

Installation and Maintenance Instructions

Gas fired condensing regular boiler

## **Greenstar 8000 Life**

GR8300iW 30 R | GR8300iW 35 R | GR8300iW 40 R | GR8300iW 45 R | GR8300iW 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**



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**

 **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 Technical help-line (0330 123 3366).
- Distance learning and training courses are available from Worcester.
- The BENCHMARK Commissioning Checklist can be found on page 73 of this Installation manual.

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

### **⚠ 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 offer flue gas systems which are suitable for use with the appliance. It is the responsibility of the designer/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 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.
- ▶ 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.
- ▶ Explain that modifications and repairs must only be performed by a competent, registered gas engineer, such as a Gas Safe registered engineer or British Gas engineer.
- ▶ 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 system serviced annually by a competent, registered gas engineer, such as a Gas Safe registered engineer or British Gas engineer. 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 [centralheating.co.uk](http://centralheating.co.uk) for more information.

### **⚠ Health and safety**

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

### **⚠ Combustion and corrosive materials**

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

Chemically aggressive substances can corrode the appliance and invalidate any 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, Building Standards (Scotland) (Consolidation),

Building Regulations (Northern Ireland), local water by-laws,

Health and Safety Document 635 (The Electricity at Work Regulations 1989) and any other local requirements.

EU Regulations No. 811/2013 - Energy Labelling.

### Building Regulations Part L1A 2013 - 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 2010 - 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 pipe work 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

### Irish Standards

The current relevant Irish standards should be followed, including:

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

### 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.

### 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 and pre-plumbed
- Galvanised steel inner frame
- Digital control system
- Automatic ignition
- Direct burner ignition electrodes
- Built-in fault finding diagnostics
- Automatic gas valve
- Modulating combustion air fan with speed regulator
- CH temperature sensor & control
- Flue gas temperature sensor
- Condensate siphonic trap

### 3.2 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.

### 3.3 Scope of delivery

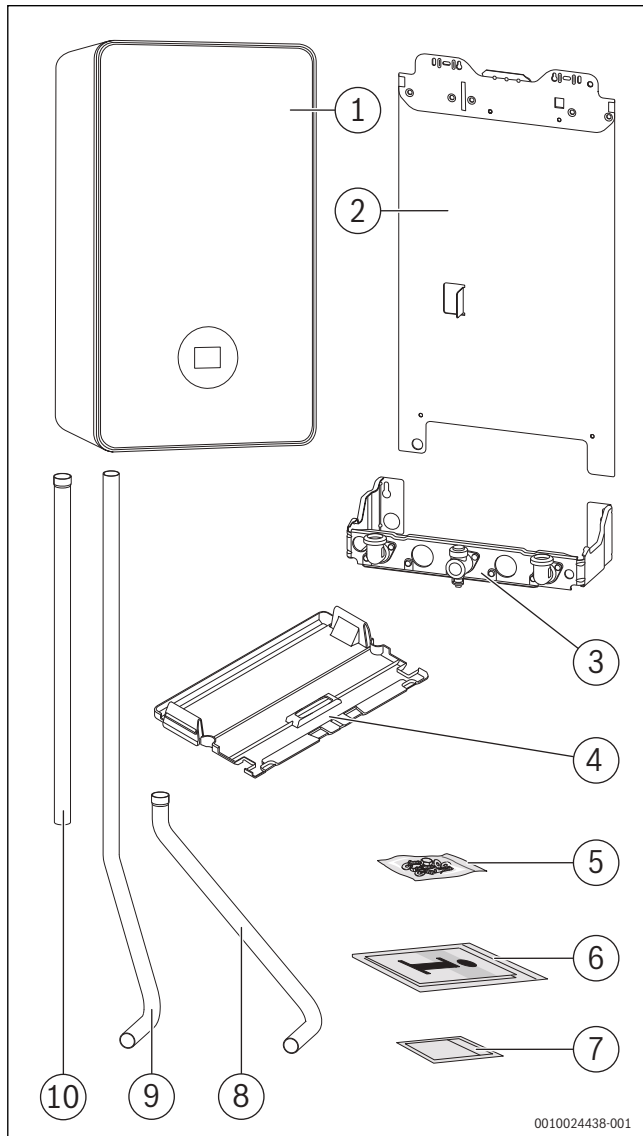


Fig. 1 Scope of delivery

- [1] Wall mounted gas condensing boiler
- [2] Mounting bracket
- [3] Mounting plate
- [4] Lower cover
- [5] Fixing materials (screws with accessories)
- [6] Set of printed documents for product documentation
- [7] Guarantee card
- [8] Return Pipe 1
- [9] Flow Pipe
- [10] Return Pipe 2

### 3.4 Declaration of Conformity

The design and operation of this product comply with European Directives and the supplementary national requirements. Conformity has been demonstrated by the CE marking.

You can ask for a copy of the declaration of conformity for this product. For this see the contact address on the back cover of these instructions.

### 3.5 Appliance type overview

This appliance are for use with:

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

This document refers to the following appliance types:

Appliance type	Part number	Gas Council number
GR8300iW 30 R NG	7 738 100 809	41-406-98
GR8300iW 35 R NG	7 738 100 810	41-406-97
GR8300iW 40 R NG	7 738 100 811	41-406-96
GR8300iW 45 R NG	7 738 100 812	41-406-95
GR8300iW 50 R NG	7 738 100 813	41-406-94
GR8300iW 30 R LPG	7 738 100 860	41-800-04
GR8300iW 35 R LPG	7 738 100 861	41-800-03
GR8300iW 40 R LPG	7 738 100 862	41-800-02
GR8300iW 45 R LPG	7 738 100 863	41-800-01
GR8300iW 50 R LPG	7 738 100 864	41-406-99

Table 2 Type overview

The name of the appliance consists of the following parts:

- GR8300iW: 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 includes the product performance information, approval data and serial number. The data plate location can be found in the product overview.

#### Additional type plate

The product name and the most important product data are shown on the additional data plate. The additional type plate can be found on the outside of the product in an easily accessible location.

### 3.7 Pipe work positions and flue outlet

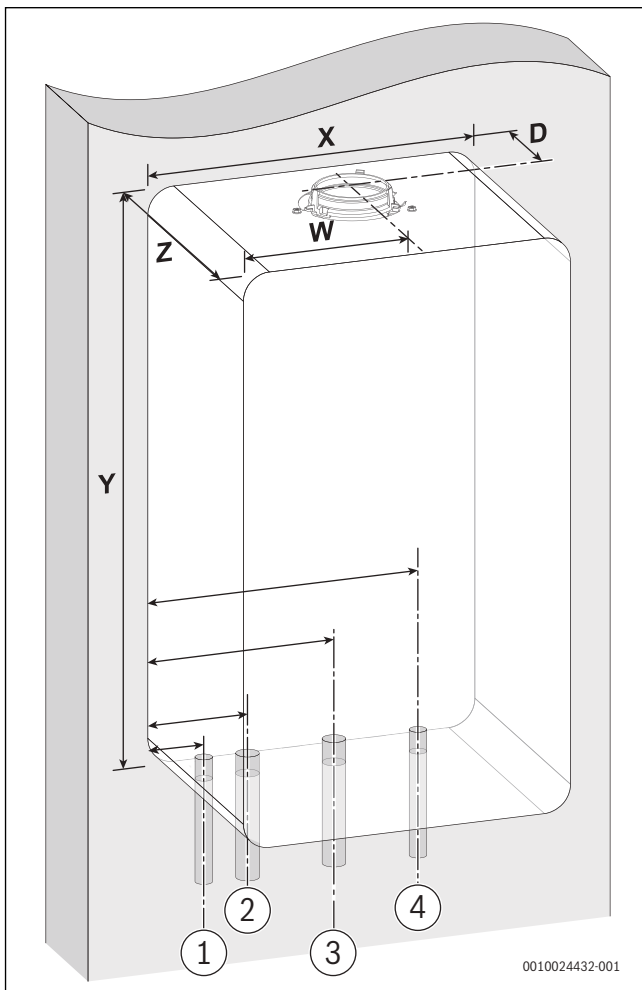


Fig. 2 Pipe and flue outlet dimensions

	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

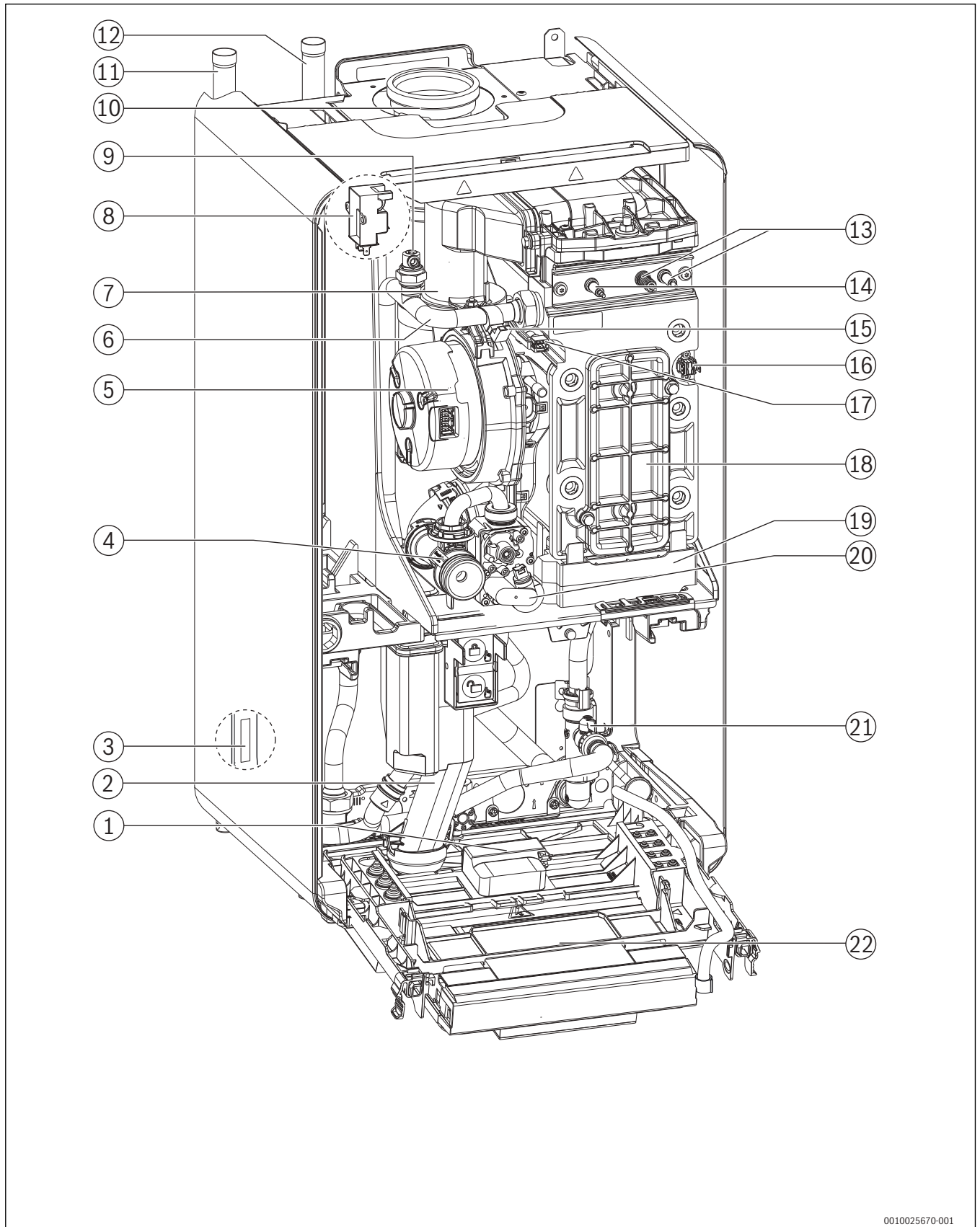
Table 4 Pipe dimensions



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



**3.8 Designation of components**



0010025670-001

*Fig. 3 Product overview Regular boilers, combustion cover removed*

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

- [13] Ignition electrodes
- [14] Flame sensing electrode
- [15] Flow temperature sensor at flow pipe
- [16] Heating block temperature limiter
- [17] Flow temperature sensor at heating block
- [18] Inspection cover
- [19] Condensate sump
- [20] Gas valve
- [21] Drain point
- [22] 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

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

Alternatively there are water softening/treatment appliances that do not adjust or alter the pH levels of the water. With these appliances it may not be necessary to provide an untreated water by-pass to the primary water filling point of the heat system.

### NOTICE:

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

#### 4.1.2 Water systems and pipe work

##### Primary system plastic pipework:

- Any plastic pipe work 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 pipe work 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 or stopped by TRV's or zone valves, a system bypass should be installed to give at least a 3 metre circuit when

activated. However; any appliance fitted with a modulating pump may not require a system bypass.

- 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 "System fill" 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.

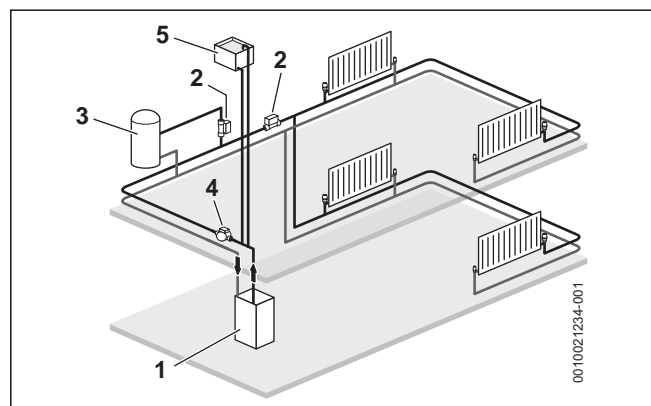


Fig. 4 Cylinder and heating zone

- [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.

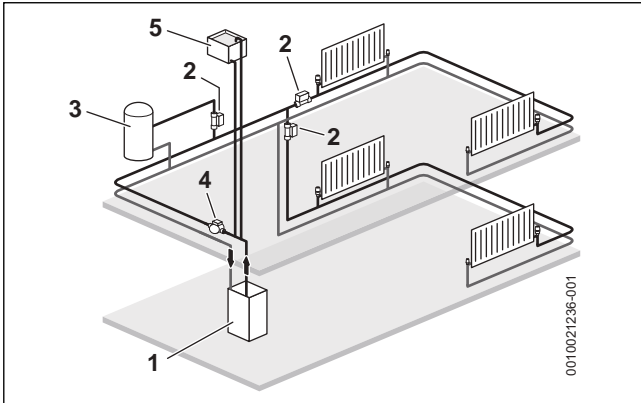


Fig. 5 Cylinder and 2 x heating zones

- [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.

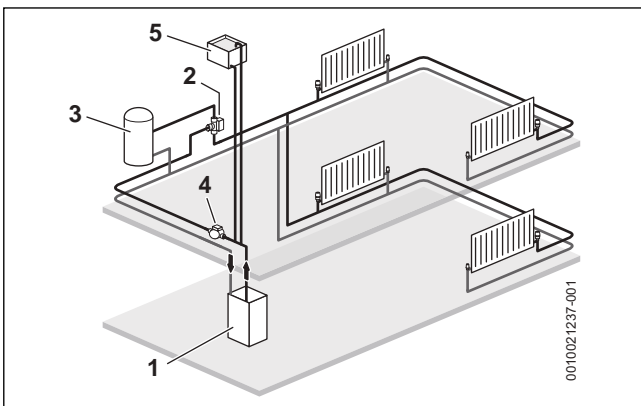


Fig. 6 3-Way valve, cylinder and heating zone

- [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.

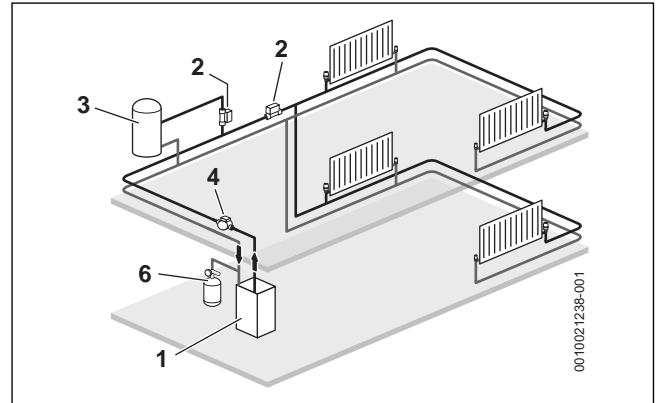


Fig. 7 Cylinder and heating zone

- [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.

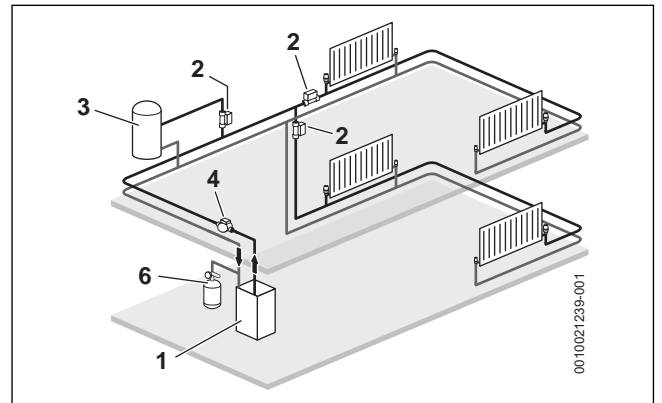


Fig. 8 Cylinder and 2 x heating zones

- [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.

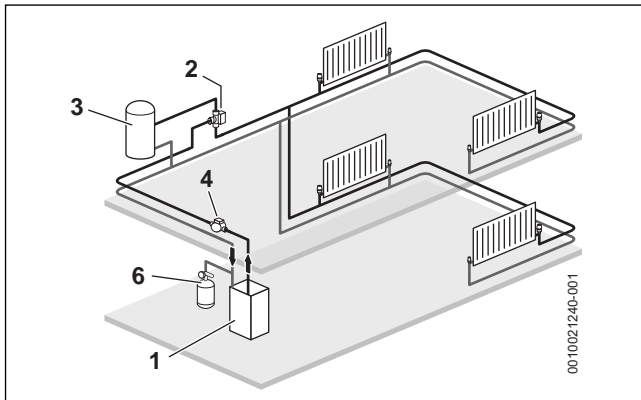


Fig. 9 3-Way valve, cylinder and heating zone

- [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 System fill

##### 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.

### External filling loop

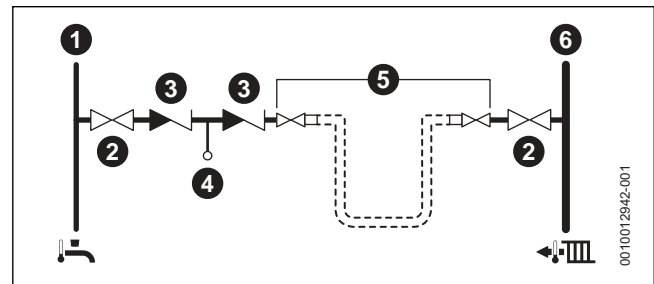


Fig. 10 External filling loop system fill example

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

### Top-up tank system fill

In situations where the cold mains pressure is not sufficient to pressurise the system to between 1 and 1.5bar an alternative can be to use a top-up tank.

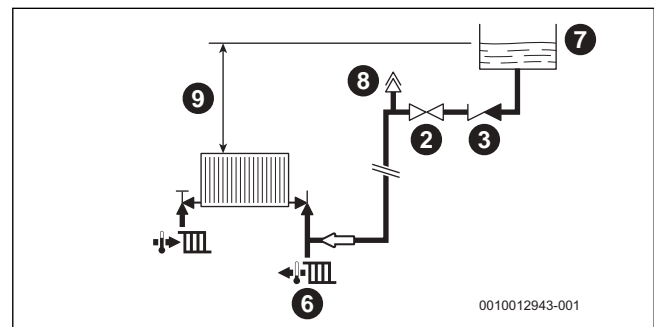


Fig. 11 Top-up tank system fill example

- [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)

## 4.2 Mains supply

### 4.2.1 Electrical supply

- Supply: 230V AC - 50 Hz
- This appliance must **not** be connected to a three phase supply.
- The wiring between the appliance and the electrical supply must comply with the latest IET wiring regulations that apply to wiring a fixed appliance.
- Type A RCDs must be employed where additional protection is required.
- External 3fuse to BS1362.
- The appliance must be earthed.
- Cable: PVC insulated 0.75mm<sup>2</sup> (24 x 0.2mm) temperature rated to 90 °C, to BS EN50525.
- Any additional components that are connected to the appliance with mains electrical supply must not have a separate supply.
- Additional equipment wired to the appliance must comply with the latest IET wiring regulations.
- 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 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 12.7).
- The meter or regulator and pipe work to the meter or regulator 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 pipe work:

- ▶ Gas installation pipe work 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 15 "Allowed mbar pressure drop".

**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



Natural Gas:

- ▶ When using this table to estimate the gas flow rate in pipe work 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 90° bend. This method is only a estimate - for more complex design please refer to BS6891 2015 and training given in ACS.

**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 pipe work 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 90° bend or straight coupler. This method is only a estimate - for more complex design please refer to BS6891 2015 and training given in ACS.

**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.



No surface protection is required against heat transfer from the appliance

**! DANGER:**

**Danger to life due to explosion!**

An increased and permanent ammonia concentration can lead to stress corrosion cracking on brass parts (e.g. gas taps, union nuts). As a result, there is a risk of explosion due to gas leakage.

- ▶ Do not use gas appliances in rooms with an increased and permanent ammonia concentration (e.g. livestock stables or storage rooms for fertilisers).

**! 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.

**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, room.
- ▶ Avoid the build up of dust.

**NOTICE:****Damage to appliance:**

Extreme temperatures may cause damage to the heating system.

- ▶ Ensure the ambient temperature is above 0 °C and below 35 °C.

**NOTICE:****Damage to system:**

The heating system pipe work 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 pipe work.  
We recommend that the frost thermostat is sited in the coldest unheated area in which pipe work 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 pipe work 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 to clearly see the appliance to carry out any work or checks.
- ▶ An engineer can gain clear and safe access 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 access to the controls, check, top up or reset the appliance.
- ▶ Roof space installations must fully conform to BS 5410 part 1: 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 and the access hatch.  
We would also recommend that a remote pressure gauge and filling loop are sited where the customer can gain easy access for checking and topping up.

**4.3.2 Rooms 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.

- In all cases the installation **must be in accordance with the latest amendments to the latest edition of the IET Wiring Regulations (BS7671)**.
- Check the IP rating of any control units to be used on this appliance.
- Circuit breaking appliances should be used in accordance with the regulations.
- Figure 12 is for guidance only.

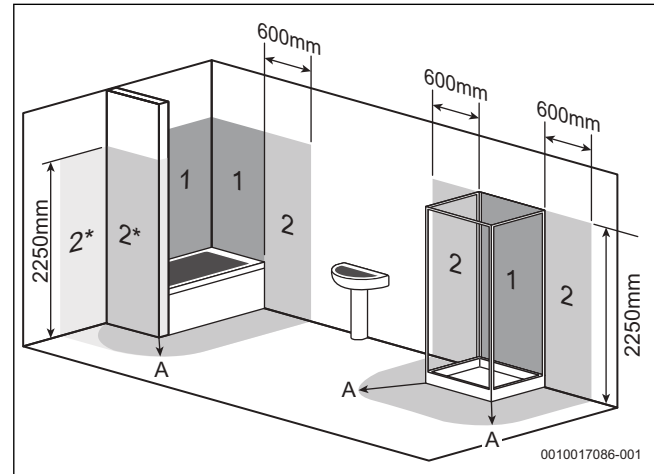


Fig. 12 Bathroom installations

- [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

**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 22 mm
2. Mains Gas Supply 22 mm
3. CH Return 22 mm

**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.

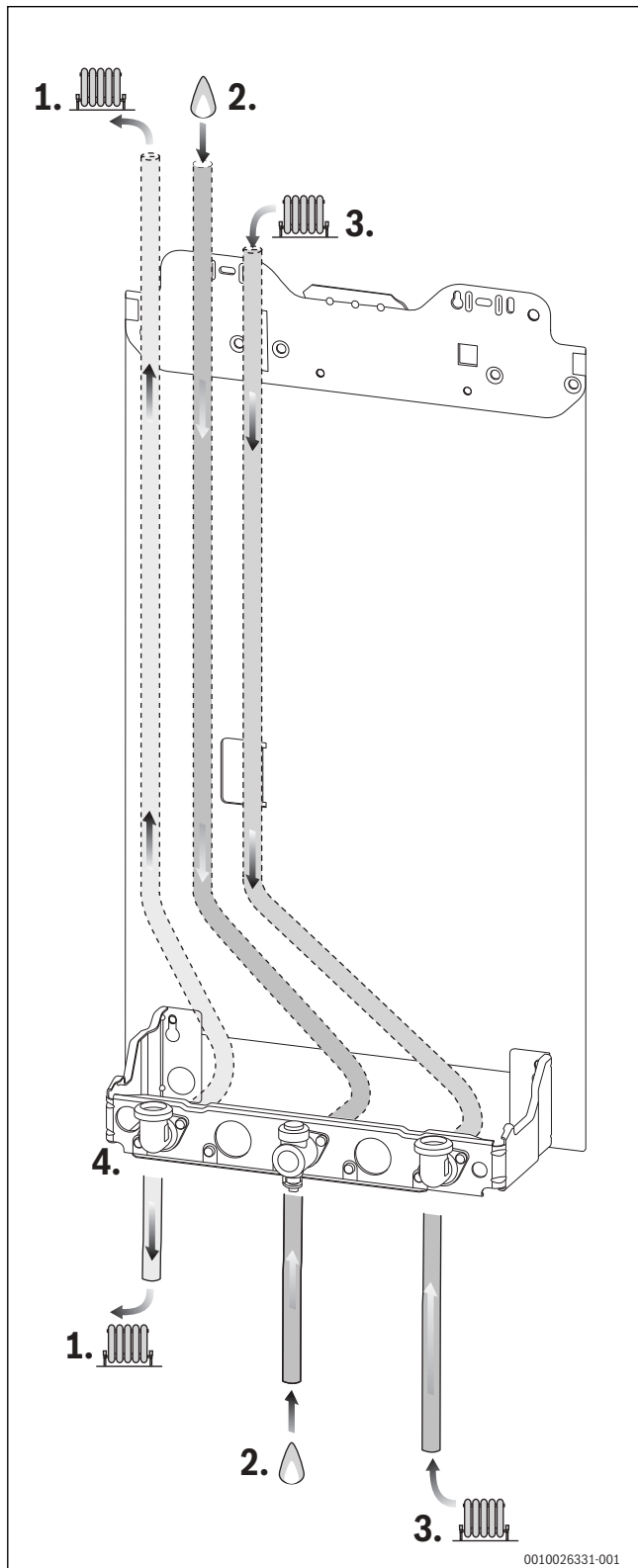


Fig. 13 Plumbing manifold

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

**4.3.4 Appliance clearances**

- The following details covering 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.

