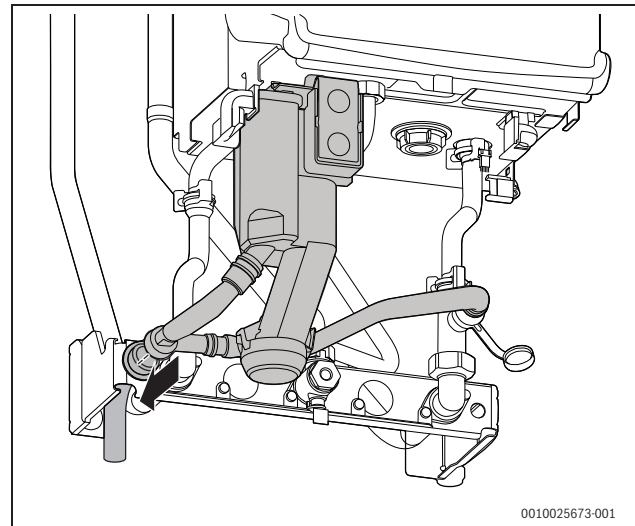


Fig. 53 Condensate connection

#### Filling the condensate trap



#### Danger to life from poisoning!

If the condensate trap is not filled, poisonous flue gas can escape.

- ▶ Fill the condensate trap with approx. 250 ml water via the flue pipe.

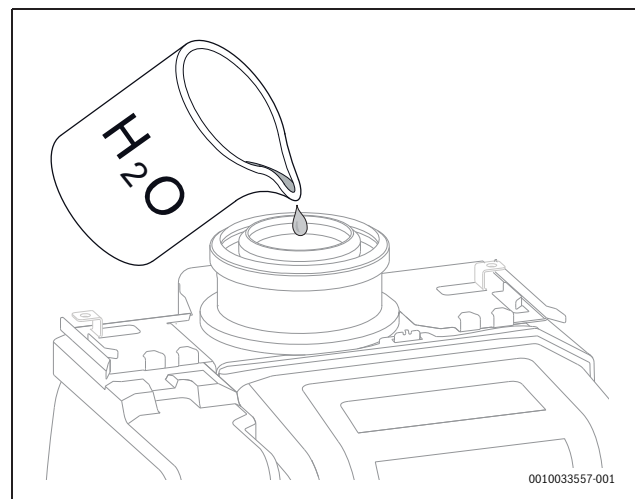


Fig. 54 filling the condensate trap with water

## 5.6 Flue turret/adaptor installation

### NOTICE

#### Flue installation

- ▶ Refer to the Flue Kit Installation instructions provided with your flue kit to correctly install the flue with this appliance.
- ▶ Do not exceed the maximum straight length for a horizontal or vertical flue or a 60mm plume management system (if used) as stated in chapter 4.4.



Telescopic flue

- ▶ Cutting the flue to an exact measurement is not required as the telescopic flue terminal can allow for some adjustment.



Apply silicone lubricant to sealing surfaces, to ease assembly of flue components.  
Refer to the manual supplied with the flue kit for complete installation instructions.

- For plume management and effective flue lengths (→ chapter 4.4).

Additional notes and reminders:

- Ensure that all cut lengths are square and free from burrs and cutting/filing debris.
- Ensure that the flue and seals are not damaged.
- The flue is sealed when assembled correctly, the components are pushed fully home and secured.
- The flue rises from the appliance at an angle of 3° or 52mm per metre length.
- Support the flue at each flue extension joint and at each change of direction, use suitable brackets and fittings:
  - Support bracket kit (silver), part number 7 738 112 876
  - 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.
- Ensure the external wall seal is fitted and properly located in the groove provided on the terminal. This seal must be installed in the groove unless the flue is extended beyond a gutter or balcony as shown in the installation instructions.

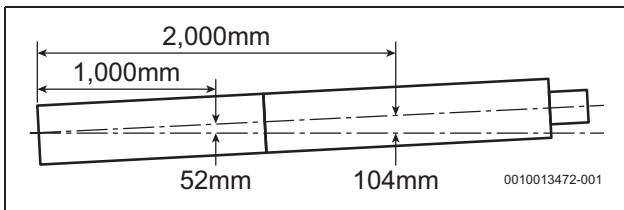


Fig. 55 Slope for condensate disposal

- Remove the three inner flue tube retaining screws [1].
  - The inner tube will be held in place in the appliance.
- Check the appliance flue seal [2] is correctly seated and apply silicone grease.

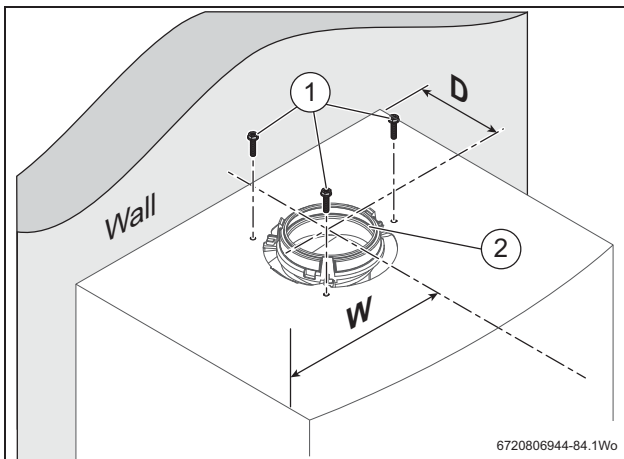


Fig. 56 Flue turret centre

- [D] 87mm
- [W] 220mm

- Align the flue turret/vertical adaptor to the appliance flue outlet with flat facing [3] to the rear of the appliance.  
The flue turret/adaptor should be pushed straight down, on to the appliance.

- The three inner flue tube retaining screws [1] are, re-used for the flue turret and replacement retaining screws [4] supplied with the adaptor kit are used to secure turret/adaptor to the appliance.

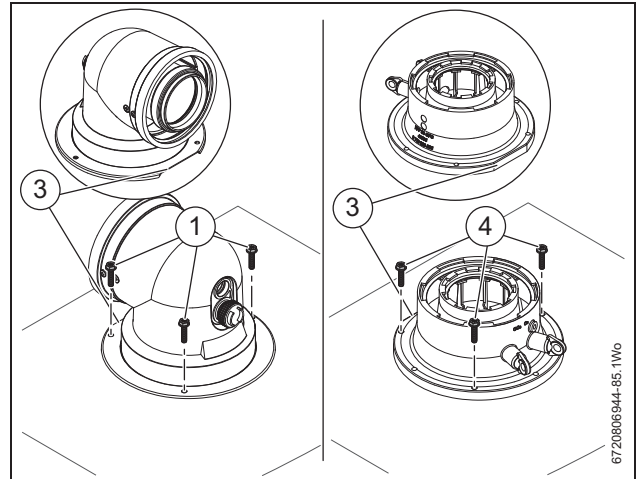


Fig. 57 Flue turret/adaptor connection

## 5.7 Electrical connection

### 5.7.1 Safety instructions



#### Risk of electric shock!

- Isolate electrical components from the power supply (230 V AC) (fuse, circuit breaker) and secure against unintentional re-connection before carrying out any work.  
Information on safe isolation can be found in national and regional regulations as well as all technical rules and guidelines for the country of installation.
- Check for zero potential (conductors proved to be dead) before proceeding with work, using approved test equipment.

Electrical considerations:

- All electrical work must be carried out by a competent and authorised person.
- All work must comply with the current national and regional regulations, technical regulations and guidelines for electrical installations.
- The mains electrical supply to the appliance must be through a fused double pole isolator.
- An isolator shall be situated next to the appliance for new systems and, where practicable, replacement appliances (this could be the fused double pole isolator).
- Any additional components/equipment that are connected to the appliance that require 230 Volts must be connected through the same isolator as the appliance.
- External fuse 3 Amps.
- When stripping the wires, ensure copper strands do not fall into the control box.

#### NOTICE

#### Risk of damage from hot appliance components.

Hot appliance components can damage electrical cables.

- Ensure all electrical cables are in the correct cable guides and away from hot appliance components.



#### Cable routing

- ▶ Route cables through support guides and retaining clips.
- ▶ Run power cables separately from signal cables. Interference from power cables can induce spurious faults on signal cables, ensure that there is at least 100mm separation from each other.
- ▶ Ensure the cables are of sufficient length to allow the control box to be moved to the service position.

If the power cable is of insufficient length and is to be replaced, access the connection terminal (→ Fig. 60)

- ▶ Replace with the following cable type:
  - Flexible PVC insulated, 0.75mm<sup>2</sup> temperature rated to 90 °C, in accordance to regulations as well as all technical rules and guidelines for appliance power supply installations.
  - A spare strain relief is supplied in the hardware pack, if required.
- ▶ Connect the cable so that the protective conductor (earth) is longer than the other wires.

#### 5.7.2 Installer connections

##### Connect external accessories

- ▶ Flip down the control appliance

- ▶ Open the cover.

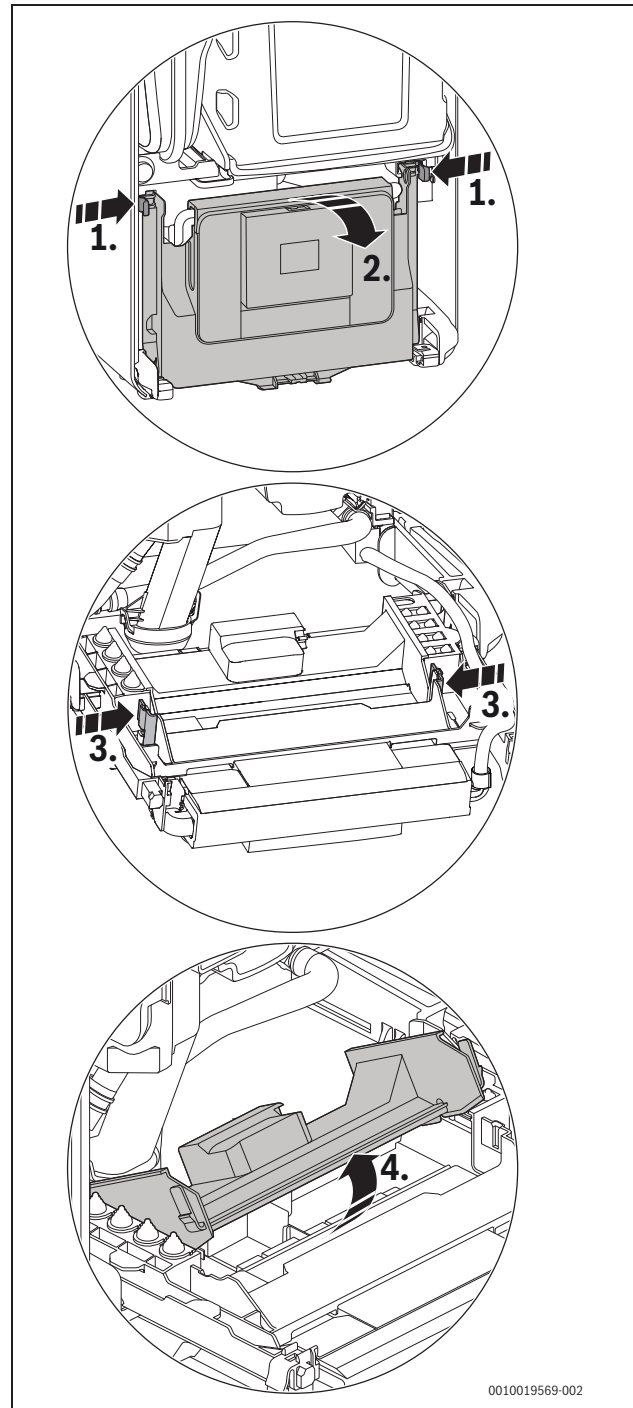


Fig. 58 Opening the cover

Access to the electrical connections once the cover is opened.



- ▶ For splash water protection (IP): cut the strain relief to match the diameter of the cable.

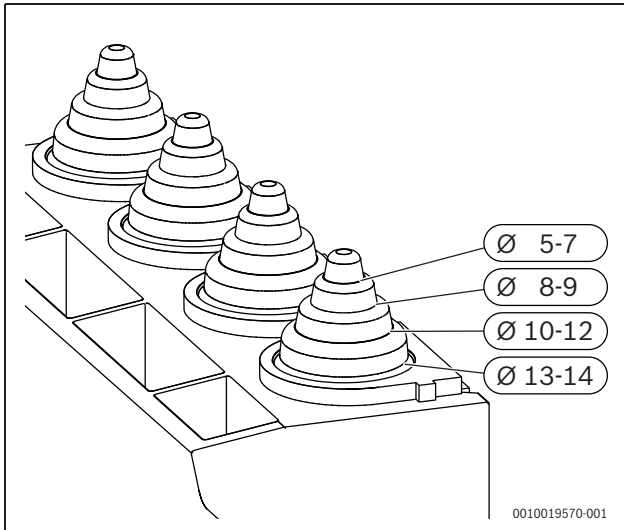


Fig. 59 Adapting the strain relief to the cable diameter

- ▶ Guide the cable through the strain relief.
- ▶ Connect the cable to the terminal strip for external accessories.
- ▶ Secure the cable on the strain relief.

**Power supply (power cables) terminal strip**

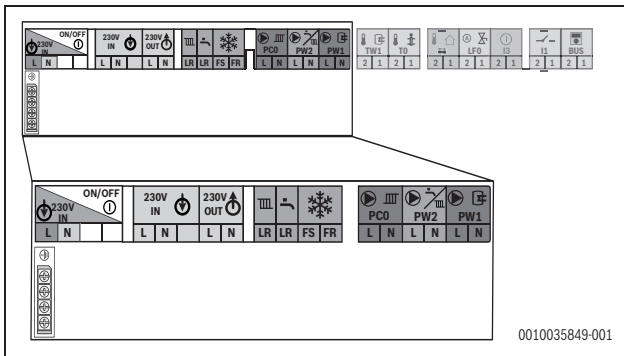


Fig. 60 Power supply (power cables) terminal strip

**Power supply (power cables) connections**

Symbol	Function
	Protective earth bar ▶ Connect the protective earth for power supply.
	Power supply (power cable) Pre-wired cable (Live and Neutral)
	No functionality; not used
	230V mains output to external controls/wiring centre ▶ If required: connect power supply for external controls.
	Switch live (Live Return) to appliance •  CH demand input •  DHW demand input (no functionality; no use)
	External frost thermostat • FS output (frost thermostat supply) • FR input (frost thermostat return)
	Primary heating pump

Symbol	Function
	Secondary heating pump (max. 100 W) or cycle circulation pump (max. 100 W)
	Cylinder primary pump (max. 100 W) or external 3-way valve 230 V

Table 14 Power supply (power cables) terminal strip for external accessories



The system pump must be connected to the appliance control for overheat protection and pump over-run facility.

**Low voltage (signal cables) terminal strip**

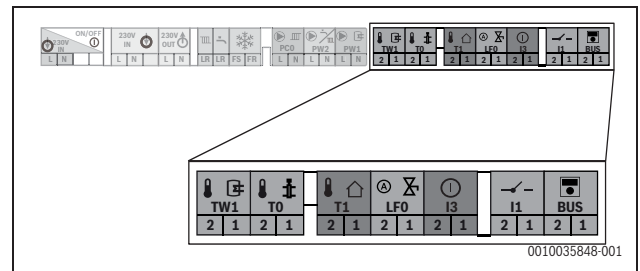


Fig. 61 Low voltage (signal cables) terminal strip

**Low voltage (signal cables) connections**

Symbol	Function
	Low-loss header temperature sensor
	Cylinder temperature sensor
	Without function
	Without function
	Without function
	On/Off thermostat input
	External control system with EMS bus control, Worcester intelligent wall mounted controls. ▶ Connect 2 core cable.

Table 15 Low voltage (signal cables) terminal strip for external accessories

**5.7.3 Cable preparations**

**NOTICE**

**Damage to control unit!**

Small pieces of wire can cause shorts and damage to electronics.

- ▶ When stripping wires always ensure copper strands do not fall into the control box.

### Power supply (power cables), example → figure 62

- ▶ Ensure the conductors (C) can reach the appropriate terminal connection and that the protective conductor (PE) is longer than the other wires.
  - Power cables connected to the appliance may have different conductor lengths depending on the termination point.

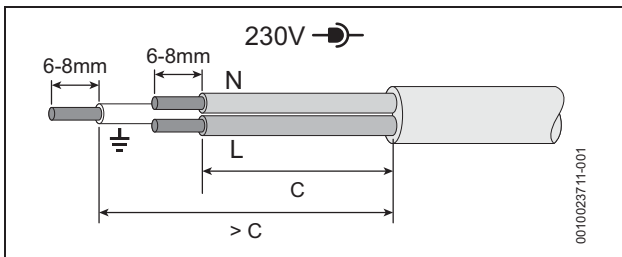


Fig. 62 Power supply (power cables) preparation

### Low voltage (signal cables), example → figure 63

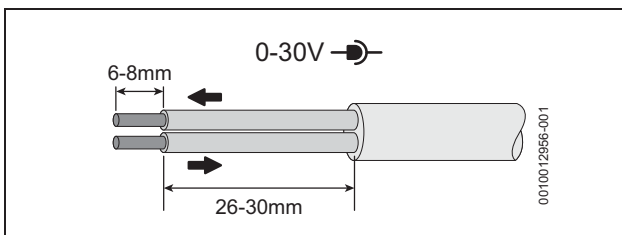


Fig. 63 Low voltage (signal cables) preparation

#### 5.7.4 External controls - domestic installations

##### Appliance external control connections example

- ▶ The electrical power supply to the external equipment [2] is supplied from 230V OUT - L (Live), N (Neutral) and  $\perp$  (earth) terminals.
- ▶ The Switch Live from the external equipment [3]:
  - Both pre-wired links are removed, the CH demands are combined and wired to the  $\perp$  LR terminal.
- ▶ External frost thermostat connections [4]:
  - The Live supply is terminal FS
  - The Switch Live is terminal FR

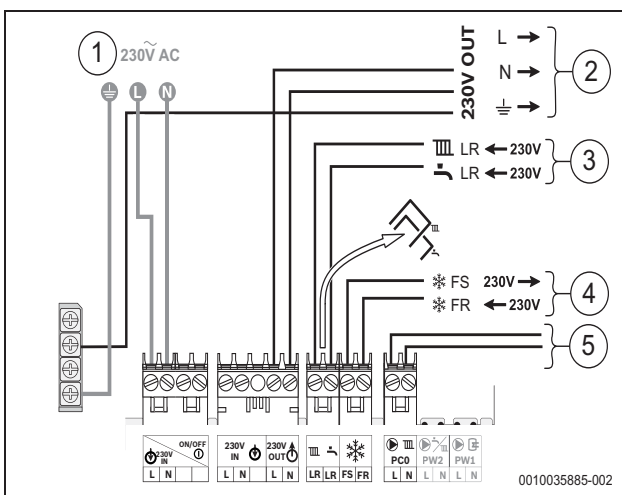


Fig. 64 External controls connections example

- [1] 230V mains supply to the appliance
- [2] 230V supply from the appliance to the wiring centre
- [3] CH Switch Live (Demand) from the external controls
- [4] External frost protection Live supply and Switch Live (Demand)
- [5] External pump connection

## 6 Commissioning

### 6.1 Safety instructions



#### Risk of electric shock!

- ▶ Isolate electrical components from the power supply (230 V AC) (fuse, circuit breaker) and secure against unintentional re-connection before carrying out any work. Information on safe isolation can be found in national and regional regulations as well as all technical rules and guidelines for the country of installation.
- ▶ Check for zero potential (conductors proved to be dead) before proceeding with work, using approved test equipment.

### 6.2 Pre-Commissioning checks

#### Checks before commissioning:

- ▶ Check that the service and water pipes are connected correctly.
- ▶ Inspect the entire gas installation, including the meter and conduct a tightness test in accordance to the latest gas safety technical regulations and guidelines (e.g. UK standards advice found in BS 6891).
- ▶ Check the gas type specified on the identification plate matches that of the gas supply and that the gas supply is properly purged.
- ▶ Appliance converted to sealed system.
  - Check that the appliance is filled with water and under pressure (1.5 bar) and that there are no leaks.
- ▶ Check that the electrical connections of the appliance are correct:
  - Mains electrical supply - 230V, 50Hz
  - Compliant earth connection
  - Correct polarities.
  - External equipment and controls are wired in correctly.
- ▶ Check that the flue is correctly fitted, airtight, free from any obstruction and the connections are secure.
- ▶ Check that the condensate pipe work is connected properly and that there are no leaks.

#### NOTICE

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

- ▶ Isolate the electricity supply.
- ▶ Isolate the gas supply.
- ▶ Drain the system and appliance.
- ▶ Label appropriately.

### 6.3 Water treatment

#### Primary system flushing (Central Heating)

##### Ensure that the system has been cleaned:

- Following the guidance of BS 7593:
  - Code of Practice for treatment of water in hot water central heating systems.
- Overview available in Pre-installation, Cleaning primary systems section.

#### Inhibitor (Central Heating):

Add a suitable inhibitor that is compatible with aluminium (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.



The pH value of the system water must be between 6.5 and 8 or the appliance warranty will be invalidated.



The inhibitor or combined inhibitor/anti-freeze must not cause damage to the materials within the appliance (aluminium, mild steel, stainless steel, copper and brass) and any other materials/components within the system.

- ▶ Record the date when the inhibitor was added to the system on the guarantee card.
- ▶ The concentration level of inhibitor in the system should be checked every 12 months or sooner if system content is lost.

**NOTICE**

**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 system micro leak have failed, Worcester, Bosch Group supports the use of Fernox F4 leak sealer.

**6.3.1 Filling the appliance and adding inhibitor**

**Filling the system - Open Vent systems**

**NOTICE**

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

- ▶ Check drain cocks and manual air vents are closed and all radiator valves are open. Add a suitable inhibitor or combined inhibitor/anti-freeze, if the system is exposed to freezing conditions, to the heating system water in accordance with the manufacturers instructions.
- ▶ Turn on the water main to the system header and allow the system fill.
- ▶ Vent the appliance using the manual air vent (on flow pipe) (→ Fig. 3.8, item 9) taking care to protect any electrical connection.
- ▶ Vent all radiators and the primary side of the hot water cylinder, tighten when completed and check the system for any leaks and correct if required.

**6.3.2 Appliances converted to sealed primary system**

**Filling the system - Sealed systems**

**NOTICE**

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

- ▶ Check drain cocks and manual air vents are closed and all radiator valves are open. Add a suitable inhibitor or combined inhibitor/anti-freeze, if the system is exposed to freezing conditions, to the heating system water in accordance with the manufacturers instructions.
- ▶ Turn on the water main and open the system valves.
- ▶ Fill the system to between 0.8 and 1.7 bar via a WRAS approved filling loop.
- ▶ The Automatic Air Vent will release any air trapped in the appliance.
- ▶ Manually vent all radiators, tighten when completed and check the system for any leaks and correct if required.
- ▶ Top up the system pressure if the pressure drops below 0.8 bar.
- ▶ Isolate and remove filling loop connections to the system.

**6.4 Starting the appliance**

**NOTICE**

**Damage to appliance or system!**

Running the appliance:

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

**6.4.1 Control panel overview**

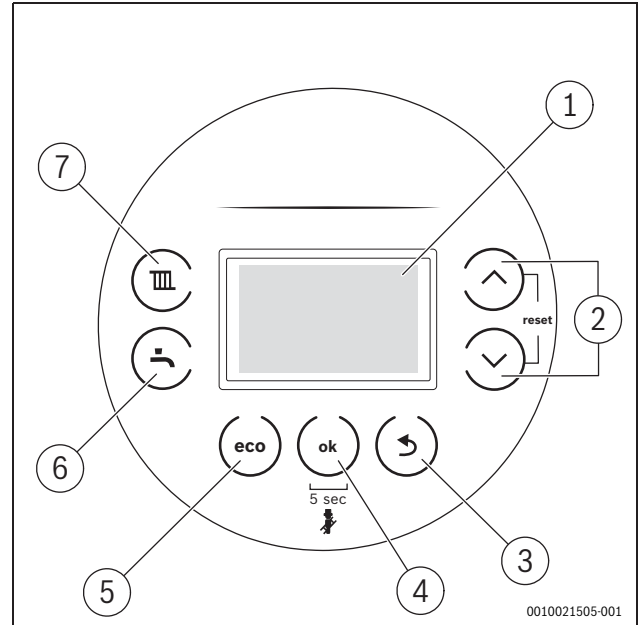


Fig. 65 Control panel

- [1] Display
- [2] ▲ and ▼ keys: To navigate through menus and increase/decrease settings
- [3] ↵ key: Return/back
- [4] ok key: Save settings, Chimney sweeper key (Service Engineer function): press 5 s for chimney sweeper mode
- [5] eco key: Hot water preheat selection (not applicable for regular appliances)
- [6] Hot water key: Adjusting the hot water temperature (not applicable for regular appliances)
- [7] Heating key: Heating mode on, set the maximum flow temperature

**6.4.2 Turn on the appliance**

Set the language the first time the appliance is turned on.

- ▶ To scroll through the languages, press the ▲ or the ▼ key.
- ▶ To select the desired language, press the **ok** key.



When the symbol appears alternately with the flow temperature, the siphon filling program is active. The condensate siphon in the appliance is filled (→ chapter 6.4.3).

**6.4.3 Siphon filling mode, manual activation/de-activation**


The siphon filling mode is activated automatically or manually by the installer on the appliance.