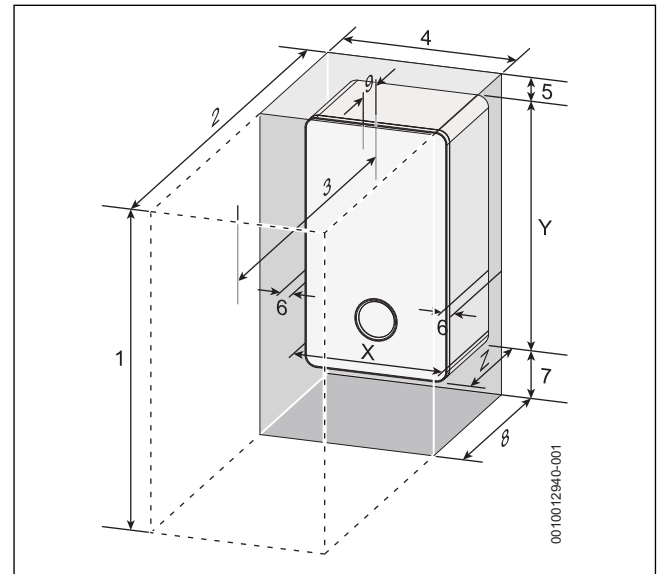


Fig. 14 Appliance minimum clearances

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	600
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

Table 7

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

**4.3.5 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 balance flue kit

Table 8 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	+ 500mm of plume management	+ 4500mm of plume management	No plume management available
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 9 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 10 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 the table below.

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

Table 11 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

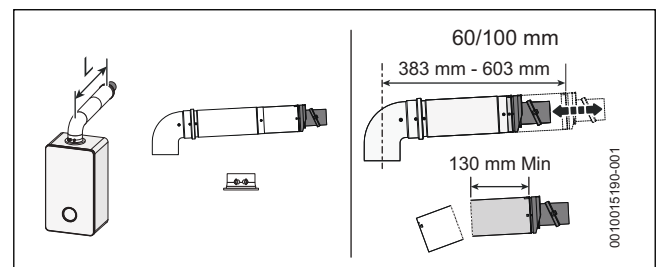


Fig. 15 Horizontal flue option

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



**Telescopic horizontal flue assembly**

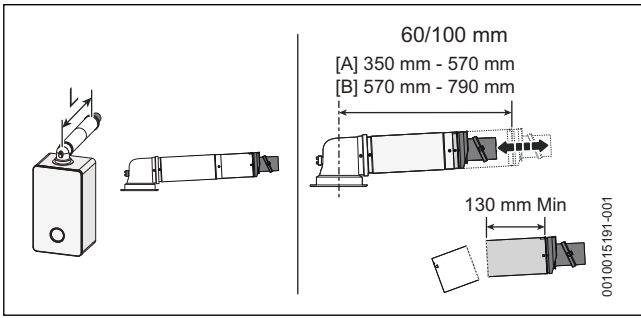


Fig. 16 Horizontal flue option

**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**

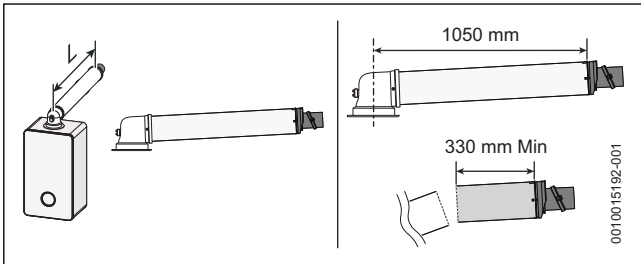


Fig. 17 Horizontal flue option

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

**Extended horizontal flue**

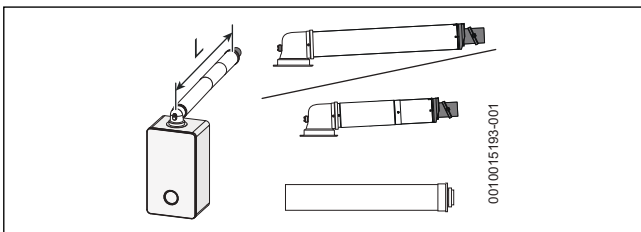


Fig. 18 Horizontal flue option

- Flue length [L] (adaptor bend included in length calculation)
  - Maximum flue length as stated in Table 9 "Maximum flue lengths - Horizontal flues".

**Horizontal flue with additional 90° elbow**

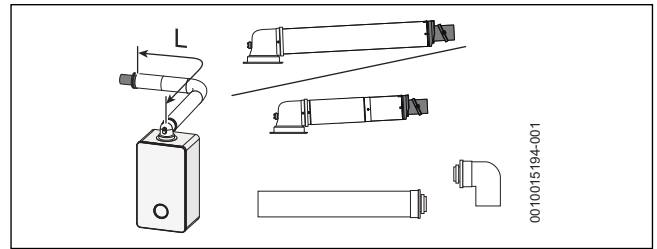


Fig. 19 Horizontal flue option

- Flue length [L] (adaptor bend included in length calculation)
  - Maximum flue length as stated in Table 9 "Maximum flue lengths - Horizontal flues" minus the 90° bend equivalent straight flue length as stated in Table 11 "Effective length of bends".

**Horizontal flue with additional 90° elbows**

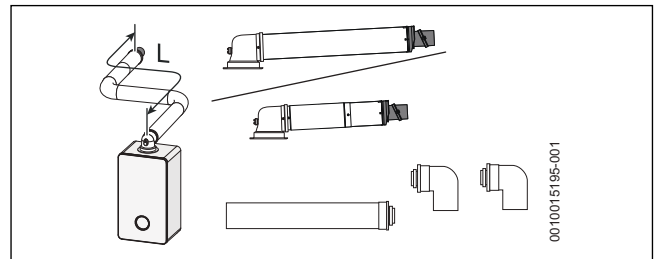


Fig. 20 Horizontal flue option

- Flue length [L] (adaptor bend included in length calculation)
  - Maximum flue length as stated in Table 9 "Maximum flue lengths - Horizontal flues" minus 2 x 90° bends equivalent straight flue length as stated in Table 11 "Effective length of bends".

**High level horizontal flue**

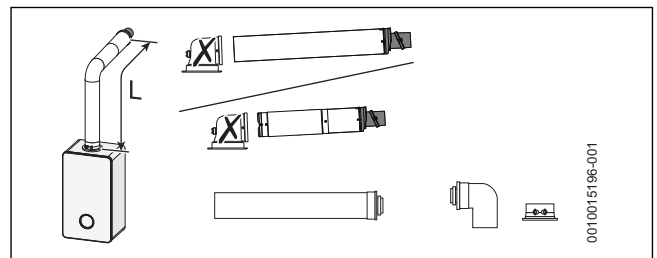


Fig. 21 Horizontal flue option

- Flue length [L] (initial bend included in length calculation)
  - Maximum flue length as stated in Table 9 "Maximum flue lengths - Horizontal flues".

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

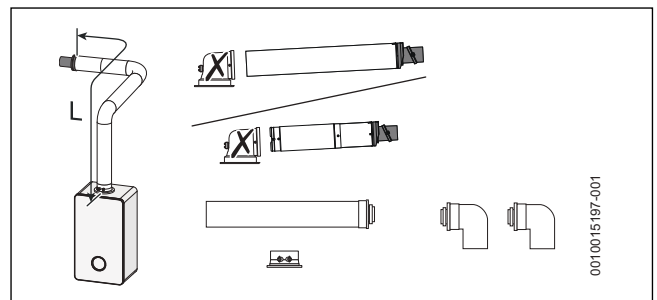


Fig. 22 Horizontal flue option

- Flue length [L] (initial bend included in length calculation)
  - Maximum flue length as stated in Table 9 "Maximum flue lengths - Horizontal flues" minus the 90° bend equivalent straight flue length as stated in Table 11 "Effective length of bends".

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

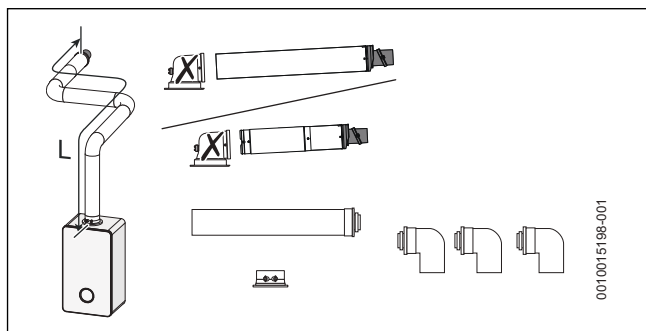


Fig. 23 Horizontal flue option

- Flue length [L] (initial bend included in length calculation)
  - Maximum flue length as stated in Table 9 "Maximum flue lengths - Horizontal flues" minus 2 x 90° bends equivalent straight flue length as stated in Table 11 "Effective length of bends".

### Vertical balanced flue assembly

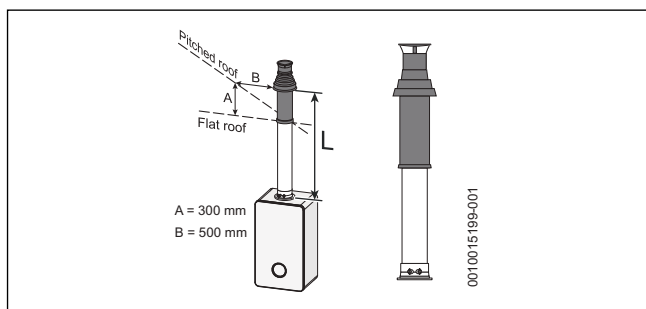


Fig. 24 Vertical flue option

- Flue length [L]
  - Maximum flue length as stated in Table 10 "Maximum flue lengths - Vertical flues".

### Vertical balanced flue with 90° elbow offset

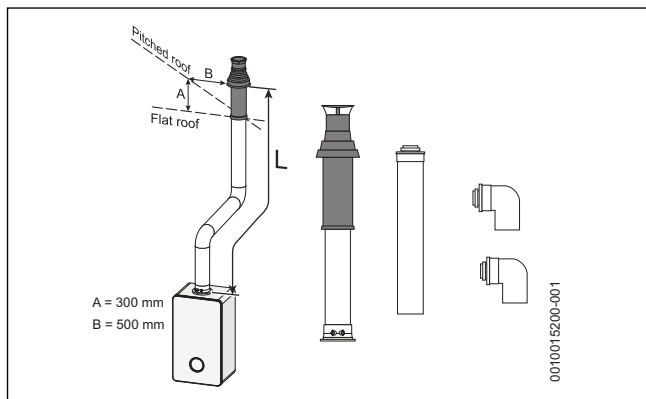


Fig. 25 Vertical flue option

- Flue length [L]
  - Maximum flue length as stated in Table 10 "Maximum flue lengths - Vertical flues" minus 2 x 90° bends equivalent straight flue length as stated in Table 11 "Effective length of bends".

### Vertical balanced flue with 45° elbow offset

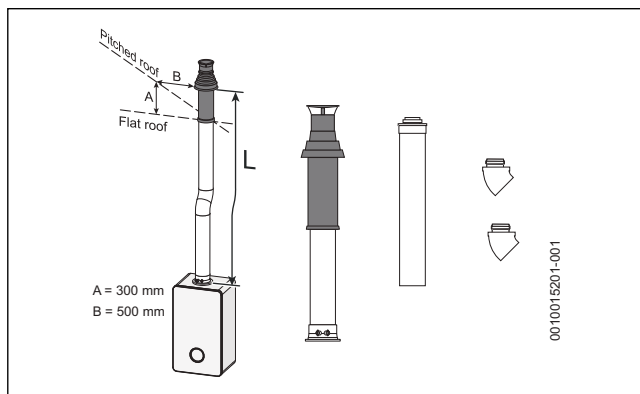


Fig. 26 Vertical flue option

- Flue length [L]
  - Maximum flue length as stated in Table 10 "Maximum flue lengths - Vertical flues" minus 2 x 45° bends equivalent straight flue length as stated in Table 11 "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.

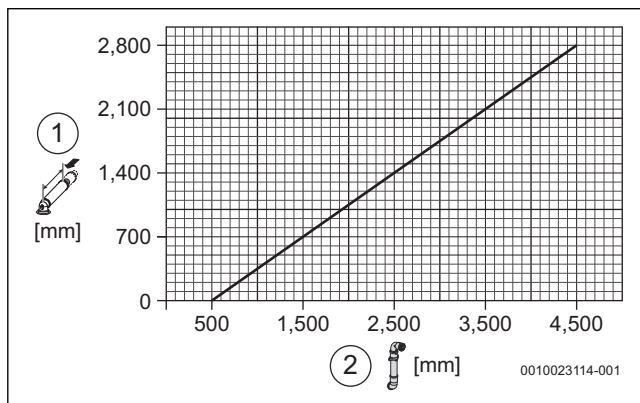


Fig. 27 Reduction to flue length as plume length increases graph

- [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 28.

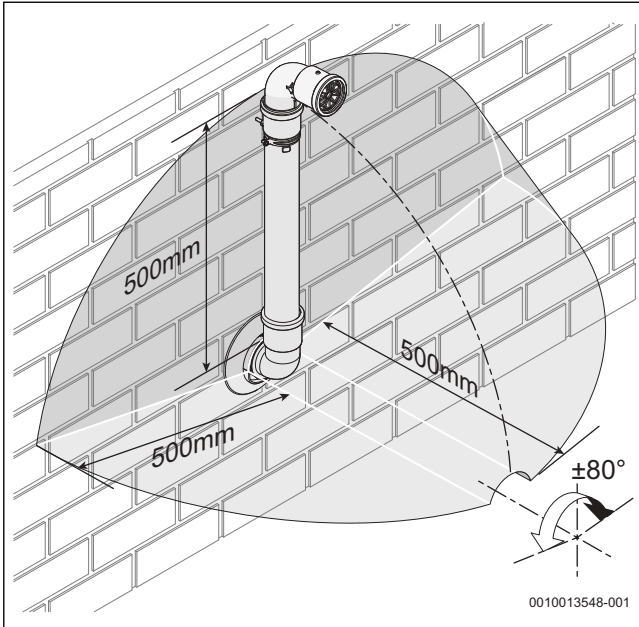


Fig. 28 Terminal exclusion zone

**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

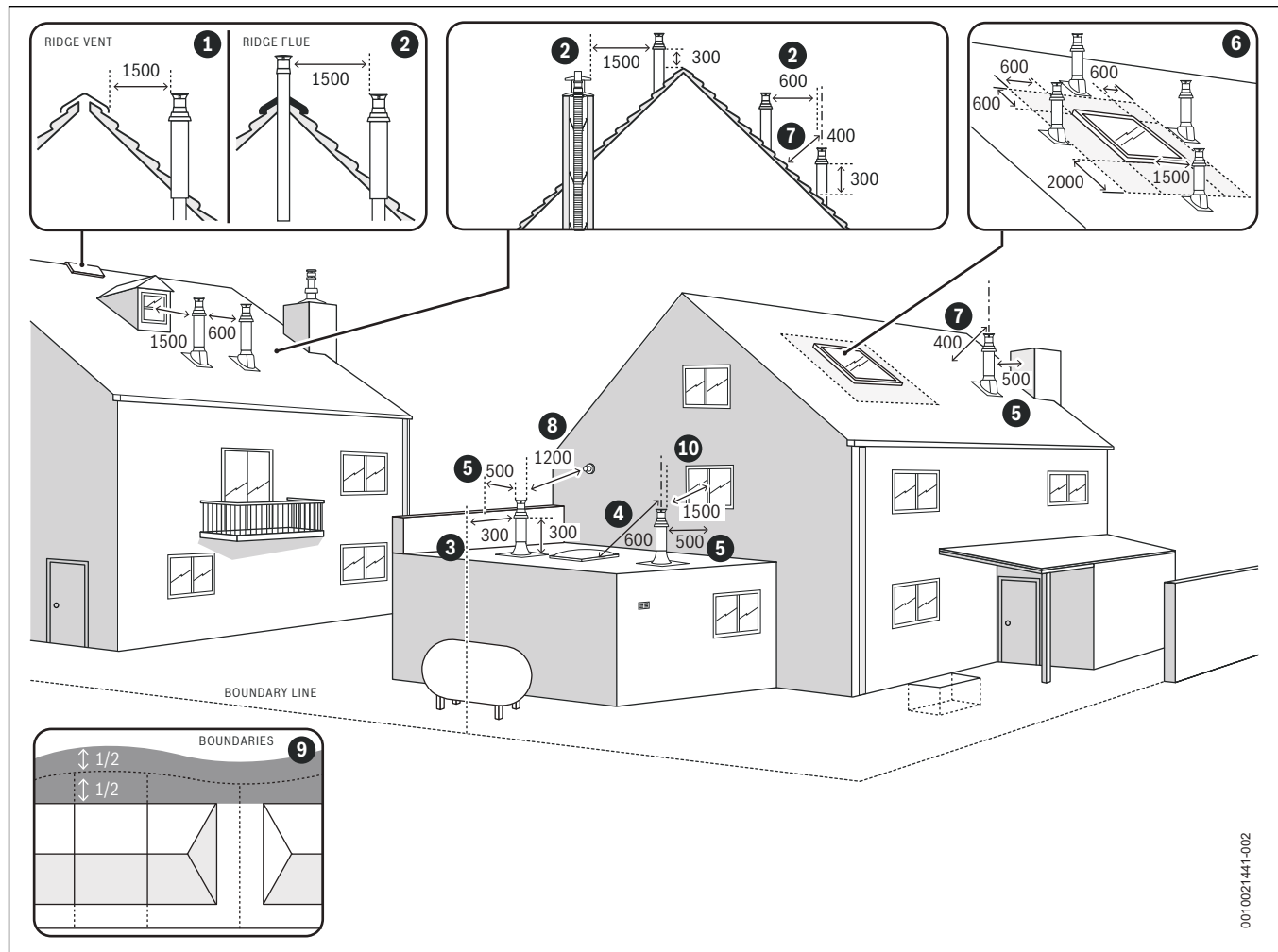


Fig. 29 Vertical flue terminal positions

**Key to figure 29:**

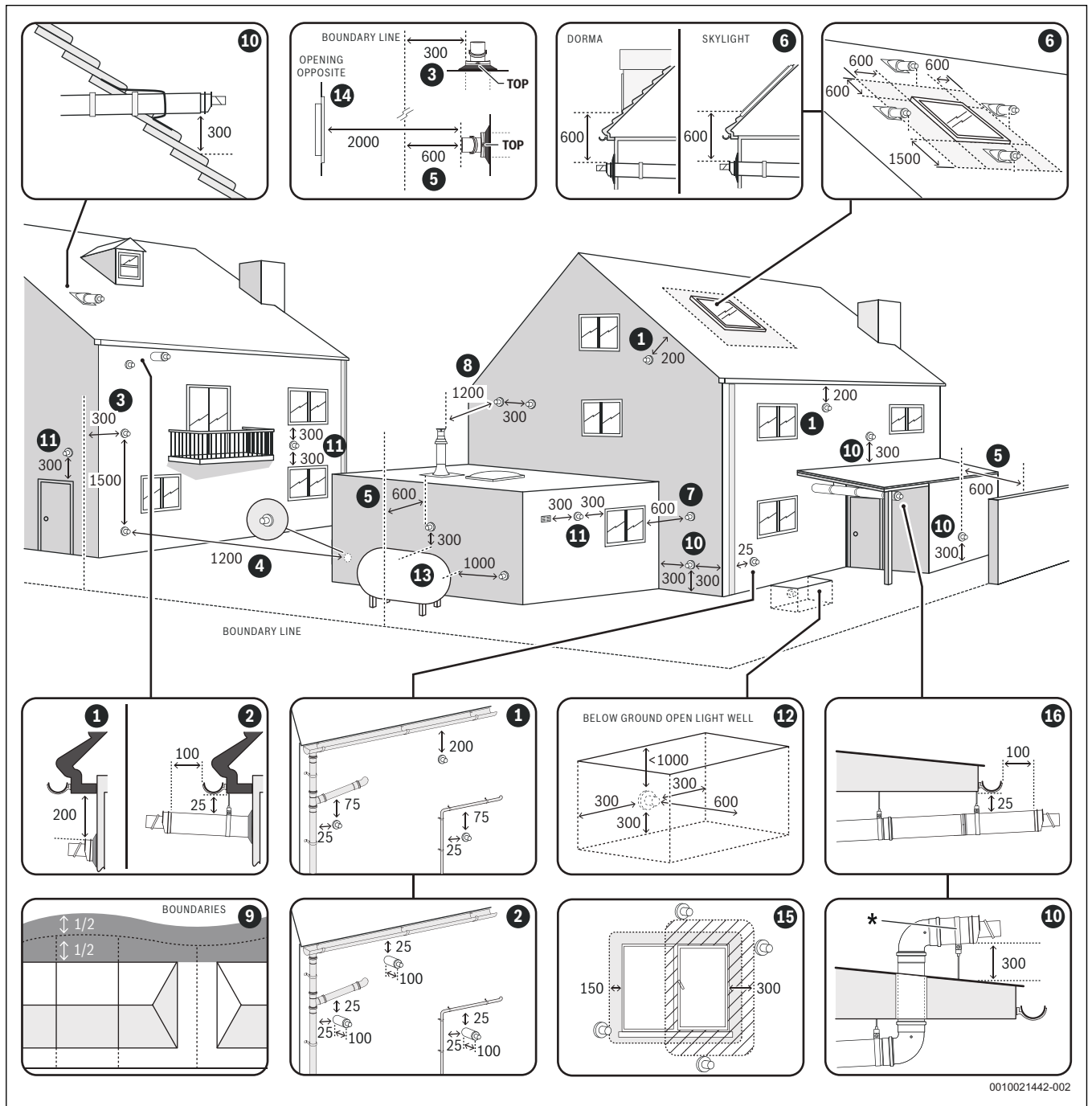
- [1] 1,500mm measured between a vertical flue terminal and an opening or vented window. 500mm measured horizontally between a vertical flue terminal and an opening or vented window providing the flue terminal is at least 300mm above the opening.
- [2] Minimum clearance to an additional flue, 600mm to 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**



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Fig. 30 Horizontal flue terminal positions

**Key to figure 30:**

- [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.
- [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.

**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 31 “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.

- [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.

**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.

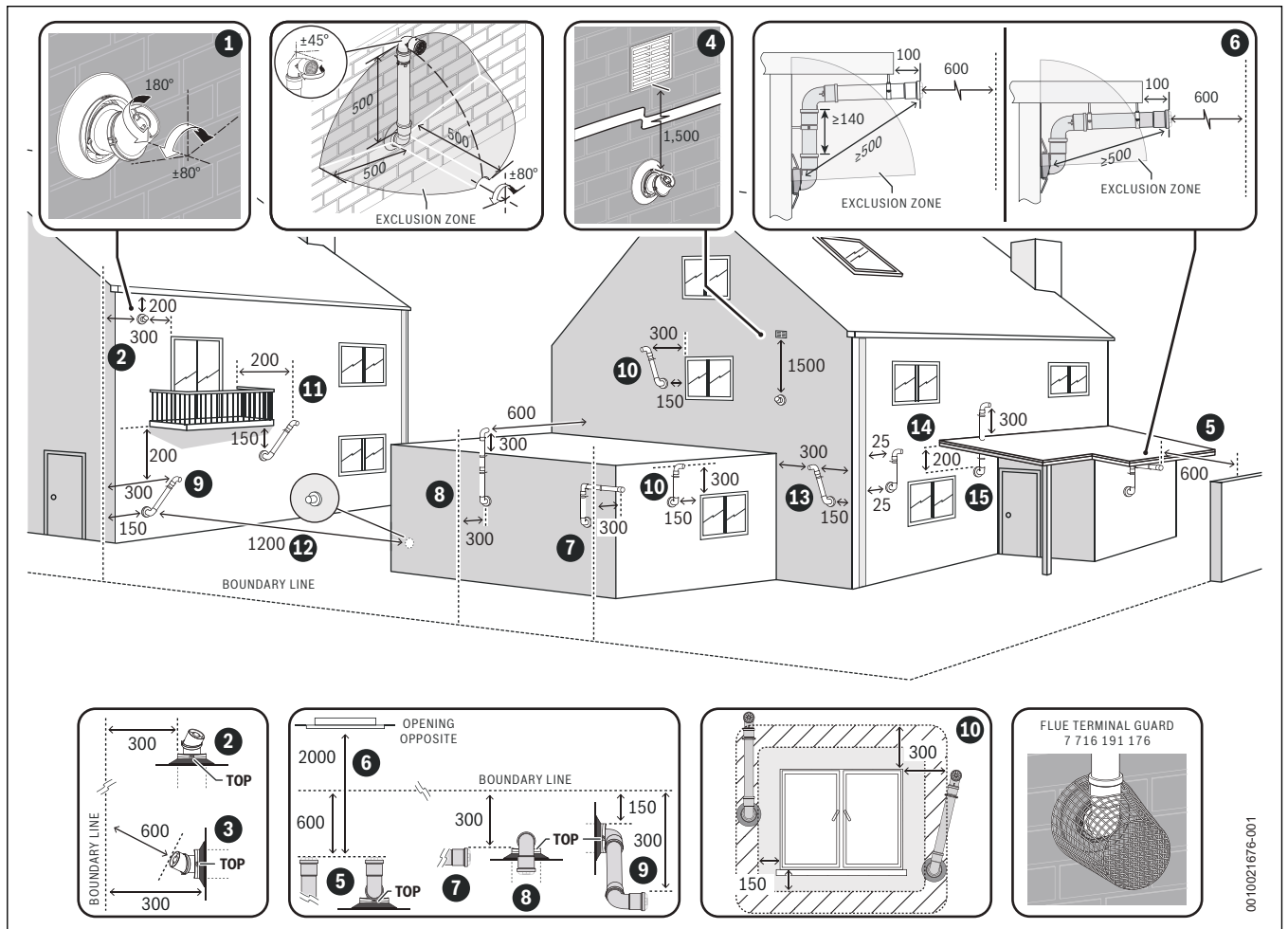


Fig. 31 Plume re-direct and plume management terminal positions

**Key to figure 31 - 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 31 - 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.

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

- [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 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 though 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 minimize the risk of freezing, wherever possible: the condensate drain should be installed internally.**
2. All condensate pipe work must 'fall' from the appliance by a minimum of 3° (52mm per metre) to ensure adequate condensate flow.
3. The pipe work 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 pipe work connected to the condensate drain outlet on the appliance should have a minimum internal diameter (ID) of 19mm.
- Keep external pipe work as short as possible. Further precautions against freezing must be taken if external pipe runs exceed 3m.

- External pipe work should have a minimum internal diameter (ID) of 30mm.
- Minimise the number of bends and connectors.
- Remove burrs after cutting pipe.
- Remove surplus solvent from the interior of the pipe.
- The condensate pipe work shall be run in standard drainpipe material, e.g. poly(vinyl chloride) (PVC), unplasticized (vinyl chloride) (PVC-U), acrylonitrilebutadiene styrene (ABS), polypropylene (PP) or chlorinated poly(vinyl chloride) (PVC.C).

### 4.5.1 Appliance siphonic condensate trap

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

The expanded siphonic operation discharges every 10 to 20 minutes. Resulting in:

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

### 4.5.2 Condensate pipe work

#### 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 pipe work - Unheated internal areas

#### NOTICE:

#### Unheated internal areas.

Although the large volume siphon will reduce the risk of freezing, condensate discharge may freeze in 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.