- ▶ Press the key and the key simultaneously, until **L.A** will be displayed.
- ▶ Press the ▲ key repeatedly, until **L.4** will be displayed.
- ▶ Press the **ok** key to confirm.
- ▶ Select and adjust service function **4-A2**.

The siphon filling mode is activated automatically in the following cases:

- The appliance is switched on using the fuse spur.
- The burner was not in use for at least 28 days.
- After switching from summer to winter mode.
- After a reset.

The next time there is a heat requirement for heating, the appliance is held at low thermal output for 15 minutes. The siphon filling mode remains active until the appliance has completed 15 minutes of operation with increased min. capacity.

During the siphon filling program, the symbol  appears alternately with the flow temperature on the display.

The siphon filling mode is interrupted when the chimney sweep mode is started.

## 6.5 Chimney sweep mode



You have 15 minutes to take your measurements or to make your settings. After this time the appliance returns to normal operation. When running in the chimney sweep mode, the external controls will need to be set to ensure that the appliance will not overheat. This is to allow sufficient time for this part of the commissioning procedure.

- ▶ 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.

In chimney sweep mode the rated output of the appliance can be selected.

- ▶ Press the **ok** key when the countdown is completed and **Chimney sweep** is displayed.
- ▶ Confirm the query with Yes.
- ▶ Set the desired rated output using the **▲** or the **▼** keys. The value is accepted after 2 seconds and marked with a tick.
- ▶ To exit the chimney sweep mode, press the **ok** key or the **↵** key.

### Adjustment with casing removed in chimney sweep mode

1. Set the chimney sweep mode and start up the appliance at maximum rated output.
2. Set the chimney sweep mode and set the appliance at minimum rated output.

## 6.6 Combustion casing removal

- ▶ Remove the combustion cover.

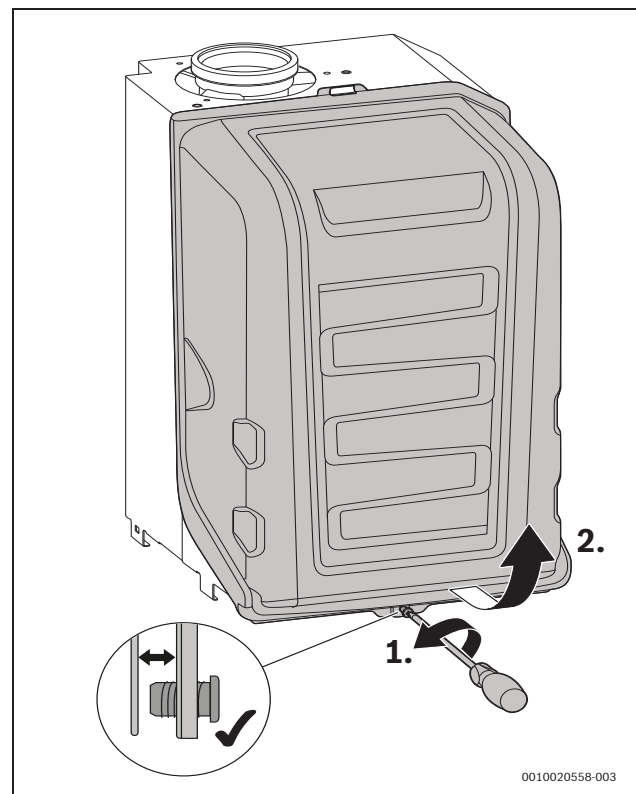


Fig. 66 Removing the combustion cover

## 6.7 Checking gas inlet pressure

### 6.7.1 Checking the gas supply pressure

- ▶ Switch off the appliance and close the gas isolator.
- ▶ Unscrew the screw on the test point for the gas supply pressure and connect a pressure gauge.

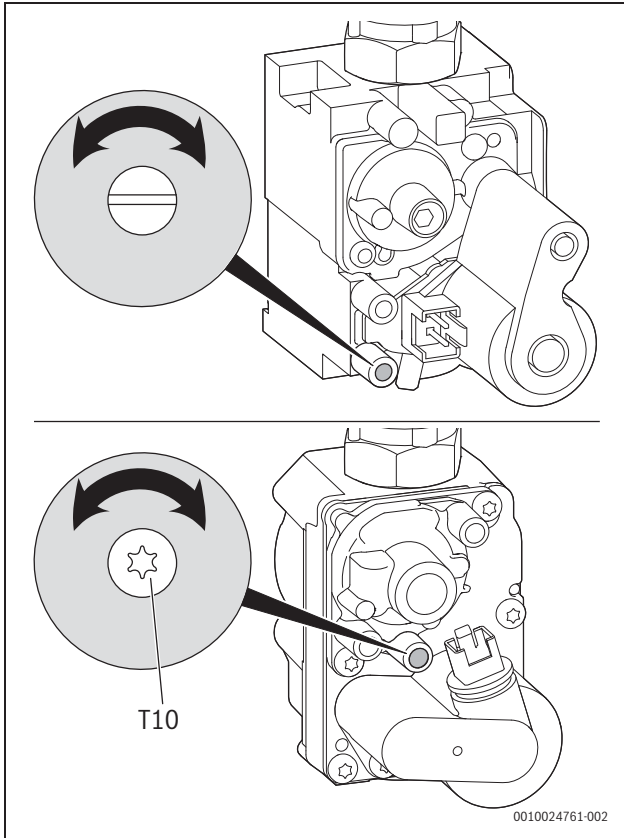


Fig. 67 Gas valve test points (above: SIT valve, below: Honeywell valve)

- ▶ Open the gas isolator and switch on the appliance.
- ▶ Ensure that there is heat transfer by opening the radiator valves and zone valves.
- ▶ Set the chimney sweep mode and start up the appliance at maximum rated output.
- ▶ Check the required gas supply pressure according to table 16.



Commissioning must not take place outside of the permissible pressure range.

- ▶ Identify the cause and rectify the fault.
  - ▶ If this is not possible: isolate the appliance on the gas side and notify the gas supplier.
- 
- ▶ Exit the chimney sweep mode.
  - ▶ Switch off the appliance, close the gas isolator, remove the pressure gauge and tighten the screw.

- ▶ Check for gas tightness.

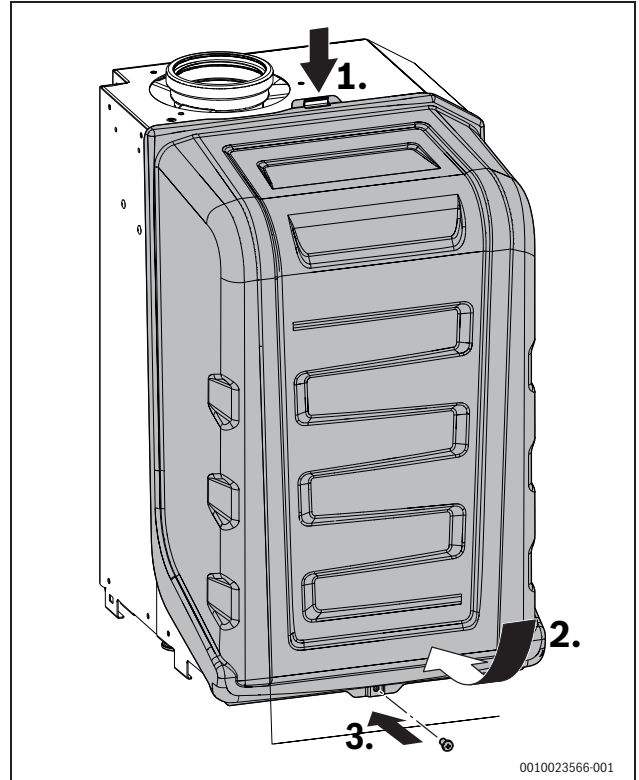


Fig. 68 Refit combustion casing

- ▶ Refit the combustion casing.
- ▶ Ensure this cover is engaged onto top bracket [1] before securing screw [3].

### Gas pressure within the system



The appliance must be running at maximum output rate when performing the gas rate check (→ chapter 6.5).



Combi appliances

- ▶ Running a hot water tap does not guarantee the boiler will operate at maximum output throughout the test.

The pressure drop from the meter or at the LPG gas supply to the gas valve inlet test point must not be more than the values stated in table 16: If the pressure drops are greater than shown in table 16, then this would indicate a problem with the pipe work or connections within the system.

Description	Gas Type	
	Natural Gas	LPG
Meter/LPG Storage Supply pressure [A] (mbar range)	18.5 - 23	32 - 45
Permitted pressure drop [A1] (mbar) <sup>1)</sup>	-	0.5
Across pipework permitted pressure drop [B] (mbar)	1	2.5
Appliance inlet [C] (mbar range)	17.5 - 22	29 - 42

Description	Gas Type	
	Natural Gas	LPG
Across appliance permitted pressure drop [D] (mbar)	≤ 40kW: 1.5	≤ 40kW: 1.5
	> 40kW: 2.5	> 40kW: 2.5
Gas valve inlet test point [E] (mbar range)	≤ 40kW: 16 - 20.5	≤ 40kW: 27.5 - 40.5
	> 40kW: 15 - 19.5	> 40kW: 26.5 - 39.5

1) Permitted pressure drop between LPG Storage and the LPG Regulator

Table 16 Allowed mbar pressure drop

**NOTICE**

► **Do not continue commissioning until the correct gas pressure is achieved with the appliance running at maximum output.**

Gas supply pressure drop - Natural Gas

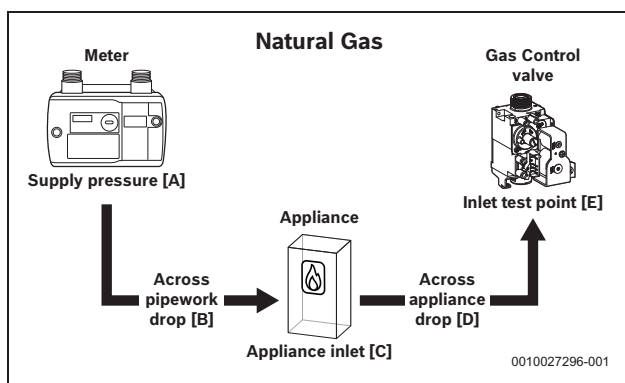


Fig. 69 Natural Gas pressures

≤ 40 kW	> 40 kW
GR8701iW 30 R	GR8701iW 40 R
GR8701iW 35 R	GR8701iW 45 R
	GR8701iW 50 R

Table 17 Pressure drop NG

Gas supply pressure drop - LPG

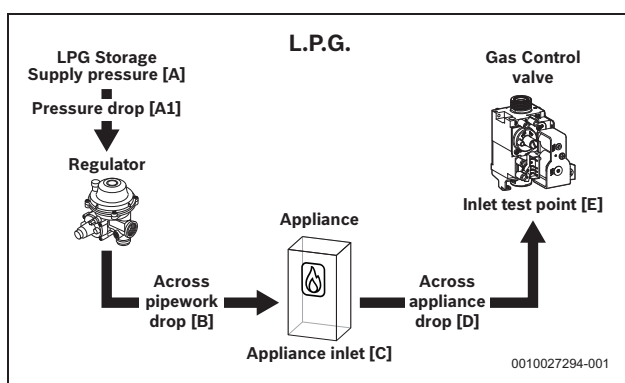


Fig. 70 L.P.G. pressures

≤ 40 kW	> 40 kW
GR8701iW 30 R	GR8701iW 45 R
GR8701iW 35 R	GR8701iW 50 R
GR8701iW 40 R	

Table 18 Pressure drop LPG

## 6.8 Checking the gas rate



The appliance must be running at maximum output rate when performing the gas rate check, (→ chapter 6.5).

- The gas rate should be measured at the gas meter after the appliance has been operating for **a minimum of 10 minutes** at maximum output.
- Refer to Technical data section of this manual for the appliance gas rates and CO/CO<sub>2</sub> ratios.
- Where a gas meter is not available (e.g. LPG) the CO/CO<sub>2</sub> must be checked.
- Gas rate must be checked with the appliance in service, maximum output test mode.
- Carry out gas rating as per the latest advice in the Gas Safety (Installation and Use) Regulations.
- Ensure all other gas appliances are isolated when carrying out the gas rate check on the appliance.
- Set the chimney sweep mode and start up the appliance at maximum rated output.
- Where a gas meter is not available (e.g. LPG) the CO/CO<sub>2</sub> must be checked to the units shown in the setting of the air/gas ratio.
- If pressure and gas rate are satisfactory press the **ok** key or the **↵** key and the boiler will return to normal operation.

## 6.9 Checking for gas leaks during operation

- Use an approved gas sniffer or leak detection fluid to check all connections for possible leaks. Leak detection fluid must be certified as a gas leak testing agent.
- Do not allow leak detection fluid to come into contact with the electrical components.

**6.10 CO and combustion check**

The following combustion and flue integrity checks are mandatory and these values must be recorded on the Benchmark check list, at the end of these instructions.

Once the gas rate and pressure have been confirmed as acceptable then the CO and combustion checks can be undertaken.

The flow chart is given for guidance, the details of the checks are given in the following sections:

- Checking flue integrity (→ chapter 6.11).
- Flue gas analysis (→ chapter 6.12).

**CO and combustion check: Gas type - Natural Gas/LPG**

**NOTICE**

**Before CO and combustion checks:**

- ▶ Verify the appliance is connected to the correct gas type.
- ▶ Ensure the appliance is supplied with the correct gas inlet pressure and gas rate as specified previously in the Commissioning section.
- ▶ Visually check the integrity of the whole flue system and confirm that all the components are correctly assembled, fixed and supported.
- ▶ The flue gas analyser must be the correct type as specified in BS 7967. Before use the analyser must have been calibrated as specified by the manufacturer. The installer must be competent in the use of the analyser.
- ▶ Check and zero the analyser in fresh air as specified by the manufacturer.
- ▶ The air/gas ratio valve is factory set and must not be adjusted during commissioning unless this action is recommended following contact with the Worcester, Bosch Group help line 0330 123 3366.

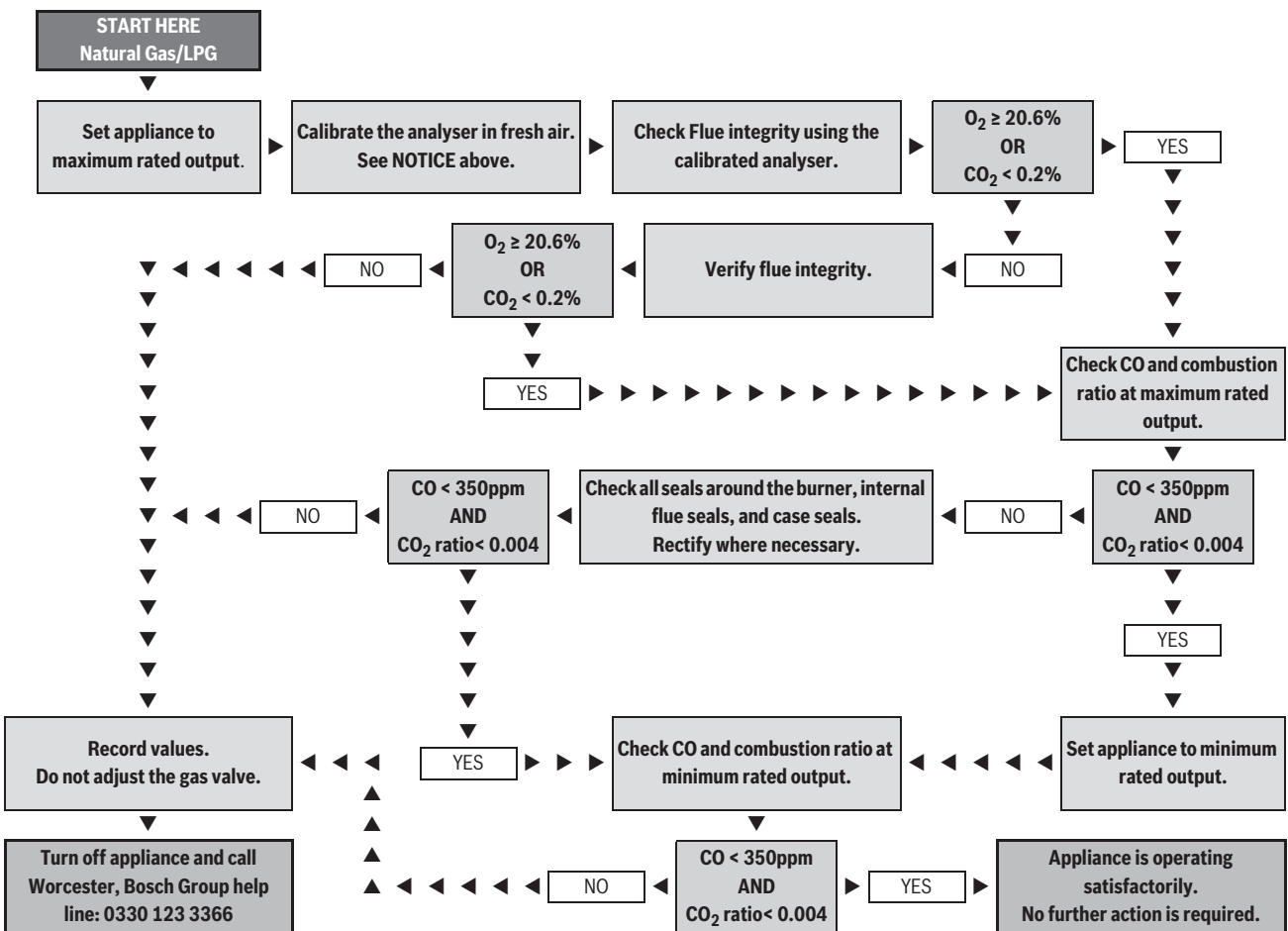


Table 19 Commissioning checks flow chart

- [<] Less than
- [≥] Greater than or equal to

## 6.11 Checking flue integrity



### Flue integrity check

- ▶ The combustion casing must be fitted whilst this test is carried out.
- ▶ Refit the test point plugs after the test has been completed.

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

Air inlet sample point location on flue turret/adaptor.

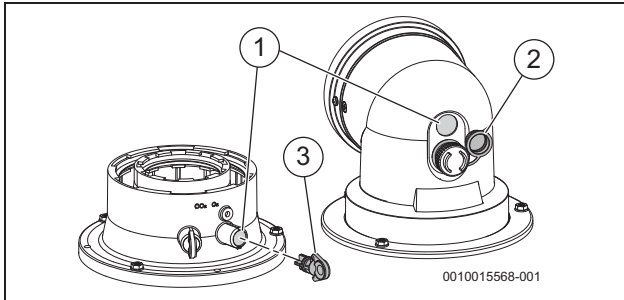


Fig. 71 Flue integrity check test point

- [1] Air inlet sample point
  - [2] Flue turret air inlet blank plug (with retaining ring)
  - [3] Flue adaptor air inlet blank plug
- ▶ With the appliance combustion casing on and the appliance running at maximum output in chimney sweep mode (→ chapter 6.5 "Chimney sweep mode"), remove the blanking plug [2 or 3] for the air inlet sample point [1].
  - ▶ Insert the analyser probe into the air inlet sample point [1].
  - ▶ Allow the readings to stabilise and check that:
    - O<sub>2</sub> is equal to, or greater than 20.6%
    - CO<sub>2</sub> 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.

## 6.12 Flue gas analysis

### NOTICE

#### Combustion testing

- ▶ Combustion testing must be carried out by a competent qualified person. Testing must not be attempted unless the person carrying out the combustion check is equipped with a calibrated Flue Gas Analyser conforming to BS 7967 and is competent in its use.



### Flue gas analysis

- ▶ Ensure that the gas inlet pressure has been checked and is satisfactory.
- ▶ Refit the test point plugs after the test has been completed.

The flue gas analysis performance of the appliance can be checked via the flue turret/adaptor sample points.

Refer to figure 72 for the location of the flue gas sample point on flue turret/adaptor.

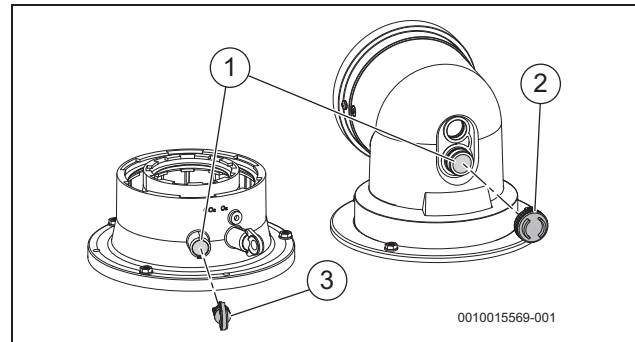


Fig. 72 Combustion test

- [1] Flue gas sample point
- [2] Flue turret flue gas blank plug
- [3] Flue adaptor flue gas blank plug

The CO and combustion ratio are checked;

- In chimney sweep mode at maximum output.
- In chimney sweep mode at minimum output.

#### Appliance to maximum output

- ▶ Set the appliance running at maximum output in chimney sweep mode (→ chapter 6.5 "Chimney sweep mode").

#### Appliance to minimum output

- ▶ Set the appliance running at minimum output in chimney sweep mode (→ chapter 6.5 "Chimney sweep mode").
  - Allow the appliance to stabilise at minimum output.

#### Measuring the CO and combustion ratio.

- ▶ Remove the blanking plug [2 or 3] for the flue gas sample point [1].
- ▶ Insert the analyser probe into the flue gas sample point [1].
  - 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.
- ▶ Check the CO and combustion readings.

## 6.13 Range rating the appliance

The maximum heat output of this boiler can be adjusted to suit the exact requirements of the building. The process of adjusting the maximum heat output is commonly referred to as range rating. The new boiler is set at the maximum output and should be adjusted when it is installed and commissioned. In accordance with the standards, the declared space heating efficiency, useful efficiency and NO<sub>x</sub> values efficiency for this range rated boiler are not measured at the maximum output. To achieve the published efficiency and NO<sub>x</sub> values, the gas rate should be reduced (→ chapter 7.2.1, Menu 3 (L.3) Basic settings, Service function 3-b1, page 51).

## 6.14 Finishing commissioning

### 6.14.1 Fitting the appliance casing



The front casing is to be secured at the bottom with one screw (as supplied) against unauthorised removal (electrical safety).

- ▶ Always secure the casing with this screw.
- ▶ Do not operate the boiler without a casing.



- ▶ Remove the protective films from the boiler display before handing over to the user.



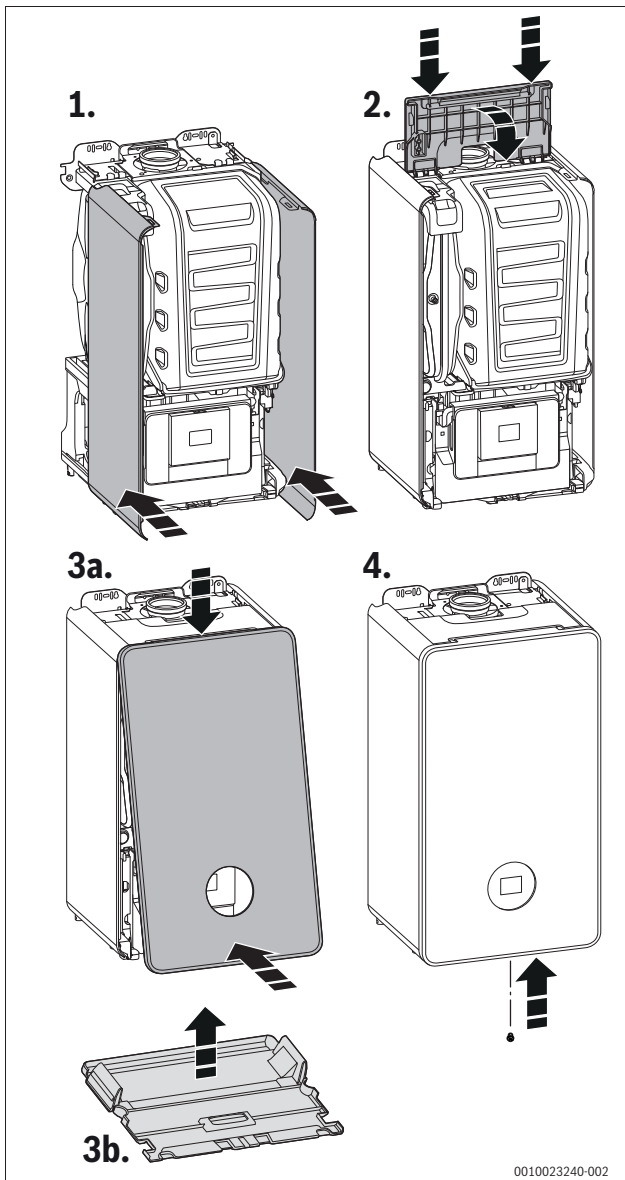


Fig. 73 Fitting the appliance casing

- [1] side covers
- [2] top
- [3] front
- [4] bottom

**i** At the time of commissioning, complete all relevant sections of the Benchmark Checklist located in the Technical Specifications/Logs section of this document.

**Benchmark menu**

- ▶ Press and hold the **III** and **II** keys for approximately 3 seconds to enter the **Service menu**.
- ▶ Press the **ok** key to select the **Benchmark menu**.

**Benchmark menu information:**

- **Flow temp.**

**Appliance handover:**

- ▶ Complete the Benchmark Gas Boiler Commissioning Checklist.
- ▶ Show the customer the special features of the appliance.
- ▶ Show the customer the efficiency tips in the User Instructions.

- ▶ Set up the appliance controls and show the customer how to operate all the control unit/s for central heating and DHW operation.
  - Also show where in the appliance/controls documentation where this information can be found.
- ▶ Where applicable, instruct the customer on:
  - how to check the system pressure and re-pressurise if necessary.
  - how to set the TRVs.
  - how to reset the appliance.
- ▶ Show the customer the fault finding section in the User Instructions.
- ▶ Show the customer where the serial number/appliance information is located, they will need this information if they call in with a problem (Benchmark Commissioning checklist on page 84 contains all relevant appliance information).
- ▶ Give the customer details of how to contact the installer/ gas emergency numbers.
- ▶ Show the customer how to safely isolate the appliance.
- ▶ Advise the customer where they can find information on the Worcester, Bosch Group website [www.worcester-bosch.co.uk](http://www.worcester-bosch.co.uk).
- ▶ Ensure that all documentation, is left with the appliance or homeowner.
  - Appliance documentation.
  - Controls documentation.
  - Any other equipment documentation that is connected to the appliance or system.
- ▶ Appliance not in use
  - If the appliance is not going to be used immediately and may be exposed to freezing conditions, advise the customer of the precautions necessary to prevent damage to the appliance, system and building.
  - If the appliance is unused and exposed to freezing conditions, safely isolate all the mains supplies and drain the system and appliance, label accordingly.
- ▶ Show the customer the location of the condensate pipe run in unheated or external areas that may be at risk of freezing during prolonged cold spells.
- ▶ **User recommendation:**
  - Advise the user to have the appliance and heating system thoroughly serviced annually by a competent, registered gas engineer, such as a Gas Safe registered engineer or British Gas engineer. In the Republic of Ireland servicing work must be carried out by a Registered Gas Installer (RGI).
  - Present, where relevant, maintenance aids and reminders within the appliance menus.
  - Arrange an inspection/maintenance contract with an approved heating contractor.

**6.14.2 Appliance/product guarantee**

This appliance/product has a guarantee against faulty materials or workmanship for a period from the date of installation subject to the terms and conditions.

**For full terms and conditions, please visit:**

[www.worcester-bosch.co.uk/guarantee-terms-and-conditions](http://www.worcester-bosch.co.uk/guarantee-terms-and-conditions)

**Guarantee registration**

Your appliance/product carries a 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](http://www.worcester-bosch.co.uk/guarantee).

Your statutory rights are not affected by the manufacturer’s guarantee.

## 7 Settings in the service menu

Many appliance functions can be set and checked in the service menu. It includes:

- **Info:** viewing information
- **Settings:** general and appliance-specific settings
- **Function check:** settings for function checks and start of function checks
- **Reset:** restoring the factory settings, resetting the maintenance intervals
- **Demo mode:** mode for testing and demonstrating the functions. Power off appliance for exit.

### 7.1 Operating the service menu


#### Opening the service menu

- ▶ Press the  key and the  key simultaneously until the service menu appears.




#### Closing the service menu

- ▶ Press the  key or the  key.



-or-

- ▶ Press the  key.


#### Navigating through the menu

- ▶ To highlight a menu or a menu item, press the  key or the  key.
- ▶ Press the **ok** key.  
The menu or the menu item is displayed.
- ▶ To return to the next higher menu level, press the  key.

#### Changing the setting values

- ▶ Select the menu item with the **ok** key.
- ▶ To select the desired value, press the  or the  key.
- ▶ Press the **ok** key.  
The new value is saved.

#### Exiting the menu item without saving values

- ▶ Press the  key.  
The value is not saved.

### 7.2 Service menu

### 7.2.1 Overview of the service menu

---

#### Benchmark

---

- Flow temp.
  - DHW flow rate
  - Hot water temp.<sup>1)</sup>
- 

#### Info

---

- Current status
  - Current fault
  - Fault history
  - Boiler
    - Mx.heat.outp %
    - Max. heat output
    - Flow temp.
    - Set flow temp.
    - Low-loss hdr.tmp
    - Heating mod.
    - Act. burner mod.
    - Burner output
    - Ionisation current
    - Pump mod.
    - Outside temp.
    - HC1 pump
    - Burner starts
    - Hours run
    - System pressure
  - Hot water
    - Max. outp.(%)
    - Max. output
    - Hot water temp.
    - DHW act. temp.
    - Hot water temp.
    - Inlet temp.<sup>2)</sup>
    - Act.DHWtmp.cyl.
    - DHW set temp.
  - System
    - Contr.device ver.
    - Progr. unit ver.
    - SW sub-ver.
    - Code plug no.
    - Code plug ver.
    - Time prog. ver.
  - Solar
    - Collector temp.
    - Cyl.temp.bottom
    - Collector pump
    - Solar fault
- 

#### Settings

---

- Hydraulics
    - Low-loss header
    - DHW configuration
    - HC1 configuration
    - Pump config.
  - Heating
- 

1) Only available if the optional integral diverter valve kit is fitted.

2) Only with solar accessory kit

- Mx.heat.outp %
  - Standby time
  - Anticyc. temp. off
  - Anticycle temp. on
  - Hot water
    - Max. DHW output
    - DHW circ. pump
    - Cycle circ. pump
    - Turbine signal del.
    - DHW start del.
    - CH delay
    - Man. TD line
    - TD-Temperature
    - Max. TD duration
    - Start TD
    - Stop TD
  - Pump
    - Pump range map
    - Pump ctr. mode
    - Min. output
    - Max. output
    - Pump overrun
    - Min.syst.pressure
    - Target pressure
  - Special function
    - Ventilation func.
    - Siphon fill. prog.
    - 3-WV mid. pos.
  - Maintenance
    - Maintenance type
      - Without
        - Boiler run time
        - Burner run time
        - Service date<sup>3)</sup>
        - Landlord<sup>1)</sup>
          - End date
          - Maint. reminder
          - Installer tel. no.
  - Limit values
    - Max. flow temp.
    - Max. DHW temp.
    - Min. boiler outp.
  - Heating curve
    - Enable
    - Htg. curve base
    - Htg. curve end
    - Summer mode
    - Frost prot.
    - Frost temp. limit
  - Solar
    - Max. solar temp.
    - Solar pump type
    - Start solar system
- 

#### Function check

---

- Activate test
    - Burner
- 

3) Only available with installed Key (accessories)

- Ignition
- Fan
- Pump
- Cyl. prim. pump
- 3-way valve
- HC1 pump
- DHW circ. pump
- Ionisat. oscill.
- Solar pump

---

**Reset**

---

- Default setting
- Fault history
- Hidden menu: Reset Maintenance Landlord

---

**Demo mode**

---

**7.2.2 Benchmark and Info menu**

Menu item	Comment/restriction
Flow temp.	Flow temperature in °C
DHW flow rate	Hot water flow rate in l/min
Hot water temp.	Outlet temperature in °C

Table 20 Benchmark menu

Menu item	Comment/restriction
Current status	
Current fault	→ Tab. 11, page 70
Fault history	
<b>Boiler</b>	
Max. heat output	Max. heating output in kW
Flow temp.	Flow temperature in °C
Set flow temp.	Setting value of the flow temperature
Low-loss hdr.tmp	Only if installed. Momentary flow temperature in low loss header in °C
Heating mod.	Burner modulation (heating) in %
Act. burner mod.	
Burner output	Current burner output in kW
Ionisation current	Current ionisation current in µA
Pump mod.	Actual system pump modulation in %
Outside temp.	Current outside temperature in °C
HC1 pump	Current status on/off
Burner starts	Number of burner starts since commissioning
Hours run	Elapsed time of the system since commissioning
System pressure	Current system pressure in bar
<b>Hot water</b>	
Max. output	Max. hot water output in kW
DHW flow rate	Current hot water flow rate in l/min
DHW act. temp.	Actual hot water temperature in °C
Hot water temp.	Current water temperature in °C
DHW set temp.	Setting value of the hot water temperature
<b>System Fill</b>	
System pressure	Current system pressure in bar
Last refill dur.	Duration of last refill
Status	There are two stages: ready and not ready
Refilling active	Automatic filling on
<b>System</b>	
Contr.device ver.	Software version of the control unit
Progr. unit ver.	Software version of the control unit
Code plug no.	Coding plug number
Code plug ver.	Coding plug version
Key	Type of installed key, e.g. "Connect-Key"
<b>Solar</b>	
Collector temp.	Collector temperature
Cyl.temp.bottom	Cylinder temperature at bottom
Collector pump	Collector pump
Solar fault	Current faults

Table 21 Info menu

### 7.2.3 Settings menu

The menu is adapted to your system automatically. Some menu items are only available if the system has been set up accordingly. The menu items are only displayed in systems in which the corresponding system components are installed, e.g. Key Timer.



The factory settings are **highlighted** in the following table.

Menu item	Settings/adjustment range	Comment/restriction
<b>Hydraulics</b>		
Low-loss header	<ul style="list-style-type: none"> <li>Low loss header not installed in the system</li> <li>Low loss header installed, temperature sensor connected to the wall mounted boiler</li> <li>Low loss header installed, temperature sensor connected to the heating circuit module</li> <li>Low loss header installed, but no temperature sensor is connected</li> </ul>	Position of the low loss header temperature sensor
DHW configuration	<ul style="list-style-type: none"> <li>Not installed</li> <li>3-way valve installed</li> <li>System?: Cyl. prim. pump inst. after low loss hdr.</li> <li>System?: Cyl. primary pump installed</li> </ul>	
HC1 configuration	<ul style="list-style-type: none"> <li>No heating circuit 1 (HK1) on the appliance (HK1 not available or not connected via the heating circuit module)</li> <li>No own pump (flow rate for HK1 is realised by the heating pump)</li> <li>Own HC1 pump downstream the low loss header</li> <li>Dedicated pump installed</li> </ul>	
Pump config.	<ul style="list-style-type: none"> <li>None</li> <li>Heating pump</li> </ul>	
<b>Heating</b>		
Max. heat output	<ul style="list-style-type: none"> <li>30 kW: 50 ... 55* ... <b>100</b> %</li> <li>35 kW: 50 ... 58* ... <b>100</b> %</li> </ul> [*] Range rated	Maximum released heating output [%]. Reducing the output increases the efficiency and reduces NO <sub>x</sub> emissions.  On natural gas appliances: <ul style="list-style-type: none"> <li>▶ Measure the gas rate.</li> <li>▶ Compare the measurement with the setting tables (→ chapter 13.5, page 81).</li> <li>▶ Correct deviations.</li> </ul>
Standby time	<ul style="list-style-type: none"> <li>3 ... <b>5</b> ... 60 min</li> </ul>	The time interval determines the minimum delay between starting and restarting the burner.
Anticyc. temp. off	<ul style="list-style-type: none"> <li>2 ... <b>6</b> ... 15 K</li> </ul>	Temperature standby period.
Anticycle temp. on	<ul style="list-style-type: none"> <li>-15 ... <b>-6</b> ... -2 K</li> </ul>	The difference between the current flow temperature and the set flow temperature until the burner is switched on or off.
<b>Hot water</b>		
Max. DHW output	<ul style="list-style-type: none"> <li>10 ... <b>100</b> %</li> </ul>	Maximum power on hot water
DHW circ. pump	<ul style="list-style-type: none"> <li><b>Off</b></li> <li>On</li> </ul>	Activation of hot water circulation pump
Cycle circ. pump	<ul style="list-style-type: none"> <li><b>1 x 3 minutes/h</b></li> <li>2 x 3 minutes/h</li> <li>3 x 3 minutes/h</li> <li>4 x 3 minutes/h</li> <li>5 x 3 minutes/h</li> <li>6 x 3 minutes/h</li> <li>Permanent</li> </ul>	Number and duration of starts of hot water circulation pump per hour
TD-Temperature	<ul style="list-style-type: none"> <li>60 ... <b>70</b> ... 80 °C</li> </ul>	
Max. TD duration	<ul style="list-style-type: none"> <li><b>10</b> ... 30 min</li> </ul>	Max. duration of legionella protection cycle in minutes
Start TD	Start thermal disinfection	Start legionella protection cycle
Stop TD	Cancel now?	Stop legionella protection cycle

Menu item	Settings/adjustment range	Comment/restriction
<b>Pump</b>		
Pump ctr. mode	<ul style="list-style-type: none"> <li>Energy saving</li> <li><b>Heat demand</b></li> </ul>	<ul style="list-style-type: none"> <li>Saving energy: intelligent heating pump stop in heating systems with weather-compensated controller. The heating pump is only switched on when needed.</li> <li>In case of a heat requirement: the flow temperature controller switches the heating pump. When there is a heat energy demand, the heating pump starts up with the burner.</li> </ul>
Min. output	• <b>10</b> ... 100%	Pump rate at minimum thermal output. Only available with pump characteristic map 0.
Max. output	• 10 ... <b>100</b> %	Pump rate at maximum thermal output. Only available with pump characteristic map 0.
Pump overrun	<ul style="list-style-type: none"> <li>1 ... <b>2</b> ... 60 min</li> <li>24 h</li> </ul>	Run-on time of the heating pump: pump run-on time begins at the end of the heat requirement.
Min.syst.pressure	• 0.6 ... <b>0.7</b> ... 0.8 bar	
Target pressure	• <b>1.0</b> ... 1.7 bar	
<b>Special function</b>		
Ventilation func.	<ul style="list-style-type: none"> <li><b>Off</b></li> <li>Auto</li> <li>On</li> </ul>	The ventilation function can be activated after maintenance. During ventilation, the following appears in the info area of the standard display Ventilation func.
Siphon fill. prog.	<ul style="list-style-type: none"> <li>Off (only permissible during maintenance)</li> <li><b>On, boiler min.</b></li> <li>On, heating min.</li> </ul>	The siphon filling program is activated in the following cases: <ul style="list-style-type: none"> <li>On, boiler min.: the appliance is being switched on.</li> <li>On, heating min.: The burner was not in use for at least 28 days.</li> <li>The operating mode is switched from summer to winter mode.</li> </ul> The next time there is a heat requirement for heating, the appliance is held at low output for 15 minutes. The siphon filling program remains active until the appliance has completed 15 minutes of operation at low output. During the siphon filling program the following appears in the info area of the standard display Siphon fill. prog.
3-WV mid. pos.	<ul style="list-style-type: none"> <li><b>No</b></li> <li>Yes</li> </ul>	The function ensures that the system is fully drained and that the motor can be easily removed. The 3-way valve remains at the centre position for approx. 15 minutes.
<b>Maintenance</b>		
Maintenance type	<ul style="list-style-type: none"> <li>Without</li> <li>Burner run time</li> <li>Boiler run time</li> <li>Service date</li> <li>Landlord</li> </ul>	<b>Landlord:</b> This menu item allows a date to be set for annual service/maintenance (End date). The service display appears as a reminder 30 days before the scheduled date. A contact telephone number (Installer tel. no.) is shown together with service display. The tenant should call this number to arrange a suitable maintenance date. A second reminder appears at the scheduled date. If the service display is not reset by the service engineer, the control unit limits the functions 14 days after the scheduled date. Reduced functions are set at Maint. reminder: <ul style="list-style-type: none"> <li>DHW reduced: reduced comfort (max. 35 °C flow temperature)<sup>1)</sup></li> <li>Boiler off: central heating and hot water<sup>1)</sup> functions are set off.</li> </ul>
<b>Limit values</b>		
Max. flow temp.	• 30 ... <b>88 °C</b>	Limits the adjustment range for the flow temperature.
Max. DHW temp.	• 30 ... 80 °C	Limits the adjustment range for the hot water temperature.

Menu item	Settings/adjustment range	Comment/restriction
Min. boiler outp.	<ul style="list-style-type: none"> <li>• <b>"Minimum rated output"</b> ... "maximum rated output"</li> </ul>	Minimum heat output depending on code plug Max output = 50%
Heating curve		
Enable	<ul style="list-style-type: none"> <li>• <b>Off</b></li> <li>• On</li> </ul>	When connecting a weather-compensated control unit, no adjustment to the appliance is required. The system control unit optimises this setting. This service function activates a simple, weather-compensated controller with a linear heating curve. Depending on the on/off input, the heating is switched on or off.
Htg. curve base	<ul style="list-style-type: none"> <li>• <b>20</b> ... 90 °C</li> </ul>	This is only displayed if the controller was activated. This can be used to set the base point of the heating curve, which corresponds to a outside temperature of +20 °C.
Htg. curve end	<ul style="list-style-type: none"> <li>• 20 ... <b>90</b> °C</li> </ul>	This is only displayed if the controller was activated. This can be used to set the end point of the heating curve, which corresponds to a outside temperature of –10 °C.
Summer mode	<ul style="list-style-type: none"> <li>• 0 ... <b>16</b> ... 30 °C</li> </ul>	This is only displayed if the controller was activated. This can be used to set the temperature threshold at which outside temperature the heating system is to switch to summer mode.
Frost prot.	<ul style="list-style-type: none"> <li>• Off</li> <li>• <b>On</b></li> </ul>	
Frost temp. limit	<ul style="list-style-type: none"> <li>• 0 ... <b>5</b> ... 10 °C</li> </ul>	Temperature value for the system frost protection. This service function is only available if the frost protection function was activated. If the outside temperature does not exceed the frost threshold temperature, then the heating pump in the heating circuit switches on.

1) Only available if optional integral diverter valve kit is fitted.

Table 22 Settings menu

#### 7.2.4 Function check menu

Menu item	Settings/adjustment range	Comment/restriction
Activate test		
Burner	<ul style="list-style-type: none"> <li>• <b>Off</b></li> <li>• On</li> </ul>	This service function enables testing of the burner.
Ignition	<ul style="list-style-type: none"> <li>• On</li> <li>• <b>Off</b></li> </ul>	Permanent ignition. Test the ignition with permanent ignition without gas supply. ► To prevent damages to the ignition transformer, never leave this function on for longer than 2 minutes.
Fan	<ul style="list-style-type: none"> <li>• On</li> <li>• <b>Off</b></li> </ul>	Permanent fan operation. Fan operation without gas supply or ignition.
Pump	<ul style="list-style-type: none"> <li>• On</li> <li>• <b>Off</b></li> </ul>	Permanent pump run (internal or external pumps).
3-way valve	<ul style="list-style-type: none"> <li>• Hot water</li> <li>• <b>Heating</b></li> </ul>	Permanent position of the 3-way valve.
HC1 pump/DHW circ. pump	<ul style="list-style-type: none"> <li>• On</li> <li>• <b>Off</b></li> </ul>	Permanent HK1 pump run (downstream the low loss header).
Ionisat.oscill.	<ul style="list-style-type: none"> <li>• On</li> <li>• <b>Off</b></li> </ul>	Check the ionisation measurement function at the flame.
Solar pump	<ul style="list-style-type: none"> <li>• On</li> <li>• <b>Off</b></li> </ul>	Permanent pump run.

Table 23 Function check menu



**7.2.5 Reset menu**

Menu item	Settings/adjustment range	Comment/restriction
Default setting	Restore?	All settings of the heat source are reset to the respective default setting. The system needs to be re-commissioned following this reset.
Service display	Reset?	Only available when service is selected.
Fault history	Reset?	Reset the maintenance first. The fault history of the heat source is deleted. If currently a fault is present, it is immediately entered again.

Table 24 Reset menu

**7.3 Thermal disinfection**

To prevent hot water from becoming contaminated by bacteria such as legionella, we recommend thermal disinfection after long downtimes.



**CAUTION**

**Risk of scalding.**

During thermal disinfection, discharging unmixed hot water can cause serious scalding.

- ▶ Only use the maximum adjustable hot water temperature for thermal disinfection.
- ▶ Inform occupants of the premises of the risk of scalding.
- ▶ Perform thermal disinfection outside of the normal operating times.
- ▶ Do not discharge DHW unmixed.

Proper thermal disinfection involves the DHW system including the draw-off points.

- ▶ Set the thermal disinfection in the hot water program of the heating controller (→ heating controller operating instructions).
- ▶ Close DHW draw-off points.
- ▶ Set any DHW circulation pump to continuous operation.
- ▶ Wait until the maximum temperature is reached.
- ▶ Open all DHW draw-off points, from the nearest to the one furthest away, and draw off hot water until hot water at a minimum of 70 °C has flown from all draw-off points for at least 3 minutes.
- ▶ Restore the original settings.

**8 Decommissioning**

**8.1 Safety instructions**

**⚠ Switching off the appliance - Anti-seizing function**

The anti-seizing function prevents the heating pump and the 3-way valve from seizing up following long periods of inactivity. The anti-seizing function is not active when the appliance is switched off.

- ▶ Switch off the appliance.
- ▶ During longer shut-down periods: observe the frost protection.

**⚠ Damage caused by frost**

The system can freeze if it is switched off:

- ▶ Observe the notices regarding frost protection.
- ▶ Due to the additional functions, e.g. DHW heating or pump anti-seizure protection, the system should always be left on.
- ▶ Have faults rectified immediately.

**8.2 Temporary Decommissioning**

**8.2.1 Setting frost protection**

**Appliance frost protection:**

The appliance frost protection function switches the burner and heating pump on when the appliance temperature falls below 5 °C. This prevents the appliance from freezing.

**Frost protection for the heating system**

**Frost protection with the appliance switched on.**

Frost protection for the heating system is only ensured if the heating pump is operational and is pumping heating water through the entire system.

- ▶ Leave the heating switched on.
- ▶ Set the room thermostat to 12 °C.
  - This limits the appliance to only fire if the property is below 12 °C but still maintains a safe temperature level, protecting the property and appliance from frost damage.



For further information, see the heating controller operating instructions.

If installed in an internal unheated area, such as a basement or garage, additional protection is recommended to protect the pipework. The appliance internal frost protection only monitors the system water temperature within the appliance to provide protection for the appliance.

- ▶ Install a frost thermostat and pipe thermostat connected in series, to protect the system pipework. It is recommended that the frost thermostat is sited in the coldest unheated area in which pipework is located and that it is set to call for heat at 5 °C. The Pipe thermostat should be located on whichever pipe is furthest from the heated area where warmer water will be drawn from considering the direction of flow, and set to end the demand at 15 °C.
- ▶ The system pipework in the internal unheated area should be insulated.

**Frost protection when the appliance is switched off.**

- ▶ Mix Worcester approved anti-freeze into the heating water (→ Chapter Cleaning primary systems, page 31) and drain the DHW circuit.

**-or-**

- ▶ Drain the heating system and DHW pipework at the lowest point.

**8.3 Recommissioning after Standstill**

**Recommission the appliance.**

- ▶ Following temporary decommissioning an approved contractor must recommission the appliance following the details covered in section 6 "Commissioning".

## 8.4 Final Decommissioning

### Decommission the appliance.



#### WARNING

#### Risk of scalding

Hot water can cause severe burns.

- ▶ Ensure the water content of the primary system, appliance and/or hot water cylinder has cooled before draining water content.

- ▶ Switch off the appliance.
- ▶ Isolate from the power supply (230V AV) and secure against unintentional reconnection.
  - Disconnect the appliance from the power supply.
- ▶ Isolate the main gas supply.
- ▶ Isolate from the gas supply via the appliance gas isolator.
  - Disconnect the appliance from gas supply.

Primary system side

- ▶ Drain the primary system and appliance.
  - Drain from the lowest point.
  - This includes the primary system side of the hot water cylinder if fitted.

Domestic hot water side

- ▶ Close shut-off valve for cold water inlet.
- ▶ Drain the domestic hot water side.
  - Drain from the lowest point.
- ▶ Close shut-off valves.

With the appliance disconnected, the system and appliance drained:

- ▶ Remove the old appliance in preparation for the replacement appliance.

## 9 Inspection and maintenance

### 9.1 Safety instructions

#### ⚠ Notes for the target group

Only approved contractors may carry out inspection, cleaning and maintenance in compliance with the system-relevant instructions. Improper execution may result in personal injury, including danger to life or material damage.

- ▶ Inform the user of the possible consequences of non-existent or improper inspection, cleaning and maintenance.
- ▶ Inspect the heating system at least once a year.
- ▶ Carry out any required cleaning or maintenance work according to the checklist (→ page 85).
- ▶ Remedy all defects immediately.
- ▶ Check the heat exchanger assembly once a year, and if necessary clean it.
- ▶ Use only original spare parts.
- ▶ Observe the service life of gaskets.
- ▶ Replace removed gaskets and O-rings with new ones.
- ▶ Record any work carried out.

#### ⚠ Annual maintenance checks

Annual maintenance checks have to be conducted to ensure the continued safe and reliable operation of the appliance.

- ▶ During each maintenance check, the gas valve, all gas joints and test points should be checked for leakage using an analyser/gas sniffer/leak detection fluid.
- ▶ If a leak is found on the gas valve then it needs replacing as a gas valve is a non-repairable component.

#### ⚠ Danger to life through electric shock!

Touching live parts can result in an electric shock.

- ▶ Before carrying out work on electrical components, isolate them from the power supply (230 V AC) and secure against unintentional reconnection.

#### ⚠ Risk of death from escaping flue gas!

Escaping flue gas can cause poisoning.

- ▶ Check for leaks after working on flue gas-carrying components.

#### ⚠ Risk of explosion from escaping gas!

Escaping gas can cause an explosion.

- ▶ Close the gas isolator prior to working on gas-carrying components.
- ▶ Carry out tightness test.



#### WARNING

#### Mains supplies - Isolate the appliance

- ▶ Turn off the gas supply and isolate the mains electrical supply before starting any work and observe all relevant safety precautions.
- ▶ Drain the appliance/system where necessary and protect any electrical equipment from water ingress during component replacement.

#### ⚠ Risk of injury from Hot surfaces!

If the appliance has been operating components may be hot.

- ▶ Ensure precautions are taken when working on the appliance.

#### ⚠ Risk of scalding from hot water!

Hot water can lead to severe scalding.