**4.5.3 Internal connections**

**Soil stack connection**

→ Figure 32

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.

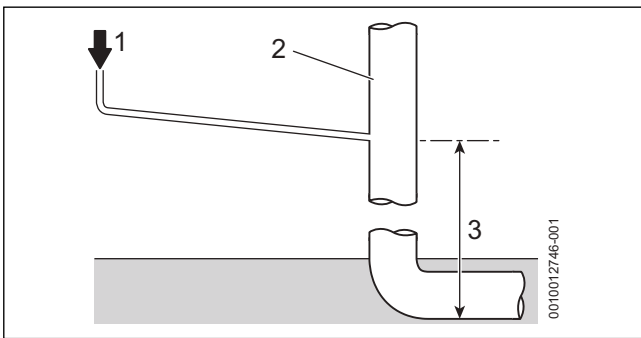


Fig. 32 Disposal to soil vent stack

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

**Waste pipe connection**

→ Figure 33

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.

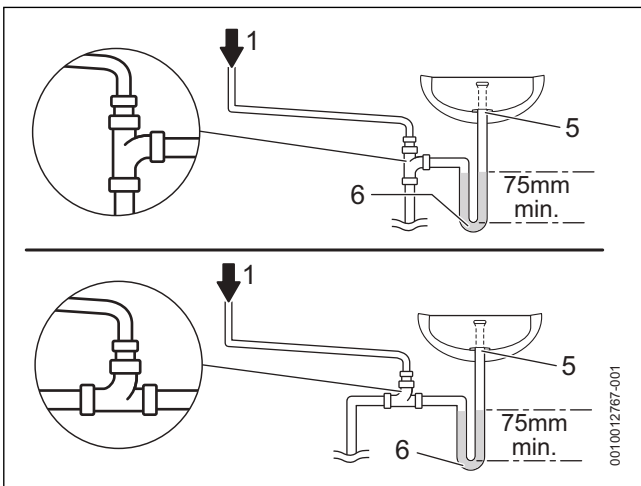


Fig. 33 Waste pipe disposal

- [1] Condensate discharge from appliance
- [5] Visible air break at plug hole
- [6] 75mm sink waste trap

**Condensate pump**

→ Figure 34

Where direct connection to a “gravity discharge” pipe work 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.

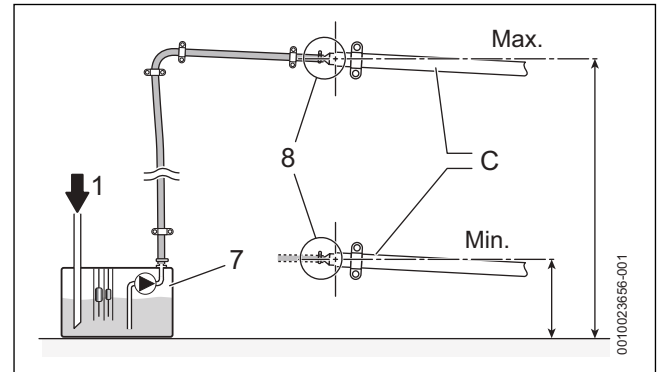


Fig. 34 Condensate pump example

- [1] Condensate discharge from appliance
- [7] Condensate pump
- [8] Pipe work transition
- [C] Gravity discharge pipe work



Proprietary condensate pump

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

**4.5.4 External connections**

**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 recover 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 the route 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 should not exceed three metres.  
Additional precaution against freezing must be taken if the external pipe run exceeds 3m.
- ▶ 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 pipe should be insulated externally using suitable waterproof and weather resistant insulation.
- ▶ The hole through the wall for the condensate pipe should 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 pipe work 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 pipe work, 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 of protecting pipe work that is run externally should be considered to prevent freezing in prolonged 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 blockage by leaves) may offer further protection from wind chill.
  - An air break on the external pipe work can reduce the risk of the appliance being inoperable due to the blocking and backing up of condensate.

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

→ Figure 35

- 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.

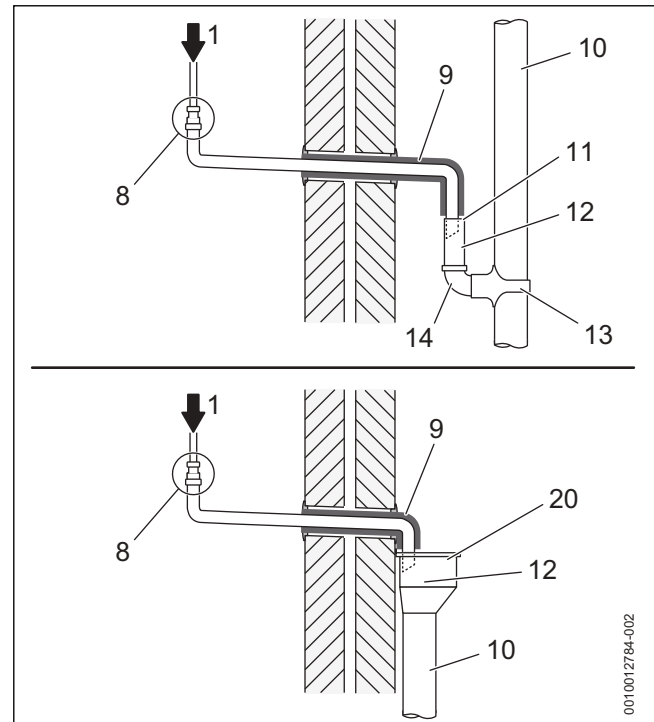


Fig. 35 Disposal into rain water down pipe

- [1] Condensate discharge from appliance
- [8] Pipe work transition
- [9] Insulate and increase pipe size
- [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

**Open drain or gully**

→ Figure 36

Where the pipe terminates over an open drain or gully:

- Refer to following example to dispose of condensate to an open drain or gully.
- The pipe should terminate below the grating level, but above water level, in order to minimise “wind chill” at the open end.
- The use of a drain cover (such as those used to prevent blockage by leaves) may offer further protection from wind chill.

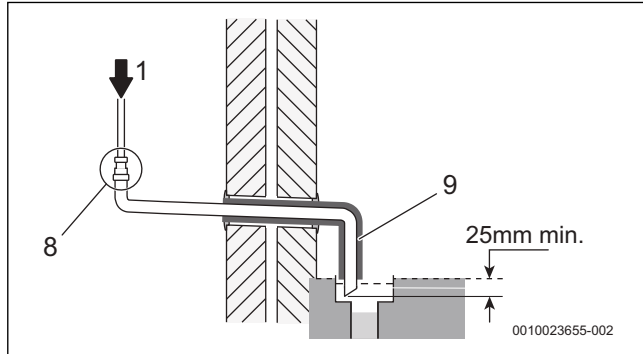


Fig. 36 Disposal to open drain or gully

- [1] Condensate discharge from appliance
- [8] Pipe work transition
- [9] Insulate and 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 an increased risk of freezing causing the condensate pipe to become blocked with 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 37

- 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 pipe work 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.

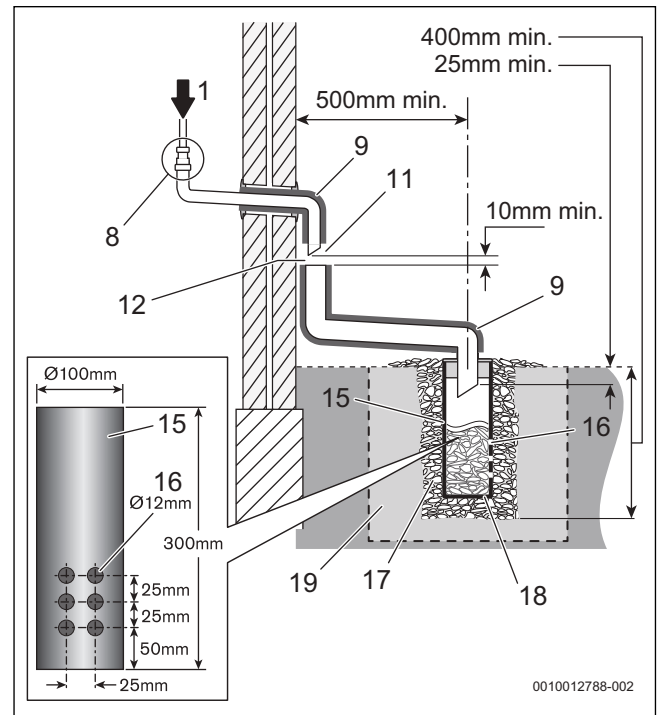


Fig. 37 Disposal to soak-away

- [1] Condensate discharge from appliance
- [8] Pipe work transition
- [9] Insulate and increase pipe size
- [11] External air break
- [12] Air gap (minimum 10mm)
- [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.

**4.6 Appliances converted to sealed primary system**

**4.6.1 Pressure relief pipe work**

**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 pressure relief discharge pipe [1 or 3] should be run in at least 15mm diameter copper pipe or pipe made of a material that will withstand PRV discharge temperatures and pressures and which complies with BS 5254 or BS EN 1451.
- Plastic pipe work must be properly supported with a maximum of 300mm between supports to prevent sagging and run downwards away from the appliance.
- 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, near the outlet to face the external wall (as shown) to help prevent freezing.

- In all normal circumstances a PRV discharge pipe installation as described above is sufficient to meet 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 occupants cannot occur from any spillage or discharge.

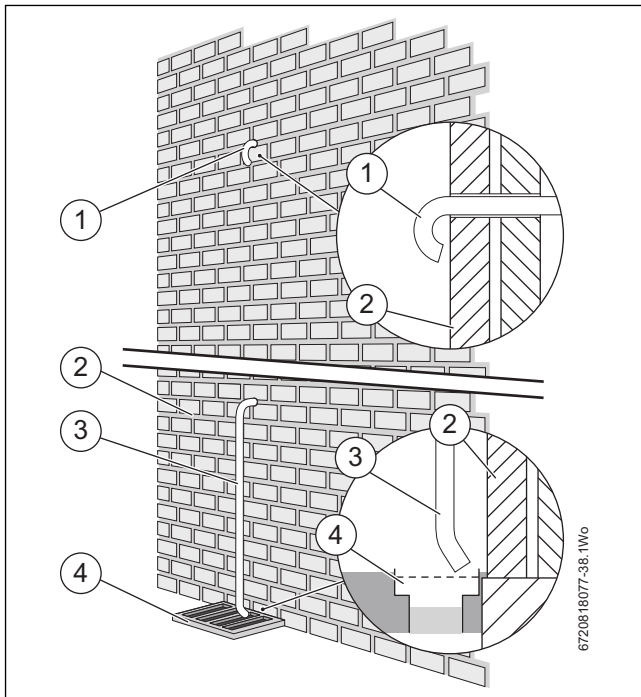


Fig. 38 Pressure relief pipe work

- [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 pipe work, 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 can be 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.

## 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 two filters that help remove both magnetite and non-magnetic debris; 22mm version, part number 7 733 600 236 and a 28mm version, part number 7 733 600 237.

### 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 DWT 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.



### WARNING:

#### Sealing agents

- ▶ In cases where all attempts to find a micro leak have failed, Worcester, Bosch Group supports the use of Fernox F4 leak sealer.

## Water treatment products

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

ADEY	01242 546717 www.adey.com
FERNOX	0870 601 5000 www.fernox.com
SENTINEL	0800 389 4670 www.sentinel-solutions.net

Table 12

### 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

### 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.



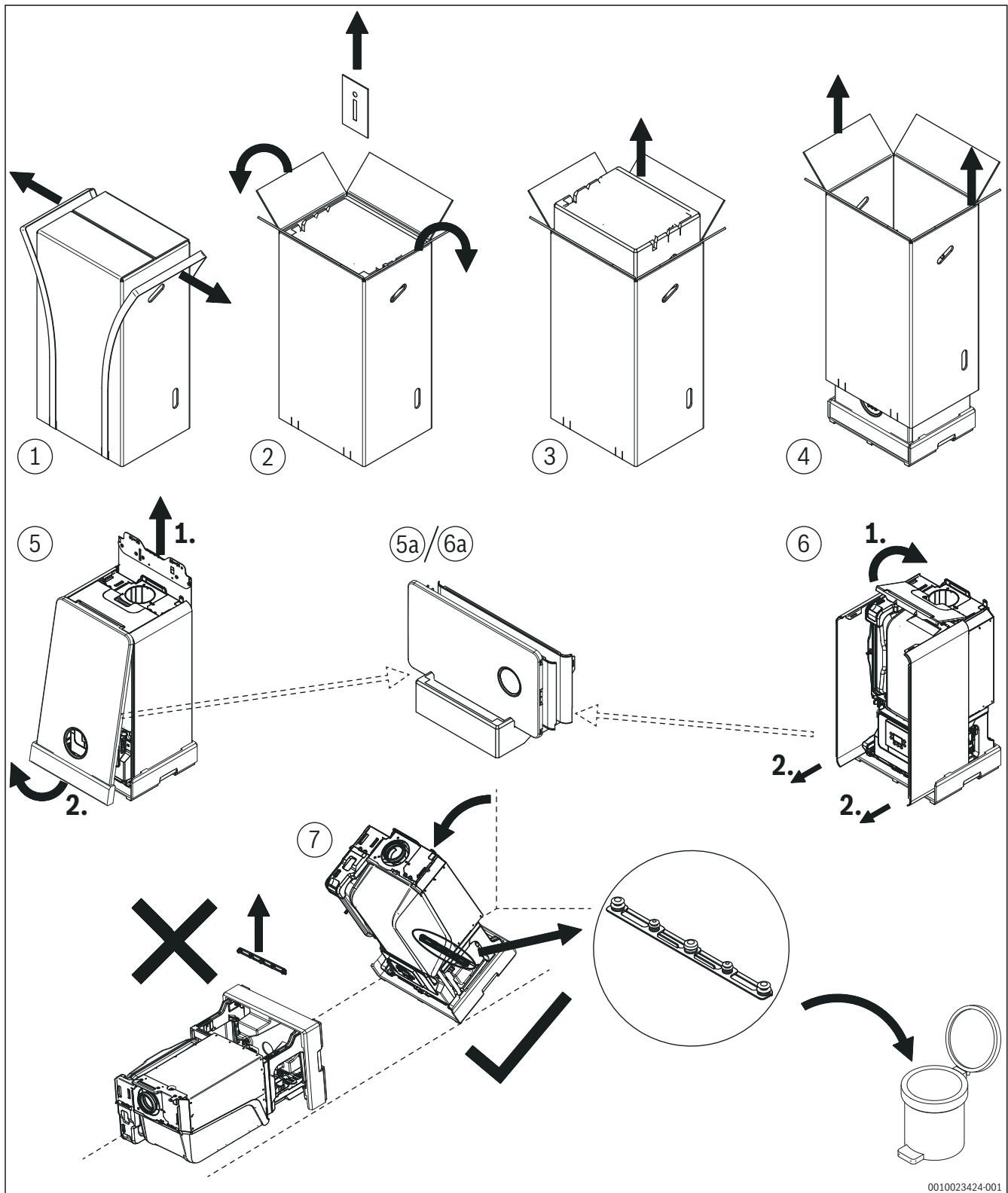
Appliance on site

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

### Important handling instructions

- It is advised that two people are used to carry the carton from the van to the point of delivery.
- Once the carton has been delivered, the outer carton is removed first. Care should be taken when releasing the straps. If a sharp implement is used make sure the outer carton is not pierced and that the implement is used in such a way so that it may not cause personal injury.
- All sharp objects must be covered or the blade retracted after use and put away in a safe place. Care should be taken when lifting the 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. 39 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

### 5.1 Position the appliance

**WARNING:**

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

**i**

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.

#### 5.1.1 Mounting frame fixing

**i**

**simple switch** 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.

**i**

Wall mounting template

- ▶ The wall mounting template has been sized to allow for the minimum clearances around the appliance, (→ section 4.3.4 "Appliance clearances").

→ figure 40

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

**i**

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.

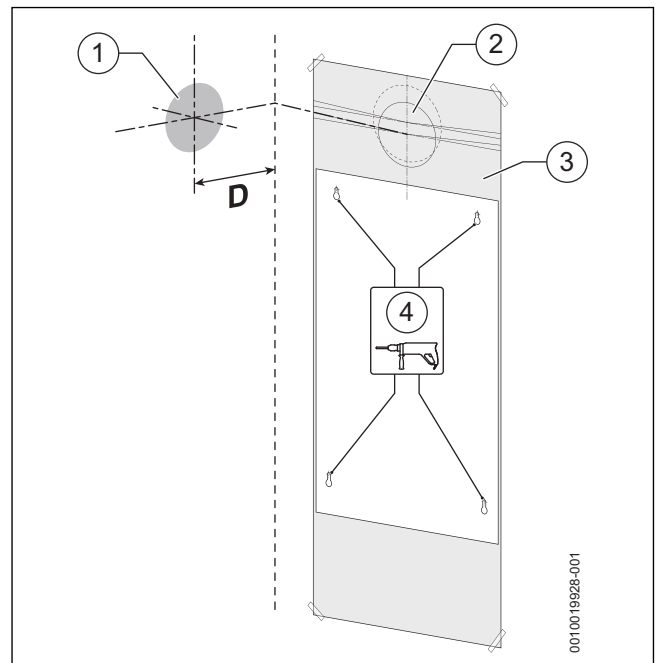


Fig. 40 Wall mounting template

- 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).

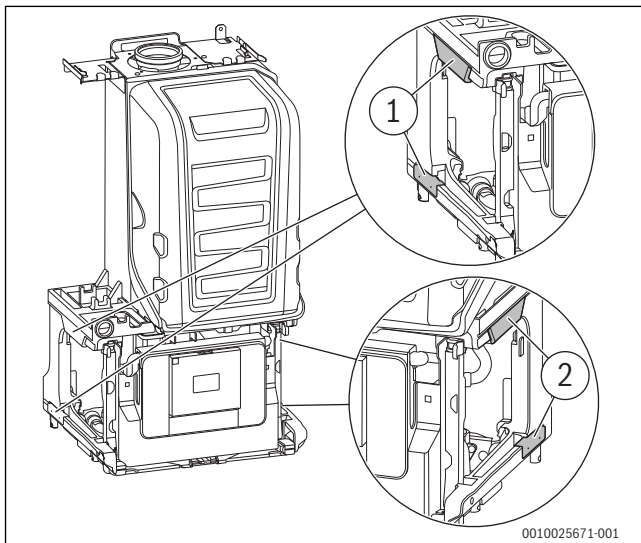


Fig. 41 Transport, lifting and handling

### 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.

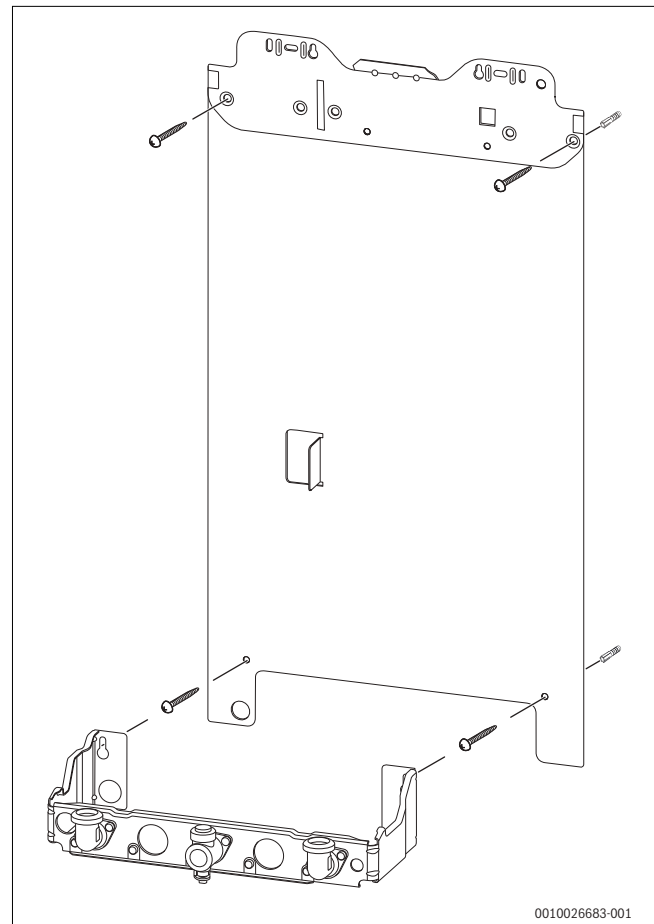


Fig. 42 Fitting the wall mounting plate and pre-plumbing manifold

## 5.2 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 pipe work, to be connected, is isolated/drained and observe all relevant safety precautions.
- ▶ Be aware of plastic components when using a naked flame on pipe work.



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



External condensate pipe work 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



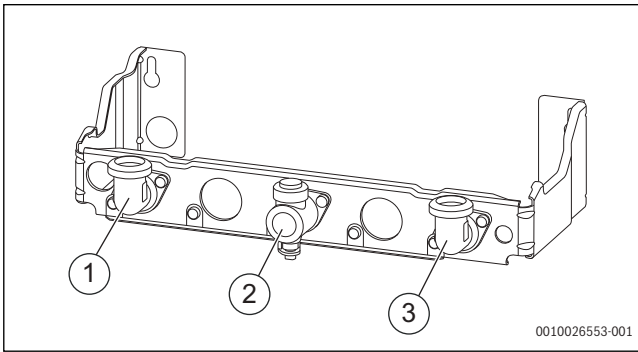


Fig. 43 Connections on the gas and the water side

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

**Preparing the pre-plumbing manifold**

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

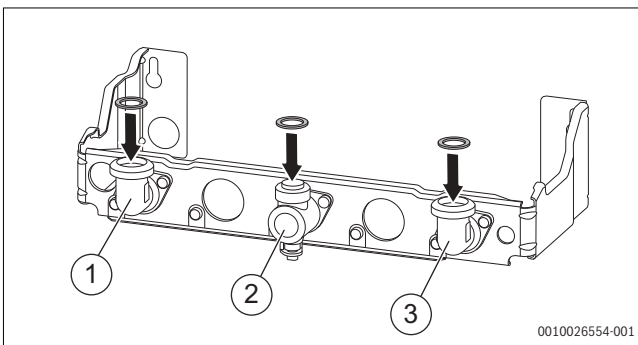


Fig. 44 Fitting the sealing washers

- [1] CH flow (22 mm)
- [2] Gas inlet (22 mm bonded washer)
- [3] CH return (22 mm)

**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.

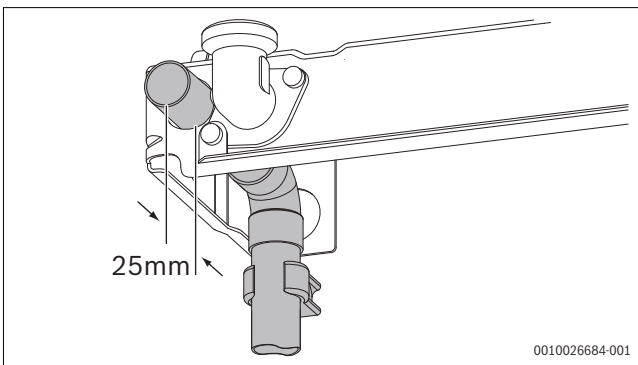


Fig. 45 Fitting the condensate pipes to the mounting plate

**Condensate connection**

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

- ▶ Ensure that the condensate drain is 22mm diameter plastic pipe. It must fall at least 52mm per metre towards the outlet.
- ▶ Refer to Fig. 46, 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.

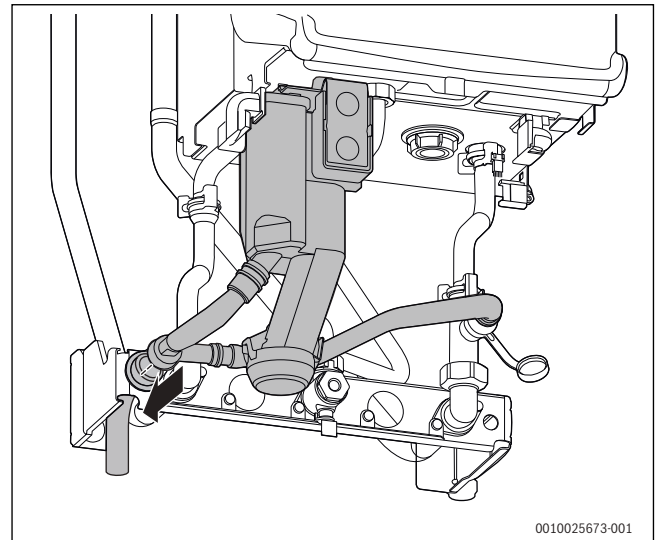


Fig. 46 Condensate connection

**5.3 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. 86).
- ▶ 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.

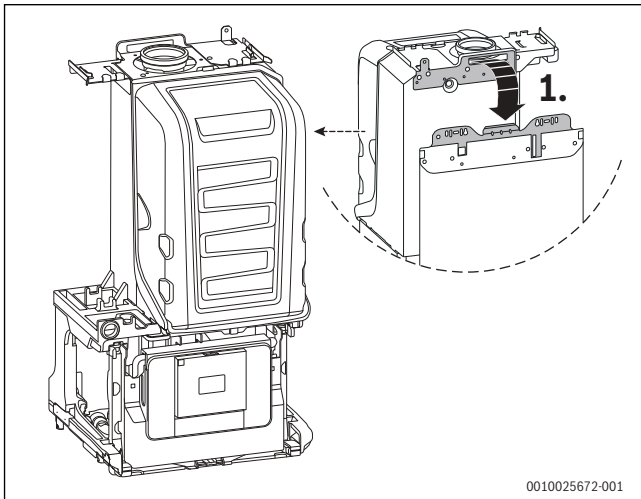


Fig. 47 Hanging the boiler

3. Make connections between the boiler 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.

#### 5.4 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 the relevant Installation and Maintenance Instructions manual or addendum.



**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 effective lengths and the effective flue lengths, → chapter 4.4.

**Additional notes and reminders:**

- Ensure that all cut lengths are square and free from burrs.
- 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:
  - Flue bracket (silver) 100mm part number: 7 738 112 876.
  - Support Bracket Kit (silver) 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.

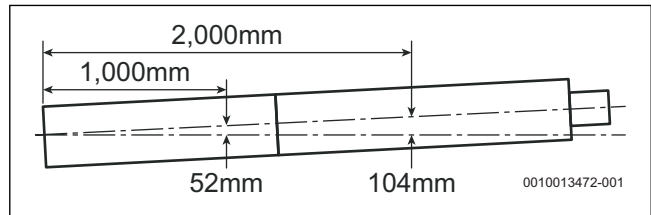


Fig. 48 Slope for condensate disposal

- ▶ 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.