- ▶ Make residents aware of the risk of scalding prior to activating the chimney sweep mode or a thermal disinfection.
- ▶ Carry out thermal disinfection outside the normal hours of use.
- ▶ Do not change the maximum domestic hot water temperature set.

#### ⚠ Escaping water can damage the device.

The control device can be damaged by escaping water.

- ▶ Cover the control device prior to work on parts routing water.

#### ⚠ Resources for inspection and maintenance

- The following measuring devices are required:
  - Electronic flue gas analyser for CO<sub>2</sub>, O<sub>2</sub>, CO and flue gas temperature
  - Pressure gauge 0 - 30 mbar (minimum resolution 0.1 mbar)
- ▶ Use heat conducting paste 8 719 918 658 0.
- ▶ Use approved greases.

#### ⚠ Gaskets and seals - gas related components!

Hot flue gas can leak through defective gaskets, damage the appliance and endanger safe operation.

- ▶ Burner/electrode assembly gasket must be replaced if disturbed.
- ▶ Other gaskets/seals must be checked and replaced where necessary.
- ▶ Do not attempt the cleaning procedure unless new gaskets and seals are available.
- ▶ Ensure that the gaskets are positioned correctly.

#### ⚠ Material damage due to chemicals!

Using chemicals during the cleaning of the heat exchanger assembly and associated parts or carrying out maintenance can damage the sealing components. This can cause exhaust gas to escape during operation.

- ▶ Do not use chemicals to flush the heat exchanger assembly and associated gas carrying components.

**⚠️ Prior to inspection/maintenance**

- ▶ Depressurise the appliance on the heating and DHW side before working on water routing components.

**⚠️ After the inspection/maintenance**

- ▶ Re-tighten all the threaded connections that have been released.
- ▶ Restart the appliance (→ chapter 6, page 42).
- ▶ Check all joints for leaks.
- ▶ Check the gas/air ratio.

**⚠️ Maintenance of gas components**

Maintenance should be performed by a qualified professional.

- ▶ When carrying out any work on the gas components, make sure that the appliance is no longer supplied with gas. The gas valve does not require any particular maintenance.
- ▶ When performing any operation near gas components, make sure that they are in good visual condition.

If a gas component is dismantled, the seals must be replaced with new seals supplied by Worcester.

- ▶ Do not repair, manipulate or deactivate the elements necessary for safety.
- ▶ Use only original spare parts.
- ▶ After any intervention on gas components, check for leaks.

**⚠️ Component replacement**

- ▶ After replacement of a gas carrying component, where a gasket or seal has been disturbed or replaced, check for gas tightness using a gas sniffer/leak detection fluid.
- ▶ 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.
  - Flue gas analysis.

**9.1.1 Safety-relevant components**

Safety-relevant components (e.g. air/gas ratio control valves) have a limited service life, which depends on their operating time in switching cycles or years.



If the operating time is exceeded or due to increased wear, the affected component may fail and the system safety may be lost.

- ▶ Do not repair, manipulate or disable safety-relevant components.
- ▶ Check safety-relevant components during every inspection and maintenance to determine the continued safety of the system.
- ▶ Replace safety-relevant components in the event of increased wear or at the latest when they have reached the end of their service life.
- ▶ Only use new and undamaged original spare parts for replacement.

Component	Check
Air/gas ratio control valve	<ul style="list-style-type: none"> <li>▶ Check the air/gas ratio control valve housing for external gas tightness using an analyser certified for gas testing.</li> <li>▶ Confirm the external gas tightness of the air/gas ratio control valve separately in the inspection and maintenance log.</li> </ul>

Table 25 Checking safety-relevant components



**CAUTION**

**Property damage and/or personal injury from unsuitable cleaning agent!**

Unsuitable cleaning agent with flammable components may explode and/or cause burns.

- ▶ Do not use cleaning agent with flammable propellants.

**9.2 Roof space installations**



A risk assessment should be carried out before undertaking work in such areas.

You must ensure:

- The ladder is of the correct type and adequately secured to the building structure.
- Floor boarding must be fit for purpose and properly installed.
  - Floorboards should not be overlapped as this can cause a trip hazard.
- Fixed lighting must be provided in the access and work areas.
- There must be a means of preventing operatives from accidentally stepping into the loft hatch.
- Minimum clearances are maintained around the product.

**9.3 Inspection and maintenance considerations**

- 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.

See the following instructions for detail of some of the service requirements:

- ▶ 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.
- ▶ Check that the condensate system is not obstructed, clean and refill the condensate siphon.
- ▶ If the appliance is in a compartment or cupboard check that the specified clearances around the appliance is clear.
- ▶ Check that the flue system is unobstructed and undamaged, clean/replace as necessary.
  - If fitted ensure the flue terminal guard is also unobstructed and undamaged.
- ▶ Operate the appliance and take note of any irregularities.
  - Refer to the fault finding pages for rectification procedure.

**9.4 Resources for inspection and maintenance**

- The following measuring devices are required:
  - Electronic flue gas analyser for CO<sub>2</sub>, O<sub>2</sub>, CO and flue gas temperature
  - Pressure gauge 0 - 30 mbar (minimum resolution 0.1 mbar)
- ▶ Use heat conducting paste 8 719 918 658 0.
- ▶ Use approved greases.

**9.5 Inspection and maintenance steps**

→ chapter 13.8

## 9.6 Component access

### Removing bottom panel

1. Push in the clip securing the bottom panel.
2. Pull bottom panel sideways to release from service position and remove.

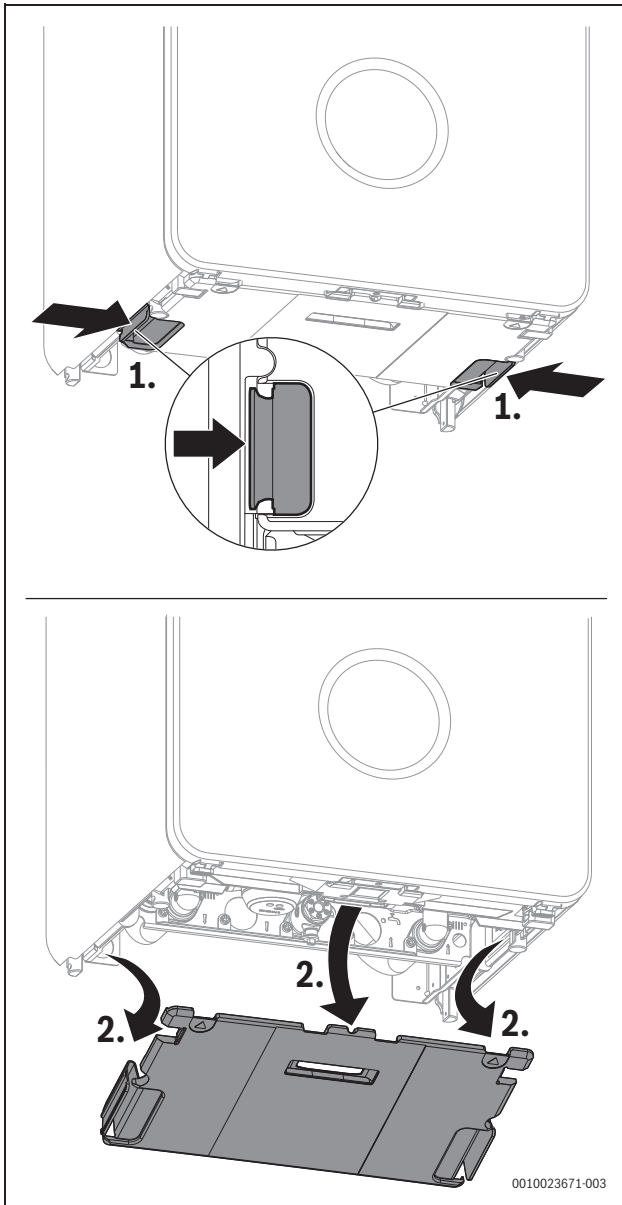


Fig. 74 Removing bottom panel

### Removing front cover

1. Remove screw from bottom of front panel.
2. Push in the green clips securing both sides the outer case.
3. Pull bottom of front cover forwards and upwards to release the clip on top of the boiler and remove outer case.

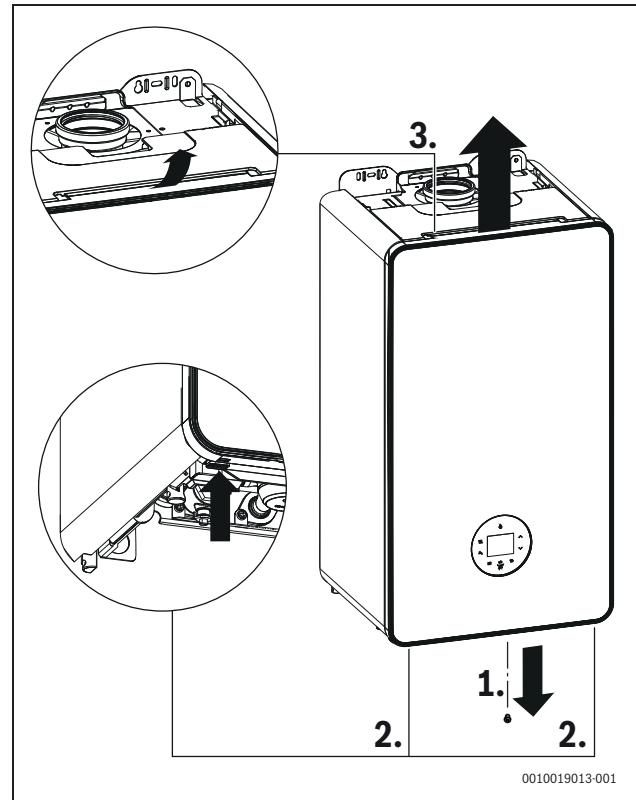


Fig. 75 Removing outer case

## 9.7 Fan pressure test

### Fan pressure check

- ▶ Remove the cap from the test nipple, and connect a pressure gauge.

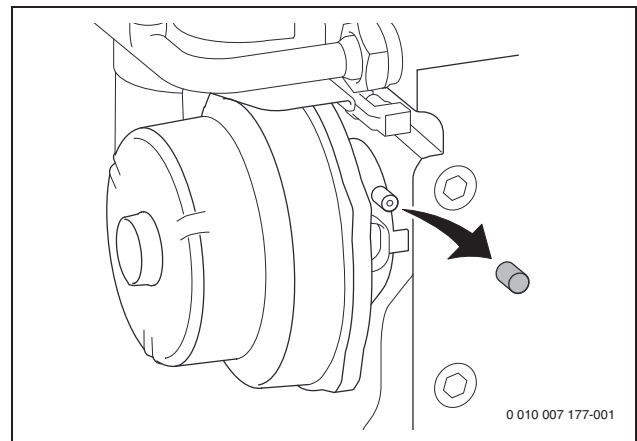


Fig. 76 Test nipple at the mixing device

- ▶ Check fan pressure at mixing device with appliance set to **maximum rated output** in chimney sweep mode.



This check is to determine if the heat exchanger assembly requires cleaning or additional actions.

The measurements in the following table/s will indicate if the heat exchanger assembly must be cleaned.

- ▶ Clean heat exchanger assembly if necessary (→ Section ).
- ▶ Remove the pressure gauge.
- ▶ Attach cap to test nipple.
- ▶ Check the gas/air ratio.

**Appliance values - Fan pressure check**



Pressure check reading

- ▶ The pressure reading will be in negative values.

**Natural Gas and LPG appliances**

Appliance output	Cleaning required		No cleaning required	
	Value			
30kW	0 mbar ⇐	-10.0 mbar	-10.1 mbar ⇒	-12 mbar
35kW	0 mbar ⇐	-3.5 mbar	-3.6 mbar ⇒	-12 mbar
40kW	0 mbar ⇐	-5.0 mbar	-5.1 mbar ⇒	-12 mbar
45kW	0 mbar ⇐	-4.8 mbar	-4.9 mbar ⇒	-12 mbar
50kW	0 mbar ⇐	-6.0 mbar	-6.1 mbar ⇒	-12 mbar

Table 26 Natural Gas and LPG values

**If the manometer reading is within tolerance**, in the white area of the table values.

- ▶ The heat exchanger/exhaust path/siphon does not require attention.

**If the manometer reading is out of tolerance**, in the shaded area of the table values then carry out the following checks.

- ▶ Check that the siphon is not restricted or blocked.
- ▶ Check the exhaust paths for restrictions.
- ▶ Clean the heat exchanger with a suitable cleaning tool, refer to cleaning section.
- ▶ Re-check the actuating pressure readings.  
If the appliance, after completing the above checks, fails the fan pressure check then contact Worcester, Bosch Group for advice.
- ▶ Switch the appliance off after completing pressure check.
- ▶ Disconnect the digital manometer and replace the test point cover.

**9.8 Check working gas inlet pressure**

**NOTICE**

**Gas inlet pressure**

- ▶ Do not continue with the other checks if the correct gas inlet pressure can not be achieved at maximum output.
- ▶ Check the gas supply working pressures in the system conform to the readings shown in the table shown in chapter 6.7 "Checking gas inlet pressure".

**9.9 Checking the flue integrity**

**NOTICE**

- ▶ Check flue joints are secure, the terminal and the terminal guard, if fitted are clear and undamaged.
- ▶ Combustion testing must be carried out to BS 7967 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 EN 50379 and is competent in its use.



Flue gas analysis

- ▶ Ensure that the gas inlet pressure has been checked and is satisfactory.
- ▶ Refit the test point plugs after the test has been completed.
- ▶ Refer to chapter 6.11 "Checking flue integrity" and check that the readings conform to those given, confirming flue system and combustion circuit are ok.

**9.10 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 flue gas analyser conforming to BS 7967 and is competent in its use.
- ▶ Set the appliance to maximum and minimum output in chimney sweep mode for the flue gas analysis checks (→ chapter 6.5).
- ▶ Check that the readings conform to those given in the following tables. In addition to CO and CO/CO<sub>2</sub> ratio checks also check the maximum and minimum CO<sub>2</sub> percentage reading.

Gas type	Maximum rated output			Minimum rated output		
	CO <sub>2</sub>	O <sub>2</sub>	CO	CO <sub>2</sub>	O <sub>2</sub>	CO
Natural gas	9.5 % ± 0.4	4.0 %	<250ppm	8.6 % ± 0.4	5.5 %	<75ppm
Liquid propane (LPG)	10.8 % ± 0.4	4.6 %	<250ppm	10.2 % ± 0.4	5.5 %	<75ppm

Table 27 CO<sub>2</sub> and O<sub>2</sub> contents

If the CO<sub>2</sub> is out of tolerance then please check:

- ▶ The gas inlet pressure.
- ▶ The gas rate.
- ▶ The fan test pressure.
- ▶ The flue and air intake, plus any possible blockages in the condensate disposal.
- ▶ The condition of burner.
- ▶ For leaks or obstructions in the exhaust paths.
- ▶ CO<sub>2</sub> is correctly adjusted.

The gas valve and venturi are factory set and should not need to be adjusted, if found to be out of tolerance and when all other possible causes have been checked, please contact the Worcester Bosch Group Helpline 0330 123 3366.

**9.11 Cleaning the siphon and heat exchanger**



**WARNING**

**Gaskets and seals - gas related components**

- ▶ Burner/electrode assembly gasket must be replaced if disturbed.
- ▶ Other gaskets/seals must be checked and replaced where necessary.
- ▶ Do not attempt the cleaning procedure unless new gaskets and seals are available.



There is an optional tool available to assist in cleaning the heat exchanger, part number 7 719 001 996.

### 9.11.1 Checking the burner

- ▶ Remove the combustion cover (→ Fig. 66).
- ▶ Remove the burner cover.

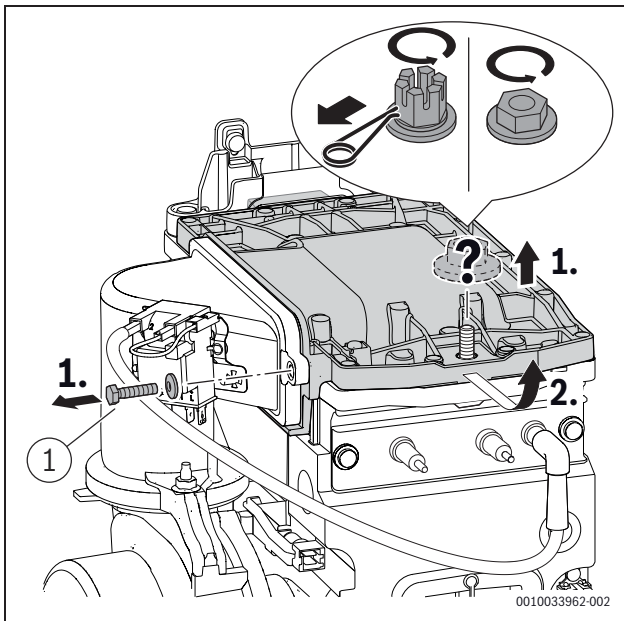


Fig. 77 Removing the burner cover

- ▶ Remove the burner and clean its components.

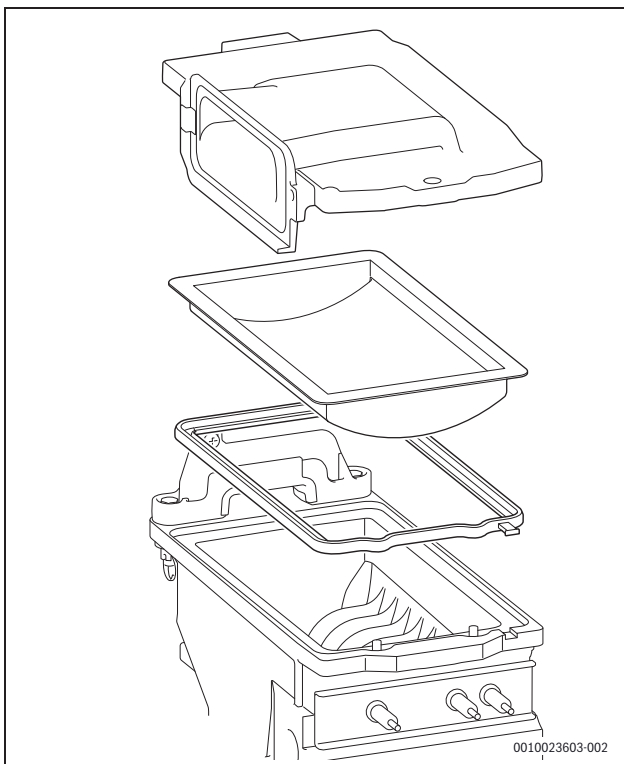


Fig. 78 Burner

- ▶ Reinstall the burner in reverse order, including a new gasket.



The GR8300iW 45 and 50 appliances have a different gasket with coded pin.

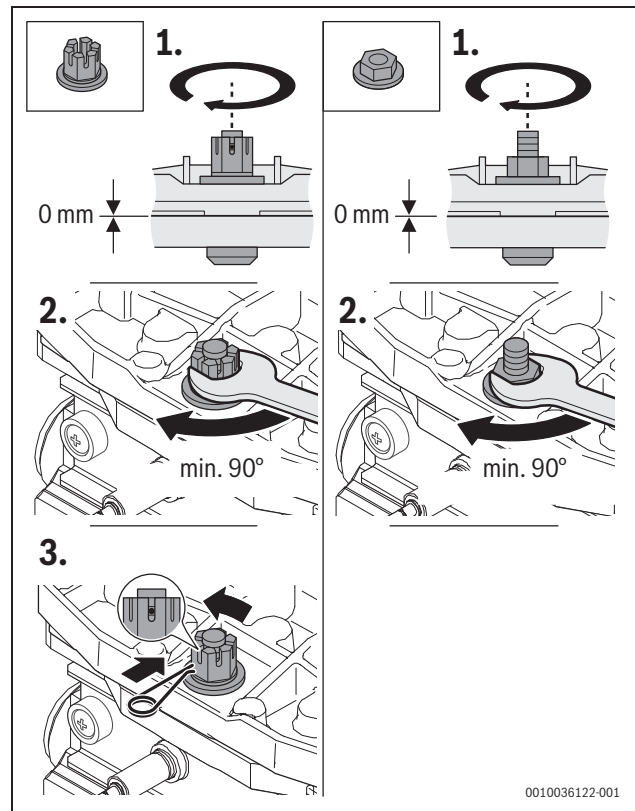


Fig. 79 Tightening the screws

- ▶ Install the burner cover.
- ▶ Tighten the nut until the gap in front of the bolt is completely closed and the nut stops turning when the metal surfaces just touch.
- ▶ Tighten the nut an additional 90°
- ▶ Check the gas/air ratio.

### 9.11.2 Checking the non-return valve in the air-gas manifold

1. Unplug the transformer.
2. Unscrew the screws at the air-gas manifold.
3. Remove the air-gas manifold.

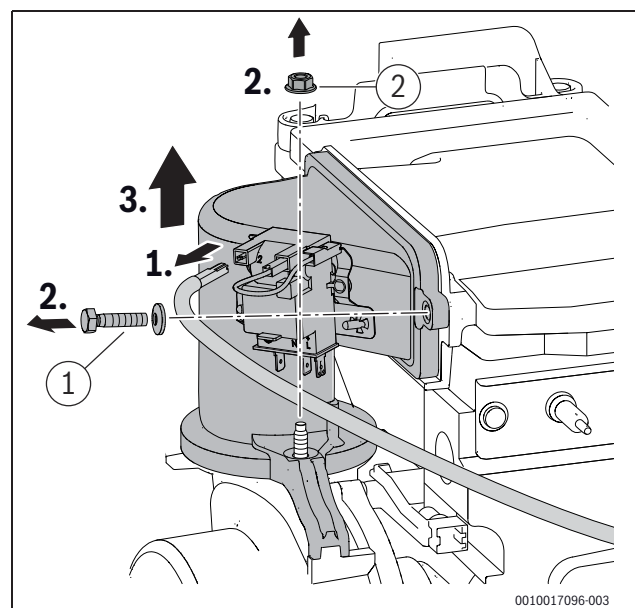


Fig. 80 Removing the air-gas manifold

1. Remove the non-return valve.

2. Check the non-return valve for contamination and cracks.

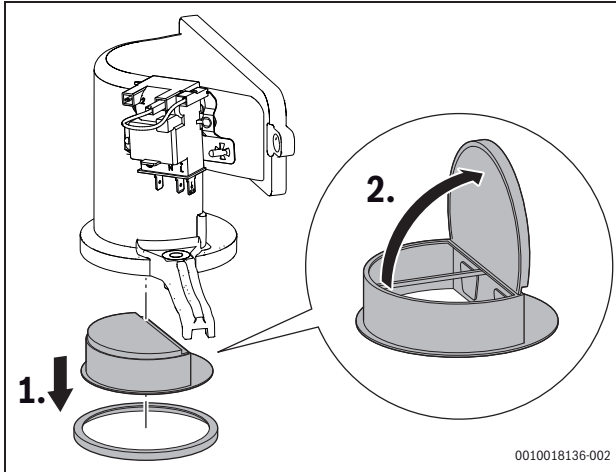


Fig. 81 Non-return valve in the air-gas manifold

- ▶ Install the non-return valve.
- ▶ Install the air-gas manifold.

**9.11.3 Fan removal**

- ▶ Undo connection of venturi.
- ▶ Remove venturi and move pipe to the far right.

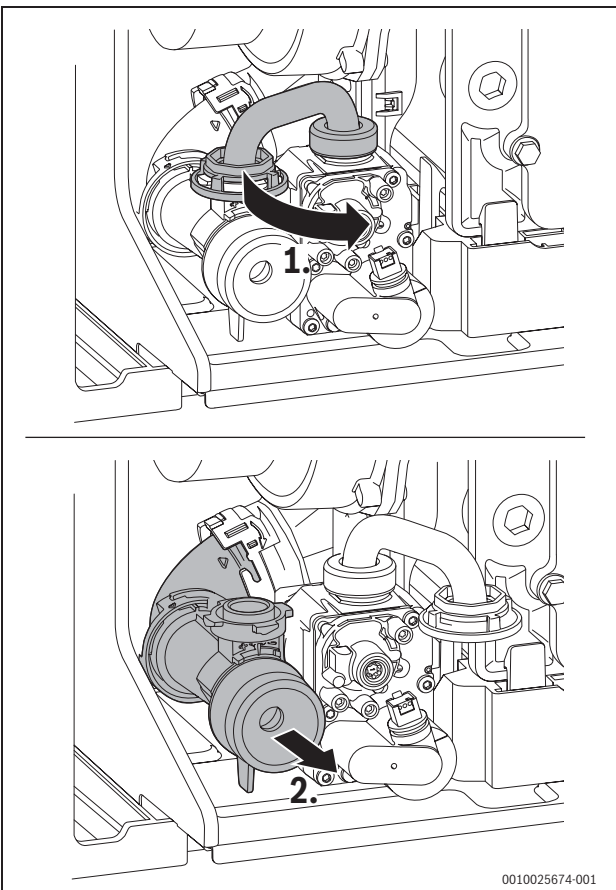


Fig. 82 Venturi removal

- ▶ Rotate venturi upwards.
- ▶ Disengage from bayonet and remove.
- ▶ Undo fan connection and remove screw and seal.

▶ Remove fan.

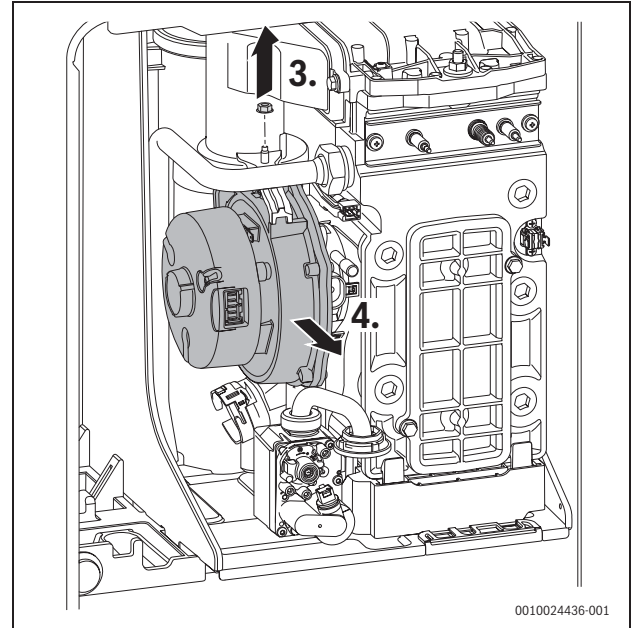


Fig. 83 Fan removal

**9.11.4 Cleaning the heat exchanger**

**Access to the heat exchanger**

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

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

**Cleaning the heat exchanger**

- ▶ Remove the siphon and place a suitable container under the outlet to catch the water and debris.
- ▶ Protect the controller from water ingress.



**The heat exchanger does not have to be removed in order to clean.**

The heat exchanger is shown removed from the appliance to illustrate cleaning more clearly.

- ▶ Remove the cleaning access cover [1] and seal [2].

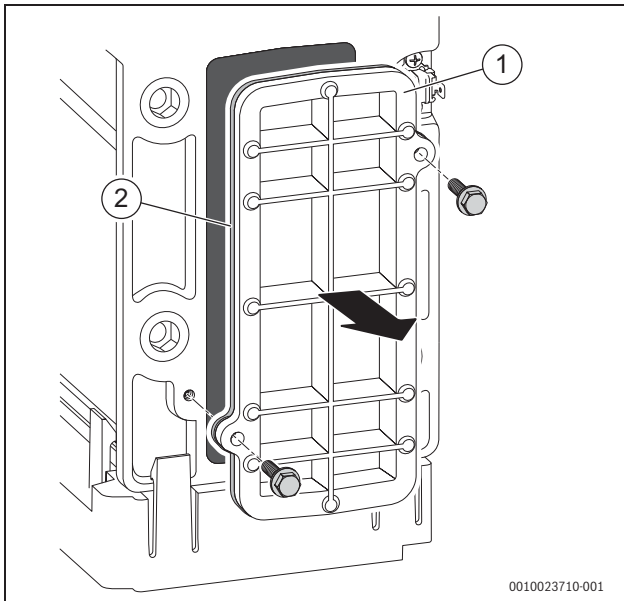


Fig. 84 Access cover removal

- ▶ Using the cleaning blade, working from the bottom to the top, to loosen any deposits in the heat exchanger.

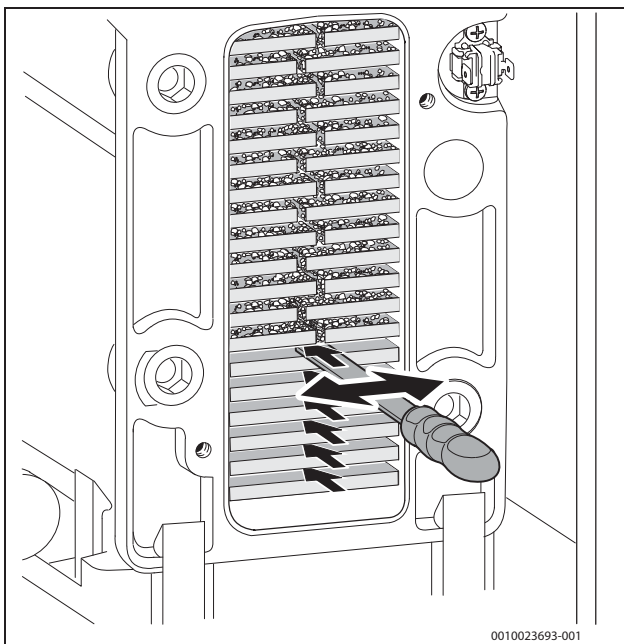


Fig. 85 Cleaning blade

- ▶ Using the brush, clean the heat exchanger from top to bottom.

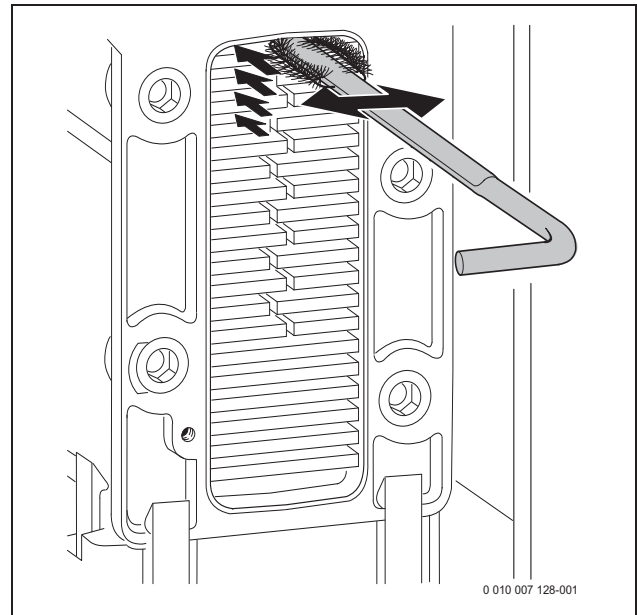


Fig. 86 Cleaning brush

- ▶ Use the handle of the brush to remove debris from the condensate tray.



It is possible to rinse any remaining debris from the heat exchanger either through the access point or alternatively through the top of the heat exchanger when the burner is removed.

- ▶ Pour water into the heat exchanger to rinse the debris through to the suitable container below the outlet to the siphon.

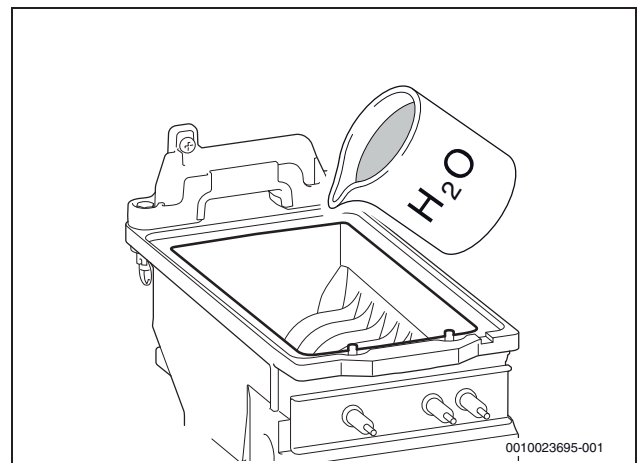


Fig. 87 Pour water into the heat exchanger



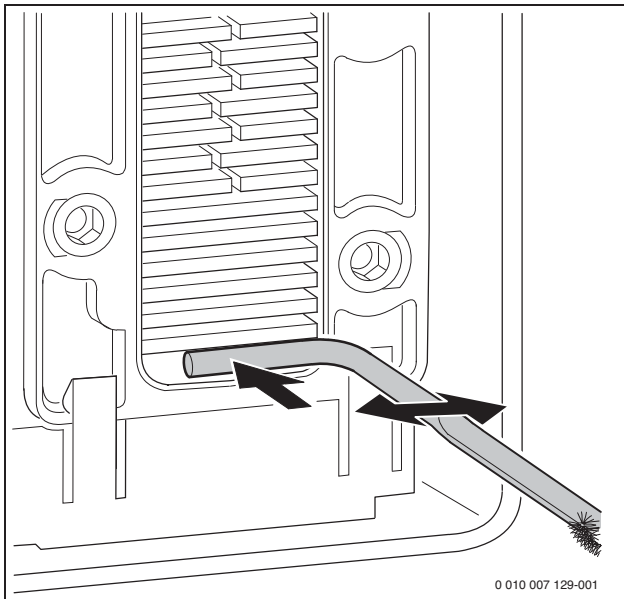


Fig. 88 Cleaning debris

- ▶ Refit the cleaning access cover assembly in reverse order the new seal [2], and the access cover [1].
- ▶ Fully tighten the bolts.

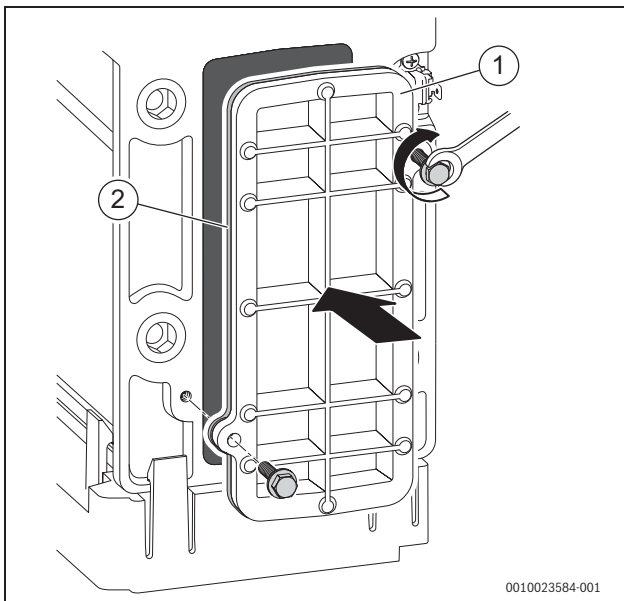


Fig. 89 Re-fitting the access cover

- ▶ Ensure that the convex side of the burner faces down into the heat exchanger when re-fitting the burner.
- ▶ Ensure seal is replaced with new seal and is correctly fitted.
- ▶ Check the siphon unit is clean before refitting to appliance.



On completion of the heat exchanger cleaning and reassembly, perform the fan pressure test.

### 9.11.5 Checking electrodes

- ▶ Remove the electrode set with gasket.
- ▶ Check electrodes for contamination.
- ▶ Clean or replace electrodes if required.
- ▶ Install electrode set with new gaskets.

- ▶ Ensure the screws are fully tightened.

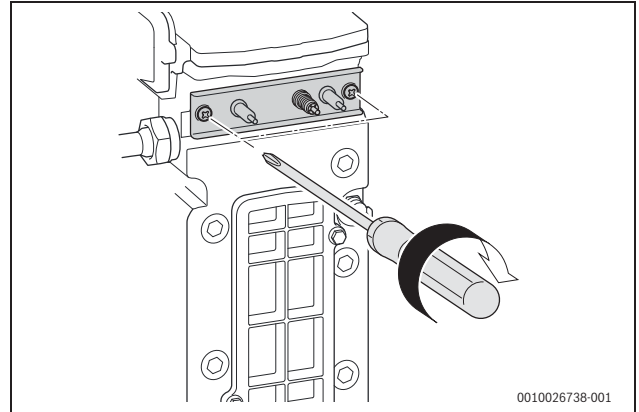


Fig. 90 Installing electrode set

- ▶ Check integrity of seal of electrode set.

### NOTICE

**To check the electrode seal, use either a mirror or a temperature probe:**

Maintain a distance of about 10mm between the electrode seal and the mirror or temperature probe during the check. Do not use flue gas analysers or sniffers, as they may give false readings due to the heating of the gasket material.

- ▶ **Using a Mirror:** Move the mirror slowly around the perimeter of the electrode set and look for any misting on the glass.
- ▶ **Using a Temperature Probe:** Move the probe slowly around the perimeter and ensure there are no spikes in temperature.

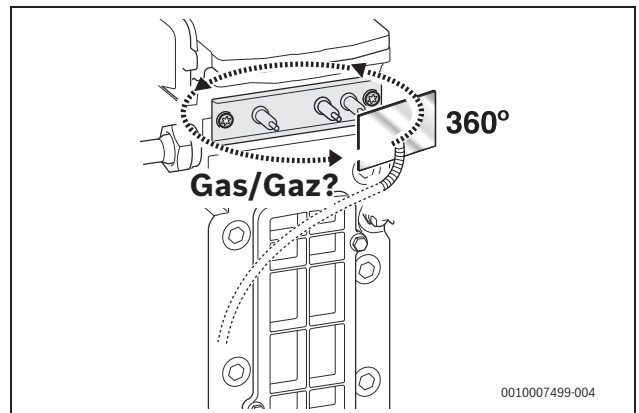


Fig. 91 Checking for leaks with an inspection mirror. Observe for misting.

### 9.11.6 Cleaning the siphon

#### Cleaning the condensate trap



### WARNING

**Danger to life due to poisoning!**

If the condensate trap is not filled, poisonous flue gas can escape.

- ▶ Only turn off the siphon filling program during maintenance, and turn it back on at the end of maintenance.
- ▶ Make sure that the condensate drains off properly.



Damages resulting from an insufficiently cleaned condensate trap are excluded from the warranty.

► Clean the condensate trap regularly.

1. Whilst supporting the condensate trap, firmly press the unlock mechanism, until an audible click is heard.
2. Pull the condensate trap forwards and tilt to the left for draining.
3. Once empty pull the hose from the condensate trap.

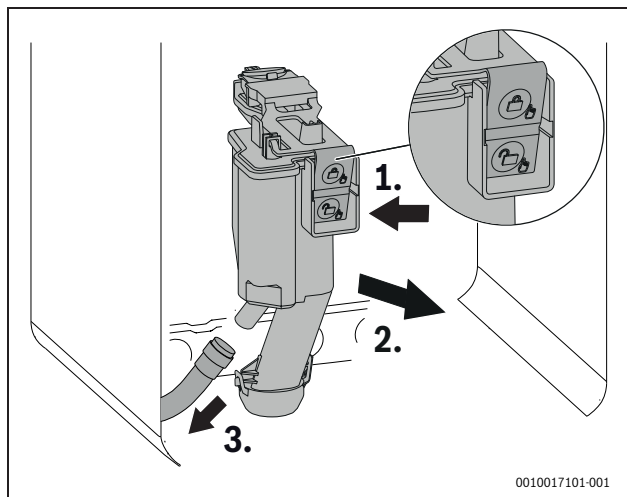


Fig. 92 Removing the condensate trap

- Remove the condensate trap.
- Clean the condensate trap, and check that the aperture towards the heat exchanger is clear.
- Remove the gasket on the top of the condensate trap.
- Check the gasket for cracks, deformation or breakage and replace if required.
- Align the new gasket correctly with the condensate trap.

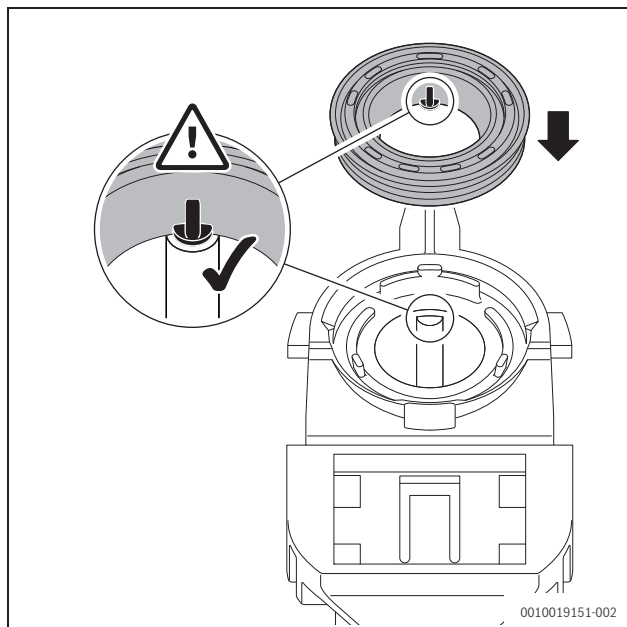


Fig. 93 Aligning the new gasket with the condensate trap

- Press on the gasket in the required order. When the gasket is correctly inserted, the pin is visible in the recess and is flush with the top edge of the gasket.

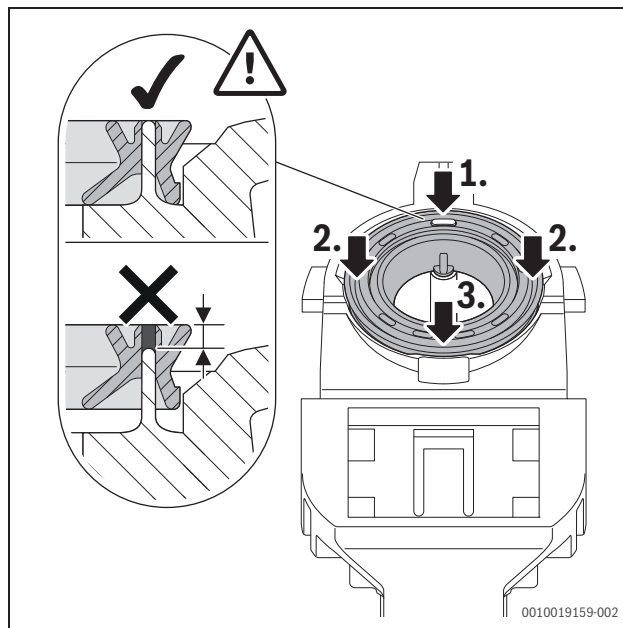


Fig. 94 Pressing on the gasket

- Check the condensate hose and clean if required.
- Fill the condensate trap with approx. 250 ml water.
- Replace the condensate trap. An audible click will indicate locking. Ensure condensate trap is secured correctly.

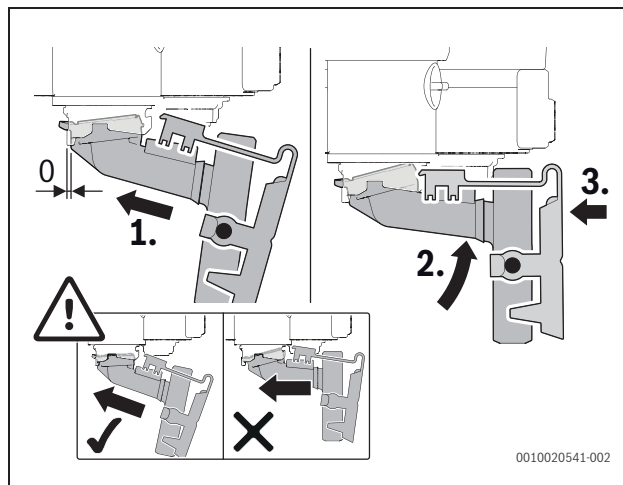


Fig. 95

### 9.12 Setting the air/gas ratio

**NOTICE**

**Setting the air/gas ratio**

- ▶ The gas valve and venturi are factory set and should not need to be adjusted if found to be out of tolerance and when all other possible causes have been checked, please contact the Worcester Bosch Group Helpline 0330 123 3366.

**NOTICE**

**Combustion testing**

- ▶ The setting of the air/gas ratio **must** be carried out by a competent registered gas engineer, such as a Gas Safe registered engineer or British Gas engineer.
- ▶ Setting of the air/gas ratio **must not** be attempted unless the person carrying out the test is equipped with a flue gas analyser conforming to BS7927 and is competent in its use.



All CO/CO<sub>2</sub> readings must be taken with the combustion chamber cover ON. Adjustments can only be made with the cover off.



CO<sub>2</sub> should be measured 10 minutes after firing the appliance.

#### 9.12.1 Checking and, if required, adjusting the gas/air ratio

- ▶ Switch off the appliance.
- ▶ Remove the front cover.
- ▶ Remove the combustion cover.

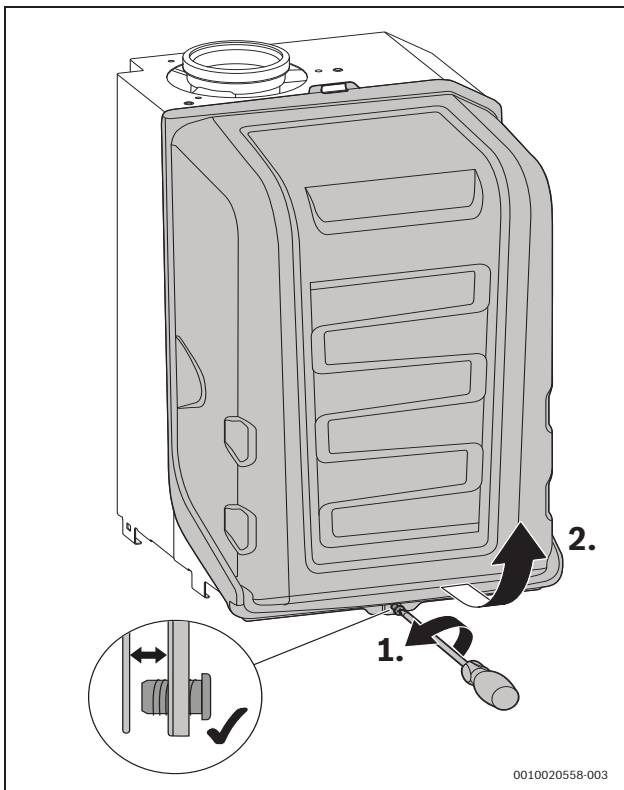


Fig. 96 Removing the combustion cover

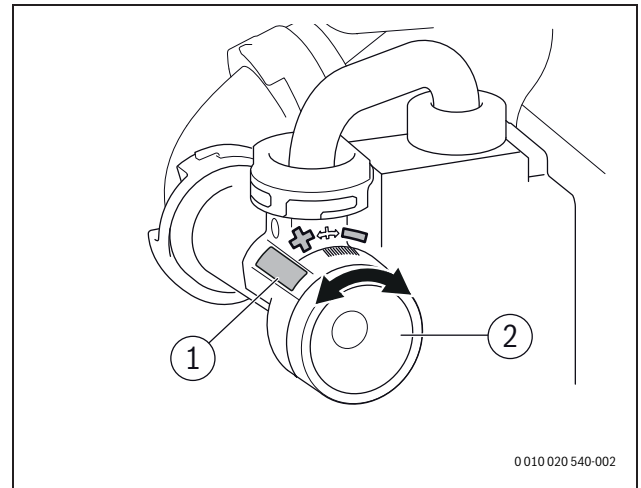


Fig. 97 Setting the adjustable venturi

- [1] Security Seal
- [2] Adjustable venturi

- ▶ Switch on the appliance.
- ▶ Remove the plug from the flue gas test port.
- ▶ Push the flue gas probe centrally into the flue gas test port.
- ▶ Seal the test point.

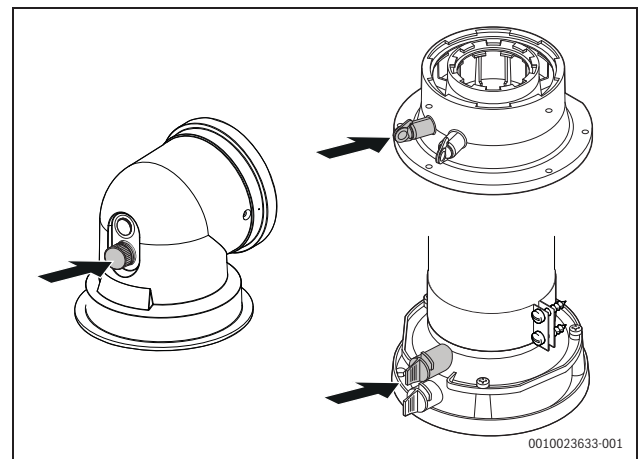


Fig. 98 Flue gas test port

- ▶ To ensure heat transfer: open the radiator valves.
- ▶ Set the chimney sweep mode and start up the appliance at maximum rated output.
- ▶ Measure the CO<sub>2</sub> or O<sub>2</sub> content.
- ▶ Check the CO<sub>2</sub> or O<sub>2</sub> content at maximum rated output according to Tab. 28 and adjust if required.



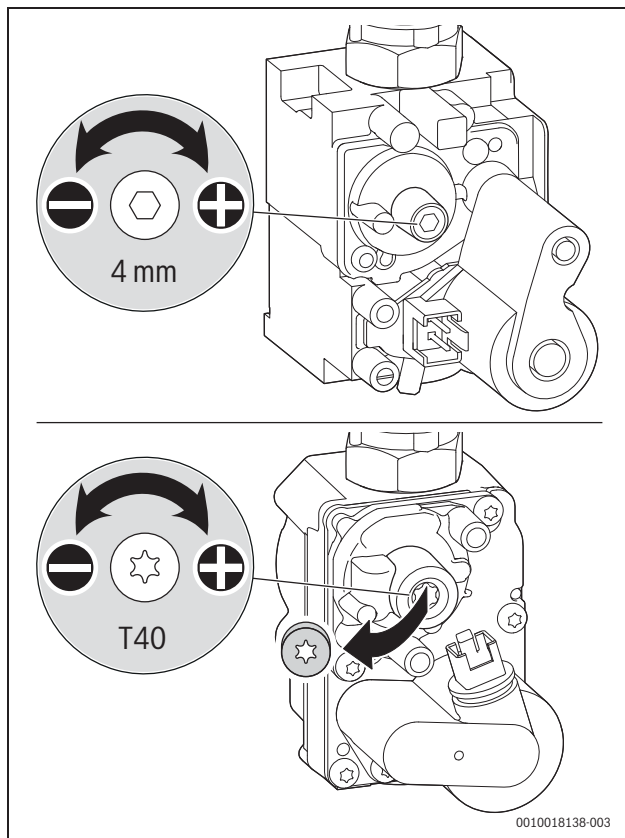
Security Seal [1] (→ Fig. 97) must be removed before adjusting the Max CO<sub>2</sub> setting. Once adjustment has been made the seal must be replaced with part number 8737708988.