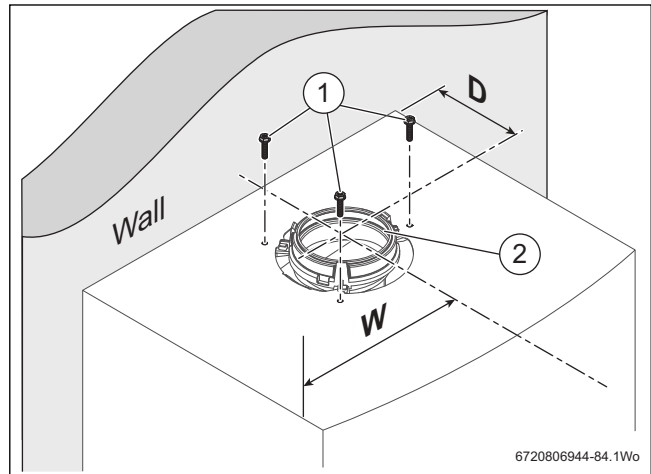


Fig. 49 Flue turret centre

[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.

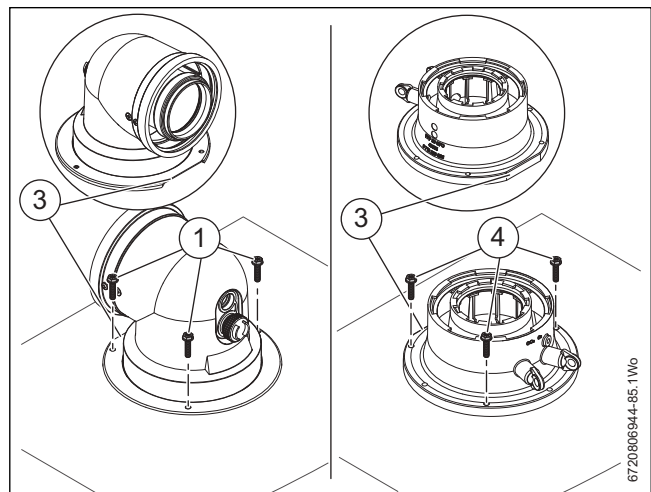


Fig. 50 Flue turret/adaptor connection

**5.5 Electrical connection**


**! DANGER:**

**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 the Health and Safety Executive guidance HSG85.
- ▶ Check for zero potential before proceeding with work, using test equipment approved to GS38 to confirm that the electricity supply is disconnected.

**i**

Electrical considerations:

- ▶ All electrical work must be carried out by a competent and authorised person.
- ▶ All work must comply with the current IET Wiring Regulations.
- ▶ The isolator shall be situated next to the appliance for new systems and, where practicable, replacement appliances.
- ▶ The mains electrical supply to the appliance must be through either, a fused double pole isolator or a fused three pin plug and unswitched socket.
- ▶ The isolator must have contact separation of 3mm minimum between poles. Any system connected to the appliance must not have a separate electrical supply.
- ▶ Any additional components that are connected to the appliance that require 230 Volts must be connected to the same supply as the appliance.
- ▶ Type A RCDs  must be employed where additional protection is required.
- ▶ 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.

**i**

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, accessing the connection terminal (→ Fig. 53)

- ▶ Replace with the following cable types:
  - H05V2V2F x 0.75 mm<sup>2</sup>
- ▶ Connect the cable so that the protective conductor is longer than the other wires.

**5.5.1 Installer connections**

**Connect external accessories**

- ▶ Flip down the control appliance (→ Fig. 51).
- ▶ Open the cover.

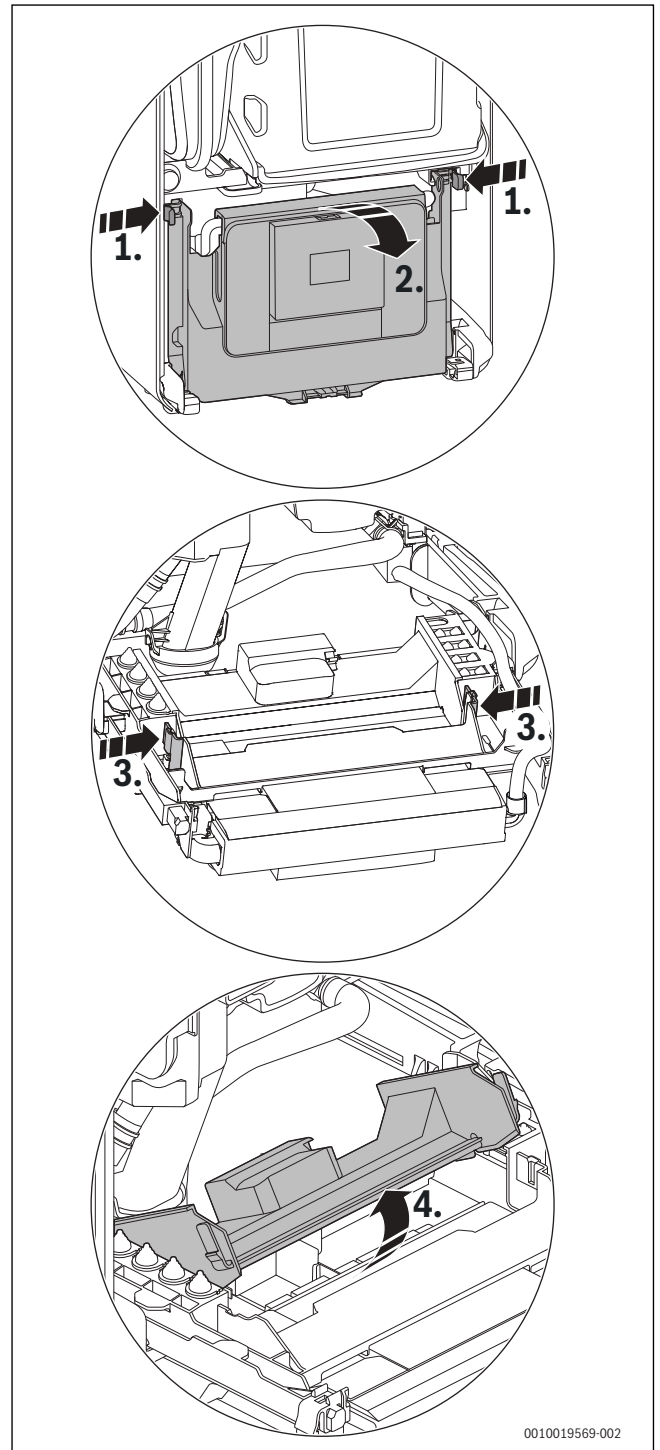


Fig. 51 Opening the cover

Access to the electrical connections once the cover is opened.

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

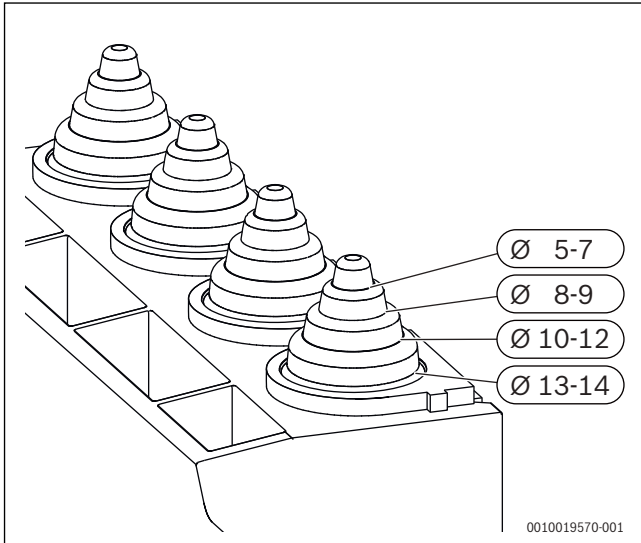


Fig. 52 Adapting the strain relief to the cable diameter

- ▶ 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**

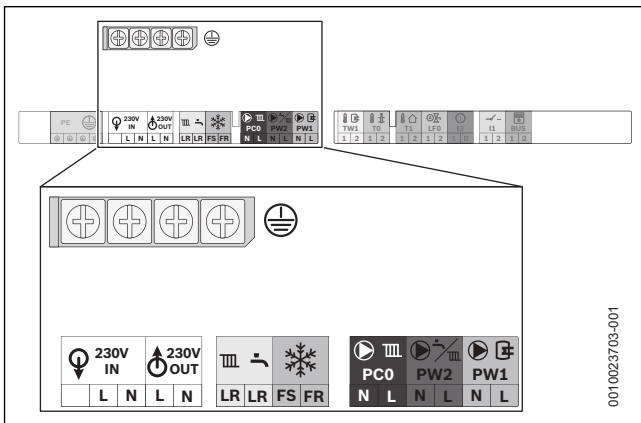


Fig. 53 Power supply (power cables) terminal strip

**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)
	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
	External frost thermostat • FS output (frost thermostat supply). Functional when pump is connected to appliance. • FR input (frost thermostat return)

Symbol	Function
	Primary heating pump
	Secondary heating pump or cycle circulation pump
	Cylinder primary pump or external 3-way valve 230 V

Table 13 Power supply (power cables) terminal strip for external accessories



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

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

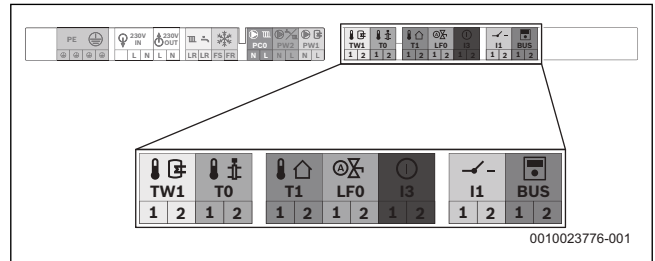


Fig. 54 Low voltage (signal cables) terminal strip

**Low voltage (signal cables) connections**

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

Table 14 Low voltage (signal cables) terminal strip for external accessories

**5.5.2 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.

**Mains voltage (power cables), example → figure 55**

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

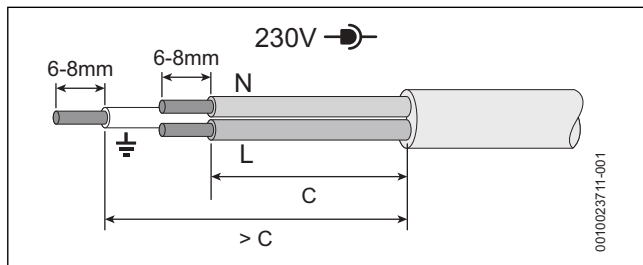


Fig. 55 Mains voltage (power cables) preparation

**Low voltage (signal cables), example → figure 56**

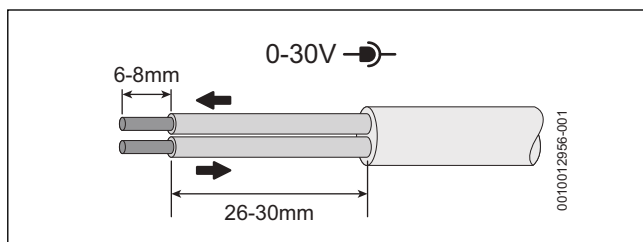


Fig. 56 Low voltage (signal cables) preparation

**5.5.3 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

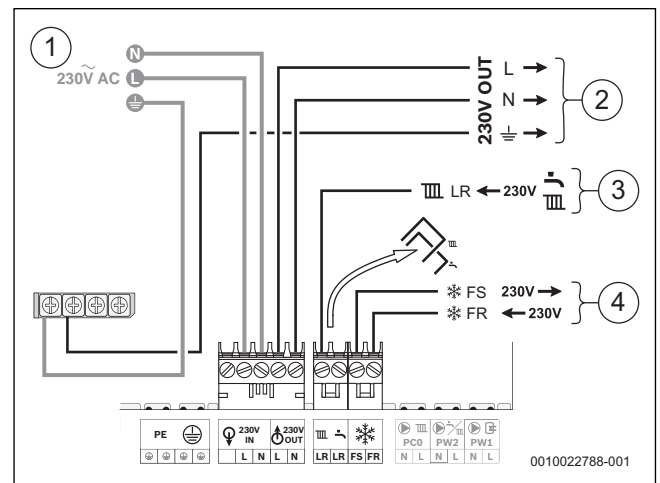


Fig. 57 External controls connections example

- [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).

**6 Commissioning**

**6.1 Pre-Commissioning checks**

**⚠ DANGER:**

**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 the Health and Safety Executive guidance HSG85.
- ▶ Check for zero potential before proceeding with work, using test equipment approved to GS38 to confirm that the electricity supply is disconnected.

Checks before commissioning:

- ▶ Check that the service and water pipes are connected correctly.
- ▶ 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.

## 6.2 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.

### 6.2.1 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, pos. 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.

### 6.2.2 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 1 and 1.5 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 1 bar.
- ▶ Isolate and remove filling loop connections to the system.

### 6.3 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.

#### 6.3.1 Control panel overview

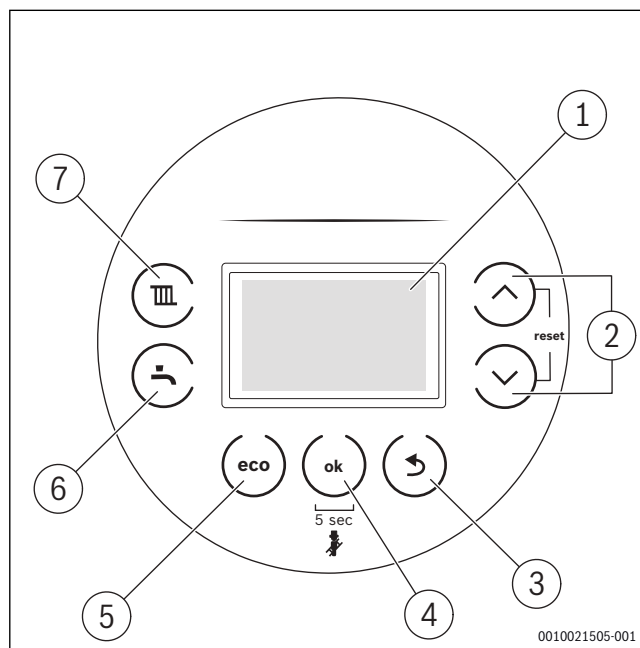


Fig. 58 Control panel


- [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 seconds 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

### 6.3.2 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 6.3.3).

### 6.3.3 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 **OK** 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 On/Off switch.
- 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.

### 6.4 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.

### 6.5 Combustion casing removal

- ▶ Remove the combustion cover.

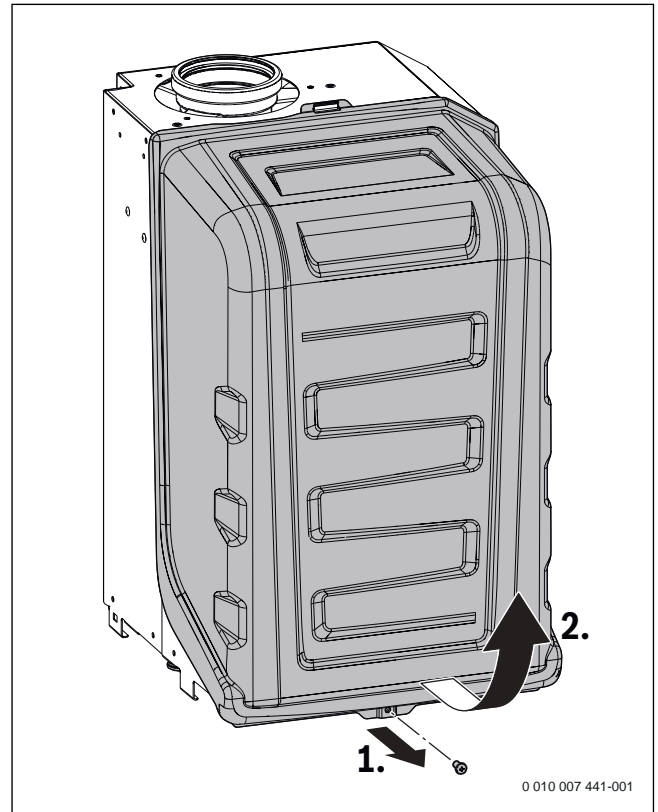


Fig. 59 Removing the combustion cover

## 6.6 Checking gas inlet pressure

### 6.6.1 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.

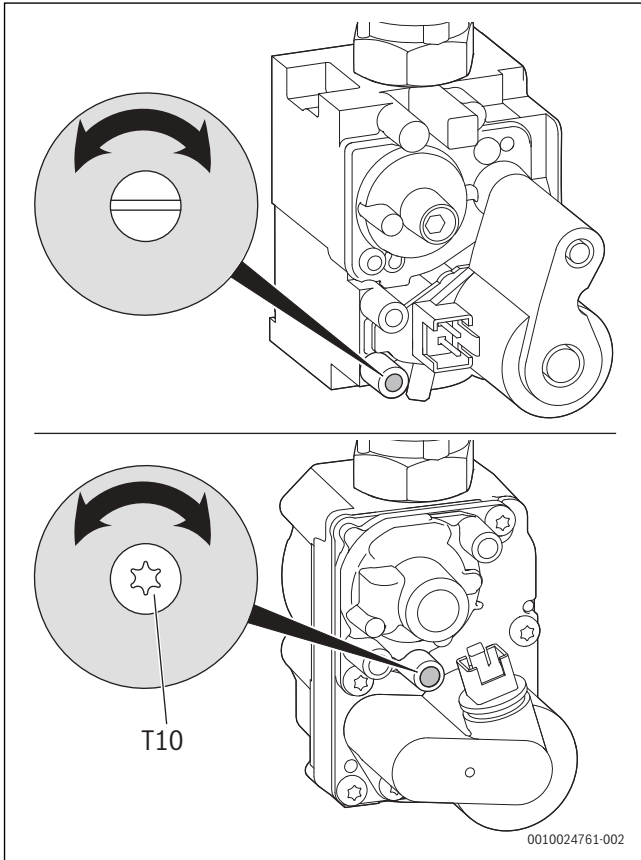


Fig. 60 Gas valve test points (above: SIT valve, below: Honeywell valve)

- ▶ 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 15.



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.

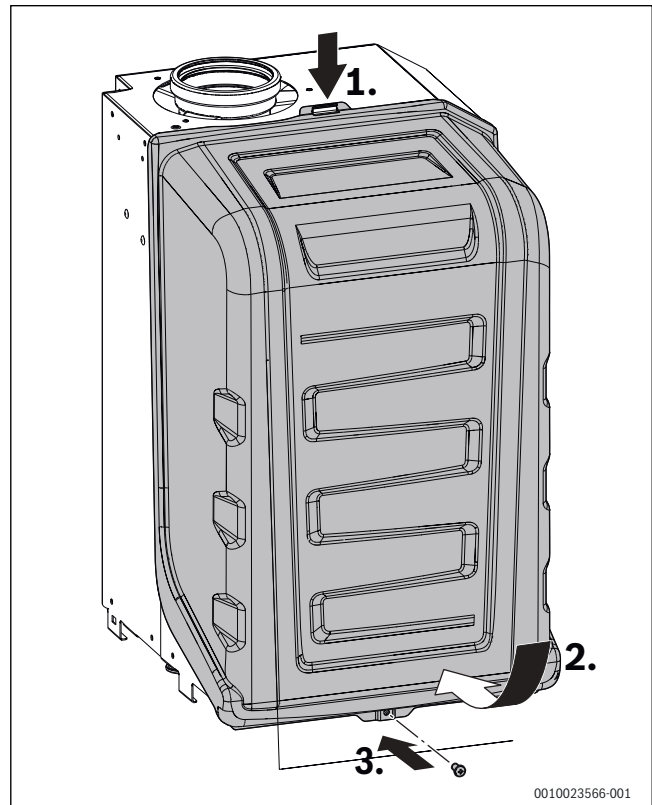


Fig. 61 Refit combustion casing

- ▶ 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 6.4).

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

The pressure drop from the meter or at the L.P.G. gas supply to the gas valve inlet test point must not be more than:

- 40 kW or below ( $\leq 40$  kw): 2.5 mbar for Natural Gas
- above 40 kW ( $> 40$  kw): 3.5 mbar for Natural Gas
- 4 mbar for L.P.G.

Meter/ LPG supply	Allowed mbar pressure drop			
	Across pipe work	Appliance inlet	Across appliance	Gas valve
<b>Natural gas</b>				
19 - 23	1	18 - 22	$\leq 40$ kw: 1.5	$\leq 40$ kw: 16.5 - 20.5
			$> 40$ kw: 2.5	$> 40$ kw: 15.5 - 19.5
<b>L.P.G.</b>				
32 - 45	2.5	29.5 - 42.5	$\leq 40$ kw: 1.5	$\leq 40$ kw: 28 - 41
			$> 40$ kw: 2.5	$> 40$ kw: 27 - 40
mbar range				

Table 15

If the pressure drops are greater than shown below, then this would indicate a problem with the pipe work or connections within the system.



**NOTICE:**

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

Gas supply pressure drop

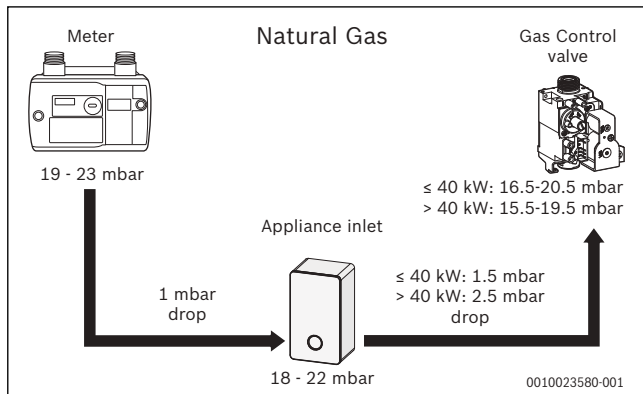


Fig. 62 Natural Gas pressures

- [≤] Less than or equal to
- [>] Greater than

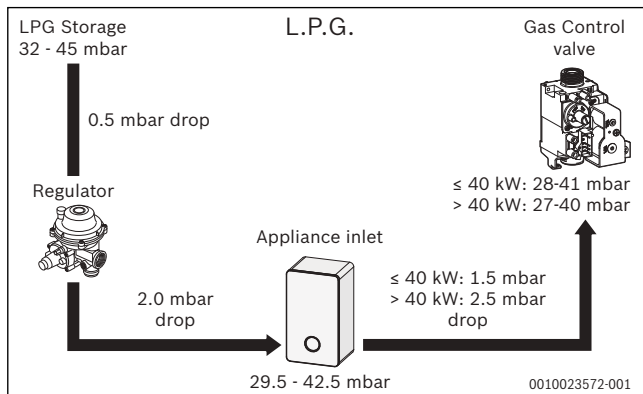


Fig. 63 L.P.G. pressures

- [≤] Less than or equal to
- [>] Greater than

**6.7 Checking the gas rate**

- ▶ 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. L.P.G.) 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 procedures as described in current edition of the "Essential Gas Safety".
- ▶ 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. L.P.G.) 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.

**6.8 Checking for gas leaks during operation**

- ▶ Use an approved gas leak detector to check all connections for possible leaks. The product must be certified as a gas leak testing agent.
- ▶ Do not allow the product to come into contact with the electrical wiring.

**6.9 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 6.10)
- Flue gas analysis, (→ chapter 6.11)

**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.

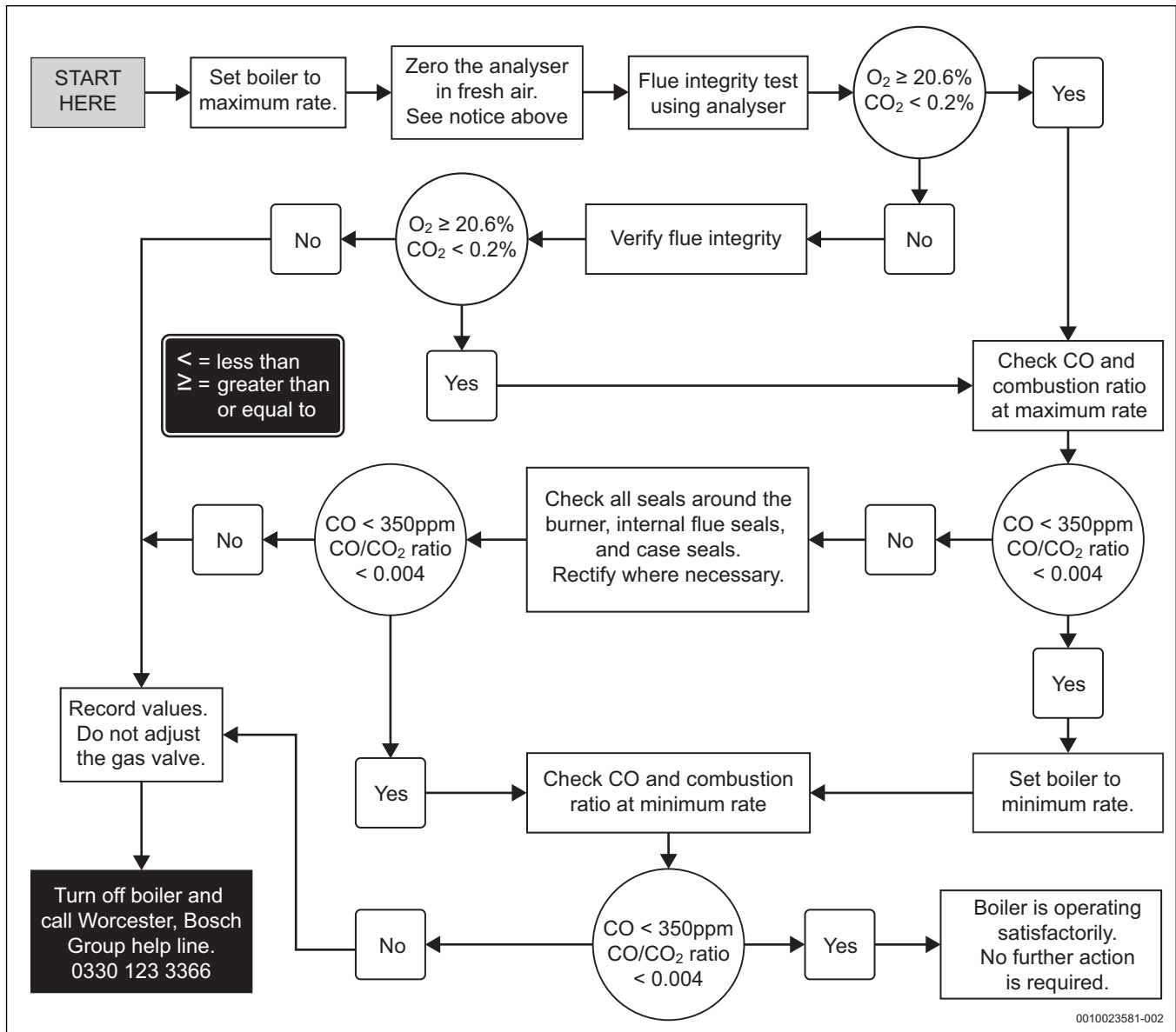


Fig. 64 Commissioning checks flow chart

### 6.10 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.

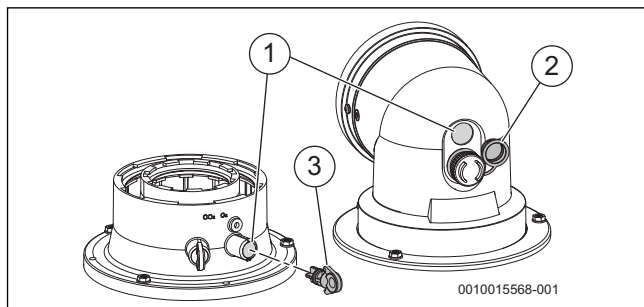


Fig. 65 Flue integrity check test point

- [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 (→ 6.4), 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.