- ▶ To increase the CO<sub>2</sub> content, remove seal [1] and turn the adjustable venturi to the left.
- ▶ To reduce the CO<sub>2</sub> content, remove seal [1] and turn the adjustable venturi to the right.

Gas type	Maximum rated output			Minimum rated output		
	CO <sub>2</sub>	O <sub>2</sub>	CO	CO <sub>2</sub>	O <sub>2</sub>	CO
Natural gas	9.5% ± 0.4	4.0%	<250ppm	8.6% ± 0.4	5.5%	<75ppm
Liquid propane (LPG)	10.8% ± 0.4	4.6%	<250ppm	10.2% ± 0.4	5.5%	<75ppm

Table 28 CO<sub>2</sub> and O<sub>2</sub> contents

- ▶ Measure the CO content.  
The CO content must be < 250ppm.
- ▶ Set the minimum rated output.
- ▶ Measure the CO<sub>2</sub> or O<sub>2</sub> content.
- ▶ Remove the seal from the adjusting screw of the air/gas ratio control valve (only air/gas ratio control valve is shown in the below Fig. 99) and set the CO<sub>2</sub> or O<sub>2</sub> content for minimum rated output.

Fig. 99 Setting the CO<sub>2</sub> or O<sub>2</sub> content (above: SIT valve, below: Honeywell valve)

- ▶ Re-check settings at maximum and minimum rated output and re-adjust if required.
- ▶ Seal the air/gas ratio control valve.
- ▶ Seal the adjustable venturi.
- ▶ Exit the chimney sweep mode.
- ▶ Enter the CO<sub>2</sub> contents in the servicing record (→ chapter 13.7, page 84).
- ▶ Remove the flue gas probe from the flue gas test port and refit the plug.

## 10 Replacement parts



### WARNING

#### Mains supplies - Isolate the appliance

- ▶ Turn off the gas supply and isolate the mains electrical supply before starting any work and observe all relevant safety precautions.
- ▶ Drain the appliance/system where necessary and protect any electrical equipment from water ingress during component replacement.



### WARNING

#### Component replacement:

- ▶ After replacement of a gas carrying component, where a gasket or seal has been disturbed or replaced, check for gas tightness using a gas sniffer/leak detection fluid.
- ▶ 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.
  - Flue gas analysis.



Only use Worcester, Bosch Group original spare parts with this appliance. Non Worcester, Bosch Group original spare parts will invalidate the guarantee (if applicable) and any warranty.

- ▶ A comprehensive list of appliance spares can be found on the website [www.worcester-bosch.co.uk/spares](http://www.worcester-bosch.co.uk/spares)

### 10.1 Draining the appliance

#### NOTICE

#### Risk of water damage to appliance or property!

Damage from disconnecting water pathways which may have retained some water.

- ▶ Take care after draining the appliance to protect equipment/property from residual water content within components.

Many of the tasks in this section require that the appliance be isolated and drained. This will be indicated in the manual if required.

- ▶ The boiler drain is already connected to the condensate trap for ease of draining.

-or-

- ▶ Connect a suitable hose firmly to the drain point and run the hose outside to a suitable point or container.
- ▶ Turn the drain valve a ¼ turn anti-clockwise to open the drain. Turn the valve firmly clockwise to close.

**10.2 Overheat thermostat removal**

- ▶ Remove two electrical connectors from thermostat.
- ▶ Unscrew [1] the sensor [2].

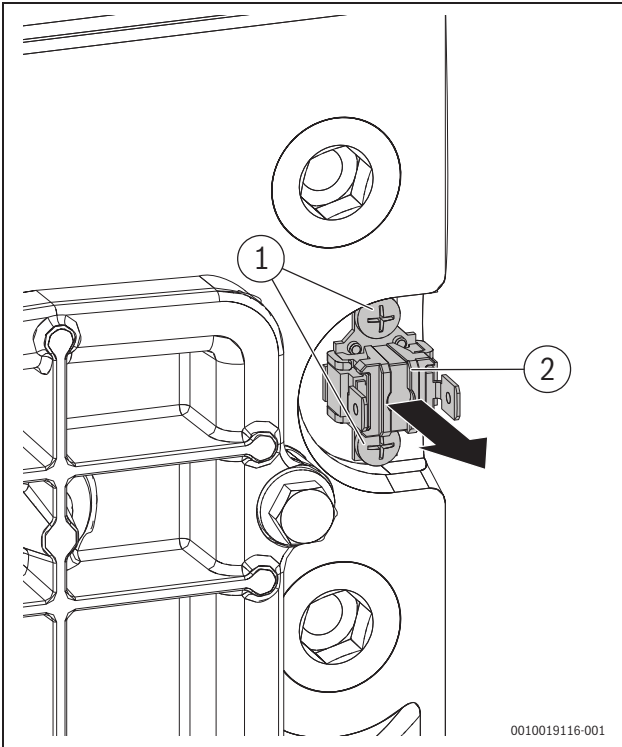


Fig. 100 Removing overheat thermostat

**10.3 Replacing the gas valve**



Honeywell and SIT gas valves are completely interchangeable.

- ▶ Close the gas isolator.
- 1. Unscrew the bayonet connection.
- 2. Unscrew the union nut.
- 3. Remove the gas pipe.

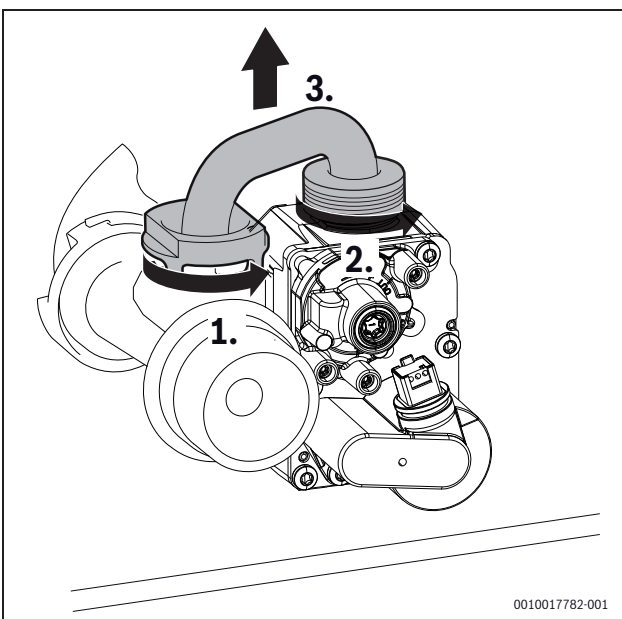


Fig. 101 Removing the gas pipe

- 1. Unplug the electrical connection.

- 2. Unscrew the union nut.

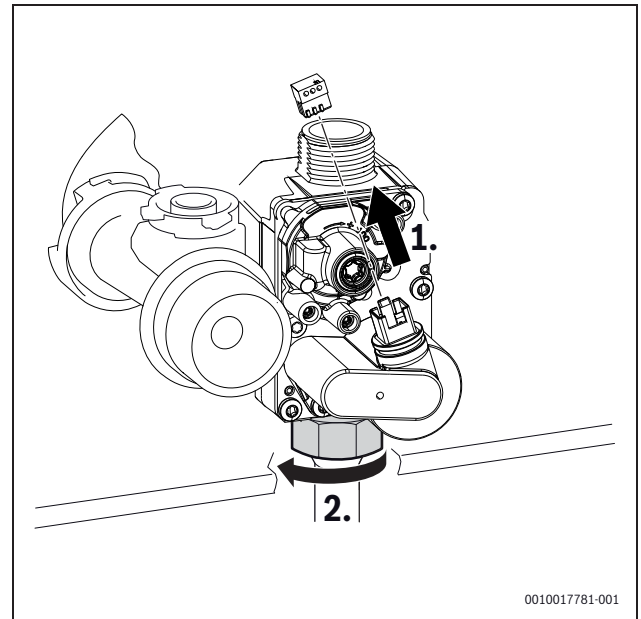


Fig. 102 Unplugging the electrical connection and unscrewing the union nut

- 1. Remove the 2 screws.
- 2. Remove the air/gas ratio control valve.

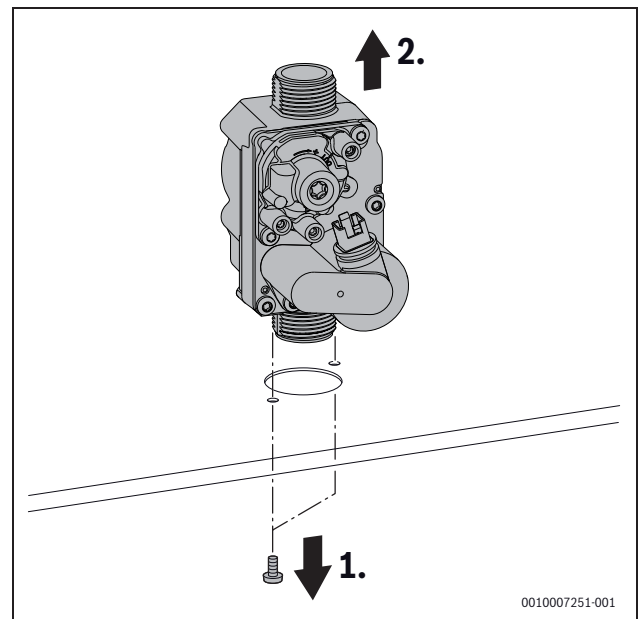


Fig. 103 Removing the gas control valve

- ▶ Install the air/gas ratio control valve in reverse order, and check the gas/air ratio.

**10.4 Following inspection/maintenance**

- ▶ Re-tighten all the threaded connections that have been released.
- ▶ Restart the appliance (→ page 42).
- ▶ Check tightness of all joints.
- ▶ Check the gas/air ratio.
- ▶ Fit the combustion casing, side-, top panels and front cover.

## 11 Fault finding and diagnosis



This fault finding information is for guidance only. Worcester cannot be held responsible for costs incurred by persons not deemed to be competent.



This fault finding system assumes that the appliance has been operating normally until the time of failure (i.e. not a first time installation error).

### Basic checks

- Ensure that there is 230V power supply and the polarity is correct to the appliance.
- Ensure that the appliance settings and functionality is correct.
- Ensure the CH programmer/timer is functioning.
- Ensure the room thermostat is functioning.
- Ensure the primary system has adequate pressure/system content for the system type.
- Ensure there is gas to the appliance.
  - Are other gas appliances working, gas cooker/hob for example?
  - Has the credit run out on the gas pre-payment meter?

### 11.1.2 Fault code table

Fault code	Fault category	Description	Remedy
200	O	Boiler in heating mode	Operating message, is not a fault.
201	O	Boiler in hot water mode	Operating message, is not a fault.
202	O	Boiler in anti-cycle mode	Operating message, is not a fault.
203	O	Boiler in standby, no heat energy demand	Operating message, is not a fault.
204	O	Current prim. water temp. higher than set val.	The actual boiler water temperature is higher than the target boiler water temperature. The boiler is switched off.
208	O	Chimney sweep demand	Operating message, is not a fault.
214	V	Fan shut down during safety time	<ol style="list-style-type: none"> <li>1. Reset the appliance.</li> <li>2. Create a heat demand does the boiler fire up.</li> <li>3. Check the voltage to the fan and the continuity of the fan harness.</li> <li>4. Check the power modulation on the fan.</li> <li>5. PCB is may be defective.</li> </ol>
224	V	Maximal flue gas thermostat or heat exchanger maximal thermostat has activated	<ol style="list-style-type: none"> <li>1. Check if lead disconnected from the safety temperature limiter.</li> <li>2. Check the high limit of the safety temperature limiter and the harness for continuity.</li> <li>3. Check the flow temperature to confirm actual temperature (may tripped out at lower temperature, leading to safety temperature limiter fault)</li> <li>4. Check the system pressure and top up as required.</li> <li>5. Check if air trapped in the system and in the boiler.</li> <li>6. Pump seized/not running: check the pump for failure or if she blocked.</li> <li>7. Check if blockage/restriction within boiler/pipe work restricting the flow.</li> </ol>

### NOTICE

On completion of the Service/Fault-Finding task which has required the breaking and remaking of electrical connections, check:

- ▶ Earth continuity,
- ▶ Short circuit check,
- ▶ Polarity,
- ▶ Resistance to earth.

### 11.1 Operating and fault displays

#### 11.1.1 General information

- **Fault code:** indicates which fault is present.
- **Fault category:** indicates what kind of fault is present and its effects.

#### Fault category O (operating code)

Operating codes indicate the operating conditions in normal operation.

#### Fault category B (blocking faults)

Blocking faults result in the heating system being shut down temporarily. The heating system restarts automatically as soon as the blocking fault is removed.

#### Fault category V (locking faults)

Locking faults result in the heating system being shut down, and the system can only be restarted after a reset.

- ▶ Press the ▲ and ▼ keys, until **Reset** is displayed. The appliance resumes operation.

If a fault persists:

- ▶ Rectify the fault according to 10.1.2 Fault code table

#### Fault category W (maintenance codes)

Fault code	Fault category	Description	Remedy
227	V	No flame signal after ignition	Tip: Check the ceramic insulator is not damaged, this can cause the spark to earth, twist and pull the ceramic insulator to ensure it is not broken. <ol style="list-style-type: none"> <li>1. Check the gas supply to property and the inlet on the gas valve.</li> <li>2. Check the low pressure when the gas valve opens.</li> <li>3. Gas valve failing to open: check for voltage to the valve and for possible blockage on inlet filter of the gas valve.</li> <li>4. Obstruction in the air intake to the fan leading to incorrect CO<sub>2</sub> ratio. Diaphragm is damaged or stuck.</li> <li>5. Condensate trap is blocked or restricted. Condensate pipe is frozen.</li> <li>6. Flue is blocked or restricted.</li> <li>7. Heat exchanger is blocked or restricted.</li> <li>8. Check the burner for damage.</li> <li>9. Check the spark electrode or the lead failure.</li> <li>10. Check the flame sense or the lead failure.</li> <li>11. Check the rectification ground (black wire to heat exchanger).</li> </ol>
228	V	Flame signal without flame present	Tip: Check the ceramic insulator is not damaged, this can cause the spark to earth, twist and pull the ceramic insulator to ensure it is not broken. <ol style="list-style-type: none"> <li>1. Check the flame sense and the lead and replace if required.</li> <li>2. Check the earth tags on the boiler and on the electrodes.</li> <li>3. Check the operation of the siphon and no water collecting in the sump.</li> <li>4. Replace the air and/or gas ratio control valve.</li> <li>5. Replace the control unit and/or burner control unit.</li> </ol>
229	B	Flame failed during burner operation	Tip: Check the ceramic insulator is not damaged, this can cause the spark to earth, twist and pull the ceramic insulator to ensure it is not broken. <ol style="list-style-type: none"> <li>1. Check the gas supply to the property and check the working pressure on the gas valve inlet.</li> <li>2. Check the gas-air ratio.</li> <li>3. Check the ionisation electrode and the harness for damage or contamination.</li> <li>4. LPG: Sufficient gas in the tank or recently refilled?</li> </ol>
232	B	Boiler locked by external switching contact	External cut off switch not used in UK: Ensure nothing is plugged into red I3 connection. <ol style="list-style-type: none"> <li>1. Connection plug for external switch contact is not plugged into PCB.</li> <li>2. There is no feedback voltage at the external safety contact at the condensate lifting pump blocks the heat generator.</li> <li>3. Switching point for the external temperature monitor is set too low.</li> <li>4. Connection cable to the external temperature monitor is damaged.</li> <li>5. External temperature monitor is defective.</li> </ol>
233	V	Boiler identification module or device electronics faulty	<ol style="list-style-type: none"> <li>1. Wrong code plug is inserted.</li> <li>2. Check the code plug is not damaged.</li> <li>3. Replace the code plug if required.</li> </ol>
234	V	Gas valve electrical fault	<ol style="list-style-type: none"> <li>1. Check the gas supply to the property and the inlet on the gas valve (check drop on inlet).</li> <li>2. Check the connections on the gas valve and the board (loose connection).</li> <li>3. Check the continuity down harness and replace if required.</li> <li>4. Check the voltage to the gas valve (19–24 V DC approx. when demand).</li> <li>5. Check for water on the gas valve connections.</li> <li>6. Check the resistance on the gas valve (pins 1–2 approx. 69, 5 Ohms).</li> <li>7. Replace the gas valve if resistances are incorrect.</li> <li>8. If all tests are correct: replace the PCB.</li> </ol>
235	V	Conflicting versions of boiler electr. and boiler identification	Replace the code plug or the burner control.
237	V	System fault	<ol style="list-style-type: none"> <li>1. Check the code plug is not damaged.</li> <li>2. Replace the code plug if required.</li> <li>3. Replace the control unit (PCB).</li> </ol>

Fault code	Fault category	Description	Remedy
238	V	Boiler electronics faulty	<ol style="list-style-type: none"> <li>1. Check the gas supply to the property and the inlet on the gas valve (check drop on inlet).</li> <li>2. Check the connections on the gas valve and the board (loose connection).</li> <li>3. Check the continuity down harness and replace if required.</li> <li>4. Check the voltage to the gas valve (19–24 V DC approx. when demand).</li> <li>5. Check for water on the gas valve connections.</li> <li>6. Check the resistance on the gas valve (pins 1–2 approx. 69, 5 Ohms).</li> <li>7. If all tests are correct: replace the PCB.</li> </ol>
242		Boiler electr. system fault	<ol style="list-style-type: none"> <li>1. Restart the appliance to see if the problem re-occurs.</li> <li>2. If the fault remains after resetting: the burner controller (PCB) is defective.</li> </ol>
244 245 246 247 248 249 250 251 252 253 254 258		System fault boiler electronics / basic controller	<ol style="list-style-type: none"> <li>1. Restart the appliance to see if the problem re-occurs.</li> <li>2. Check the electrical connections on the board (check for loose wires etc.).</li> <li>3. Check the code plug is not damaged.</li> <li>4. Replace the code plug if required.</li> <li>5. Replace the control unit (PCB).</li> </ol>
257 259	V	System fault boiler electronics / basic controller	<ol style="list-style-type: none"> <li>1. Restart the appliance to see if the problem re-occurs.</li> <li>2. Check the electrical connections on the board (check for loose wires etc.).</li> <li>3. Check the code plug is not damaged.</li> <li>4. Replace the code plug if required.</li> <li>5. Replace the control unit (PCB).</li> </ol>
262 263	V	System fault boiler electronics / basic controller	<ol style="list-style-type: none"> <li>1. Restart the appliance to see if the problem re-occurs.</li> <li>2. Check the electrical connections on board (check for loose wires etc.).</li> <li>3. Check the code plug is not damaged.</li> <li>4. Replace the code plug if required.</li> <li>5. Replace the control unit (PCB).</li> </ol>
265	B	Heat demand lower than energy supplied	Not applicable, operating message, is not a fault.
268	O	Relay test was activated	Not applicable, status message.
269	V	Flame monitoring	<ol style="list-style-type: none"> <li>1. Restart the appliance to see if the problem re-occurs.</li> <li>2. Check the electrical connections on the board (check for loose wires etc.).</li> <li>3. Replace the control unit (PCB).</li> </ol>
273	B	Operation of burner and fan interrupted	Not applicable, status message.
281	B	Pump stuck or running in air	<ol style="list-style-type: none"> <li>1. Check the flow pressure in system.</li> <li>2. Check the system for circulation issues (air locks, blockage, restriction).</li> <li>3. Check that the tacho cable plug for the circulation pump is fitted correctly.</li> <li>4. Check the tacho cable for continuity and replace the tacho cable if required.</li> <li>5. Replace the pump.</li> </ol>
283	O	Burner starting	Operating message, is not a fault.
284	O	Opening air/gas ratio control valve/oil solenoid valves	Operating message, is not a fault.
306	V	Flame signal after closing the fuel supply	<p>Tip: Ensure the working pressure returns immediately to the standing pressure when the gas valve closes.</p> <ol style="list-style-type: none"> <li>1. Check the gas supply to the property and the inlet on the gas valve (check drop on inlet).</li> <li>2. Check the gas valve is not passing and replace if required.</li> <li>3. Replace the PCB.</li> </ol>
357	O	Ventilation program	Operating message, is not a fault: Venting program has been activated.
358	O	Anti-seizing functn. active	Operating message, is not a fault: blocking protection for the heating pump and the 3-way valve is active.
360	V	System fault boiler electronics / basic controller	<ol style="list-style-type: none"> <li>1. Wrong code plug is inserted.</li> <li>2. Check the code plug is not damaged.</li> <li>3. Replace the code plug if required.</li> </ol>



Fault code	Fault category	Description	Remedy
362	V	Boiler identification module or boiler electronics faulty	<ol style="list-style-type: none"> <li>1. Wrong code plug is inserted.</li> <li>2. Check the code plug is not damaged.</li> <li>3. Replace the code plug if required.</li> </ol>
363	V	System fault boiler electronics / basic controller	<ol style="list-style-type: none"> <li>1. Check and replace the ionisation cable.</li> <li>2. Check and replace the electrodes if required.</li> <li>3. Check and replace the control unit and/or burner control unit.</li> </ol>
604		System fault burner control unit	<ol style="list-style-type: none"> <li>1. Restart the appliance to see if the problem re-occurs.</li> <li>2. If the fault remains after resetting: the burner controller (PCB) is defective.</li> </ol>
815	W	Low loss header temp. sensor faulty	Tip: Check menu has not been accidentally switched on. Moisture on the connectors – PCB fault.
1010	O	No communication via EMS BUS connection	<ol style="list-style-type: none"> <li>1. Check the HMI plug on far right of the PCB (low voltage connection).</li> <li>2. If using the Key: Check the Key connections (black, white, red, green) are plugged in to the correct position on the PCB. (Next to orange BUS connection leaving one space.) Check the pins on the plug.</li> <li>3. Check the bridging links are in LR &amp; 230 V out.</li> <li>4. Replace the board.</li> <li>5. Occasionally the Key connection (green flap) can cause this.</li> <li>6. Check the 230 V external wiring does not run alongside the BUS connections.</li> </ol>
1013		Max. combustion point reached	<ol style="list-style-type: none"> <li>1. Check the maintenance menu.</li> <li>2. Reset the maintenance code via the reset menu.</li> </ol>
1018		Maintenance interval expired	<ol style="list-style-type: none"> <li>1. Check the maintenance date set in the menu.</li> <li>2. Reset the maintenance code via the reset menu.</li> </ol>
1019		Incorrect pump type detected	<ol style="list-style-type: none"> <li>1. Pump communication failure or wrong pump is fitted (non-ErP).</li> <li>2. Check the pump communication wire is connected and has continuity.</li> <li>3. Replace the pump for correct modulating pump.</li> </ol>
1022		Cylinder temp. sensor faulty or contact problems	<ol style="list-style-type: none"> <li>1. Plug the connection plug correctly into the cylinder temperature sensor.</li> <li>2. Replace the cylinder temperature sensor.</li> <li>3. Replace the connecting lead to the cylinder temperature sensor.</li> <li>4. Replace the control unit.</li> </ol>
1023		Maximum run time including standby time reached	<ol style="list-style-type: none"> <li>1. Check the maintenance menu.</li> <li>2. Reset the maintenance code via the reset menu.</li> </ol>
1025		Return temp. sensor is faulty	Not fitted on the boiler.
1037	W	Outside temp. sensor faulty - heating back-up operation active	Tip: Check the weather compensation is applicable and the menu has not been accidentally switched on in the menu. <ol style="list-style-type: none"> <li>1. Check the positioning of the outside weather sensor.</li> <li>2. Check the weather sensor connections on the control board.</li> <li>3. Check the resistance of the sensor and the continuity down the cable and replace if required.</li> </ol>
1068	W	Outside temp. sensor or lambda probe faulty.	<ol style="list-style-type: none"> <li>1. Check the outdoor sensor plug is connected.</li> <li>2. Check the resistance of the sensor and replace if required.</li> <li>3. Check the continuity of harness and replace if required.</li> <li>4. Replace the outdoor sensor.</li> </ol>
1070		Maintenance is due on <dd.mm.yyyy> please call your service engineer	Advanced service reminder warning. <ol style="list-style-type: none"> <li>1. Check the maintenance menu.</li> <li>2. Reset the maintenance code via the reset menu.</li> </ol>
1071		Maintenance is now due please call your service engineer	<ol style="list-style-type: none"> <li>1. Check the maintenance menu.</li> <li>2. Reset the maintenance code via the reset menu.</li> </ol>
1072		Maintenance is overdue please call your service engineer	<ol style="list-style-type: none"> <li>1. Check the maintenance menu.</li> <li>2. Reset the maintenance code via the reset menu.</li> </ol>
1075	W	Heat exchanger temp sensor short circuit	<ol style="list-style-type: none"> <li>1. Check the temperature sensor plug is connected.</li> <li>2. Check the resistance of sensor and replace if required.</li> <li>3. Check the continuity of harness and replace if required.</li> <li>4. Replace the temperature sensor.</li> <li>5. Replace the PCB.</li> </ol>

Fault code	Fault category	Description	Remedy
1076	W	Heat exchanger temp sensor disconnected	<ol style="list-style-type: none"> <li>1. Replace the temperature sensor plug is connected.</li> <li>2. Check the resistance of sensor and replace if required.</li> <li>3. Check the continuity of harness and replace if required.</li> <li>4. Replace the temperature sensor.</li> <li>5. Replace the PCB.</li> </ol>
2085	V	Internal fault	<ol style="list-style-type: none"> <li>1. Reset the appliance.</li> <li>2. Switch off the appliance for 30 s then turn back on.</li> <li>3. Check the incoming mains voltage.</li> <li>4. Check the polarity.</li> <li>5. Replace the PCB.</li> </ol>
2908	V	System fault boiler electronics / basic controller	<ol style="list-style-type: none"> <li>1. Restart the appliance to see if the problem re-occurs.</li> <li>2. If the fault remains after resetting: the burner controller (PCB) is defective and must be replaced.</li> </ol>
2910	V	Fault in flue system	<ol style="list-style-type: none"> <li>1. Check the flue for obstructions and remove any found.</li> <li>2. Check the flue integrity test.</li> <li>3. Check for water in the sump and check the siphon operation.</li> </ol>
2914 2915 2916		Boiler electr. system fault	<ol style="list-style-type: none"> <li>1. Restart the appliance to see if the problem re-occurs.</li> <li>2. If the fault remains after resetting: the burner controller (PCB) is defective.</li> </ol>
2920	V	Fault in flame monitoring	Possible PCB fault, no checks available.
2923 2924 2925 2926 2927	V	Boiler electr. system fault	<ol style="list-style-type: none"> <li>1. Check the voltage to the gas valve.</li> <li>2. Check the resistance of the gas valve coils.</li> <li>3. Check the continuity of harness and replace if required.</li> <li>4. The gas valve or the PCB may have a fault.</li> </ol>
2928		Internal fault	<ol style="list-style-type: none"> <li>1. Restart the appliance to see if the problem re-occurs.</li> <li>2. If the fault remains after resetting: the burner controller (PCB) is defective.</li> </ol>
2931		System fault boiler electronics / basic controller	<ol style="list-style-type: none"> <li>1. Restart the appliance to see if the problem re-occurs.</li> <li>2. If the fault remains after resetting: the burner controller (PCB) is defective.</li> </ol>
2940	V	System fault burner control unit	<ol style="list-style-type: none"> <li>1. Restart the appliance to see if the problem re-occurs.</li> <li>2. If the fault remains after resetting: the burner controller (PCB) is defective.</li> </ol>
2946	V	Incorrect code plug detected	<ol style="list-style-type: none"> <li>1. Check the code plug and the part number.</li> <li>2. Check the code plug connections for damage.</li> <li>3. Replace the code plug.</li> </ol>
2948	B	No flame signal with low output	<p>The burner starts automatically after purging. It may cause strong winds.</p> <ol style="list-style-type: none"> <li>1. If the fault occurs repeatedly: check the settings of the CO<sub>2</sub> values.</li> <li>2. Check the flue integrity.</li> <li>3. Check the flue terminal.</li> </ol>
2949	B	No flame signal with high output	<p>It may cause strong winds or flue gas recirculation. The burner starts automatically after purging.</p> <ol style="list-style-type: none"> <li>1. Check the flue integrity.</li> <li>2. Check the flue terminal position.</li> <li>3. Check the CO<sub>2</sub> settings and adjust.</li> <li>4. Check the burner and the heat exchanger gaskets and the inner flue gaskets.</li> <li>5. Check the gas pressure during burning at full load (working pressure, dropping low).</li> </ol>
2950	B	No flame signal following starting procedure	<ol style="list-style-type: none"> <li>1. Check the CO<sub>2</sub> settings and adjust.</li> <li>2. Check the burner and the heat exchanger gaskets.</li> <li>3. Check the gas pressure during burning at full load.</li> <li>4. Burner restarts automatically after purging.</li> </ol>
2951	V	Loss of flame too many times	<p>Note: Combustion case off can cause this fault.</p> <ol style="list-style-type: none"> <li>1. Refer to blocking errors(s) that lead to this locking error. Check the fault history on the appliance.</li> <li>2. Possibly the purging of the gas pipe is incomplete.</li> <li>3. It could also indicate a wide variety of issues such as pipework undersized or gas pressure dropping off, incorrectly routed condensate drains, incorrectly sited flues, incorrectly wired etc.</li> </ol>

Fault code	Fault category	Description	Remedy
2952	V	Internal fault when testing the ionisation signal	<ol style="list-style-type: none"> <li>1. Restart the appliance to see if the problem re-occurs.</li> <li>2. If the fault remains after resetting: the burner controller (PCB) is defective.</li> </ol>
2955	B	Boiler does not support the parameters set for the hydraulic configuration	Verify that the following settings are correct. This can only be reset by powering off the appliance. <ol style="list-style-type: none"> <li>1. Low loss header setting = OFF</li> <li>2. Internal DHW hydraulic = 1/ON</li> <li>3. Heat circuit 1 hydraulic = 1/ON</li> <li>4. CH hydraulic = 1/ON</li> </ol>
2956	O	Hydraulic configuration at the boiler activated	Verify that the following settings are correct. This can only be reset by powering off the appliance. <ol style="list-style-type: none"> <li>1. Low loss header setting = OFF</li> <li>2. Internal DHW hydraulic = 1/ON</li> <li>3. Heat circuit 1 hydraulic = 1/ON</li> <li>4. CH hydraulic = 1/ON</li> </ol>
2957	V	Boiler electr. system fault	<ol style="list-style-type: none"> <li>1. Restart the appliance to see if the problem re-occurs.</li> <li>2. If the fault remains after resetting: the burner controller (PCB) is defective and must be replaced.</li> </ol>
2961 2962	V	No fan signal available	<ol style="list-style-type: none"> <li>1. Check the mains voltage to the fan.</li> <li>2. Check the fan harness for continuity and replace if required.</li> <li>3. Check the pulse width modulation (PWM).</li> <li>4. Replace the fan.</li> <li>5. Replace the PCB.</li> </ol>
2963	B	The heat exchanger sensor or both supply and heat exchanger sensors are defect	<ol style="list-style-type: none"> <li>1. Check the flow through the appliance and the system is filled.</li> <li>2. Check for air locks in the system and purge if required.</li> <li>3. Check the heat exchanger sensor (primary thermistor) and the plug connected to temperature sensor.</li> <li>4. Check the resistant of the temperature sensor and replace if required.</li> <li>5. Check the continuity of harness and replace if required.</li> </ol>
2965	B	Flow temperature too high	<ol style="list-style-type: none"> <li>1. Check the flow through the appliance and the system is filled.</li> <li>2. Check for the air locks in the system and purge if required.</li> <li>3. Check the isolation valves.</li> </ol>
2966	B	Flow temperature rise in heat exchanger too rapid	<ol style="list-style-type: none"> <li>1. Check the flow through the appliance and the system is filled.</li> <li>2. Check for the air locks in the system and purge if required.</li> <li>3. Check the isolation valves.</li> <li>4. Check the pump is operating freely and check the voltage to the pump.</li> </ol>
2968	O	Refilling system pressure	The auto filling function is active. The filling valve opens in order to feed fresh water to the heating system automatically.
2969		Maximum number of refills reached	The maximum number of refills has been reached.
2972		Mains voltage too low	Check the mains voltage on the appliance (L and N).
2980	V	Locking fault: To unlock Hold up and down arrow keys pressed simultaneously for 3 s. For more information see operating instr. (Boiler locked. Contact a qualified heating engineer)	Boiler is in the super lock-out condition. <ul style="list-style-type: none"> <li>▶ Super lock-out (2980) occurs when a potential safety-critical condition is detected and 5 locking faults are reset within a 15-minute period. If the fault is not remedied and the complete system is not checked, there is a risk of personal injury:</li> </ul>
2981	V	Locking fault: To unlock Hold up and down arrow keys pressed simultaneously for 3 s. For more information see operating instr. (Boiler locked. Contact a qualified heating engineer)	<ul style="list-style-type: none"> <li>▶ Diagnose and remedy the locking fault. Check the complete system, including sensors and harnesses.</li> <li>▶ When remedied and system checked, turn the boiler power off and on again.</li> <li>▶ Fault condition 2981 will appear, the boiler is still in super lock-out</li> <li>▶ Press the up and down arrows simultaneously for 3 seconds.</li> <li>▶ Immediately after 22 seconds have elapsed, perform an additional reset by pressing the up and down arrows simultaneously for 3 seconds.</li> <li>▶ Super lock-out is remedied, boiler returns to normal operating condition.</li> <li>▶ Fault history is now available, double check the last 10 faults to confirm the fault has been remedied</li> </ul>

Table 29 Indicators and fault displays

### 11.1.3 Faults that are not displayed

Appliance faults	Remedy
Combustion noises too loud; rumbling noises	<ul style="list-style-type: none"> <li>▶ Check the gas type.</li> <li>▶ Check the gas supply pressure.</li> <li>▶ Check the flue system; clean or repair if required.</li> <li>▶ Check the gas/air ratio.</li> <li>▶ Check the air/gas ratio control valve; replace if required.</li> </ul>
Flow noises	<ul style="list-style-type: none"> <li>▶ Set the pump rate or pump characteristic map correctly and match to the maximum output.</li> </ul>
Heat-up takes too long.	<ul style="list-style-type: none"> <li>▶ Set the pump rate or pump characteristic map correctly and match to the maximum output.</li> </ul>
Flue gas values incorrect; CO content too high.	<ul style="list-style-type: none"> <li>▶ Check the gas type.</li> <li>▶ Check the gas supply pressure.</li> <li>▶ Check the flue system; clean or repair if required.</li> <li>▶ Check the gas/air ratio.</li> <li>▶ Check the air/gas ratio control valve; replace if required.</li> </ul>
Delayed ignition, poor ignition.	<ul style="list-style-type: none"> <li>▶ Check the ignition transformer with service function t01 for misfiring, replace if required.</li> <li>▶ Check the gas type.</li> <li>▶ Check the gas supply pressure.</li> <li>▶ Check the power supply.</li> <li>▶ Check the electrodes with cable; replace if required.</li> <li>▶ Check the flue system; clean or repair if required.</li> <li>▶ Check the gas/air ratio.</li> <li>▶ Check the burner, replace if required.</li> <li>▶ Check the air/gas ratio control valve; replace if required.</li> </ul>
Condensate in air box	<ul style="list-style-type: none"> <li>▶ Check the non-return valve in the air-gas manifold, replace if required.</li> </ul>
No function, the display remains dark.	<ul style="list-style-type: none"> <li>▶ Check the electrical wiring for damage.</li> <li>▶ Replace defective cables.</li> <li>▶ Check the fuse, replace if required.</li> </ul>

Table 30 Faults that are not shown on the display

**System gassing**

**WARNING**

If you suspect the heating system is gassing, you must exercise caution when carrying out testing or remedial work as the gasses produced can be flammable.

Do not vent air from radiators whilst the central heating is switched on. Allow 30mins after venting the radiators before using the central heating or hot water.

- ▶ Whilst venting radiators, do not allow the pressure on the boiler to drop below the point at which it is normally set.
- ▶ If the system is to be drained, the boiler must be electrically isolated.

**CAUTION**

If system pressure is repeatedly increasing, even when the appliance is not operating, you should first check that the filling link is fully closed and confirm that it is not passing. If radiators are also not heating to the top of the panels and repeatedly need venting, the heating system may be suffering from gassing. This is an indication that corrosion is taking place and requires the system being cleaned and treated to BS7593.

- ▶ This should be confirmed by taking water samples to check pH levels and turbidity.
- ▶ Failure to properly maintain the heating system may result in damage to the system and appliance, and may affect the boiler warranty.

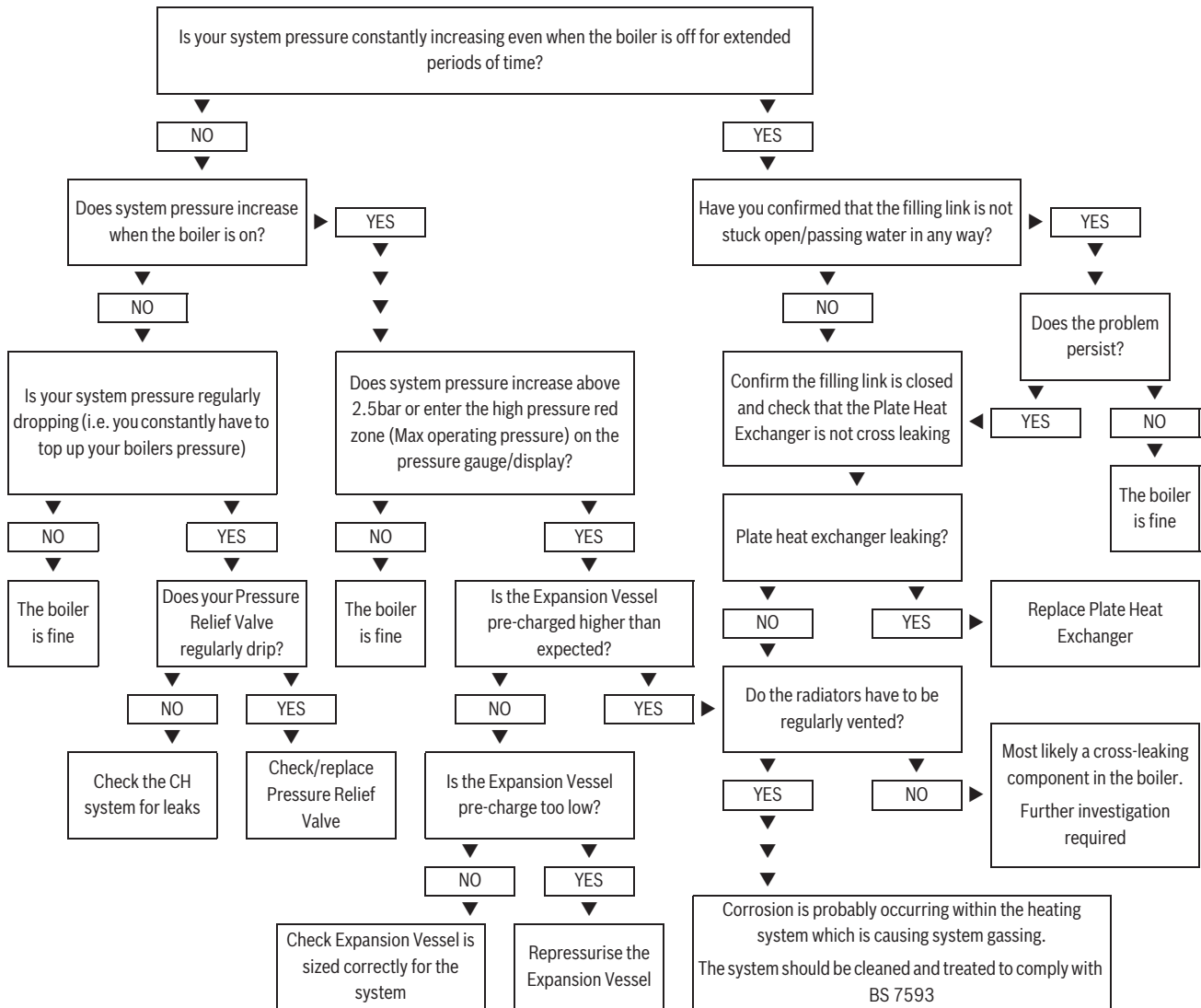


Table 31 System gassing flow chart

## 12 Environmental protection and disposal

Environmental protection is a fundamental corporate strategy of the Bosch Group.

The quality of our products, their economy and environmental safety are all of equal importance to us and all environmental protection legislation and regulations are strictly observed.

We use the best possible technology and materials for protecting the environment taking account of economic considerations.

### Packaging

Where packaging is concerned, we participate in country-specific recycling processes that ensure optimum recycling.

All of our packaging materials are environmentally compatible and can be recycled.

### Used appliances

Used appliances contain valuable materials that can be recycled.

The various assemblies can be easily dismantled. Synthetic materials are marked accordingly. Assemblies can therefore be sorted by composition and passed on for recycling or disposal.

### Old electrical and electronic appliances



This symbol means that the product must not be disposed of with other waste, and instead must be taken to the waste collection points for treatment, collection, recycling and disposal.



The symbol is valid in countries where waste electrical and electronic equipment regulations apply, e.g. "(UK) Waste Electrical and Electronic Equipment Regulations 2013 (as amended)". These regulations define the framework for the return and recycling of old electronic appliances that apply in each country.

As electronic devices may contain hazardous substances, it needs to be recycled responsibly in order to minimize any potential harm to the environment and human health. Furthermore, recycling of electronic scrap helps preserve natural resources.

For additional information on the environmentally compatible disposal of old electrical and electronic appliances, please contact the relevant local authorities, your household waste disposal service or the retailer where you purchased the product.

You can find more information here:

[www.bosch-homecomfortgroup.com/en/company/legal-topics/weee/](http://www.bosch-homecomfortgroup.com/en/company/legal-topics/weee/)

### Batteries

Batteries must not be disposed together with your household waste.

Used batteries must be disposed of in local collection systems.

## 13 Technical Specifications/Logs

### 13.1 Technical data

The new boiler is set at the maximum output and should be adjusted when it is installed and commissioned. In accordance with the

standards, the declared space heating efficiency, useful efficiency and NO<sub>x</sub> values efficiency for this range rated boiler are not measured at the maximum output. To achieve the published efficiency and NO<sub>x</sub> values, the gas rate should be reduced.

#### Technical data table - Greenstar 8000+ Natural Gas appliances

Greenstar 8000+		GR8701iW 30R	GR8701iW 35R	GR8701iW 40R	GR8701iW 45R	GR8701iW 50R
Description	Unit	NG	NG	NG	NG	NG
<b>Gas flow maximum rate - 10 minutes from lighting</b>						
Gas inlet pressure (nominal) <sup>1)</sup>	mbar	20.0	20.0	20.0	20.0	20.0
Natural gas <sup>2)</sup>	m <sup>3</sup> /h	3.2	3.6	4.3	4.6	5.1
<b>Heat output/load</b>						
Modulation range, heat input Q	kW	3.0 - 30.2	5.1 - 34.4	5.1 - 34.4	6.3 - 34.4	6.3 - 34.4
Adjustment range, rated heat input of heating Q <sub>n</sub>	kW	15.1 - 30.2	17.2 - 34.4	17.2 - 34.4	17.2 - 34.4	17.2 - 34.4
Adjustment range, rated heat output (80/60 °C) P <sub>n</sub>	kW	14.8 - 29.6	16.9 - 33.7	16.9 - 33.7	16.9 - 33.8	16.9 - 33.8
Adjustment range, rated heat output (50/30 °C) P <sub>cond</sub>	kW	15.5 - 31.0	17.5 - 35.0	17.5 - 35.0	17.9 - 35.7	17.9 - 35.7
Adjustment range, rated heat output (40/30 °C)	kW	15.6 - 31.2	17.6 - 35.2	17.6 - 35.2	18.0 - 36.0	18.0 - 36.0
Maximum flow temperature	°C	70	70	70	70	70
Maximum flow temperature possible	°C	82	82	82	82	82
Maximum permissible operating pressure (PMS)	bar (MPa)	2.5	2.5	2.5	2.5	2.5
Available pump head at 20 °C system temperature rise	m	7.0	6.5	6.5	6.5	6.5
<b>Flue</b>						
Flue gas temperature max. load DHW demand	°C	72/56	72/56	77/56	69/56	73/56
Flue gas temperature 80/60 °C, rated/min. load	°C	72/56	72/56	77/56	69/56	73/56
Flue gas temperature 40/30 °C, rated/min. load	°C	52/31	52/31	56/31	52/30	55/33
CO <sub>2</sub> level at max. rated heat output (after 10 minutes)	%	9.5	9.5	9.5	9.5	9.5
CO <sub>2</sub> level at min. rated heat output (after 10 minutes)	%	8.6	8.6	8.6	8.6	8.6
NO <sub>x</sub> rating (EN 15502-1)	mg/kWh	≤ 40	≤ 40	≤ 40	≤ 40	≤ 40
NO <sub>x</sub> Class	–	6	6	6	6	6
<b>Condensate</b>						
Maximum condensate rate	l/h	3.5	4.1	4.1	4.1	4.1
pH value, approx.	–	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0
<b>Electrical</b>						
Electrical power supply voltage	a.c. V	230	230	230	230	230
Frequency	Hz	50	50	50	50	50
Maximum power consumption (stand-by)	W	2	2	2	2	2
Maximum power consumption (heating)	W	109	120	130	130	143
Energy efficiency index (EEI) heating pump	–	≤ 0.20	≤ 0.20	≤ 0.20	≤ 0.20	≤ 0.20
<b>Approval data</b>						
Gas group classification (gas type) UK				CATIII <sub>2H/3P</sub>		
Installation type				C <sub>13</sub> , C <sub>33</sub> , C <sub>53</sub>		
<b>General data</b>						
Expansion vessel capacity	l	10	10	10	10	10
Expansion vessel pre-charge pressure	bar	5.1	5.1	5.1	5.1	5.1
Appliance protection rating	IP	X4D	X4D	X4D	X4D	X4D
Permissible ambient temperature	°C	0-50/40 (long time)	0-50/40 (long time)	0-50/40 (long time)	0-50/40 (long time)	0-50/40 (long time)
Nominal capacity of the appliance	l	5.2	5.2	5.2	5.9	5.9
Total packaged weight	kg	55	55	55	57	57
Total appliance weight (excluding packaging)	kg	47	47	47	49	49
Lift weight (front panel and sidepanels removed)	kg	41	41	41	43	43
SAP 10	%	--	--	--	--	--

1) For minimum and maximum permissible pressure refer to "Gas pressure within the system", section 9.8.

2) The Gas Rate provided assumes the accepted NG averaged calorific value of 34.9 MJ/m<sup>3</sup> net.

Table 32 Technical data Greenstar 8000+

#### LPG appliances

Greenstar 8000+		GR8701iW 30 R LPG	GR8701iW 35 R LPG	GR8701iW 40 R LPG	GR8701iW 45 R LPG	GR8701iW 50 R LPG
Description	Unit					
<b>Gas flow maximum rate - 10 minutes from lighting</b>						
Gas inlet pressure (nominal) <sup>1)</sup>	mbar	37.0	37.0	37.0	37.0	37.0
Propane Gas (LPG) <sup>2)</sup>	kg/h	2.3	2.7	3.2	3.4	3.8
<b>Heat output/load</b>						
Modulation range, heat input Q	kW	3.0 - 30.2	5.1 - 34.4	5.1 - 34.4	6.3 - 34.4	6.3 - 34.4
Adjustment range, rated heat input of heating Q <sub>n</sub>	kW	15.1 - 30.2	17.2 - 34.4	17.2 - 34.4	17.2 - 34.4	17.2 - 34.4
Adjustment range, rated heat output (80/60 °C) P <sub>n</sub>	kW	14.8 - 29.6	16.9 - 33.7	16.9 - 33.7	16.9 - 33.8	16.9 - 33.8
Adjustment range, rated heat output (50/30 °C) P <sub>cond</sub>	kW	15.5 - 31.0	17.5 - 35.0	17.5 - 35.0	17.9 - 35.7	17.9 - 35.7
Adjustment range, rated heat output (40/30 °C)	kW	15.6 - 31.2	17.6 - 35.2	17.6 - 35.2	18.0 - 36.0	18.0 - 36.0
Maximum flow temperature	°C	70	70	70	70	70
Maximum flow temperature possible	°C	82	82	82	82	82
Maximum permissible operating pressure (PMS)	bar (MPa)	2.5	2.5	2.5	2.5	2.5
Available pump head at 20 °C system temperature rise	m	7.0	6.5	6.5	6.5	6.5
Maximum DHW flow rate - 35 °C rise (for industry comparison)	l/min	13.7	15.2	17.1	18.2	20.2
<b>Flue</b>						
Flue gas temperature max. load DHW demand	°C	72/56	72/56	77/56	69/56	73/56
Flue gas temperature 80/60 °C, rated/min. load	°C	72/56	72/56	77/56	69/56	73/56
Flue gas temperature 40/30 °C, rated/min. load	°C	52/31	52/31	56/31	52/30	55/33
CO <sub>2</sub> level at max. rated heat output (after 10 minutes)	%	10.8	10.8	10.8	10.8	10.8
CO <sub>2</sub> level at min. rated heat output (after 10 minutes)	%	10.2	10.2	10.2	10.2	10.2
NOx rating (EN 15502-1)	mg/kWh	≤ 40	≤ 40	≤ 40	≤ 40	≤ 40
NOx Class	–	6	6	6	6	6
<b>Condensate</b>						
Maximum condensate rate	l/h	3.5	4.1	4.1	4.1	4.1
pH value, approx.	–	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0
<b>Electrical</b>						
Electrical power supply voltage	a.c. V	230	230	230	230	230
Frequency	Hz	50	50	50	50	50
Maximum power consumption (stand-by)	W	2	2	2	2	2
Maximum power consumption (heating)	W	109	120	130	130	143
Maximum power consumption (Domestic Hot Water)	W	113	124	130	130	143
Energy efficiency index (EEI) heating pump	–	≤ 0.20	≤ 0.20	≤ 0.20	≤ 0.20	≤ 0.20
<b>Approval data</b>						
Gas group classification (gas type) UK		CATII <sub>2H/3P</sub>				
Installation type		C <sub>13</sub> , C <sub>33</sub> , C <sub>53</sub>				
<b>General data</b>						
Expansion vessel capacity	l	10	10	10	10	10
Expansion vessel pre-charge pressure	bar	5.1	5.1	5.1	5.1	5.1
Appliance protection rating	IP	X4D	X4D	X4D	X4D	X4D
Permissible ambient temperature	°C	0-50/40 (long time)	0-50/40 (long time)	0-50/40 (long time)	0-50/40 (long time)	0-50/40 (long time)
Nominal capacity of the appliance	l	5.2	5.2	5.2	5.9	5.9
Total packaged weight	kg	55	55	55	57	57
Total appliance weight (excluding packaging)	kg	47	47	47	49	49
Lift weight (without front and side panels)	kg	41	41	41	43	43
SAP 10	%	--	--	--	--	--

1) For minimum and maximum permissible pressure refer to “Gas pressure within the system”, section 9.8.