### 6.11 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.

Flue gas sample point location on flue turret/adaptor.

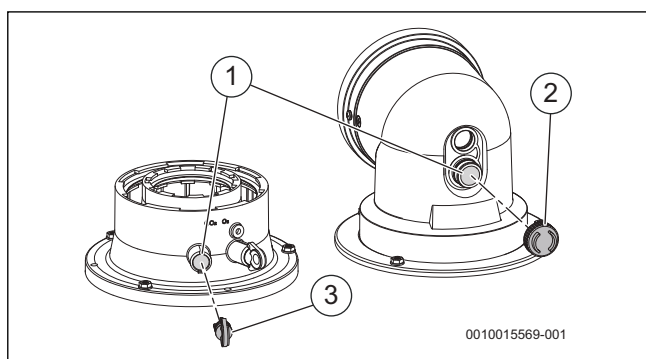


Fig. 66 Combustion test

- [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**

With the appliance combustion casing on;

- ▶ Set the appliance running at maximum output in chimney sweep mode(→ 6.4).

**Appliance to minimum output**

With the appliance combustion casing on;

- ▶ Set the appliance running at minimum output in chimney sweep mode(→ 6.4).
  - 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.

### 6.12 Finishing commissioning

#### 6.12.1 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.



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

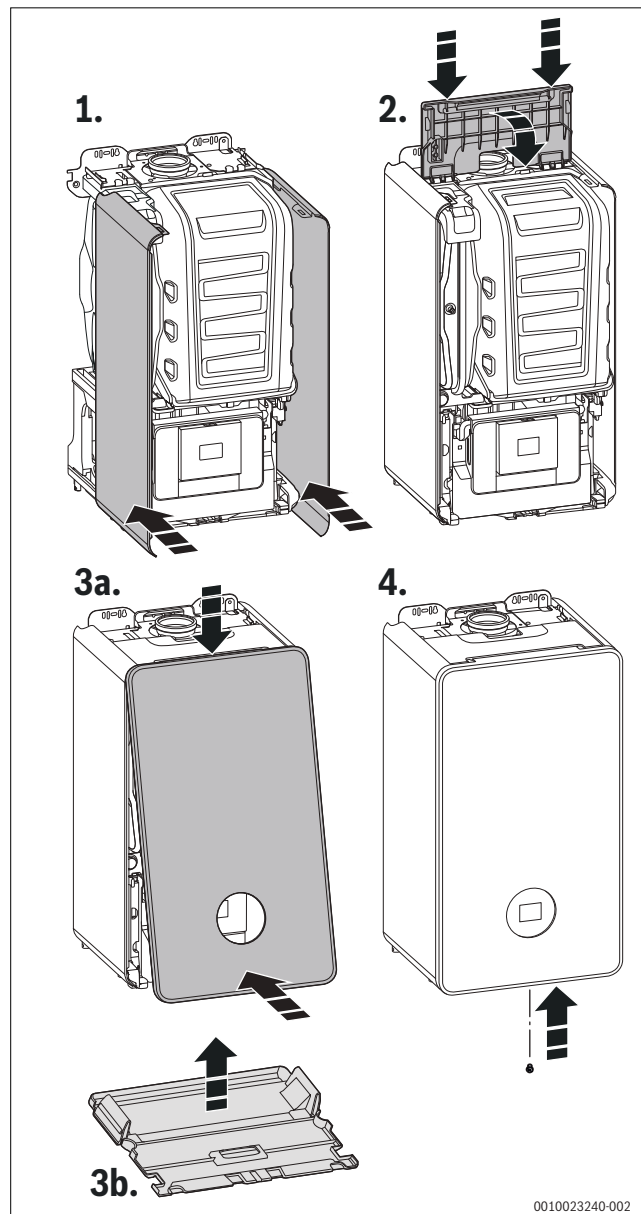


Fig. 67 Fitting the appliance casing

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



At the time of commissioning, complete all relevant sections of the Benchmark Checklist located at the end of this chapter.

### Appliance handover:

- ▶ Complete the Benchmark Gas Boiler Commissioning Checklist.
- ▶ Set up the appliance controls and show the customer how to operate all the control unit/s for central heating 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 73 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 that outside temperatures will affect the output of the appliance, especially the DHW.
- ▶ 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:** Arrange an inspection/maintenance contract with an approved heating contractor.

#### 6.12.2 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.

### 7.1 Operating the service menu

#### Opening the service menu

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

#### Closing the service menu

- ▶ Press the DHW key or the Heating 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.  
The new value will be saved after 5s or after pressing the **OK** key.

#### Exiting the menu item without saving values

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

#### Documenting the settings

The label “Service menu settings” (scope of delivery) makes it easier to restore the individual settings following maintenance.

- ▶ Enter modified settings.
- ▶ Affix label to the device in a visible location.

## 7.2 Service menu

- ▶ To confirm the selection: Press the **OK** key.
- ▶ Select and set the service function.

### 7.2.1 Service functions overview

#### Menu A (L.A) Benchmark menu

- ▶ Press the **||||** key and **↵** key at the same time, until **L.A** is displayed.

Service function L.A	Unit	More information
A-A5 Actual temperature	°C	Flow temperature at the flow temperature sensor

Table 16 Benchmark menu

#### Menu 1 (L.1) Info menus

- ▶ Press the **||||** key and **↵** key at the same time, until **L.A** is displayed.
- ▶ Keep pressing the arrow key **▲**, until **L.1** is displayed.
- ▶ To confirm the selection: Press the **OK** key.
- ▶ Select and set the service function.



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

Service function L.1	Unit	More information
1-A1 Current status		Status code.
1-A2 Current fault		Fault code (→ table 10.1.2)
1-A3 Maximum heating output	%	The maximum thermal output can be reduced via the service function 3-b1.
1-A4 Upper limit of the maximum DHW output	%	Only available if optional cylinder sensor is fitted.
1-A5 Actual temperature	°C	Flow temperature at the flow temperature sensor.
1-A6 Set flow temperature	°C	Setting value of the flow temperature demanded by the heating controller.
1-A7 Current flow temperature in low loss header	°C	Is only displayed, if a low loss header is connected.
1-b3 DHW actual temperature	°C	Actual hot water temperature (Only available if optional cylinder sensor is fitted).
1-b5 Current storage cylinder temperature	°C	Only available if optional cylinder sensor is fitted.
1-b7 DHW set temperature	°C	Setting value of the hot water temperature demanded by the heating controller (Only available if optional cylinder sensor is fitted).
1-b8 Maximum heat output	%	Maximum heating output.
1-C1 Ionisation current	µA	
1-C2 Pump modulation	%	Actual heating pump modulation.
1-C4 Outside temperature	°C	Current outside temperature (with outside temperature sensor connected)
1-C5 Temperature at the solar buffer cylinder	°C	Is only displayed, if a solar module is connected.
1-C6 System pressure	bar	Current system pressure
1-d1 Collector temperature	°C	Is only displayed, if a solar module is connected.
1-d2 Cylinder temperature bottom	°C	Is only displayed, if a solar module is connected.
1-d3 Collector pump	%	Is only displayed, if a solar module is connected.
1-d4 Solar fault		Is only displayed, if a solar module is connected. Fault code
1-E1 Control device version		Software version of the control unit.
1-E2 Programmer unit version		Software version of the programmer.
1-E3 Code plug number		Coding plug number.
1-E4 Code plug version		Coding plug version.
1-EA Software version of the equipment electronics (main version)	-	
1-Eb Software version of the equipment electronics (ancillary version)	-	

Table 17 Menu 1: Display of information

### Menu 2 (L.2) Hydraulic settings

- ▶ Press the **||||** key and **↩** key at the same time, until **L.A** is displayed.
- ▶ Keep pressing the arrow key **▲**, until **L.2** is displayed.
- ▶ To confirm the selection: Press the **OK** key.
- ▶ Select and set the service function.



The basic settings are depicted as **highlighted** in the following table.

Service function L.2	Settings/adjustment range	Remark/restriction
2-A1 Low-loss header	<ul style="list-style-type: none"> <li>• <b>0</b>: No low-loss header present</li> <li>• 1: Temperature sensor connected at the appliance</li> <li>• 2: Low-loss header connected to the module</li> <li>• 3: Low-loss header without temperature sensor</li> </ul>	This setting defines, where the temperature sensor for the low-loss header is connected.
2-A2 Hot water system	<ul style="list-style-type: none"> <li>• <b>0</b>: Not installed</li> <li>• 1: 3-way valve installed</li> <li>• 2: Cylinder primary pump installed</li> </ul>	
2-A3 Hydraulic configuration for heating circuit 1	<ul style="list-style-type: none"> <li>• <b>0</b>: No independent heating pump installed</li> <li>• 1:</li> <li>• 2: Heating pump after low-loss header</li> <li>• 3: Heating pump connected to the module</li> </ul>	This service function will only be available, if service function 2-A1 is set.
2-A4 Hydraulic configuration heating pump	<ul style="list-style-type: none"> <li>• 0: No pump</li> <li>• <b>1</b>: Heating pump</li> </ul>	

Table 18 Menu 2: Hydraulic settings

### Menu 3 (L.3) Basic Settings

- ▶ Press the **||||** key and **↩** key at the same time, until **L.A** is displayed.
- ▶ Keep pressing the arrow key **▲**, until **L.3** is displayed.
- ▶ To confirm the selection: Press the **OK** key.
- ▶ Select and set the service function.






The basic functions are depicted as **highlighted** in the following table.

Service function L.3	Settings/adjustment range	Remark/restriction
3-b1 Maximum heat output	<ul style="list-style-type: none"> <li>• 50 ... <b>100</b> %</li> </ul>	<ul style="list-style-type: none"> <li>▶ Set thermal output in percent.</li> <li>▶ Measure gas flow rate.</li> <li>▶ Compare measured result with the setting tables (→ page 69). Correct the setting in the case of any deviation.</li> </ul>
3-b2 Standby time	<ul style="list-style-type: none"> <li>• 3 ... <b>5</b> ... 60 minutes</li> </ul>	<p>The time interval determines the minimum delay between starting and restarting the boiler.</p> <p>If an outside temperature-controlled heating controller is connected, this setting is optimised by the heating controller.</p>
3-b3 Temperature interval for switching off the burner and switching it on again	<ul style="list-style-type: none"> <li>• -15 ... <b>-6</b> ... -2 K (°C)</li> </ul>	<p>Difference between current flow temperature and set flow temperature up to the point when the burner is switched on.</p> <p>If an outside temperature-controlled heating controller is connected, this setting is optimised by the heating controller.</p>
3-C1 Maximum power on DHW	<ul style="list-style-type: none"> <li>• 50 ... <b>100</b> %</li> </ul>	
3-C2 DHW circulation pump	<ul style="list-style-type: none"> <li>• ON</li> <li>• <b>OFF</b></li> </ul>	
3-C3 DHW circulation pump, number of starts	<ul style="list-style-type: none"> <li>• 1: 1 x 3 min/h</li> <li>• <b>2</b>: 2 x 3 min/h</li> <li>• 3: 3 x 3 min/h</li> <li>• 4: 4 x 3 min/h</li> <li>• 5: 5 x 3 min/h</li> <li>• 6: 6 x 3 min/h</li> <li>• 7: permanent</li> </ul>	
3-C7 Thermal disinfection	<ul style="list-style-type: none"> <li>• <b>OFF</b></li> <li>• ON</li> </ul>	<p>This service function activates heating up the storage to 75 °C.</p> <ul style="list-style-type: none"> <li>▶ Undertaking Thermal Disinfection (→ chapter 7.3).</li> </ul> <p>Thermal Disinfection will be completed after 30 minutes of heating the storage up to 75 °C.</p>

Service function L.3		Settings/adjustment range	Remark/restriction
3-CA	DHW mode	<ul style="list-style-type: none"> <li>0: Preheat mode</li> <li><b>1: Eco mode</b></li> </ul>	<p>In Preheat mode the appliance will heat the cylinder if the temperature is approximately 6 °C below the set temperature. The appliance heats the cylinder more frequently. This tops up the cylinder temperature for quicker heat up times, this is useful for large/longer demand periods.</p> <p>In eco mode the appliance will heat the cylinder if the temperature is approximately 12 °C below the set temperature. Eco mode is enabled by default, during the initial appliance start up.</p>
3-d1	Pump range map	<ul style="list-style-type: none"> <li>0: Pump output proportional to the thermal output</li> <li>1: Constant pressure 150 mbar</li> <li>2: Constant pressure 200 mbar</li> <li><b>3: Constant pressure 250 mbar</b></li> <li>4: Constant pressure 300 mbar</li> <li>5: Constant pressure 350 mbar</li> <li>6: Constant pressure 400 mbar</li> </ul>	<ul style="list-style-type: none"> <li>► Set low pump curve to save energy and avoid possible flow noise.</li> </ul>
3-d2	Pump control mode	<ul style="list-style-type: none"> <li><b>OFF</b></li> <li>ON</li> </ul>	<ul style="list-style-type: none"> <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> <li>Saving energy: intelligent heating pump stop in heating systems with weather-compensated controller. The heating pump is only switched on when needed.</li> </ul>
3-d3	Min. output	<ul style="list-style-type: none"> <li><b>10</b> ... 100 %</li> </ul>	Pump rate at minimum thermal output. Only available with pump characteristic map 0.
3-d4	Max. output	<ul style="list-style-type: none"> <li>10 ... <b>100</b> %</li> </ul>	Pump rate at maximum thermal output. Only available with pump characteristic map 0.
3-d5	Pump block time for external 3-way valve	<ul style="list-style-type: none"> <li><b>0</b> ... 24 seconds</li> </ul>	Pump rate at maximum thermal output. Only available with pump characteristic map 0.
3-d6	Pump overrun	<ul style="list-style-type: none"> <li>1 ... <b>2</b> ... 60 minutes</li> <li>24 hours</li> </ul>	Run-on time of the heating pump: pump run-on time begins at the end of the heat requirement.

Table 19 Menu 3: Basic settings


### Menu 4 (L.4) Settings

- ▶ Press the  key and the  key at the same time, until **L.A** is displayed.
- ▶ Keep pressing the arrow key , until **L.4** is displayed.
- ▶ To confirm the selection: Press the **OK** key.

- ▶ Select and set the service function.



The basic settings are depicted as **highlighted** in the following table.




Service function L.4	Settings/adjustment range	Remark/restriction
4-A1 Ventilation function	<ul style="list-style-type: none"> <li>• <b>0</b></li> <li>• 1: Auto</li> <li>• 2: Permanent</li> </ul>	<p>The ventilation function can be activated after maintenance.</p> <p>During ventilation the symbol  appears in the info area of the standard display Ventilation function.</p>
4-A2 Siphon filling program	<ul style="list-style-type: none"> <li>• 0: Switched off (only allowed during maintenance work)</li> <li>• <b>1</b>: Switched on at minimum output</li> <li>• 2: Switched on at minimum thermal output</li> </ul>	<p>The siphon filling program is activated in the following cases:</p> <ul style="list-style-type: none"> <li>• On, boiler min.: the appliance is switched on using the On/Off switch.</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> <li>• After a reset.</li> </ul> <p>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.</p> <p>During the siphon filling program the symbol  appears in the info area of the standard display Siphon filling program.</p>
4-A4 Maintenance type	<ul style="list-style-type: none"> <li>• <b>0</b>: Switched off</li> <li>• 1: Burner runtime</li> <li>• 3: Appliance runtime</li> </ul>	<p>Setting 1: The maximum burner time is reached.</p> <p>Setting 3: The maximum operating time including standby is reached.</p>
4-A5 Burner runtime	<ul style="list-style-type: none"> <li>• 10 ... <b>60</b></li> </ul>	<p>This service function is only available, if service function 4-A4 is set to 1.</p> <p>Elapsed time x 100 of the system since commissioning</p>
4-A6 Appliance runtime	<ul style="list-style-type: none"> <li>• 1 ... <b>72</b> months</li> </ul>	<p>This service function is only available, if service function 4-A4 is set to 3.</p> <p>After this time period has elapsed, the display shows the required inspection via the <b>1018</b> service display.</p>
4-b1 Outside temperature control within the appliance	<ul style="list-style-type: none"> <li>• <b>OFF</b></li> <li>• ON</li> </ul>	<p>This service function is not available, if a temperature controller with an EMS link is connected.</p>
4-b2 Summer mode	<ul style="list-style-type: none"> <li>• 0 ... <b>16</b> ... 30 °C</li> </ul>	<p>This service function is only available, if service function 4-b1 is activated.</p> <p>If the outside temperature exceeds the set temperature limit, the heating switches off (Summer mode). If the outside temperature falls by at least 1 °C below the setting, the heating switches on again (Winter mode).</p>
4-b3 Heating curve end	<ul style="list-style-type: none"> <li>• 20 ... <b>90</b> °C</li> </ul>	<p>This service function is only available, if service function 4-b1 is activated.</p> <p>Set flow temperature at an outside temperature of - 10 °C.</p>
4-b4 Heating curve base	<ul style="list-style-type: none"> <li>• <b>20</b> ... 90 °C</li> </ul>	<p>This service function is only available, if service function 4-b1 is activated.</p> <p>Set flow temperature at an outside temperature of + 20 °C.</p>



Service function L.4		Settings/adjustment range	Remark/restriction
4-b5	Frost protection	<ul style="list-style-type: none"> <li>• OFF</li> <li>• <b>ON</b></li> </ul>	This service function is only available, if service function 4-b1 is activated. Appliance frost protection switches the burner and heat pump on, if the outside temperature falls below 5 °C. This prevents the heating appliance freezing.
4-b6	Frost temperature 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 service function 4-b1 was activated. If the outside temperature does not exceed the frost threshold temperature, then the heating pump in the heating circuit switches on.
4-C1	Maximum temperature in the solar cylinder	<ul style="list-style-type: none"> <li>• 20 ... <b>60</b> ... 90 °C</li> </ul>	Only available if the solar module is activated. Temperature, to which the solar cylinder may be charged.
4-C2	Solar pump speed control	<ul style="list-style-type: none"> <li>• 0: No</li> <li>• <b>1</b>: PWM</li> <li>• 2: 0-10 V</li> </ul>	Only available if the solar module is activated.
4-C3	Solar module active	<ul style="list-style-type: none"> <li>• <b>OFF</b></li> <li>• ON</li> </ul>	Only available if the solar module is detected.
4-d2	Minimum system pressure	<ul style="list-style-type: none"> <li>• <b>0.8</b>...1.1 bar</li> </ul>	
4-d3	Target system pressure	<ul style="list-style-type: none"> <li>• <b>1.3</b>...1.7 bar</li> </ul>	
4-F1	Reset appliance to basic setting	<ul style="list-style-type: none"> <li>• <b>NO</b>: Settings are retained</li> <li>• YES: Appliance is reset to basic settings</li> </ul>	
4-F2	Reset of maintenance message	<ul style="list-style-type: none"> <li>• <b>NO</b></li> <li>• YES</li> </ul>	

Table 20 Menu 4: Settings

**Menu 5 (L.5) Limit values**

- ▶ Press the  key and  key at the same time, until **L.A** is displayed.
- ▶ Keep pressing the arrow key , until **L.5** is displayed.
- ▶ To confirm the selection: Press the **OK** key.
- ▶ Select and set the service function.



The basic settings are depicted as **highlighted** in the following table.

Service function L.5		Settings/adjustment range	Remark/restriction
5-A1	Maximum flow temperature	<ul style="list-style-type: none"> <li>• 30 ... <b>88</b> °C</li> </ul>	Limits the adjustment range for the flow temperature.
5-A2	Maximum DHW temperature	<ul style="list-style-type: none"> <li>• 35...<b>60</b> ... 70 °C</li> </ul>	Limits the adjustment range for the hot water temperature.
5-A3	Minimum boiler output (heating and DHW)	<ul style="list-style-type: none"> <li>• <b>10</b> ... 50 %</li> </ul>	Minimum heat output.

Table 21 Menu 5: Limit values

### Menu 6 (L.6) Function tests

- ▶ Press the **||||** key and **↶** key at the same time, until **L.A** is displayed.
- ▶ Keep pressing the arrow key **▲**, until **L.6** is displayed.
- ▶ To confirm the selection: Press the **OK** key.
- ▶ Select and set the service function.



The basic settings are depicted as **highlighted** in the following table.

Service function L.6	Settings/adjustment range	Remark/restriction
6-t1 Ignition	<ul style="list-style-type: none"> <li>• <b>OFF</b></li> <li>• ON</li> </ul>	Testing the ignition by means of 8s on and 2s off without gas supply. <ul style="list-style-type: none"> <li>▶ To prevent damage to the ignition transformer: Leave the function switched on for a maximum of 2 minutes.</li> </ul>
6-t2 Fan	<ul style="list-style-type: none"> <li>• <b>OFF</b></li> <li>• ON</li> </ul>	Permanent fan operation. Fan operation without gas supply or ignition.
6-t3 Continuous pump running (heating pump)	<ul style="list-style-type: none"> <li>• <b>OFF</b></li> <li>• ON</li> </ul>	If ON is set, the pump runs at 100 %.
6-t4 DHW charge pump	<ul style="list-style-type: none"> <li>• <b>OFF</b></li> <li>• ON</li> </ul>	Depends on the hydraulic configuration 2-A3.
6-t5 3-way valve	<ul style="list-style-type: none"> <li>• 0: Heating</li> <li>• 1: DHW</li> <li>• 2: Middle position</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.
6-t7 HC1 pump	<ul style="list-style-type: none"> <li>• <b>OFF</b></li> <li>• ON</li> </ul>	This service function is only available, if service function 2-A3 is set to 2.
6-t8 DHW circulation pump	<ul style="list-style-type: none"> <li>• <b>OFF</b></li> <li>• ON</li> </ul>	Depends on the settings of 3-C2.
6-t9 Solar pump	<ul style="list-style-type: none"> <li>• <b>OFF</b></li> <li>• ON</li> </ul>	Permanent pump run. This service function is only available, if a solar module is installed.
6-tA Ionisation oscillator	<ul style="list-style-type: none"> <li>• <b>OFF</b></li> <li>• ON</li> </ul>	Check the ionisation measurement function at the flame.
6-tb Burner	<ul style="list-style-type: none"> <li>• <b>OFF...100 %</b></li> </ul>	The burner test is ended, if the setting value is set to OFF again, or if L.6 is exited.

Table 22 Menu 6: Function tests

### Menu 0 (L.0) Manual mode

- ▶ Press the **||||** key and **↶** key at the same time, until **L.A** is displayed.
- ▶ Keep pressing the arrow key **▲**, until **L.0** is displayed.
- ▶ To confirm the selection: Press the **OK** key.
- ▶ Select and set the service function.



The basic settings are depicted as **highlighted** in the following table.

Service function L.0	Settings/adjustment range	Remark/restriction
0-A1 Manual mode	<ul style="list-style-type: none"> <li>• <b>OFF</b></li> <li>• ON</li> </ul>	Allows manual control of heating during loss of RF Key signal. Set the desired heating flow temperature.
0-A2 Set temperature for manual mode	<ul style="list-style-type: none"> <li>• <b>30 ...70 °C</b></li> </ul>	This service function will only be available, if service function 0-A1 is activated.

Table 23 Menu 0: Manual mode

## 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 Inspection and maintenance

### DANGER:

#### 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 the Health and Safety Executive guidance HSG85.
- ▶ Check for zero potential before proceeding with work, using test equipment approved to GS38 to confirm that the electricity supply is disconnected.

### CAUTION:

#### Mains supplies:

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

### NOTICE:

#### Personnel and equipment

- ▶ Any service work must be carried out by competent registered engineers.
- ▶ Service work must not be attempted if a calibrated CO/CO<sub>2</sub> analyser and manometer are not available.

### WARNING:

#### Hot surfaces!

If the appliance has been operating components may be hot.

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

### CAUTION:

#### Component replacement:

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

### 8.1 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.

### 8.2 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.

### 8.3 Inspection and maintenance steps

→ chapter 12.8 "Inspection and maintenance checklist".

## 8.4 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.

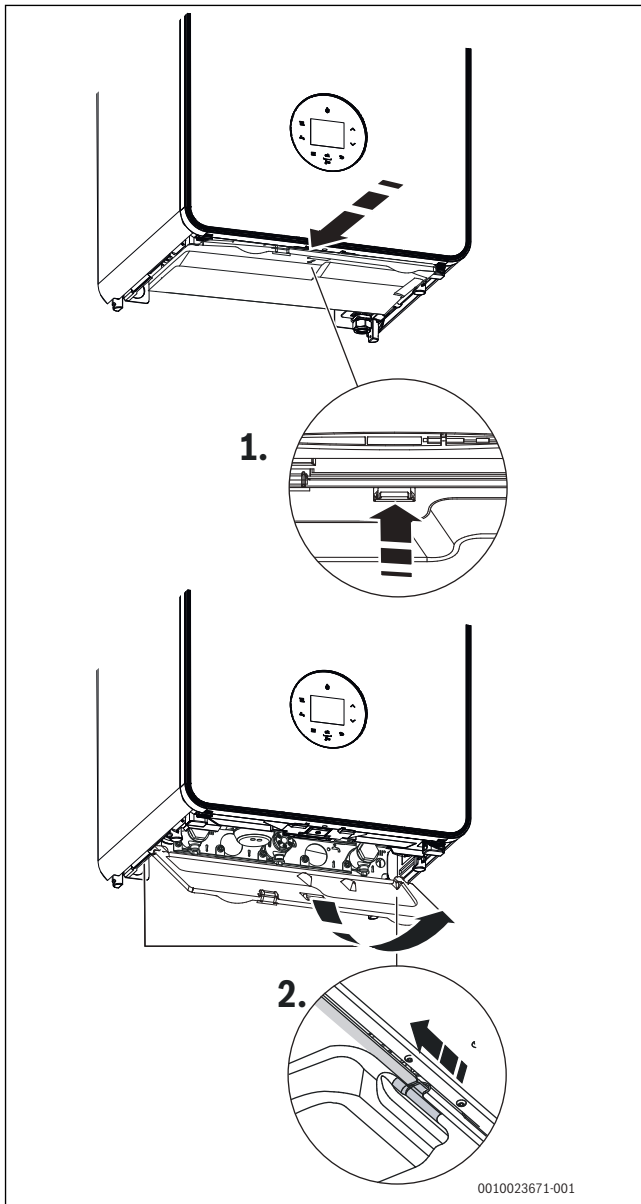


Fig. 68 Removing bottom panel

### 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.

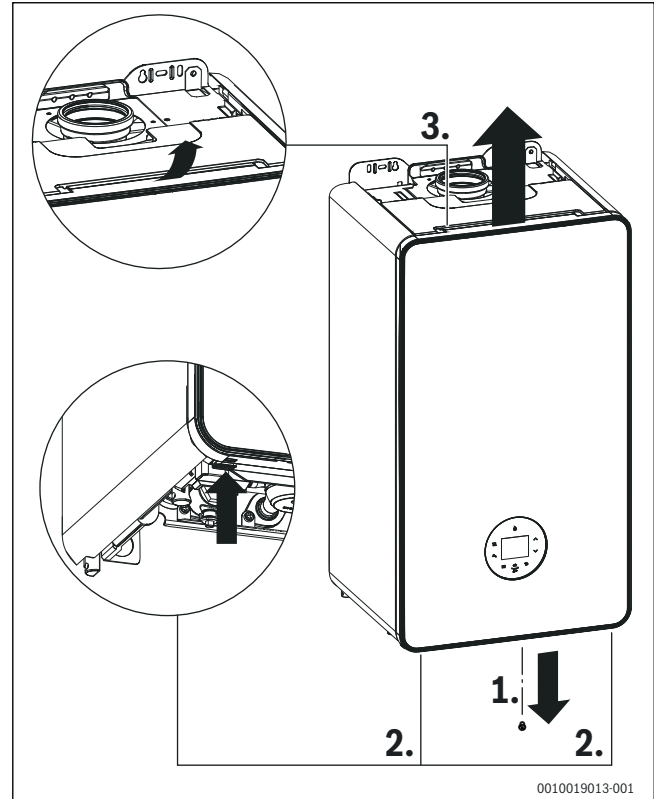


Fig. 69 Removing outer case

## 8.5 Fan pressure test

### NOTICE:

#### Fan pressure test

- ▶ The appliance must be running at maximum output in chimney sweep mode for the fan pressure test, (→ chapter 6.4).