2) Propane/butane mixture for fixed containers with capacity up to 15 000 litres.

Table 33 Technical data Greenstar 8000+



### 13.2 Ionisation current

Type	Gas type	When the burner is running at a minimum rated heat	
		OK	Faulty
GR8701iW 30	NG	$\geq 3 \mu\text{A}$	$< 3 \mu\text{A}$
	LPG	$\geq 3 \mu\text{A}$	$< 3 \mu\text{A}$
GR8701iW 35, GR8701iW 40, GR8701iW 45, GR8701iW 50	NG	$\geq 7 \mu\text{A}$	$< 7 \mu\text{A}$
	LPG	$\geq 10 \mu\text{A}$	$< 10 \mu\text{A}$

Table 34 Ionisation current

### 13.3 Component resistance characteristics

#### 13.3.1 Sensor values

Temperature [ $^{\circ}\text{C} \pm 10\%$ ]	Resistance [ $\Omega$ ]
-20	2392
-16	2088
-12	1811
-8	1562
-4	1342
0	1149
4	984
8	842
12	720
16	616
20	528
24	454

Table 35 Outside temperature sensor (for weather-compensated controllers, accessory)

Temperature [ $^{\circ}\text{C} \pm 10\%$ ]	Resistance [ $\Omega$ ]
0	35 975
5	28 538
10	22 763
15	18 284
20	14 772
25	12 000
30	9 786
35	8 054
40	6 652
45	5 523
50	4 607
55	3 856
60	3 243
65	2 744
70	2 332
75	1 990
80	1 703
85	1 464
90	1 261
95	1 093
100	949

Table 36 Flow temperature sensor

### 13.4 Code plug

Type	Gas type	Number
GR8701iW 30 NG	Natural Gas	20677
GR8701iW 35 NG	Natural Gas	20679
GR8701iW 40 NG	Natural Gas	20681
GR8701iW 45 NG	Natural Gas	20683
GR8701iW 50 NG	Natural Gas	20685
GR8701iW 30 LPG	Liquid Petroleum Gas	20678
GR8701iW 35 LPG	Liquid Petroleum Gas	20680
GR8701iW 40 LPG	Liquid Petroleum Gas	20682
GR8701iW 45 LPG	Liquid Petroleum Gas	20684
GR8701iW 50 LPG	Liquid Petroleum Gas	20686

Table 37 Code plug

### 13.5 Limiting nominal heat output (range rating) (Settings menu, Heating, Max. heat output)

Heat output [kW]	Display [%]	Heat input [kW]	Gas volume (NG-G20) [l/min]
14.8	51	15.1	27
16.0*	54	16.4	29
17.0	58	17.5	31
18.0	61	18.5	32
19.0	65	19.5	34
20.0	68	20.5	36
21.0	71	21.5	38
22.0	75	22.5	40
23.0	78	23.5	41
24.0	81	24.6	43
25.0	85	25.6	45
26.0	88	26.6	47
27.0	91	27.6	48
28.0	95	28.6	50
29.0	98	29.6	52
29.6	100	30.2	53

Table 38 GR8701iW 30

[\*] Range rated value for efficiency and  $\text{NO}_x$ . The heating output must be capped at values marked (\*) in order to achieve the  $\text{NO}_x$  values quoted on  $\rightarrow$  page 79.

Heat output [kW]	Display [%]	Heat input [kW]	Gas volume (NG-G20) [l/min]
16.9	50	17.2	30
18.0	53	18.4	32
19.0	56	19.4	34
20.0*	59	20.4	36
21.0	62	21.4	38
22.0	65	22.5	39
23.0	68	23.5	41
24.0	71	24.5	43
25.0	74	25.5	45
26.0	77	26.5	47
27.0	80	27.6	48
28.0	83	28.6	50
29.0	86	29.6	52
30.0	89	30.6	54

Heat output [kW]	Display [%]	Heat input [kW]	Gas volume (NG-G20) [l/min]
31.0	92	31.6	56
32.0	95	32.7	57
33.0	98	33.7	59
33.7	100	34.4	60

Table 39 GR8701iW 35

[\*] Range rated value for efficiency and NO<sub>x</sub>. The heating output must be capped at values marked (\*) in order to achieve the NO<sub>x</sub> values quoted on →page 79.

Heat output [kW]	Display [%]	Heat input [kW]	Gas volume (NG-G20) [l/min]
16.9	43	17.2	30
18.0	45	18.4	32
19.0	48	19.4	34
20.0*	50	20.4	36
21.0	53	21.4	38
22.0	55	22.5	39
23.0	58	23.5	41
24.0	60	24.5	43
25.0	63	25.5	45
26.0	65	26.5	47
27.0	68	27.6	48
28.0	70	28.6	50
29.0	73	29.6	52
30.0	75	30.6	54
31.0	78	31.6	56
32.0	80	32.7	57
33.0	83	33.7	59
33.7	84	34.4	60

Table 40 GR8701iW 40

[\*] Range rated value for efficiency and NO<sub>x</sub>. The heating output must be capped at values marked (\*) in order to achieve the NO<sub>x</sub> values quoted on →page 79.

Heat output [kW]	Display [%]	Heat input [kW]	Gas volume (NG-G20) [l/min]
16.9	40	17.2	30
18.0	42	18.3	32
19.0	44	19.3	34
20.0*	47	20.3	36
21.0	49	21.4	37
22.0	51	22.4	39
23.0	54	23.4	41
24.0	56	24.4	43
25.0	58	25.4	45
26.0	61	26.4	46
27.0	63	27.5	48
28.0	65	28.5	50
29.0	68	29.5	52
30.0	70	30.5	54
31.0	73	31.5	55
32.0	75	32.6	57

Heat output [kW]	Display [%]	Heat input [kW]	Gas volume (NG-G20) [l/min]
33.0	77	33.6	59
33.8	79	34.4	60

Table 41 GR8701iW 45

[\*] Range rated value for efficiency and NO<sub>x</sub>. The heating output must be capped at values marked (\*) in order to achieve the NO<sub>x</sub> values quoted on →page 79.

Heat output [kW]	Display [%]	Heat input [kW]	Gas volume (NG-G20) [l/min]
16.9	35	17.2	30
18.0	37	18.3	32
19.0	40	19.3	34
20.0*	42	20.3	36
21.0	44	21.4	37
22.0	46	22.4	39
23.0	48	23.4	41
24.0	50	24.4	43
25.0	52	25.4	45
26.0	54	26.4	46
27.0	56	27.5	48
28.0	58	28.5	50
29.0	60	29.5	52
30.0	62	30.5	54
31.0	65	31.5	55
32.0	67	32.6	57
33.0	69	33.6	59
33.8	70	34.4	60

Table 42 GR8701iW 50

[\*] Range rated value for efficiency and NO<sub>x</sub>. The heating output must be capped at values marked (\*) in order to achieve the NO<sub>x</sub> values quoted on →page 79.

**13.6 Electrical wiring**

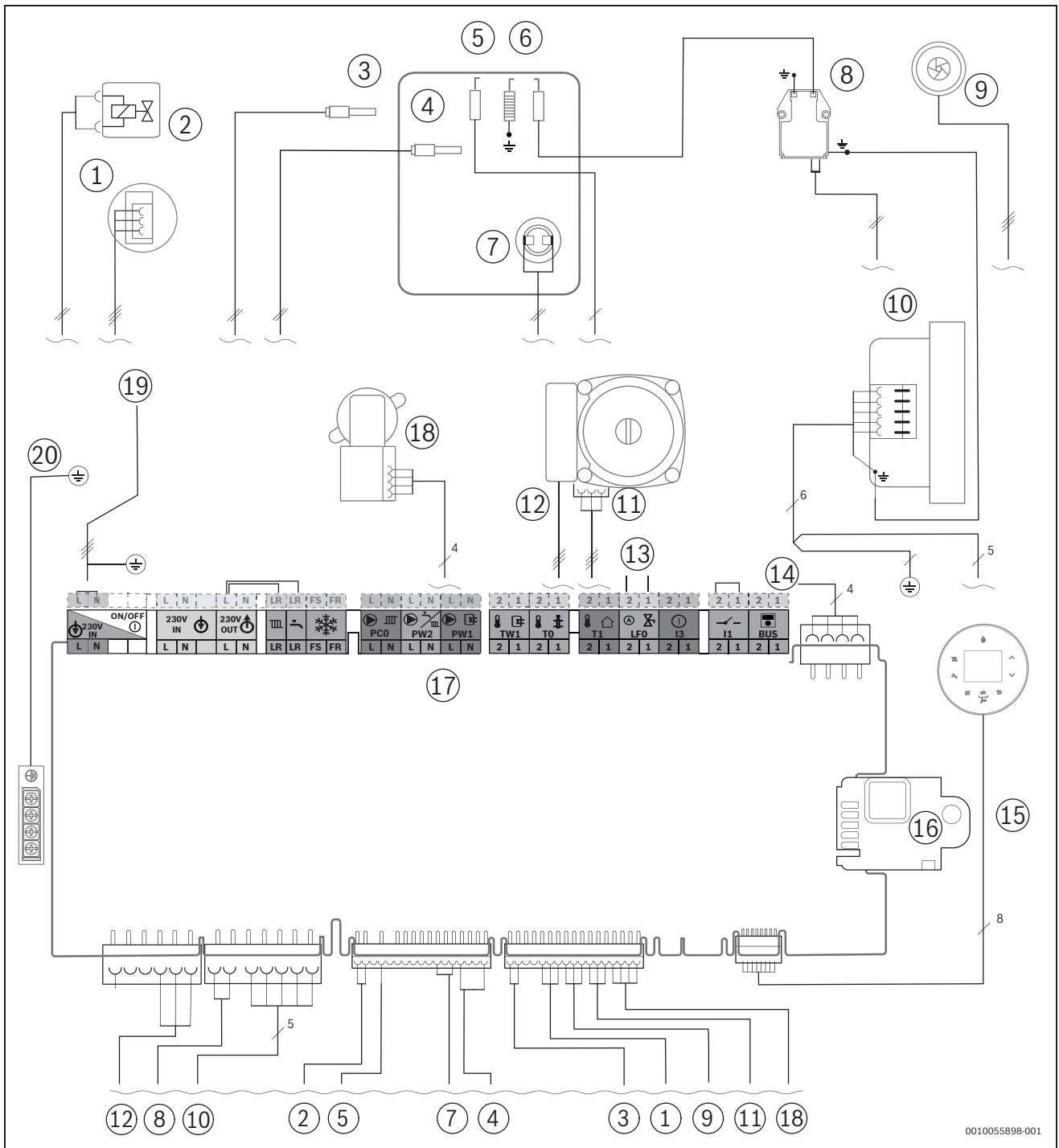


Fig. 104 Electrical wiring

- |  |   |
|--|---|
| [1] Pressure sensor                          | [15] Display  |
| [2] Air/gas ratio control valve              | [16] Code plug  |
| [3] Hot water temperature sensor             | [17] Terminal strip for external accessories (→ terminal assignment Tab. , page 41) |
| [4] Flow temperature sensor at heating block | [18] 3-way valve  |
| [5] Flame sensing electrode                  | [19] Connection cable   |
| [6] Ignition electrode                       | [20] Earth bar  |
| [7] Heating block temperature limiter        |   |
| [8] Ignition transformer                     |   |
| [9] Flow turbine                             |   |
| [10] Fan                                     |   |
| [11] Control cable of the heating pump       |   |
| [12] Heating pump 230 V                      |   |
| [13] Connector for automatic filling device  |   |
| [14] Connecting lead for Key slot            |   |

## GAS BOILER SYSTEM COMMISSIONING CHECKLIST & WARRANTY VALIDATION RECORD

Address:															
Boiler make and model:															
Boiler serial number:															
Commissioned by (PRINT NAME):						Gas Safe registration number:									
Company name:						Telephone number:									
Company email:						Company address:									
										Commissioning date:					
Heating and hot water system complies with the appropriate Building Regulations?											Yes				
Optional: Building Regulations Notification Number (if applicable):															
Time, temperature control and boiler interlock provided for central heating and hot water											Yes				
Boiler Plus requirements (tick the appropriate box(s))															
Boiler Plus option chosen for combination boiler in ENGLAND						Weather compensation			Smart thermostat with automation and optimisation						
						Load compensation			Flue Gas Heat Recovery						
Time and temperature control to hot water			Cylinder thermostat and programmer/timer						Combination boiler						
Zone valves		pre-existing		Fitted		Not required									
Thermostatic radiator valves		pre-existing		Fitted		Not required									
Automatic bypass to system		pre-existing		Fitted		Not required									
Underfloor heating		pre-existing		Fitted		Not required									
Water quality															
The system has been flushed, cleaned and a suitable inhibitor applied upon final fill, in accordance with BS7593 and boiler manufacturers' instructions											Yes				
What system cleaner was used?						Brand:			Product:						
What inhibitor was used?						Brand:			Product:						
Primary water system filter		pre-existing		Fitted		Not required									
CENTRAL HEATING MODE measure and record (as appropriate)															
Gas rate (for combination boilers complete DHW mode gas rate)				m <sup>3</sup> /hr		or		ft <sup>3</sup> /hr							
Central heating output left at factory settings?						Yes		No							
If no, what is the maximum central heating output selected?											kW				
Dynamic gas inlet pressure											mbar				
Central heating flow temperature											°C				
Central heating return temperature											°C				
System correctly balanced/rebalanced?											Yes				
COMBINATION BOILERS ONLY															
Is the installation in a hard water area (above 200ppm)?						Yes		No							
Water scale reducer/softener		pre-existing		Fitted		Not required									
What type of scale reducer/softener has been fitted?						Brand:			Product:						
Water meter fitted?						Yes		No							
If yes- DHW expansion vessel		pre-existing		Fitted		Not required									
Pressure reducing valve		pre-existing		Fitted		Not required									
DOMESTIC HOT WATER MODE Measure and record															
Gas rate				m <sup>3</sup> /hr		or		ft <sup>3</sup> /hr							
Dynamic gas inlet pressure at maximum rate											mbar				
Cold water inlet temperature											°C				
Hot water has been checked at all outlets						Yes		Temperature							
CONDENSATE DISPOSAL															
The condensate drain has been installed in accordance with the manufacturers' instructions and/or BS5546/BS6798											Yes				
Point of termination						Internal		External (only where internal termination impractical)							
Method of disposal						Gravity		Pumped							
ALL INSTALLATIONS															
Record the following		At max rate:		CO		p		CO <sub>2</sub>		%		CO/CO <sub>2</sub>		Ratio	
		At min rate (where possible)		CO		p		CO <sub>2</sub>		%		CO/CO <sub>2</sub>		Ratio	
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?											Yes				
The operation of the boiler and system controls have been demonstrated to and understood by the customer											Yes				
The manufacturers' literature, including Benchmark Checklist and Service Record, has been explained and left with the customer											Yes				
Commissioning Engineer's signature															
Customer's signature (To confirm satisfactory demonstration and receipt of manufacturers' literature)															

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

**13.8 Inspection and maintenance checklist**

Inspection and maintenance checklist		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Date:																
1	Check appliance operation (CH) and fault history	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>
2	Visual inspection:-	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>
Check compliance of appliance, system and components																
3	Internal visual inspection	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>
Check for signs of leaking, corrosion and distress																
4	Appliance performance checks:															
4.1	Check Fan pressure test	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>
was cleaning required?		No <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>	No <input type="checkbox"/>
		Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>
4.2	Check and clean syphon	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>
4.3	Correct working gas inlet pressure	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>
4.4	Flue gas analysis															
Check combustion settings: Min/Max test modes		Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>
4.5	Gas rate appliance at maximum output in test mode	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>
4.6	Check flame failure appliance	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>
4.7	Fit casing	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>
4.8	Check flue integrity	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>
6	Gas Safe/Benchmark documentation updated	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>
8	Appliance left to customer settings	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>	Yes <input type="checkbox"/>
9	Gas Safe registration number															
Gas Safe Engineers Signature																

Table 43 Inspection and maintenance checklist

# SERVICE & INTERIM BOILER WORK RECORD

It is recommended that your boiler and heating system are regularly serviced and maintained, in line with manufacturers' instructions, and that the appropriate service / interim work record is completed.

## Service provider

When completing a service record (as below), please ensure you have carried out the service as described in the manufacturers' instructions. Always use the manufacturers' specified spare parts.

<b>SERVICE/INTERIM WORK ON BOILER</b> delete as appropriate					Date:	
Engineer name:		Company name:				
Telephone N°:		Gas Safe registration N°:				
Max rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>	
Min rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>	
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?*					yes	
Gas rate:	m <sup>3</sup> /h	OR	ft <sup>3</sup> /h			
Were parts fitted? <sup>delete as appropriate</sup>		Yes	No			
Parts fitted:						
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes	n/a
Comments:						
Signature:						

\*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

<b>SERVICE/INTERIM WORK ON BOILER</b> delete as appropriate					Date:	
Engineer name:		Company name:				
Telephone N°:		Gas Safe registration N°:				
Max rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>	
Min rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>	
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?*					yes	
Gas rate:	m <sup>3</sup> /h	OR	ft <sup>3</sup> /h			
Were parts fitted? <sup>delete as appropriate</sup>		Yes	No			
Parts fitted:						
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes	n/a
Comments:						
Signature:						

\*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

<b>SERVICE/INTERIM WORK ON BOILER</b> delete as appropriate					Date:	
Engineer name:		Company name:				
Telephone N°:		Gas Safe registration N°:				
Max rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>	
Min rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>	
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?*					yes	
Gas rate:	m <sup>3</sup> /h	OR	ft <sup>3</sup> /h			
Were parts fitted? <sup>delete as appropriate</sup>		Yes	No			
Parts fitted:						
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes	n/a
Comments:						
Signature:						

\*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

<b>SERVICE/INTERIM WORK ON BOILER</b> delete as appropriate					Date:	
Engineer name:		Company name:				
Telephone N°:		Gas Safe registration N°:				
Max rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>	
Min rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>	
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?*					yes	
Gas rate:	m <sup>3</sup> /h	OR	ft <sup>3</sup> /h			
Were parts fitted? <sup>delete as appropriate</sup>		Yes	No			
Parts fitted:						
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes	n/a
Comments:						
Signature:						

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<b>SERVICE/INTERIM WORK ON BOILER</b> delete as appropriate					Date:	
Engineer name:		Company name:				
Telephone N°:		Gas Safe registration N°:				
Max rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>	
Min rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>	
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?*					yes	
Gas rate:	m <sup>3</sup> /h	OR	ft <sup>3</sup> /h			
Were parts fitted? <sup>delete as appropriate</sup>		Yes	No			
Parts fitted:						
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes	n/a
Comments:						
Signature:						

\*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

<b>SERVICE/INTERIM WORK ON BOILER</b> delete as appropriate					Date:	
Engineer name:		Company name:				
Telephone N°:		Gas Safe registration N°:				
Max rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>	
Min rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>	
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?*					yes	
Gas rate:	m <sup>3</sup> /h	OR	ft <sup>3</sup> /h			
Were parts fitted? <sup>delete as appropriate</sup>		Yes	No			
Parts fitted:						
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes	n/a
Comments:						
Signature:						

\*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

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

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# SERVICE & INTERIM BOILER WORK RECORD

It is recommended that your boiler and heating system are regularly serviced and maintained, in line with manufacturers' instructions, and that the appropriate service / interim work record is completed.

## Service provider

When completing a service record (as below), please ensure you have carried out the service as described in the manufacturers' instructions. Always use the manufacturers' specified spare parts.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>					Date:
Engineer name:		Company name:			
Telephone N°:		Gas Safe registration N°:			
Max rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>
Min rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"				yes	
Gas rate:	m <sup>3</sup> /h	OR	ft <sup>3</sup> /h		
Were parts fitted? <small>delete as appropriate</small>		Yes	No		
Parts fitted:					
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *				yes	n/a
Comments:					
Signature:					

\*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>					Date:
Engineer name:		Company name:			
Telephone N°:		Gas Safe registration N°:			
Max rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>
Min rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"				yes	
Gas rate:	m <sup>3</sup> /h	OR	ft <sup>3</sup> /h		
Were parts fitted? <small>delete as appropriate</small>		Yes	No		
Parts fitted:					
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *				yes	n/a
Comments:					
Signature:					

\*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>					Date:
Engineer name:		Company name:			
Telephone N°:		Gas Safe registration N°:			
Max rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>
Min rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"				yes	
Gas rate:	m <sup>3</sup> /h	OR	ft <sup>3</sup> /h		
Were parts fitted? <small>delete as appropriate</small>		Yes	No		
Parts fitted:					
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *				yes	n/a
Comments:					
Signature:					

\*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>					Date:
Engineer name:		Company name:			
Telephone N°:		Gas Safe registration N°:			
Max rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>
Min rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"				yes	
Gas rate:	m <sup>3</sup> /h	OR	ft <sup>3</sup> /h		
Were parts fitted? <small>delete as appropriate</small>		Yes	No		
Parts fitted:					
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *				yes	n/a
Comments:					
Signature:					

\*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>					Date:
Engineer name:		Company name:			
Telephone N°:		Gas Safe registration N°:			
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Min rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"				yes	
Gas rate:	m <sup>3</sup> /h	OR	ft <sup>3</sup> /h		
Were parts fitted? <small>delete as appropriate</small>		Yes	No		
Parts fitted:					
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *				yes	n/a
Comments:					
Signature:					

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SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>					Date:
Engineer name:		Company name:			
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Max rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>
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Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"				yes	
Gas rate:	m <sup>3</sup> /h	OR	ft <sup>3</sup> /h		
Were parts fitted? <small>delete as appropriate</small>		Yes	No		
Parts fitted:					
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *				yes	n/a
Comments:					
Signature:					

\*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

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## 13.10 Data Protection Notice

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### 14 Data Protection Notice



We, **Bosch Thermotechnology Ltd., Cotswold Way, Warndon, Worcester WR4 9SW, United Kingdom**

process product and installation information, technical and connection data, communication data, product registration and client history data to provide product functionality (art. 6 (1) sentence 1 (b) GDPR / UK GDPR), to fulfil our duty of product surveillance and for product safety and security reasons (art. 6 (1) sentence 1 (f) GDPR / UK GDPR), to safeguard our rights in connection with warranty and product registration questions (art. 6 (1) sentence 1 (f) GDPR / UK GDPR) and to analyze the distribution of our products and to provide individualized information and offers related to the product (art. 6 (1) sentence 1 (f) GDPR / UK GDPR). To provide services such as sales and marketing services, contract management, payment handling, programming, data hosting and hotline services we can commission and transfer data to external service providers and/or Bosch affiliated enterprises. In some cases, but only if appropriate data protection is ensured, personal data might be transferred to recipients located outside of the European Economic Area and the United Kingdom. Further information are provided on request. You can contact our Data Protection Officer under: Data Protection Officer, Information Security and Privacy (C/ISP), Robert Bosch GmbH, Postfach 30 02 20, 70442 Stuttgart, GERMANY.

You have the right to object, on grounds relating to your particular situation or where personal data are processed for direct marketing purposes, at any time to processing of your personal data which is based on art. 6 (1) sentence 1 (f) GDPR / UK GDPR. To exercise your rights, please contact us via [privacy.ttgb@bosch.com](mailto:privacy.ttgb@bosch.com) To find further information, please follow the QR-Code.



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**15 Statement of Compliance**

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**Statement of Compliance**

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Product Type

**Worcester 1000 Boiler range / Worcester Greenstar 2000 Boiler range / Worcester Greenstar 4000 Boiler range / Worcester Greenstar CDI Compact ErP Boiler range / Worcester Greenstar I Compact ErP Boiler range / Worcester Greenstar RI Compact ErP Boiler range / Worcester Greenstar RI ErP+ Boiler range / Worcester Greenstar 8000 Boiler range**

---

We declare that, in our opinion, the stated products comply with all applicable provisions of the Product Security and Telecommunications Infrastructure (Security Requirements for Relevant Connectable Products) Regulations 2023 as listed below.

The applicable security requirements in Schedule 1 of the Product Security and Telecommunications Infrastructure (Security Requirements for Relevant Connectable Products) Regulations 2023

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The defined support period for the product ends on: N/A. Security updates are not applicable for this product range.

---

**BOSCH**Bosch Thermotechnology Ltd., Cotswold Way, GB-Worcester  
WR4 9SW, as the manufacturerpki, BOSCH, UK,  
J, A, Jason.Foxall  
Digitally signed by pki, BOSCH,  
UK, J, A, Jason.Foxall  
Date: 2024.03.21 10:53:57 Z

Jason Foxall

Head of Quality Management  
WoP/QMM, CyP/QMMpki, BOSCH, UK,  
R, I, Richard.Evans  
Digitally signed by pki,  
BOSCH, UK, R, I,  
Richard.Evans  
Date: 2024.03.21 10:50:20 Z

Richard Evans

Head of Engineering  
HC-CS/PAC1

We declare that this statement of compliance is prepared by Bosch Thermotechnology Ltd., Cotswold Way, GB-Worcester WR4 9SW.

Place of issue: Worcester

Date of issue: 21/03/2024





TECHNICAL SUPPORT: 0330 123 3366  
RENEWABLE SUPPORT: 0330 123 9229  
CONTROLS AND CONNECTIVITY TEAM: 0330 123 3641  
APPOINTMENTS: 0330 123 9339  
SPARES: 0330 123 9779  
LITERATURE: 0330 123 9119  
TRAINING: 0330 123 0166  
SALES: 0330 123 9669

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 **WORCESTER**

 **BOSCH**