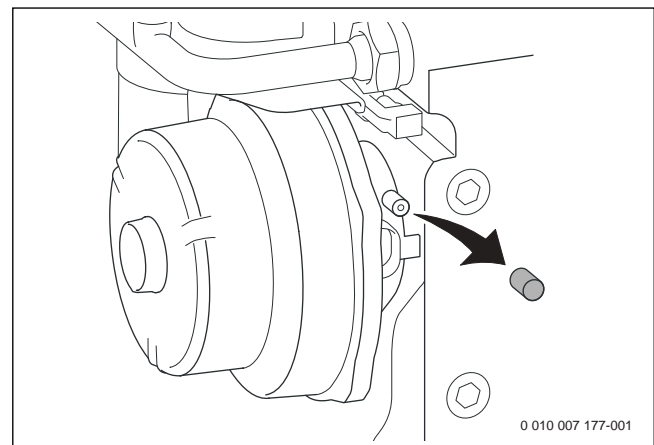


Fig. 70 Fan pressure test point



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



Fan pressure test reading.

- ▶ The pressure reading will be in negative values.

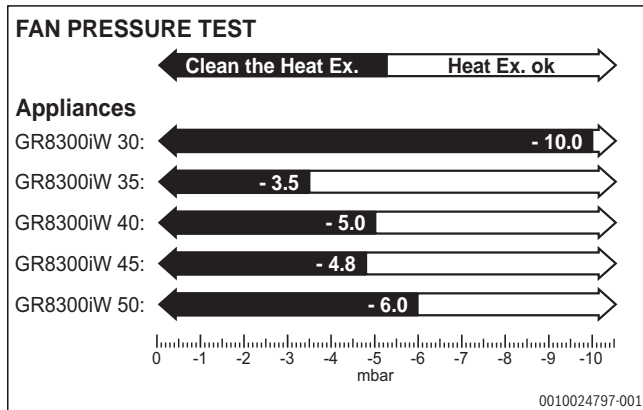


Fig. 71 Fan pressure test values

**Appliance fan pressure test values**

Natural Gas and LPG appliances

Appliance	×	↔	↓ Value [P]
GR8300iW 30	0 mbar	to	-10,0 mbar
GR8300iW 35	0 mbar	to	-3,5 mbar
GR8300iW 40	0 mbar	to	-5,0 mbar
GR8300iW 45	0 mbar	to	-4,8 mbar
GR8300iW 50	0 mbar	to	-6,0 mbar

Table 24 Natural Gas and LPG appliances

- [×] Cleaning required
- [✓] No cleaning required

**If the manometer reading is higher then** the appliance output value [P] mbar.

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

**If the manometer reading shows the heat exchanger requires cleaning,** 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 fan pressure readings.  
If the boiler, after completing the above checks, fails the fan pressure test then contact Worcester, Bosch Group for advice.
- ▶ Replace test point cover after completing pressure check.

**8.6 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.
- ▶ Check the gas supply working pressures in the system conform to the readings shown in the table shown in section 6.6 "Checking gas inlet pressure".

**8.7 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 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.



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 section 6.10 "Checking flue integrity" and check that the readings conform to those given, confirming flue system and combustion circuit are ok.

**8.8 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 6.4).
- ▶ 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 25 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.

### 8.9 Cleaning the siphon and heat exchanger

**! WARNING:**

#### Gaskets and seals - gas related components

- ▶ Replace gaskets and seals when disturbing gas related components (e.g. burner, electrode assembly etc.), after cleaning the heat exchanger.
- ▶ Do not attempt the cleaning procedure unless new gaskets and seals are available.

**i**

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

#### 8.9.1 Checking the burner

- ▶ Remove the combustion cover → Fig. 90.
- ▶ Remove the burner cover.

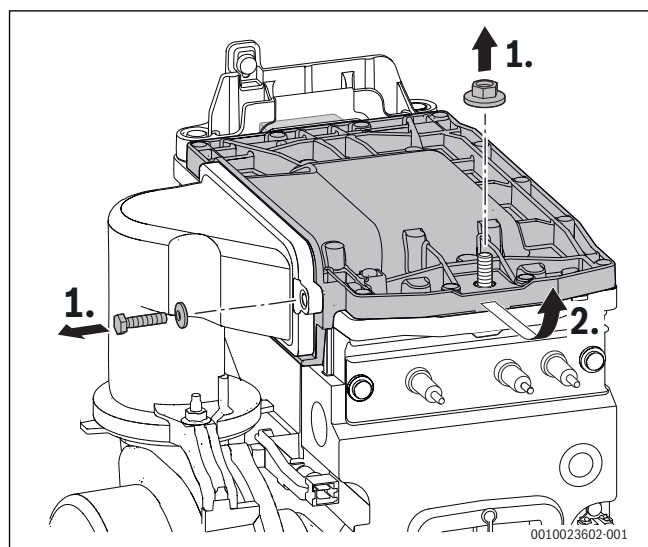


Fig. 72 Removing the burner cover

- ▶ Remove the burner and clean its components.

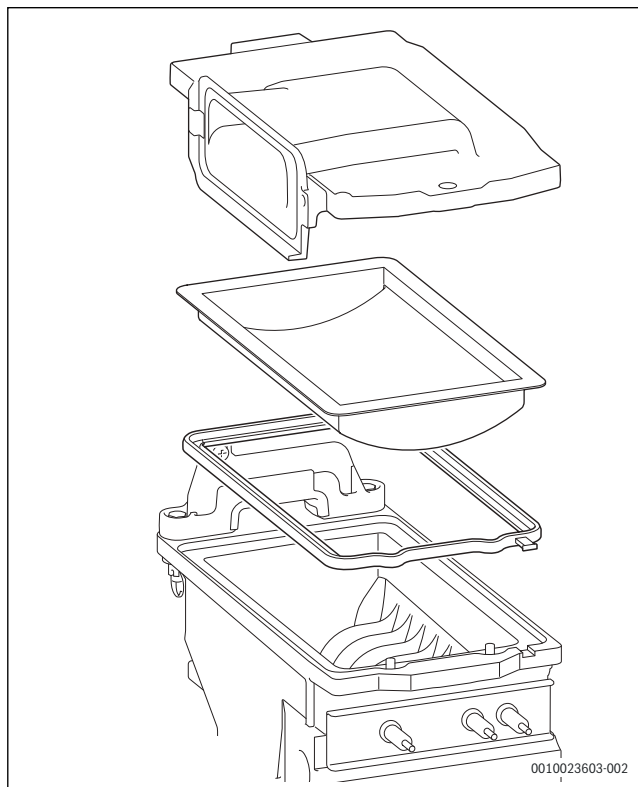


Fig. 73 Burner

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

**i**

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

- ▶ Install the burner and the burner cover.
- ▶ Check the gas/air ratio.

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

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

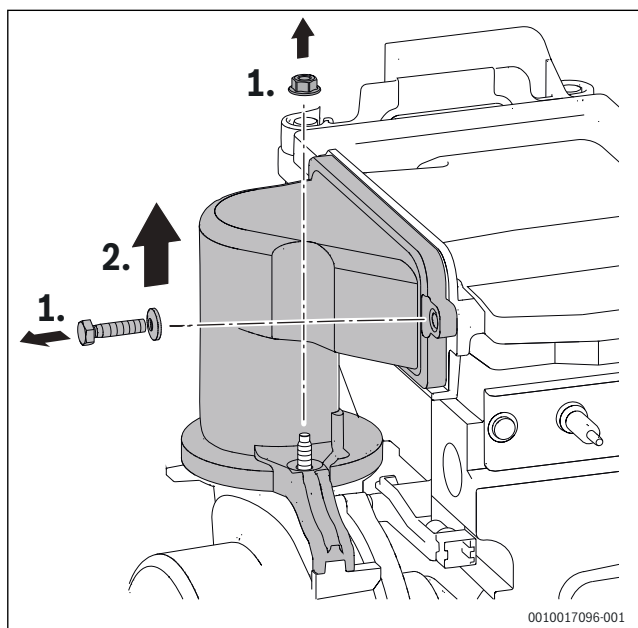


Fig. 74 Removing the air-gas manifold

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

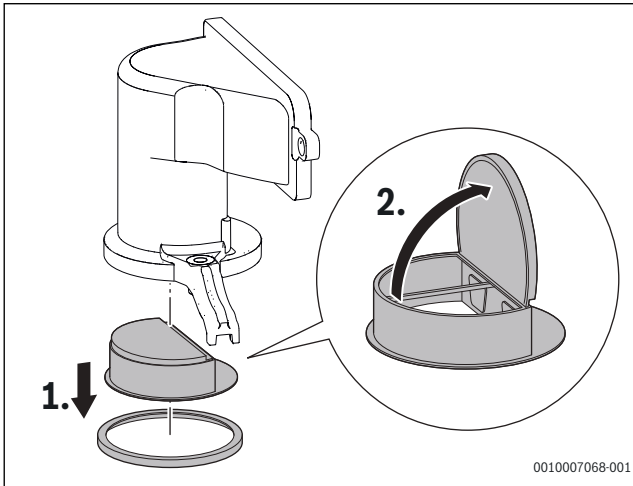


Fig. 75 Non-return valve in the air-gas manifold

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

### 8.9.3 Fan removal

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

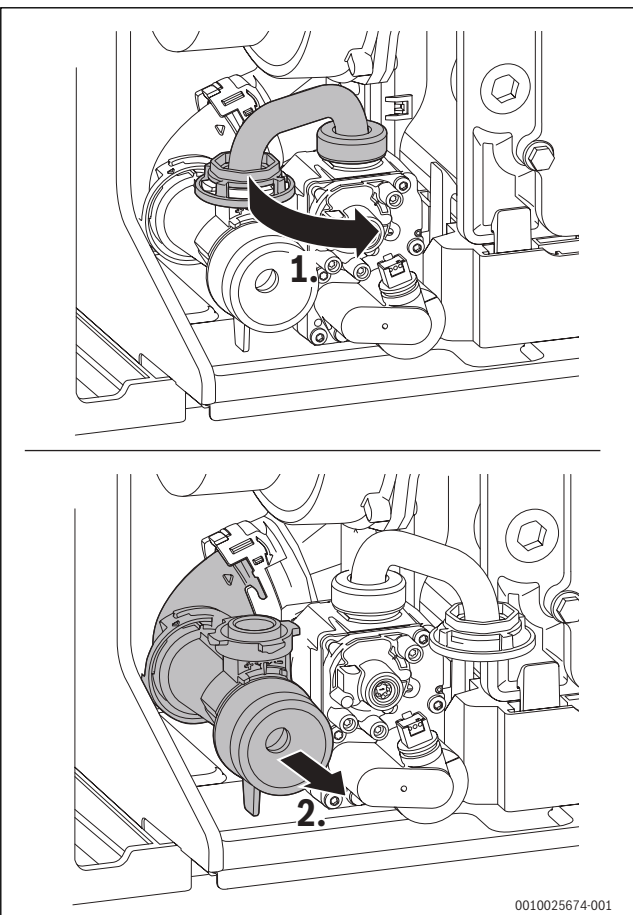


Fig. 76 Venturi removal

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

- ▶ Remove fan.

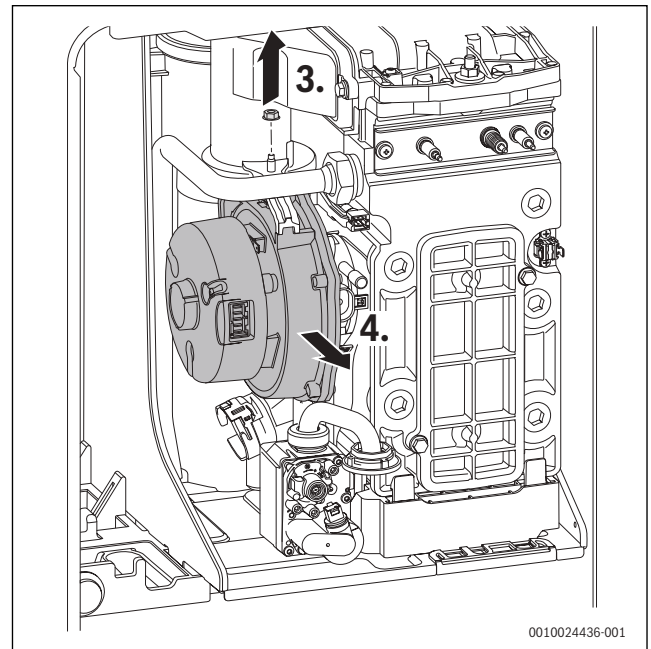


Fig. 77 Fan removal

### 8.9.4 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.
- ▶ Flueway
- ▶ 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].

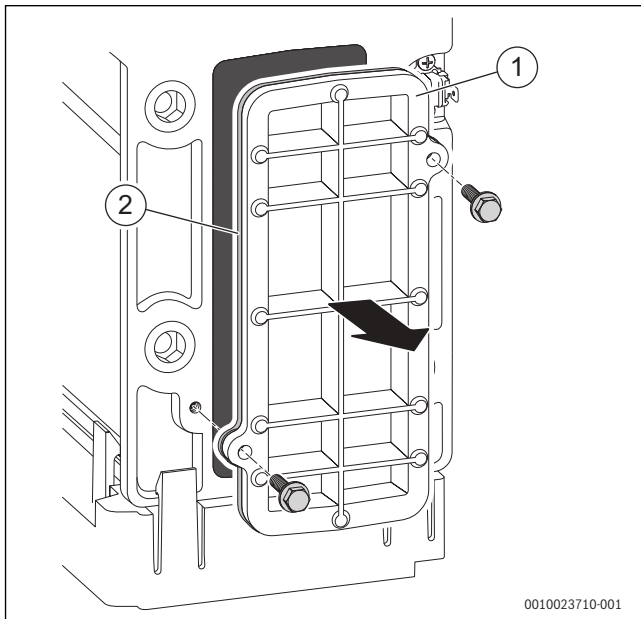


Fig. 78 Access cover removal

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

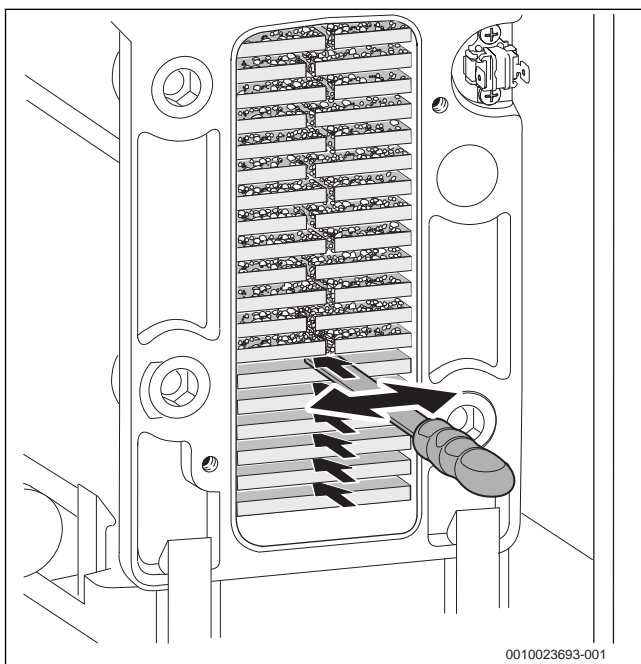


Fig. 79 Cleaning blade

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

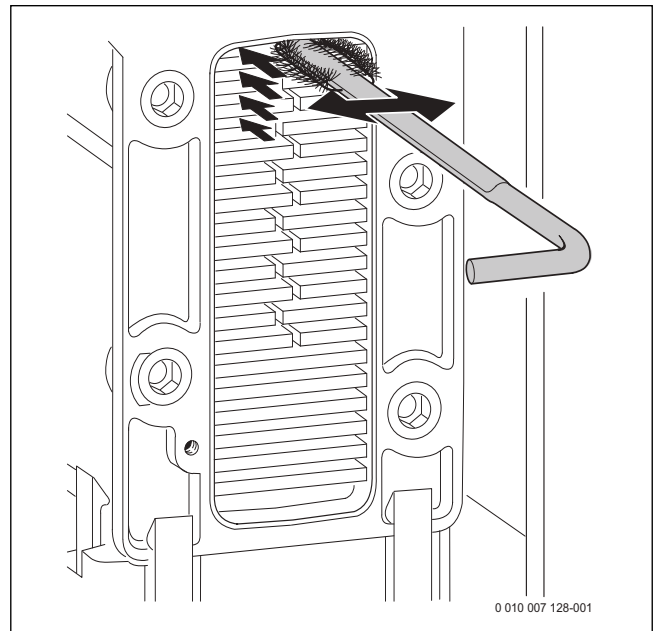


Fig. 80 Cleaning brush

- ▶ 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. 81 Pour water into the heat exchanger



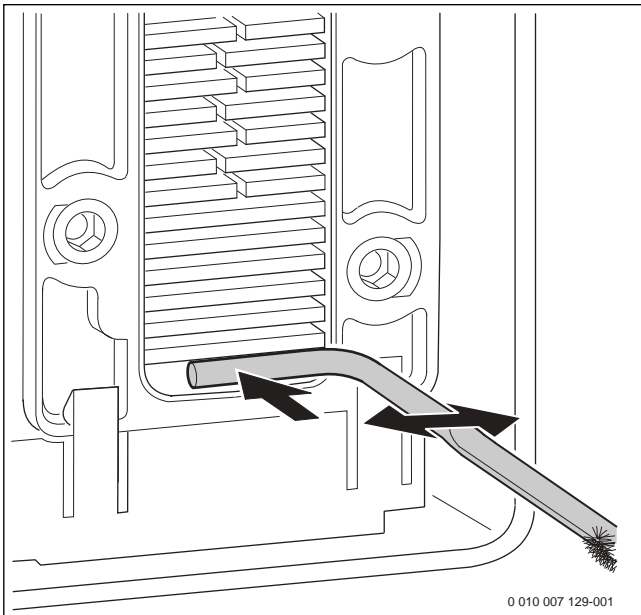


Fig. 82 Cleaning debris

- ▶ Refit the cleaning access cover assembly in reverse order the new seal [2], and the access cover [1].
- ▶ Hand tighten the bolts and then use a spanner to tighten the bolts a further half turn.

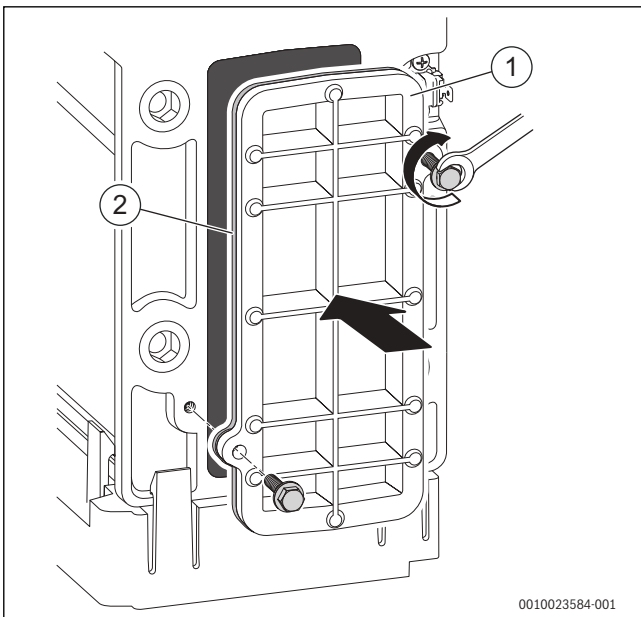


Fig. 83 Re-fitting the access cover

- ▶ 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.

### 8.9.5 Checking electrodes

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

- ▶ Install electrode set with new gaskets.

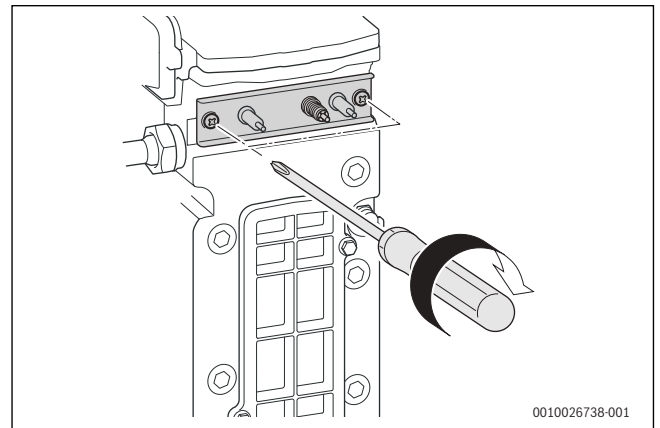


Fig. 84 Installing electrode set

- ▶ Check integrity of seal of electrode set. Using a mirror to check for misting.

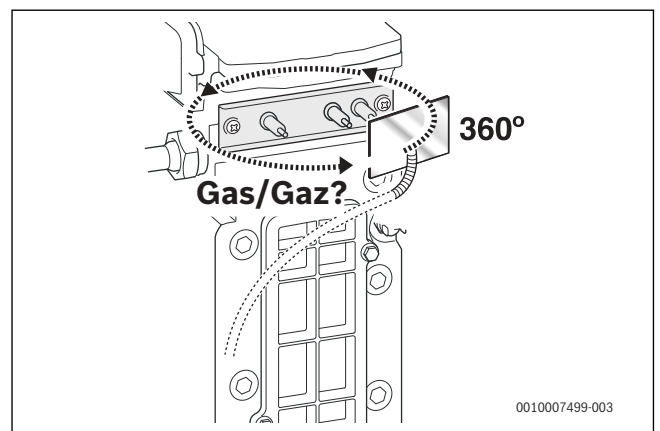


Fig. 85 Checking for leaks with an inspection mirror. Observe for misting.

### 8.9.6 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.

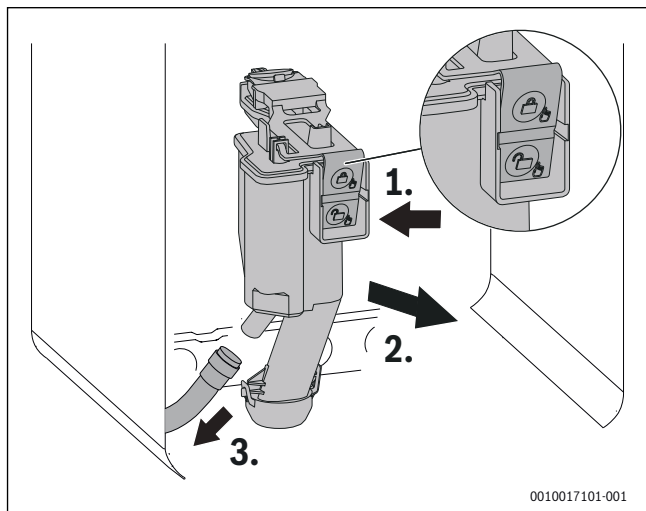


Fig. 86 Removing the condensate trap

- ▶ 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.

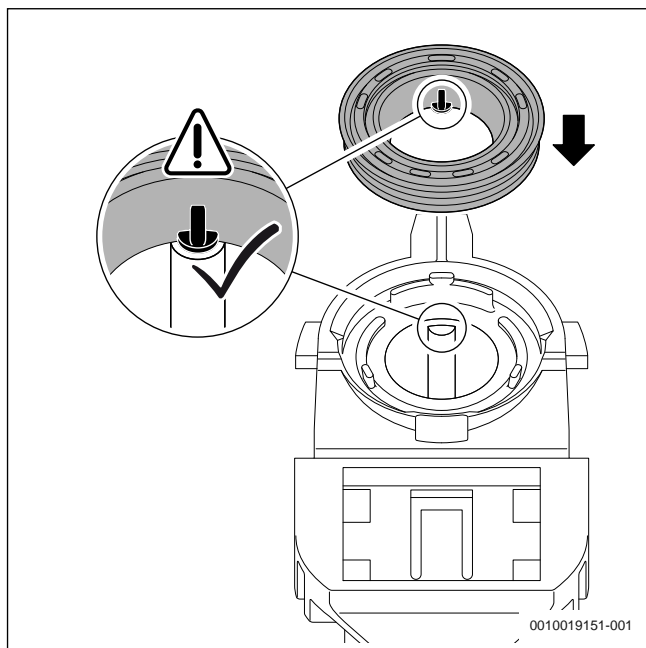


Fig. 87 Aligning the new gasket with the condensate trap

- ▶ 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.

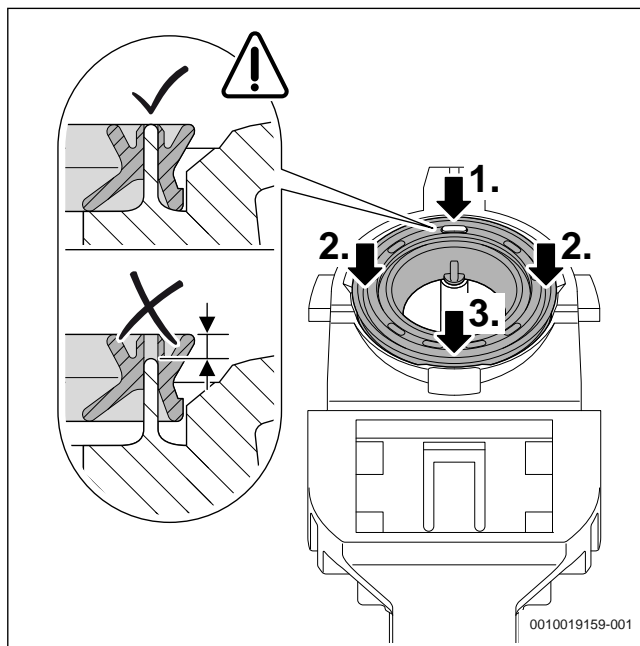


Fig. 88 Pressing on the gasket

- ▶ 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.

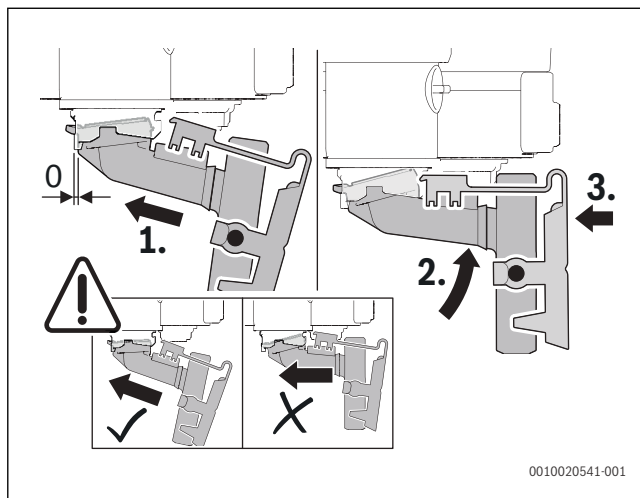


Fig. 89

### 8.10 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.

**8.10.1 Checking and, if required, adjusting the gas/air ratio**

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

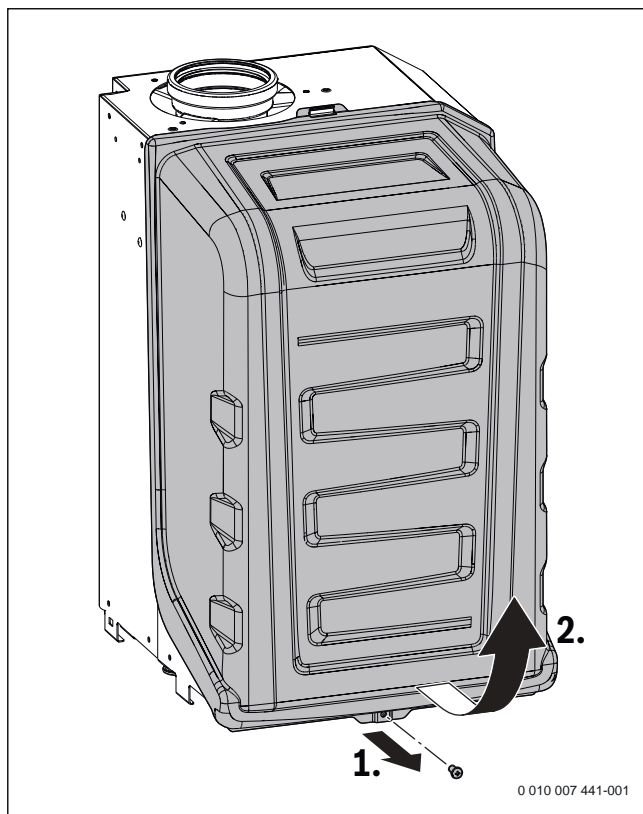


Fig. 90 Removing the combustion cover

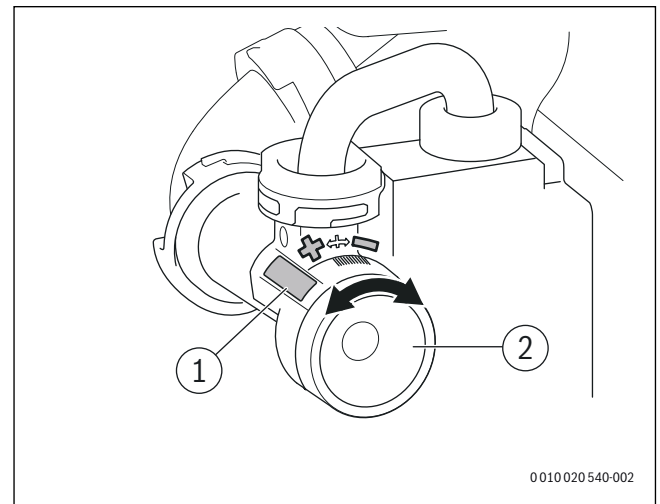


Fig. 91 Setting the adjustable venturi

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

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

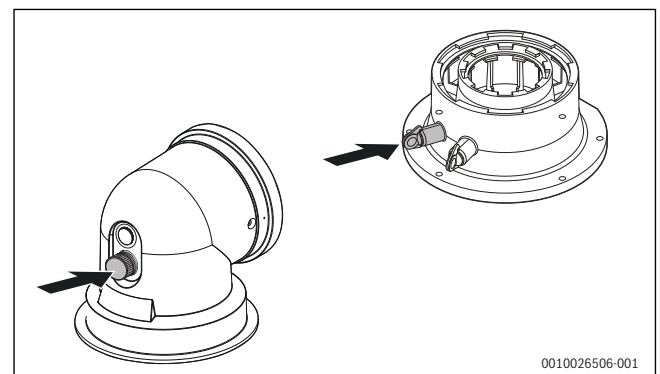


Fig. 92 Flue gas test point

- ▶ To ensure heat transfer: open the radiator valves and zone valves.
- ▶ Set the chimney sweep mode and start up the appliance at maximum rated output.
- ▶ Measure the CO<sub>2</sub> content.
- ▶ Check the CO<sub>2</sub> content at maximum rated output according to Tab. 26 and adjust if required.



Security Seal [1] (→ Fig. 91) 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 26 CO<sub>2</sub> and O<sub>2</sub> contents

- ▶ Measure the CO content.  
The CO content must be < 250 ppm.
- ▶ Set the minimum rated output.
- ▶ Measure the CO<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. 93) and set the CO<sub>2</sub> content for minimum rated output.

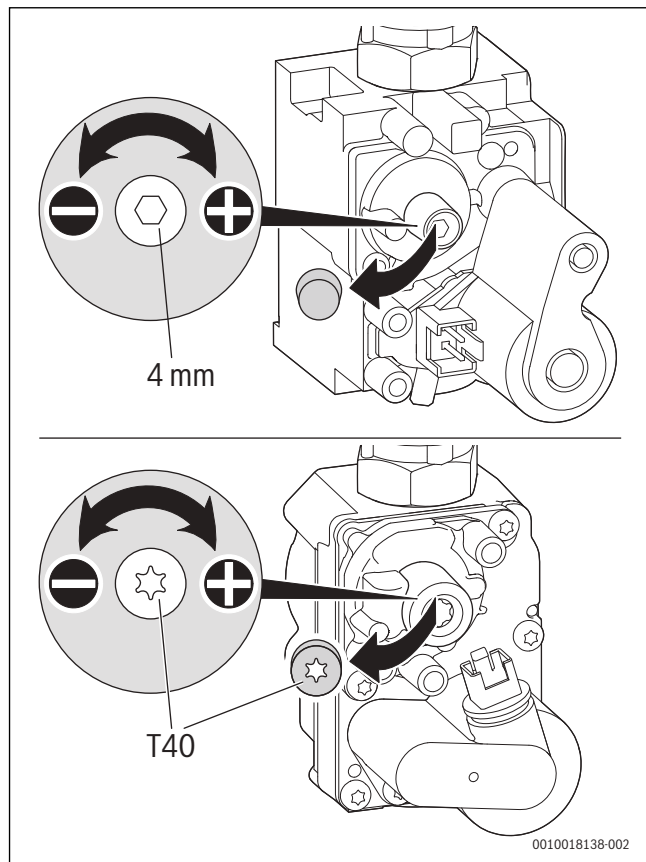


Fig. 93 Setting the CO<sub>2</sub> content (above: SIT valve, below: Honeywell valve)

- ▶ 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> readings in the servicing record (→ Chapter 12.7, page 73).
- ▶ Remove the flue gas probe from the flue gas test point and refit the plug.

## 9 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.

**i**

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)

### 9.1 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.

### 9.2 Overheat thermostat removal

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

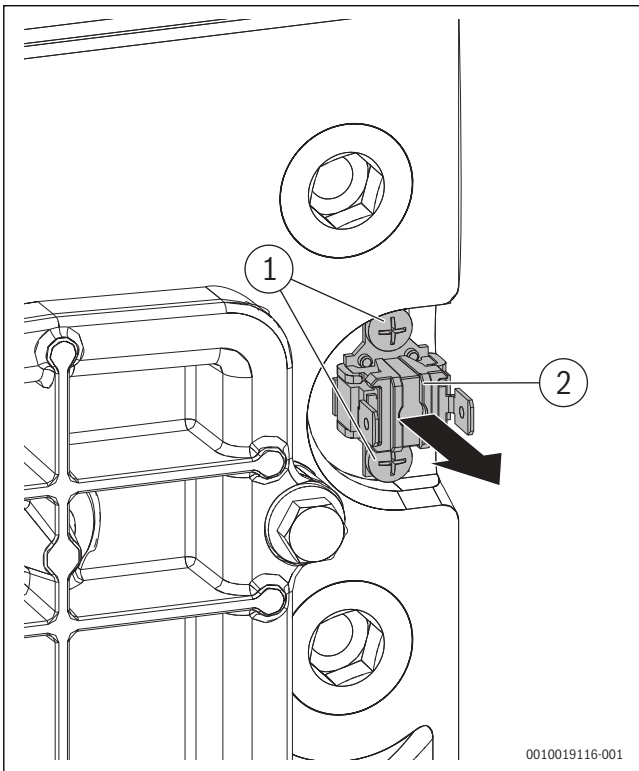


Fig. 94 Removing overheat thermostat

### 9.3 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.

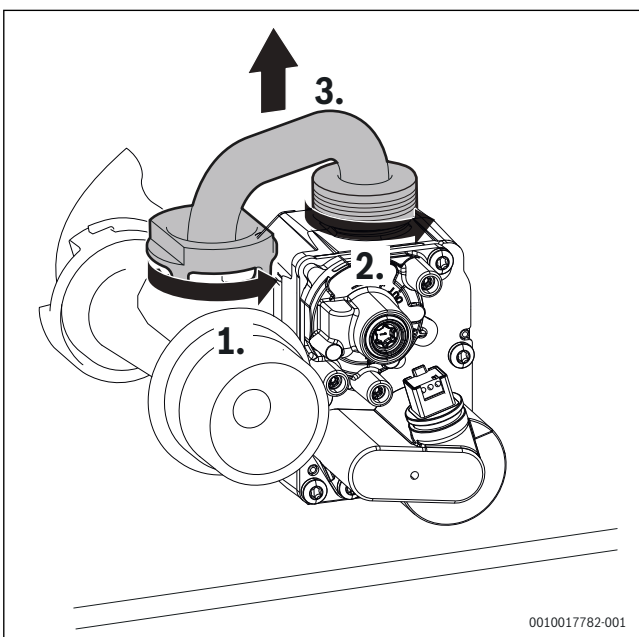


Fig. 95 Removing the gas pipe

1. Unplug the electrical connection.
2. Unscrew the union nut.

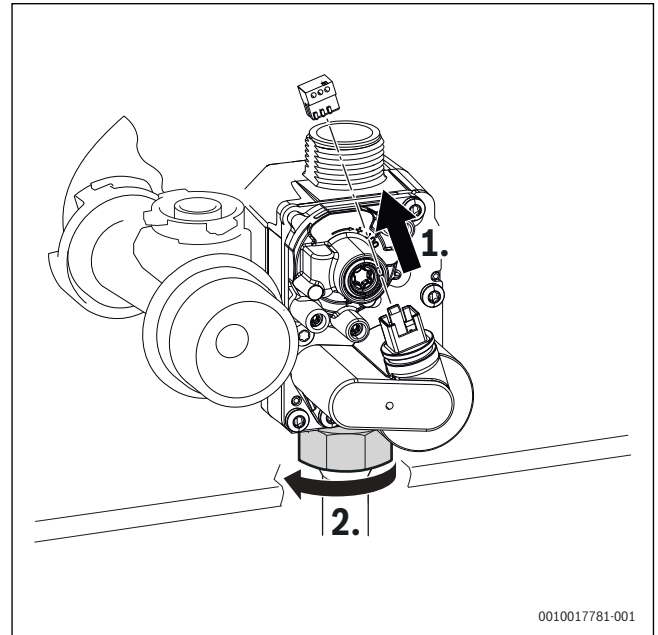


Fig. 96 Unplugging the electrical connection and unscrewing the union nut

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

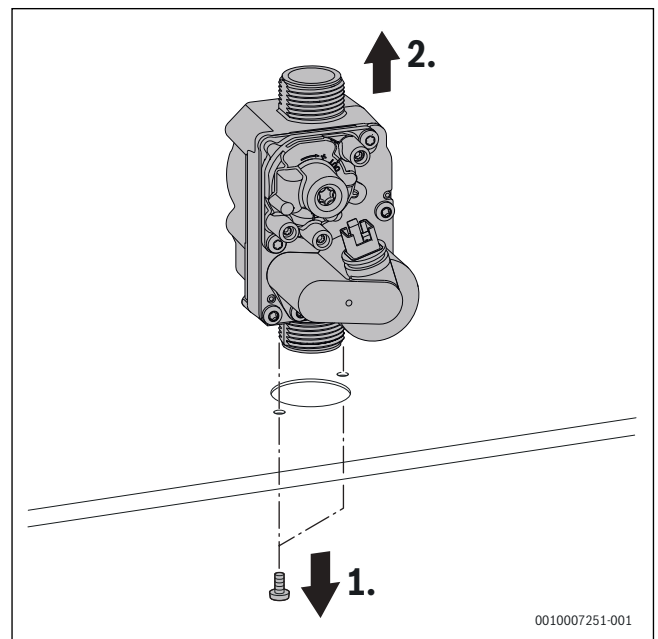


Fig. 97 Removing the gas control valve

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

### 9.4 Following inspection/maintenance

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

## 10 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?

### 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.

## 10.1 Operating and fault displays

### 10.1.1 General information

- **Fault code:** indicates the fault.
- **Fault category:** indicates the fault 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)

### 10.1.2 Fault code table

Fault code	Fault category	Fault text on the display, description	Remedy
200	O	Boiler in heating mode	–
201	O	Boiler in hot water mode	–
202	O	Boiler in anti-cycle mode	–
203	O	Boiler in standby, no heat energy demand	–
204	O	Current prim. water temp. higher than set val.	–
208	O	Chimney sweep demand	–
224	V	Safety temp. limiter has tripped	<ol style="list-style-type: none"> <li>1. Open the closed valve in the heating circuit.</li> <li>2. Top up water until the preset pressure is reached.</li> <li>3. Connect the plug correctly to the safety temperature limiter.</li> <li>4. Replace the safety temperature limiter.</li> </ol>
227	V	No flame signal after ignition	<ol style="list-style-type: none"> <li>1. Open the gas isolator.</li> <li>2. Change the gas installation.</li> <li>3. Replace the control unit/burner control unit.</li> <li>4. Replace the ignition electrode.</li> <li>5. Replace the monitoring electrode.</li> <li>6. Replace the ignition cable.</li> <li>7. Replace the ionisation cable.</li> <li>8. Replace the air/gas ratio control valve.</li> <li>9. Correct the burner setting.</li> </ol>
228	V	Flame signal without flame present	<ol style="list-style-type: none"> <li>1. Replace the air/gas ratio control valve.</li> <li>2. Replace the ionisation cable.</li> <li>3. Replace the control unit/burner control unit.</li> </ol>

Fault code	Fault category	Fault text on the display, description	Remedy
306	V	Flame signal after closing the fuel supply	<ol style="list-style-type: none"> <li>1. Replace the air/gas ratio control valve.</li> <li>2. Replace the ionisation cable.</li> <li>3. Replace the control unit/burner control unit.</li> </ol>
360	V	Incompatible code plug.	<ol style="list-style-type: none"> <li>1. Check if a correct code plug is installed.</li> <li>2. Exchange or reconnect code plug.</li> </ol>
815	W	Low loss header temp. sensor faulty	<ol style="list-style-type: none"> <li>1. Check the sensor port.</li> <li>2. Check the differential sensor for incorrect installation position or breakage.</li> </ol>
1010	O	No BUS communication. Cable for EMS-Bus is not correct connect or damaged.	<ol style="list-style-type: none"> <li>1. Connect the cable for the EMS-Bus correct or replace the damaged cable.</li> <li>2. Exchange fuse.</li> </ol>
1037	W	Outside temperature sensor defective	The control panel is receiving unrealistic values from the outside sensor. Effect: The minimum outside temperature is used.
1068	W	Outside temperature sensor defective	Outdoor temperature sensor is defective.
1073	W	Short circuit of the flow temperature sensor	<ol style="list-style-type: none"> <li>1. Replace the temperature sensor.</li> <li>2. Replace the connecting lead to the temperature sensor.</li> <li>3. Replace the control unit.</li> </ol>
1074	W	No signal from the flow temperature sensor available	<ol style="list-style-type: none"> <li>1. Connect the plug to the flow temperature sensor correctly.</li> <li>2. Replace the flow temperature sensor.</li> <li>3. Replace the connecting lead to the flow temperature sensor.</li> <li>4. Replace the control unit.</li> </ol>
1075	W	Short circuit of the temperature sensor at the heating block	<ol style="list-style-type: none"> <li>1. Replace the temperature sensor.</li> <li>2. Replace the connecting lead to the temperature sensor.</li> <li>3. Replace the control appliance.</li> </ol>
1076	W	No signal from the temperature sensor at the heating block available	<ol style="list-style-type: none"> <li>1. Replace the temperature sensor.</li> <li>2. Replace the connecting lead to the temperature sensor.</li> <li>3. Replace the control unit.</li> </ol>
2920	V	Fault in flame monitoring	Igniter on for too long after flame detected: <ol style="list-style-type: none"> <li>1. Check cabling.</li> <li>2. Check igniter.</li> <li>3. Check burner module.</li> </ol>
2924	V	No feedback from the modulating gas valve	Gas valve relay defect. <ol style="list-style-type: none"> <li>1. Press Reset button and apply burner start. Wait to see if fault reoccurs.</li> <li>2. Replace the gas valve.</li> </ol>
2925	V	Too low feedback from the modulating gas valve	Too low feedback from the modulating/current controlled gas valve.
2927	B	Flame failed during burner operation	<ol style="list-style-type: none"> <li>1. Open the main shut-off valve.</li> <li>2. Open the appliance shut-off valve.</li> <li>3. Shut down the appliance and check the gas line.</li> <li>4. Signal evaluation on printed circuit board defective.</li> <li>5. Replace the ionisation electrode.</li> <li>6. Establish protective conductor connection (PE) in the control unit.</li> <li>7. Replace the ignition cable.</li> <li>8. Replace the connecting lead to the ionisation electrode.</li> <li>9. Replace the air/gas ratio control valve.</li> <li>10. Set the burner correctly.</li> <li>11. Set the burner at minimum rated load.</li> <li>12. Check the integrity flue system.</li> <li>13. Clean the heating block on the flue gas side.</li> <li>14. Replace the control unit/burner control unit.</li> </ol>
2946	V	Incorrect code plug detected	Replace the code plug.
2948	B	No flame signal with low output	The burner starts automatically after cleaning. <ol style="list-style-type: none"> <li>1. If the fault occurs repeatedly: check the settings of the CO<sub>2</sub> values.</li> </ol>
2950	B	No flame signal following starting procedure	The burner starts automatically after cleaning. <ol style="list-style-type: none"> <li>1. Set the correct gas/air ratio correctly.</li> </ol>
2963	B	Signal from flow and heat exchanger temperature sensor outside the permissible range	Connect the connecting lead correctly.

Fault code	Fault category	Fault text on the display, description	Remedy
2964	B	Flow rate in heat exchanger too low	<ol style="list-style-type: none"> <li>1. Supply sensor is not assembled on the supply pipe.</li> <li>2. Supply sensor does not make proper contact to the supply pipe.</li> <li>3. System is not filled with water.</li> <li>4. No water flow, because CH system is closed.</li> <li>5. No water flow, because pump is not operating correctly.</li> </ol>
2965	B	Flow temperature too high	<ol style="list-style-type: none"> <li>1. System is not filled with water.</li> <li>2. No water flow, because CH system is closed.</li> <li>3. No water flow, because pump is not operating correctly.</li> </ol>
2966	B	Flow temperature rise in heat exchanger too rapid	<ol style="list-style-type: none"> <li>1. System is not filled with water.</li> <li>2. No water flow, because CH system is closed.</li> <li>3. No water flow, because pump is not operating correctly.</li> </ol>
2967	B	Flow/heat exchanger temperature sensor differential too great	<ol style="list-style-type: none"> <li>1. Supply sensor is not assembled on the supply pipe.</li> <li>2. Supply sensor does not make proper contact to the supply pipe.</li> <li>3. System is not filled with water.</li> <li>4. No water flow, because CH system is closed.</li> <li>5. No water flow, because pump is not operating correctly.</li> </ol>

Table 27 Indicators and fault displays

### 10.1.3 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 28 Faults that are not shown on the display



## 11 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 indicates that the product must not be disposed of with other waste, but be taken to the waste collection centers for treatment, collection, recycling and disposal procedure.

The symbol applies to countries with electronic waste regulations, for example the European Waste Electrical and Electronic Equipment Directive 2012/19/EU. These regulations determine the framework for the return and recycling of used electronic appliances as applicable within each country.

As electronic equipment 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 your electronic waste will help to conserve natural resources.

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

For additional information, please visit:  
[www.weee.bosch-thermotechnology.com/](http://www.weee.bosch-thermotechnology.com/)

### Batteries

Batteries must not be disposed together with your household waste. Used batteries must be disposed of in local collection systems.

## 12 Technical Specifications/Logs

### 12.1 Technical data

#### 12.1.1 Specifications Regular

##### Greenstar 8000 Life

	Unit	GR8300iW 30		GR8300iW 35	
		Natural gas	Propane <sup>1)</sup>	Natural gas	Propane <sup>1)</sup>
<b>Gas flow maximum rate – 10 minutes from lighting</b>					
Natural Gas <sup>2)</sup>	m <sup>3</sup> /h	3.2	–	3.6	–
Propane Gas (LPG)	kg/h	–	2.3	–	2.7
<b>Central Heating (CH)</b>					
Maximum rated heat input (net) (Q <sub>max</sub> )	kW	30.2	30.2	34.4	34.4
Maximum rated heat output 40/30 °C	kW	31.2	31.2	35.2	35.2
Maximum rated heat output 50/30 °C (P <sub>cond, max</sub> )	kW	31.0	31.0	35.0	35.0
Maximum rated heat output 80/60 °C (P <sub>max</sub> )	kW	29.6	29.6	33.7	33.7
Minimum rated heat input (net) (Q <sub>min</sub> )	kW	3.0	3.0	5.1	5.1
Minimum rated heat output 40/30 °C	kW	3.3	3.3	5.5	5.5
Minimum rated heat output 50/30 °C (P <sub>cond, min</sub> )	kW	3.2	3.2	5.5	5.5
Minimum rated heat output 80/60 °C (P <sub>min</sub> )	kW	2.9	2.9	5.0	5.0
Maximum flow temperature	°C	70	70	70	70
Maximum flow temperature possible	°C	82	82	82	82
Maximum permissible operating pressure (PMS)	bar	2.5	2.5	2.5	2.5
<b>Flue</b>					
Flue gas temperature 80/60 °C, max/min load	°C	67/56	67/56	72/56	72/56
Flue gas temperature 40/30 °C, max/min load	°C	49/31	49/31	52/31	52/31
CO <sub>2</sub> level at max. rated heat output (after 10 minutes)	%	9.5	10.8	9.5	10.8
CO <sub>2</sub> level at min. rated heat output (after 10 minutes)	%	8.6	10.2	8.6	10.2
NO <sub>x</sub> class	–	6	6	6	6
NO <sub>x</sub> rating (EN 15502-1)	mg/kWh	≤ 40	≤ 40	≤ 40	≤ 40
<b>Condensate</b>					
Maximum condensate rate	l/h	3.5	3.5	4.1	4.1
pH value, approx.	–	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
Frequency	Hz	50	50	50	50
Maximum power consumption (running)	W	82	82	53	53
Maximum power consumption (stand-by)	W	1	1	1	1
<b>General data</b>					
Appliance protection rating <sup>3)</sup>	IP	X4D	X4D	X4D	X4D
Permissible ambient temperature short time/long time	°C	0 – 50/40	0 – 50/40	0 – 50/40	0 – 50/40
Nominal capacity of the appliance	l	4.2	4.2	4.2	4.2
Total packaged weight	kg	54	54	54	54
Total appliance weight (excluding packaging)	kg	46	46	46	46
Lift weight (without front and side panels)	kg	40	40	40	40

1) Propane/butane mixture for fixed containers with capacity up to 15 000 l.

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

3) Protection rating may change depending on the control unit/s used on this appliance.

Table 29 GR8300iW 30/35

	Unit	GR8300iW 40		GR8300iW 45	
		Natural gas	Propane <sup>1)</sup>	Natural gas	Propane <sup>1)</sup>
<b>Gas flow maximum rate – 10 minutes from lighting</b>					
Natural Gas <sup>2)</sup>	m <sup>3</sup> /h	4.3	–	4.6	–
Propane Gas (LPG)	kg/h	–	3.2	–	3.4
<b>Central Heating (CH)</b>					
Maximum rated heat input (net) (Q <sub>max</sub> )	kW	40.8	40.8	43.5	43.5
Maximum rated heat output 40/30 °C	kW	41.4	41.4	44.9	44.9
Maximum rated heat output 50/30 °C (P <sub>cond, max</sub> )	kW	41.2	41.2	44.7	44.7
Maximum rated heat output 80/60 °C (P <sub>max</sub> )	kW	39.8	39.8	42.6	42.6
Minimum rated heat input (net) (Q <sub>min</sub> )	kW	5.1	5.1	6.3	6.3
Minimum rated heat output 40/30 °C	kW	5.5	5.5	6.8	6.8
Minimum rated heat output 50/30 °C (P <sub>cond, min</sub> )	kW	5.5	5.5	6.7	6.7
Minimum rated heat output 80/60 °C (P <sub>min</sub> )	kW	5.0	5.0	6.2	6.2
Maximum flow temperature	°C	70	70	70	70
Maximum flow temperature possible	°C	82	82	82	82
Maximum permissible operating pressure (PMS)	bar	2.5	2.5	2.5	2.5
<b>Flue</b>					
Flue gas temperature 80/60 °C, max./min load	°C	77/56	77/56	69/56	69/56
Flue gas temperature 40/30 °C, max./min load	°C	56/31	56/31	52/30	52/30
CO <sub>2</sub> level at max. rated heat output (after 10 minutes)	%	9.5	10.8	9.5	10.8
CO <sub>2</sub> level at min. rated heat output (after 10 minutes)	%	8.6	10.2	8.6	10.2
NO <sub>x</sub> class	–	6	6	6	6
NO <sub>x</sub> rating (EN 15502-1)	mg/kWh	≤ 40	≤ 40	≤ 40	≤ 40
<b>Condensate</b>					
Maximum condensate rate	l/h	4.5	4.5	4.7	4.7
pH value, approx.	–	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
Frequency	Hz	50	50	50	50
Maximum power consumption (running)	W	63	63	68	68
Maximum power consumption (stand-by)	W	1	1	1	1
<b>General data</b>					
Appliance protection rating <sup>3)</sup>	IP	X4D	X4D	X4D	X4D
Permissible ambient temperature short time/long time	°C	0 – 50/40	0 – 50/40	0 – 50/40	0 – 50/40
Nominal capacity of the appliance	l	4.2	4.2	4.2	4.2
Total packaged weight	kg	54	54	56	56
Total appliance weight (excluding packaging)	kg	46	46	48	48
Lift weight (without front and side panels)	kg	40	40	42	42

1) Propane/butane mixture for fixed containers with capacity up to 15 000 l

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

3) Protection rating may change depending on the control unit/s used on this appliance.

Table 30 GR8300iW 40/45

	Unit	GR8300iW 50	
		Natural gas	Propane <sup>1)</sup>
<b>Gas flow maximum rate – 10 minutes from lighting</b>			
Natural Gas <sup>2)</sup>	m <sup>3</sup> /h	5.1	–
Propane Gas (LPG)	kg/h	–	3.8
<b>Central Heating (CH)</b>			
Maximum rated heat input (net) (Q <sub>max</sub> )	kW	48.9	48.9
Maximum rated heat output 40/30 °C	kW	50.0	50.0
Maximum rated heat output 50/30 °C (P <sub>cond, max</sub> )	kW	49.9	49.9
Maximum rated heat output 80/60 °C (P <sub>max</sub> )	kW	47.9	47.9
Minimum rated heat input (net) (Q <sub>min</sub> )	kW	6.3	6.3
Minimum rated heat output 40/30 °C	kW	6.8	6.8
Minimum rated heat output 50/30 °C (P <sub>cond, min</sub> )	kW	6.7	6.7
Minimum rated heat output 80/60 °C (P <sub>min</sub> )	kW	6.2	6.2
Maximum flow temperature	°C	70	70
Maximum flow temperature possible	°C	82	82
Maximum permissible operating pressure (PMS)	bar	2.5	2.5
<b>Flue</b>			
Flue gas temperature 80/60 °C, max/min load	°C	73/56	73/56
Flue gas temperature 40/30 °C, max./min load	°C	55/30	55/30
CO <sub>2</sub> level at max. rated heat output (after 10 minutes)	%	9.5	10.8
CO <sub>2</sub> level at min. rated heat output (after 10 minutes)	%	8.6	10.2
NO <sub>x</sub> class	–	6	6
NO <sub>x</sub> rating (EN 15502-1)	mg/kWh	≤ 40	≤ 40
<b>Condensate</b>			
Maximum condensate rate	l/h	7.8	6.8
pH value, approx.	–	4.5 – 5.0	4.5 – 5.0
<b>Electrical</b>			
Electrical power supply voltage	a.c. V	230	230
Frequency	Hz	50	50
Maximum power consumption (running)	W	75	75
Maximum power consumption (stand-by)	W	1	1
<b>General data</b>			
Appliance protection rating <sup>3)</sup>	IP	X4D	X4D
Permissible ambient temperature short time/long time	°C	0 – 50/40	0 – 50/40
Nominal capacity of the appliance	l	4.2	4.2
Total packaged weight	kg	56	56
Total appliance weight (excluding packaging)	kg	48	48
Lift weight (without front and side panels)	kg	42	42

1) Propane/butane mixture for fixed containers with capacity up to 15 000 l

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

3) Protection rating may change depending on the control unit/s used on this appliance.

Table 31 GR8300iW 50

## 12.2 Ionisation current

Type	Gas type	When the burner is running at a minimum rated heat	
		OK	Faulty
GR8300iW 30 R	Natural gas	≥ 3 μA	< 3 μA
	LPG	≥ 3 μA	< 3 μA
GR8300iW 35 R, GR8300iW 40 R, GR8300iW 45 R GR8300iW 50 R	Natural gas	≥ 7 μA	< 7 μA
	LPG	≥ 10 μA	< 10 μA

Table 32 Ionisation current

## 12.3 Component resistance characteristics

### 12.3.1 Sensor values

Temperature [°C ± 10 %]	Resistance [Ω]
-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 33 Outside temperature sensor (for weather-compensated control units, accessory)

Temperature [°C ± 10 %]	Resistance [Ω]
0	33 404
5	25 902
10	20 247
15	15 950
20	12 657
25	10 115
30	8 138
35	6 589
40	5 367
45	4 398
50	3 624
55	3 002
60	2 500
65	2 092
70	1 759
75	1 486
80	1 260
85	1 074
90	918.3
95	788.5

Table 34 Flow temperature sensor

### 12.4 Code plug

Type	Gas type	Number
GR8300iW 30 R NG	Natural gas	20031
GR8300iW 35 R NG	Natural gas	20032
GR8300iW 40 R NG	Natural gas	20033
GR8300iW 45 R NG	Natural gas	20034
GR8300iW 50 R NG	Natural gas	20035
GR8300iW 30 R LPG	Liquid Petroleum gas	20043
GR8300iW 35 R LPG	Liquid Petroleum gas	20044
GR8300iW 40 R LPG	Liquid Petroleum gas	20045
GR8300iW 45 R LPG	Liquid Petroleum gas	20046
GR8300iW 50 R LPG	Liquid Petroleum gas	20047

Table 35 Coding plug

## 12.5 Setting values for central heating output

Gross calorific value Net calorific value Performance [kW]	$H_{S(0^{\circ}\text{C})}$ [kWh/m <sup>3</sup> ]	Display [%]	G20 (20 mbar) 11.2
	$H_{i(15^{\circ}\text{C})}$ [kWh/m <sup>3</sup> ]		9.5
	Load [kW]		Gas volume [l/min at $T_V/T_R$ = 80/60 °C]
<b>4.9</b>	5.1	17	9
<b>6.0</b>	6.3	21	11
<b>7.0</b>	7.3	24	13
<b>8.0</b>	8.4	28	15
<b>9.0</b>	9.5	31	17
<b>10.0</b>	10.6	35	19
<b>11.0</b>	11.7	39	21
<b>12.0</b>	12.8	42	22
<b>13.0</b>	13.9	46	24
<b>14.0</b>	15.0	50	26
<b>15.0</b>	16.2	54	28
<b>16.0</b>	17.3	57	30
<b>17.0</b>	18.5	61	32
<b>18.0</b>	19.6	65	34
<b>19.0</b>	20.8	69	36
<b>20.0</b>	21.9	73	38
<b>21.0</b>	23.1	77	41
<b>22.0</b>	24.3	80	43
<b>23.0</b>	25.5	84	45
<b>24.0</b>	26.7	88	47
<b>25.0</b>	27.9	92	49
<b>26.0</b>	29.1	96	51
<b>26.9</b>	30.2	100	53

Table 36 GR8300iW 30 R

Gross calorific value Net calorific value Performance [kW]	$H_{S(0^{\circ}\text{C})}$ [kWh/m <sup>3</sup> ]	Display [%]	G20 (20 mbar) 11.2
	$H_{i(15^{\circ}\text{C})}$ [kWh/m <sup>3</sup> ]		9.5
	Load [kW]		Gas volume [l/min at $T_V/T_R$ = 80/60 °C]
<b>6.1</b>	6.3	18	11
<b>7.0</b>	7.2	21	13
<b>8.0</b>	8.3	24	15
<b>9.0</b>	9.3	27	16
<b>10.0</b>	10.3	30	18
<b>11.0</b>	11.3	33	20
<b>12.0</b>	12.4	36	22
<b>13.0</b>	13.4	39	23
<b>14.0</b>	14.4	42	25
<b>15.0</b>	15.4	45	27
<b>16.0</b>	16.5	48	29

Gross calorific value	H <sub>S</sub> (0 °C) [kWh/m <sup>3</sup> ]		G20 (20 mbar)
	H <sub>i</sub> (15 °C) [kWh/m <sup>3</sup> ]		11.2
Net calorific value			9.5
Performance [kW]	Load [kW]	Display [%]	Gas volume [l/min at T <sub>V</sub> /T <sub>R</sub> = 80/60 °C]
	17.0	17.5	51
18.0	18.5	54	32
19.0	19.5	57	34
20.0	20.5	60	36
21.0	21.6	63	38
22.0	22.6	66	40
23.0	23.6	69	41
24.0	24.6	72	43
25.0	25.6	74	45
26.0	26.6	77	47
27.0	27.6	80	49
28.0	28.7	83	50
29.0	29.7	86	52
30.0	30.7	89	54
31.0	31.7	92	56
32.0	32.7	95	57
33.0	33.7	98	59
33.7	34.4	100	60

Table 37 GR8300iW 35 R

Gross calorific value	H <sub>S</sub> (0 °C) [kWh/m <sup>3</sup> ]		G20 (20 mbar)
	H <sub>i</sub> (15 °C) [kWh/m <sup>3</sup> ]		11.2
Net calorific value			9.5
Performance [kW]	Load [kW]	Display [%]	Gas volume [l/min at T <sub>V</sub> /T <sub>R</sub> = 80/60 °C]
	23.0	23.7	58
24.0	24.7	61	43
25.0	25.7	63	45
26.0	26.7	66	47
27.0	27.7	68	49
28.0	28.8	70	50
29.0	29.8	73	52
30.0	30.8	75	54
31.0	31.8	78	56
32.0	32.8	80	58
33.0	33.8	83	59
34.0	34.8	85	61
35.0	35.8	88	63
36.0	36.8	90	65
37.0	37.8	93	66
38.0	38.8	95	68
39.0	39.8	98	70
40.0	40.8	100	72

Table 38 GR8300iW 40 R

Gross calorific value	H <sub>S</sub> (0 °C) [kWh/m <sup>3</sup> ]		G20 (20 mbar)
	H <sub>i</sub> (15 °C) [kWh/m <sup>3</sup> ]		11.2
Net calorific value			9.5
Performance [kW]	Load [kW]	Display [%]	Gas volume [l/min at T <sub>V</sub> /T <sub>R</sub> = 80/60 °C]
	4.9	5.1	13
6.0	6.2	15	11
7.0	7.3	18	13
8.0	8.3	20	15
9.0	9.3	23	16
10.0	10.4	25	18
11.0	11.4	28	20
12.0	12.4	30	22
13.0	13.5	33	24
14.0	14.5	36	25
15.0	15.5	38	27
16.0	16.5	41	29
17.0	17.6	43	31
18.0	18.6	46	33
19.0	19.6	48	34
20.0	20.6	51	36
21.0	21.7	53	38
22.0	22.7	56	40

Gross calorific value	H <sub>S</sub> (0 °C) [kWh/m <sup>3</sup> ]		G20 (20 mbar)
	H <sub>i</sub> (15 °C) [kWh/m <sup>3</sup> ]		11.2
Net calorific value			9.5
Performance [kW]	Load [kW]	Display [%]	Gas volume [l/min at T <sub>V</sub> /T <sub>R</sub> = 80/60 °C]
	6.2	6.3	14
7.0	7.1	16	12
8.0	8.1	19	14
9.0	9.1	21	16
10.0	10.2	23	18
11.0	11.2	26	20
12.0	12.2	28	21
13.0	13.2	30	23
14.0	14.2	33	25
15.0	15.3	35	27
16.0	16.3	37	29
17.0	17.3	40	30
18.0	18.3	42	32
19.0	19.3	44	34
20.0	20.4	47	36
21.0	21.4	49	38
22.0	22.4	52	39
23.0	23.4	54	41

Gross calorific value Net calorific value Performance [kW]	$H_{S(0\text{ }^{\circ}\text{C})}$ [kWh/m <sup>3</sup> ]	Display [%]	G20 (20 mbar) 11.2
	$H_{i(15\text{ }^{\circ}\text{C})}$ [kWh/m <sup>3</sup> ]		9.5
	Load [kW]		Gas volume [l/min at $T_V/T_R$ = 80/60 °C]
24.0	24.4	56	43
25.0	25.5	59	45
26.0	26.5	61	46
27.0	27.5	63	48
28.0	28.5	66	50
29.0	29.6	68	52
30.0	30.6	70	54
31.0	31.6	73	55
32.0	32.6	75	57
33.0	33.7	77	59
34.0	34.7	80	61
35.0	35.7	82	63
36.0	36.7	84	64
37.0	37.8	87	66
38.0	38.8	89	68
39.0	39.8	92	70
40.0	40.8	94	72
41.0	41.9	96	73
42.0	42.9	99	75
42.6	43.5	100	76

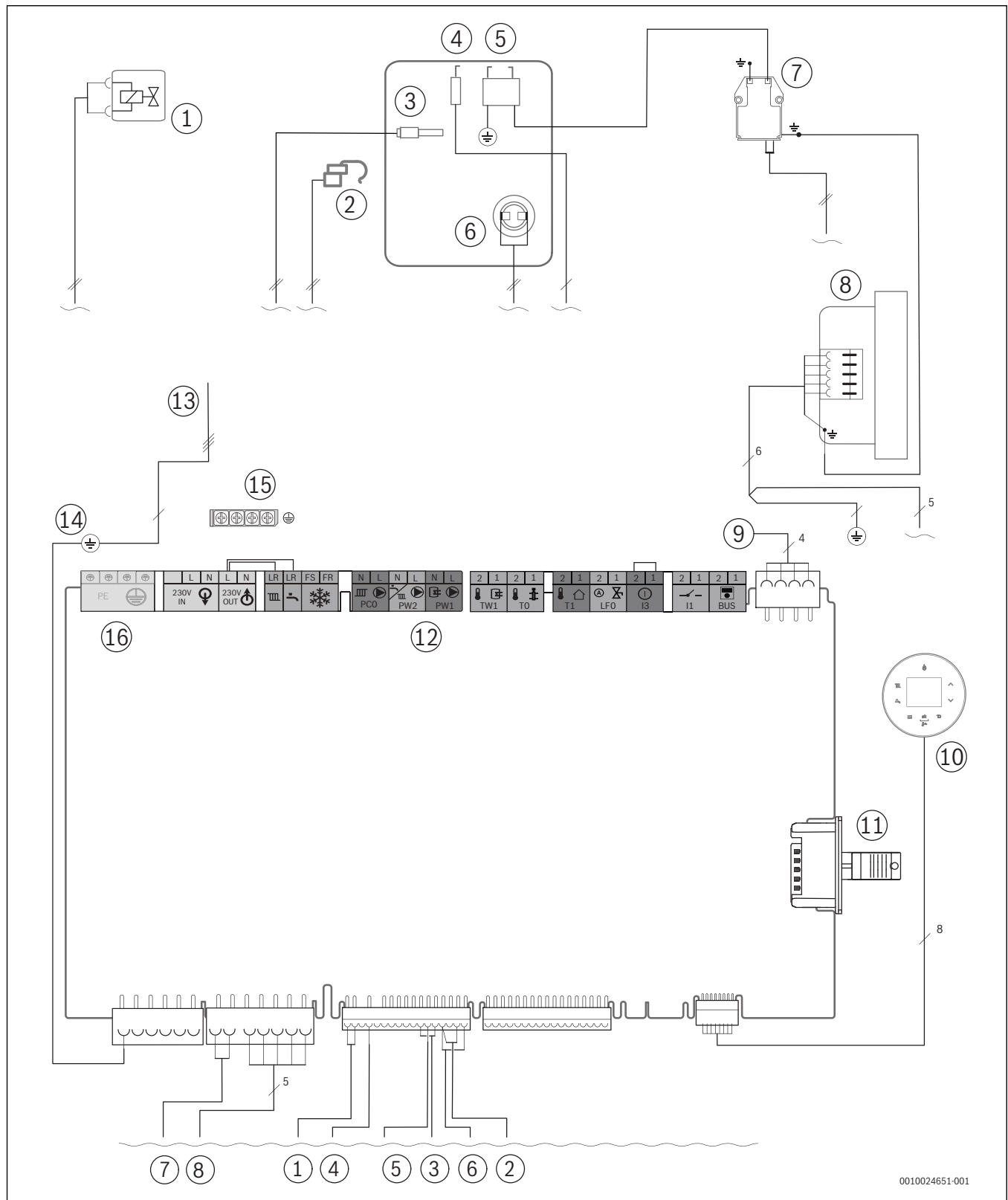
Table 39 GR8300iW 45 R

Gross calorific value Net calorific value Performance [kW]	$H_{S(0\text{ }^{\circ}\text{C})}$ [kWh/m <sup>3</sup> ]	Display [%]	G20 (20 mbar) 11.2
	$H_{i(15\text{ }^{\circ}\text{C})}$ [kWh/m <sup>3</sup> ]		9.5
	Load [kW]		Gas volume [l/min at $T_V/T_R$ = 80/60 °C]
6.1	6.3	13	11
7.0	7.2	15	13
8.0	8.3	17	14
9.0	9.3	19	16
10.0	10.3	21	18
11.0	11.3	23	20
12.0	12.4	25	22
13.0	13.4	27	24
14.0	14.4	30	25
15.0	15.5	32	27
16.0	16.5	34	29
17.0	17.5	36	31
18.0	18.5	38	33
19.0	19.6	40	34
20.0	20.6	42	36
21.0	21.6	44	38

Gross calorific value Net calorific value Performance [kW]	$H_{S(0\text{ }^{\circ}\text{C})}$ [kWh/m <sup>3</sup> ]	Display [%]	G20 (20 mbar) 11.2
	$H_{i(15\text{ }^{\circ}\text{C})}$ [kWh/m <sup>3</sup> ]		9.5
	Load [kW]		Gas volume [l/min at $T_V/T_R$ = 80/60 °C]
22.0	22.6	46	40
23.0	23.6	48	41
24.0	24.7	50	43
25.0	25.7	53	45
26.0	26.7	55	47
27.0	27.7	57	49
28.0	28.7	59	50
29.0	29.8	61	52
30.0	30.8	63	54
31.0	31.8	65	56
32.0	32.8	67	58
33.0	33.8	69	59
34.0	34.8	71	61
35.0	35.9	73	63
36.0	36.9	75	65
37.0	37.9	77	66
38.0	38.9	80	68
39.0	39.9	82	70
40.0	40.9	84	72
41.0	41.9	86	74
42.0	42.9	88	75
43.0	44.0	90	77
44.0	45.0	92	79
45.0	46.0	94	81
46.0	47.0	96	82
47.0	48.0	98	84
47.9	48.9	100	86

Table 40 GR8300iW 50 R

### 12.6 Electrical wiring



0010024651-001

Fig. 98 Electrical wiring

- |  |  |
|--|--|
| [1] Air/gas ratio control valve              | [10] Display   |
| [2] Flow temperature sensor at flow pipe     | [11] Code plug   |
| [3] Flow temperature sensor at heating block | [12] Terminal strip for external accessories (→ terminal assignment Tab. 13) |
| [4] Flame sensing electrode                  | [13] Connecting lead   |
| [5] Ignition electrode                       | [14] Earth (PE)  |
| [6] Heating block temperature limiter        | [15] Earth bar   |
| [7] Ignition transformer                     | [16] Not used  |
| [8] Fan                                      |  |
| [9] Connecting lead for KEY slot             |  |



## 12.7 Gas boiler system commissioning checklist

**This Commissioning checklist is to be completed in full by the competent person who commissioned the appliance as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.**

Failure to install and commission according to the manufacturer's instructions and complete this Benchmark Commissioning Checklist will invalidate the warranty. This does not affect the customer's statutory rights.

Customer name:	Telephone number:
Address:	
Boiler make and model	
Boiler serial number:	
Commissioned by (PRINT NAME):	Gas Safe register number:
Company name:	Telephone number:
Company address:	
Commissioning date:	
<b>To be completed by the customer on receipt of a Building Regulations Compliance Certificate*</b>	
Building Regulations Notification Number (if applicable):	

Controls: Tick the appropriate boxes		
Time and temperature control to heating	Room thermostat and programmer/timer <input type="checkbox"/>	Programmable room thermostat <input type="checkbox"/>
	Load/Weather compensation <input type="checkbox"/>	Optimum start control <input type="checkbox"/>
Time and temperature control hot water	Cylinder thermostat and programmer/timer <input type="checkbox"/>	Combination boiler <input type="checkbox"/>
Heating zone valves	Fitted <input type="checkbox"/>	Not required <input type="checkbox"/>
Hot water zone valves	Fitted <input type="checkbox"/>	Not required <input type="checkbox"/>
Thermostatic radiator valves	Fitted <input type="checkbox"/>	Not required <input type="checkbox"/>
Automatic by-pass valve fitted to system	Fitted <input type="checkbox"/>	Not required <input type="checkbox"/>
Boiler interlock		Provided <input type="checkbox"/>

All Systems		
The system has been flushed and cleaned in accordance with BS7593 and boiler manufacturer's instructions		Yes <input type="checkbox"/>
What system cleaner was used?		
What inhibitor was used?	Quantity	litres
Has a primary water system filter been installed?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
The condensate drain has been installed in accordance with the manufacturer's instructions and/or BS5546/BS6798		Yes <input type="checkbox"/>

CENTRAL HEATING MODE measure and record			
Gas rate	m <sup>3</sup> /hr	<b>OR</b>	ft <sup>3</sup> /hr
Burner operating pressure (if applicable)	mbar	<b>OR</b> Gas inlet pressure	mbar
Central heating temperatures	Flow temperature	Return temperature	°C

COMBINATION BOILERS ONLY		
Is the installation in a hard water area (above 200ppm)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
If yes, and if required by the manufacturer, has a water scale reducer been fitted?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
What type of scale reducer has been fitted?		

HOT WATER MODE measure and record			
Gas rate	m <sup>3</sup> /hr	<b>OR</b>	ft <sup>3</sup> /hr
Burner operating pressure (if applicable)	mbar	<b>OR</b> Gas inlet pressure	mbar
Cold water inlet temperature °C			
Hot water has been checked at all outlets	Yes <input type="checkbox"/>	Temperature	°C
Water flow rate			l/min

All INSTALLATIONS - Record the following:					
Flue integrity check:	Pass <input type="checkbox"/>	At max. rate:	CO	ppm	<b>AND</b> CO/CO <sub>2</sub> Ratio
	Fail <input type="checkbox"/>	At max. rate: (where possible)	CO	ppm	<b>AND</b> CO/CO <sub>2</sub> Ratio
The heating and hot water system complies with the appropriate Building Regulations					Yes <input type="checkbox"/>
The boiler and associated products have been installed and commissioned in accordance with the manufacturer's instructions					Yes <input type="checkbox"/>
The operation of the boiler and system controls have been demonstrated to and understood by the customer					Yes <input type="checkbox"/>
The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer					Yes <input type="checkbox"/>

Commissioning Engineer's Signature
Customer's Signature
(To confirm satisfactory demonstration and receipt of manufacturer's 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.  
[www.centralheating.co.uk](http://www.centralheating.co.uk)



**12.8 Inspection and maintenance checklist**

<b>Inspection and maintenance checklist</b>		<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>	<b>Year 8</b>	<b>Year 9</b>	<b>Year 10</b>	<b>Year 11</b>	<b>Year 12</b>	<b>Year 13</b>	<b>Year 14</b>	<b>Year 15</b>
	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:- Check compliance of appliance, system and components	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"/>
3	Internal visual inspection Check for signs of leaking, corrosion and distress	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	Appliance performance checks:															
4.1	Check Fan pressure test was cleaning required?	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"/>
		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	Fine 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	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"/>
	Gas Safe Engineers Signature															

Table 41 Inspection and maintenance checklist

## 12.9 Service record

**It is recommended that your heating system is serviced annually and that the Service record is completed.**

### Service Provider

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

Always use the manufacturer's recommended spare parts.

<b>SERVICE 01</b>	Date:
Engineer name:	
Company name:	
Telephone No:	
Gas safe register No:	
Record	At max. rate      CO      ppm <b>AND</b> CO <sub>2</sub> %
	At min. rate (Where possible) CO      ppm <b>AND</b> CO <sub>2</sub> %
Comments:	
Signature	

<b>SERVICE 02</b>	Date:
Engineer name:	
Company name:	
Telephone No:	
Gas safe register No:	
Record	At max. rate      CO      ppm <b>AND</b> CO <sub>2</sub> %
	At min. rate (Where possible) CO      ppm <b>AND</b> CO <sub>2</sub> %
Comments:	
Signature	

<b>SERVICE 03</b>	Date:
Engineer name:	
Company name:	
Telephone No:	
Gas safe register No:	
Record	At max. rate      CO      ppm <b>AND</b> CO <sub>2</sub> %
	At min. rate (Where possible) CO      ppm <b>AND</b> CO <sub>2</sub> %
Comments:	
Signature	

<b>SERVICE 04</b>	Date:
Engineer name:	
Company name:	
Telephone No:	
Gas safe register No:	
Record	At max. rate      CO      ppm <b>AND</b> CO <sub>2</sub> %
	At min. rate (Where possible) CO      ppm <b>AND</b> CO <sub>2</sub> %
Comments:	
Signature	

<b>SERVICE 05</b>	Date:
Engineer name:	
Company name:	
Telephone No:	
Gas safe register No:	
Record	At max. rate      CO      ppm <b>AND</b> CO <sub>2</sub> %
	At min. rate (Where possible) CO      ppm <b>AND</b> CO <sub>2</sub> %
Comments:	
Signature	

<b>SERVICE 06</b>	Date:
Engineer name:	
Company name:	
Telephone No:	
Gas safe register No:	
Record	At max. rate      CO      ppm <b>AND</b> CO <sub>2</sub> %
	At min. rate (Where possible) CO      ppm <b>AND</b> CO <sub>2</sub> %
Comments:	
Signature	

<b>SERVICE 07</b>	Date:
Engineer name:	
Company name:	
Telephone No:	
Gas safe register No:	
Record	At max. rate      CO      ppm <b>AND</b> CO <sub>2</sub> %
	At min. rate (Where possible) CO      ppm <b>AND</b> CO <sub>2</sub> %
Comments:	
Signature	

<b>SERVICE 08</b>	Date:
Engineer name:	
Company name:	
Telephone No:	
Gas safe register No:	
Record	At max. rate      CO      ppm <b>AND</b> CO <sub>2</sub> %
	At min. rate (Where possible) CO      ppm <b>AND</b> CO <sub>2</sub> %
Comments:	
Signature	

<b>SERVICE 09</b>	Date:
Engineer name:	
Company name:	
Telephone No:	
Gas safe register No:	
Record	At max. rate      CO      ppm <b>AND</b> CO <sub>2</sub> %
	At min. rate (Where possible) CO      ppm <b>AND</b> CO <sub>2</sub> %
Comments:	
Signature	

<b>SERVICE 10</b>	Date:
Engineer name:	
Company name:	
Telephone No:	
Gas safe register No:	
Record	At max. rate      CO      ppm <b>AND</b> CO <sub>2</sub> %
	At min. rate (Where possible) CO      ppm <b>AND</b> CO <sub>2</sub> %
Comments:	
Signature	

\* 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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TECHNICAL SUPPORT: 0330 123 3366  
RENEWABLE SUPPORT: 0330 123 9229  
CONTROLS AND CONNECTIVITY TEAM: 0330 123 3641  
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